FLORA OF TROPICAL AFRICA.

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FLORA

OF

TROPICAL AFRICA.

EDITED BY

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VOL. VI.—SECTION 1.

NYCTAGINEÆ TO EUPHORBIACEÆ.

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PREFACE.

THIS is the last section of the "Flora of Tropical Africa" which will be issued under my editorship. The control and supervision necessary in an undertaking of the kind cannot be properly exercised except the headquarters of its preparation. Some degree of uniformity must at least be aimed at in the work of different contributors. Questions will consequently arise on which the editor must give a decision: difficulties which are readily solved by personal discussion are not disposed of so easily by correspondence.

The preparation of this section has been protracted. When I retired from the Directorship of Kew in 1905 much of the material available had been worked up by my indefatigable contributor, Mr. J. G. Baker, F.R.S. The continuous access of fresh collections had in the meantime largely added to it. In fact the general position with regard to the Flora resembles the "Curve of Pursuit," in which the pursuer has to change his direction constantly in the attempt to overtake his elusive quarry. In the case of the smaller orders Mr. Baker's advanced years made it necessary to entrust the necessary additions to other hands. The *Euphorbiaceæ* were not so easily disposed of. This vast family will probably prove to supply the dominant constituent of tropical forests. In view of the large access of fresh material and of what had been worked out by Continental botanists it was necessary to recast entirely what had been prepared. This task was generously undertaken by my successor Lt.-Col. Sir David Prain, F.R.S., and though my name stands on the title-page of the volume, its accomplishment and the merit which attaches to it must for the most part be attributed to his indefatigable energy and critical insight. Mr. J. Hutchinson collaborated with him, and Mr. N. E. Brown, A.L.S., who finds a peculiar fascination in the study of succulent plants, the difficulties of which most botanists find deterrent, undertook the genus *Euphorbia*.

The present section thus disposes of all that was in view when I retired from Kew. The "Flora of Tropical Africa" differs from other

works in the series of which it is a part in having an official and not a personal character. In the preface to the seventh volume I have given an account of the circumstances of its initiation and of those under which at the instance of the Government its preparation was resumed.

In view of what I have said, I can have no doubt that I am adopting the course which is most expedient in the interest of the work in resigning the task of its completion to the present Director of Kew.

It has been the practice in the more recent works that have been prepared at Kew to conform to the classification and sequence of orders adopted in Bentham and Hooker's "Genera Plantarum." This was accordingly done by Professor Oliver, F.R.S., in the first and second volumes. In the third he appears to have preferred the continuous numbering of the cohorts given by Sir Joseph Hooker in his translation of "A General System of Botany" by Le Maout and Decaisne. Bentham and Hooker, however, in the "Genera Plantarum" commence a new numbering of the cohorts for *Gamopetalæ*. This I have followed in Vol. IV. The numerical sequence does not therefore follow on from that of Professor Oliver, but as the actual sequence adopted by him is that of the "Genera Plantarum" anyone who cares to do so can readily correct Professor Oliver's numbers. Unfortunately, in Vol. V. a further correction is necessary. By one of those clerical oversights which can only be accounted for by the frailty of human nature, the numbering of the cohorts does not conform to either work. PERSONALES should be ix. instead of xxiv. and LAMIALES x. instead of xxv.

Although the Old World has always had before it the problem of unknown Africa, it is singular how tardy has been its exploration compared with that of the New. Yet it has been for no lack of curiosity. In the fourth century B.C., and possibly earlier, the Greeks had a proverb preserved by Aristotle, *ἀεὶ φέρει τι Λιβύη καινόν*. At the commencement of our era Pliny, if with a whimsical explanation, recalls the "vulgare Græciæ dictum semper aliquid novi Africam adferre." In our twentieth century the novelty descends on the bewildered botanist in a continuous flood, and more than one generation will come and go without seeing it exhausted.

A quarter of a century separates the three volumes of the "Flora of Tropical Africa" issued by Professor Oliver from the fourth edited by myself. Nothing more was claimed for the former than that they were a "repertory" of what was known of the vegetation of the time, imperfect as that knowledge was. Dr. Stapf in a memorandum in the "Kew Bulletin" for 1906 (pp. 239, 240) has brought out in a

striking way the immense progress it has made in the interval. "For every three species then known, five species have since been added." There is therefore already room for a supplement to the first three volumes of more than equal bulk. It would not be becoming for me to lay the burden on Kew. But it may be hoped that if, as may be confidently expected, it is able to complete the "Flora of Tropical Africa" on the lines already laid down, substantial encouragement will not be wanting from H.M. Government to enable the Kew staff to add further to our knowledge of the vegetable resources of a portion of the earth's surface in which as a nation we have so large a stake.

For the amended definition of the regions into which the area of the Flora is divided, reference may be made to the preface to the seventh volume.

The further collections made use of in the present volume and not previously acknowledged are as follows:

I. Upper Guinea.—Aug. Chevalier, French Guinea; C. E. Lane-Poole and C. W. Smythe, Sierra Leone; Aug. Chevalier, Ivory Coast; J. Anderson, R. W. Brent, T. F. Chipp, A. E. Evans, A. C. Miles, and H. N. Thompson, Gold Coast; R. E. Dennett, H. Dodd, G. C. Dudgeon, J. H. J. Farquhar, Dr. Lamborn, J. C. Leslie, T. D. Maitland, Mr. and Mrs. P. A. Talbot, N. W. Thomas, A. H. Unwin, and J. L. Williams, Southern Nigeria; Dr. J. M. Dalziel, Col. E. J. Lugard, Dr. A. C. Parsons, B. E. B. Shaw, and C. C. Yates, Northern Nigeria.

II. North Central.—Aug. Chevalier, Chari Region, Darbanda, French Congo, &c.

III. Nile Land.—Dr. R. E. Drake-Brockman and R. J. Stordy, Southern Abyssinia; A. F. Broun, Sudan; M. S. Evans. R. Fyffe, and C. B. Ussher, Uganda; E. Battiscombe, M. S. Evans, E. E. Galpin, D. E. Hutchins, H. Powell, and W. S. Routledge, British East Africa.

IV. Lower Guinea.—J. Gossweiler and Dr. F. G. Wellman, Angola; E. E. Galpin, German South-West Africa.

V. South Central.—Rev. F. A. Rogers and F. Thonner, Belgian Congo.

VI. Mozambique Distr.—J. T. Last, Zanzibar; M. T. Dawe, W. H. Johnson, and J. Stocks, Portuguese East Africa; J. M. Purves, Nyasaland; Mrs. O. Colville, E. E. Galpin, Miss L. S. Gibbs, Rev. Dr. F. C. Kolbe, H. G. Mundy, and Rev. F. A. Rogers, Rhodesia.

The most cordial acknowledgments are due to Professor I. B. Balfour, Monsieur G. Beauverd, Professor A. Borzi, Dr. J. Briquet, Monsieur

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I must add my final acknowledgments of the aid given me by Assistants in the Herbarium of the Royal Botanic Gardens; to Mr. C. H. Wright, A.L.S., in preparing the manuscript for the press and in checking the proofs; and to Mr. N. E. Brown, A.L.S., for working out the geographical distribution.

For the detailed topography the third edition of the "Spezial-Karte von Africa" (Gotha: Justus Perthes, 1893) has been chiefly used.

W. T. T.-D.

WITCOMBE; *February* 17, 1913.

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CONSPECTUS OF THE ORDERS CONTAINED IN THE SIXTH VOLUME.—SECTION 1.

CLASS I.—DICOTYLEDONES.

SUBCLASS III.—MONOCHLAMYDEÆ.

Series I.—Curvembryeæ. *Seed with usually floury albumen; embryo curved, lateral or peripheral, more rarely nearly straight, subcentral. Ovule usually solitary and erect, rarely several. Flowers hermaphrodite, rarely unisexual or polygamous. Petals usually absent. Stamens as many as the perianth-segments or fewer, rarely more. Leaves usually entire.*

CIV. NYCTAGINEÆ. Base of the perianth persistent, enclosing and often adhering to the fruit. Stamens hypogynous. Carpel solitary; style simple. Seed with inferior radicle. Herbs, shrubs or trees.

CV. ILLECEBRACEÆ. Perianth persistent, herbaceous or with scarious margins. Stamens perigynous. Ovary 1-celled; style-arms 2–3 or styles 2–3. Herbs, rarely small shrubs. Leaves usually opposite; stipules scarious.

CVI. AMARANTACEÆ. Perianth dry, not herbaceous, subtended by a bract and 2 bracteoles. Stamens hypogynous or perigynous; filaments united at the base and often with alternating teeth. Ovary 1-celled; style simple or 2–3-fid. Fruit a membranous utricle (rarely a berry), breaking irregularly or circumscissile. Herbs or undershrubs. Leaves opposite or alternate, exstipulate.

CVII. CHENOPODIACEÆ. Perianth membranous or herbaceous. Stamens hypogynous or perigynous; filaments usually free. Ovary 1-celled, 1-ovuled; style simple or 2–3-lobed, or styles 2–5, distinct. Utricle included in the persistent perianth, indehiscent, sometimes subbaccate. Herbs or shrubs. Leaves alternate, exstipulate.

CVIII. PHYTOLACCACEÆ. Perianth herbaceous or coriaceous, rarely membranous, persistent or deciduous. Stamens hypogynous; filaments sometimes connate at the

base. Carpels solitary, or many, free or connate; styles as many as the carpels, free. Shrubs or herbs, rarely trees. Leaves alternate; stipules none or small.

CIX. POLYGONACEÆ. Perianth herbaceous or membranous, sometimes coloured 4–6-merous, rarely adherent to the base of the ovary. Stamens perigynous, usually 6–9 (in *Symmeria* 20–30); filaments free or connate at the base. Ovary 1-celled, 1-ovuled; styles or style-arms 2–3. Seeds with superior radicle. Herbs or shrubs. Leaves alternate, dilated at the base into a membranous sheath; stipules usually ochreate.

Series II.—Multiovulatæ Aquaticæ. *Submerged herbs. Ovary syncarpous,* 1–3*-celled, superior; ovules numerous in each cell or on each placenta.*

CX. PODOSTEMACEÆ. Herbs of various habit, often resembling mosses, foliaceous or frondose hepaticæ and algæ. Perianth minute or absent. Stamens 1 to many. Ovary with 2–3 cells or placentas. Seeds exalbuminous.

Series III.—Multiovulatæ Terrestres. *Terrestrial herbs or shrubs. Ovary syncarpous, inferior; ovules numerous in each cell or on each placenta.*

CXI. CYTINACEÆ. Fleshy root- or branch-parasites, leafless or with the leaves reduced to scales. Seed albuminous; embryo small.

CXII. ARISTOLOCHIACEÆ. Erect or climbing leafy herbs or shrubs. Seed with fleshy albumen; embryo small.

Series IV.—Micrembryeæ. *Ovary syncarpous, monocarpous or apocarpous; ovules solitary (rarely 2 or few) in each carpel. Seed with copious fleshy or floury albumen; embryo minute or small.*

CXIII. PIPERACEÆ. Stamens 2–6, free. Ovary syncarpous, 1-celled and 1-ovuled in the Tropical African genera. Herbs or shrubs, erect or climbing. Leaves alternate, rarely opposite or verticillate. Flowers minute, spicate.

CXIV. MYRISTICACEÆ. Stamens 2–30, monadelphous. Carpel solitary; ovule 1, subbasal. Radicle inferior. Trees. Leaves alternate, often with pellucid dots. Flowers small, variously arranged.

CXV. MONIMIACEÆ. Stamens numerous; anthers frequently subsessile. Carpels many, distinct, or in *Xymalos* and *Plagiostyles* solitary; ovule erect or pendulous. Radicle inferior or superior. Trees or shrubs. Leaves opposite or alternate. Flowers in axillary fascicles, cymes or racemes.

Series V.—Daphnales. *Carpel solitary, very rarely several united; ovules solitary or 2 collateral, very rarely in superposed pairs. Perianth usually calycine, sometimes coloured; lobes* 1–2*-seriate. Stamens as many or twice as many as the perianth-lobes, or in Hernandiaceæ fewer. Trees or shrubs, rarely herbs.*

CXVI. LAURINEÆ. Perianth-lobes 6 or 8, 2-seriate, imbricate. Stamens typically in 4 whorls, one whorl often reduced to staminodes; anthers dehiscing by valves from below upwards. Ovary superior, 1-celled, sometimes enclosed in the receptacle; ovule solitary, pendulous. Radicle superior. Trees or shrubs, very rarely (*Cassytha*) twining parasitic herbs. Leaves alternate, in *Cassytha* reduced to small scales.

CXVIA. HERNANDIACEÆ. Perianth-lobes 4–10, 2-seriate, valvate or imbricate. Stamens 3–7; anthers dehiscing by valves; staminodes usually present. Ovary inferior, 1-celled; ovule solitary, pendulous. Radicle superior. Trees or shrubs, sometimes climbing. Leaves alternate.

CXVII. PROTEACEÆ. Perianth-lobes 4, 1-seriate, valvate. Stamens as many as the perianth-lobes and opposite them; anthers dehiscing longitudinally. Ovary superior, 1-celled; ovule solitary and laterally attached in the Tropical African genera. Radicle lateral. Shrubs or trees, rarely perennial herbs. Leaves alternate, rarely opposite or verticillate.

CXVIII. THYMELÆACEÆ. Perianth-lobes 4–5, 2-seriate, imbricate. Stamens perigynous, as many or twice as many as the perianth-lobes; anthers dehiscing longitudinally. Ovary superior, 1–4-celled; ovule solitary in each cell, pendulous. Radicle superior. Trees or shrubs, rarely slender annual herbs, with tough fibrous bark, often heath-like. Leaves opposite or alternate.

Series VI.—Achlamydosporeæ. *Ovary usually inferior, 1-celled; ovules 1–3, usually not evident before flowering. Seeds without a testa, sometimes adhering to the pericarp. Perianth sometimes coloured.*

CXIX. LORANTHACEÆ. Green shrubs, more rarely herbs, parasitic. Ovule solitary, erect.

CXX. SANTALACEÆ. Herbs, shrubs or trees, often parasitic. Ovules 2–4, pendulous from a free-central placenta.

CXXI. BALANOPHOREÆ. Fleshy herbs parasitic on roots, without chlorophyll but usually brightly coloured. Leaves reduced to scales.

Series VII.—Unisexuales. *Flowers unisexual. Ovary syncarpous or monocarpous; styles as many as the carpels, often bipartite; ovules solitary or 2 collateral. Seed albuminous or exalbuminous. Herbs, shrubs or trees. Perianth calycine, small or none; petals present in some Euphorbiaceæ.*

CXXII. EUPHORBIACEÆ. Inflorescence, perianth and stamens very variable. Ovary 2–3- (rarely many-) celled, rarely of 1 carpel. Fruit usually breaking into 2-valved cocci (winged in *Hymenocardia*), sometimes drupaceous or nut-like. Albumen usually copious and fleshy, sometimes thin or none; radicle superior. Herbs shrubs or trees, often with milky juice, sometimes cactus-like.

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Order CIV. **NYCTAGINEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers hermaphrodite, rarely unisexual, regular. Perianth inferior, small, herbaceous or petaloid, persistent and usually accrescent; tube from short to very long, sometimes circumscissile above the base; limb truncate or 3–5-toothed or -lobed. Stamens 1–∞, hypogynous; filaments free or connate into a cup at the base, involute-circinnate in bud; anthers dorsifixed, 2-celled, dehiscence longitudinal. Ovary sessile or stalked, 1-celled; style short or long, slender; stigma small, capitellate, peltate or fimbriate; ovule solitary, erect, campylotropous, on a short funicle. Fruit (*anthocarp*) enclosed in the persistent base of the perianth, costate, sulcate or winged, sometimes glandular. Seed erect; endosperm scanty or copious; embryo straight or curved.—Herbs, rarely shrubs or trees. Leaves opposite and alternate, sessile or stalked, simple, entire, exstipulate. Flowers in terminal or axillary cymes, panicles or corymbs; bracts often forming a brightly coloured involucre.

Species about 150, chiefly American, from the United States to Chili; a few in India, the Mascarene and Pacific Isles.

Bougainvillea spectabilis, Willd., is naturalised at Banana, on the Lower Congo, according to Durand and Schinz, *Études Fl. Congo*, i. 231.

Bracts large, connate	1. Mirabilis.
Bracts minute, free	
Herbs; flowers hermaphrodite	2. Boerhaavia.
Shrubs; flowers polygamo-diœcious	
Flowers and leaves not fascicled	3. Pisonia.
Flowers and leaves fascicled	4. Phæoptilum.

1. **MIRABILIS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 3.

Involucre calyx-like, 5-lobed, marcescent, 1–∞-flowered. Perianth-tube long, constricted above the ovary; limb rather flattened, 5-lobed,

plicate, deciduous. Stamens 5–6, unequal, exserted; filaments capillary, incurved at the apex, united into a short cup at the base; anther-cells subglobose. Ovary ellipsoid or ovoid; style filiform, exserted; stigma capitellate, bearing stalked papillæ. Fruit enclosed in the hardened base of the perianth and surrounded at the base by the persistent staminal cup. Seeds adhering to the pericarp; embryo curved; cotyledons surrounding the scanty farinaceous endosperm.—Di- or tri-chotomously branched herbs, glabrous or glandular-pubescent; root elongated or tuberous. Leaves opposite, the lower petioled, upper sessile. Involucres cymosely arranged. Flowers rather large, fragrant or inodorous, white, red or variously coloured.

Species about 10, in the hotter parts of America.

1. **M. Jalapa**, *Linn. Sp. Pl. ed.* i. 177. An erect perennial herb about 2 ft. high. Root napiform. Stem glabrous or shortly pubescent. Leaves thin, ovate or ovate-cordate, acuminate, glabrous or pulverulent above, often ciliate on the margin and bearing cystoliths below, 3 in. long, 1½ in. wide; petiole slender, ½ in. long, Involucre ½ in. long; lobes ovate. Flowers 3–6 in each cyme. Perianth purple, red, yellow or white; tube 1½ in. long, cylindrical below, funnel-shaped at the top; limb spreading, 1 in. or rather more in diam.—Ait. Hort. Kew. ed. 1, i. 234; Bot. Mag. t. 371; Plenck, Ic. Pl. ii. 37, t. 137; Choisy in DC. Prodr. xiii. ii. 427; Schmidt in Mart. Fl. Bras. xiv. ii. 349, t. 81; Hiern in Cat. Afr. Pl. Welw. i. 881; Cummins in Kew Bulletin, 1898, 77. *M. dichotoma*, Linn. Syst. ed. 10, ii. 931, and Sp. Pl. ed. 2, 252; Welw. Apont. 547. *Nyctago Jalapæ*, DC. Fl. Franç. iii. 426. *Jalapa officinalis*, Crantz, Inst. ii. 266.

Upper Guinea. Ashanti, *Cummins!* Lagos, *Punch*, 19! *Rowland!* Sierra Leone, *Winwood Reade!*

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2444!

Lower Guinea. Island of St. Thomas, *Moller.* Angola: Cazengo and Golungo Alto; in forests on the banks of the River Luinha, *Welwitsch*, 5376, 5377; Icolo e Bengo; at the convent of San Antonio, *Welwitsch*, 5377B; Pungo Andongo; abundant along the banks of streams, *Welwitsch.*

Mozamb. Dist. German East Africa: Usambara; Amboni, *Holst*, 2799! Portuguese East Africa: Mozambique, *Peters.* Shamo, near the mouth of the River Shire, *Kirk!* Nyasaland: Manganja Hills; at N'Garis Village, 3000 ft., *Meller! Waller!* Zanzibar, *Lyne!*

A native of Peru, now established in many parts of the Old World.

2. **BOERHAAVIA**, Vaill.; Benth. et Hook. f. Gen. Pl. iii. 5.

Bracts minute, rarely forming an involucre. Perianth-tube cylindrical, the lower part persistent and becoming hardened to enclose the fruit, the upper part petaloid and deciduous; limb shortly 5-lobed. Stamens 1–5, more or less exserted; filaments capillary, connate at the base; anthers 2-celled. Ovary stipitate; style capillary; stigma peltate. Persistent base of the perianth clavate, hard, 5-ribbed, often

glandular, enclosing the fruit. Seed adherent to the pericarp; embryo uncinate; cotyledons thin, broad, encircling the thin endosperm; radicle long.—Much-branched herbs. Leaves opposite, entire or slightly repand. Flowers small, usually umbellate; pedicels articulated at the apex.

Species about 20, throughout the tropics and warm temperate regions.

Perianth not more than $2\frac{1}{2}$ lin. long.
- Flowers usually solitary, rarely 2–3-nate.
  - Leaves glabrous . . . . . 1. *B. elegans.*
  - Leaves pubescent . . . . . 2. *B. hereroensis.*
- Flowers all in terminal umbels.
  - Fruit-perianth $1\frac{1}{2}$ lin. long . . . . . 3. *B. adscendens.*
  - Fruit-perianth 2 lin. long . . . . . 4. *B. repens.*
  - Fruit-perianth 3 lin. long . . . . . 5. *B. Schinzii.*
- Flowers both in terminal umbels and lateral whorls.
  - Upper part of perianth 1 lin. long . . . 6. *B. verticillata.*
  - Upper part of perianth $2\frac{1}{2}$ lin. long . . . 7. *B. fallacissima.*

Perianth at least 3 lin. long.
- Pedicels short. Fruit with large globose glands near the apex . . . . . 8. *B. plumbaginea.*
- Pedicels long.
  - Ribs of fruit-perianth obscure . . . . 9. *B. pentandra.*
  - Ribs of fruit-perianth distinct . . . . 10. *B. squarrosa.*

1. **B. elegans,** *Choisy in DC. Prodr.* xiii. ii. 453. Stems tall, branched, woody at the base, glabrous. Leaves distinctly petioled, broadly ovate, $1\frac{1}{2}$ in. long and broad, glabrous, whitish beneath. Flowers solitary, rarely in pairs, arranged in a lax ample panicle above the leaves; ultimate panicle-branches very slender; bracts minute; pedicels very short. Upper portion of the perianth very small, campanulate; accrescent base clavate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, pentagonal, viscid or glabrate. Stamens 2.—*B. repens*, var. *elegans*, Aschers. & Schweinf. in Schweinf. Beitr. Fl. Aethiop. 169. *B. rubicunda,* Steud. Nomencl. ed. 2, i. 213. *B. Marlothii,* Heimerl in Engl. Jahrb. x. 10.

Nile Land. Coast of Nubia, ex *Boissier.* Uganda: Unyoro, *Speke & Grant,* 540! British East Africa: Nyika country near Mombasa, *Wakefield!*

Lower Guinea. Angola: in open places near the sea at Banana, *Monteiro!* German South-West Africa: Hereroland; in stony places at Otyimbingue, 2900 ft., *Marloth,* 1342.

Mozamb. Dist. German East Africa: Rovuma River, *Kirk!* British Central Africa: Nyasaland; Zomba and vicinity, 2500–3500 ft., *Whyte!*

Also in Arabia and eastwards to Beluchistan.

The roots are eaten by the natives in Unyoro, according to Speke and Grant.

2. **B. hereroensis,** *Heimerl in Engl. Jahrb.* x. 9. Very much branched, diffuse, very viscid herb; slender stems densely pubescent. Leaves thick, pubescent, the lower and middle cuneately narrowed into a petiole as long as the blade, oblong-lanceolate, 2–3 times longer than broad, obtuse, the upper suddenly smaller, subacute, shortly petioled. Panicle much branched; ultimate branches capillary, almost glabrous

1-flowered or 2–3-chotomous and very short; bracteoles 2–3, deciduous. Upper part of perianth campanulate with inflexed margin, reddish, hirtulous outside; lower part pyriform, dirty greenish, densely covered with rather long glandular hairs and having 5 prominent nearly smooth ribs. Stamens 3, unequal, included. Stigma rather large, peltate.—Schinz in Bull. Herb. Boiss. v. App. iii. 67.

Lower Guinea. German South-west Africa: Hereroland; in stony places at Otymbingue, 2900 ft., *Marloth*, 1403 ! *Linden*.

3. **B. adscendens,** *Willd. Sp. Pl.* i. 19. Stem glabrous except in the young parts, ascending, 2–3 ft. high. Leaves usually opposite, ovate-oblong or -rotundate, slightly sinuate, acute or rather obtuse, up to 2 in. long and 1½ in. wide, usually glabrous except when young, dark green above, paler beneath; petiole up to 1 in. long. Panicle terminal, diffuse, up to 9 in. long; ultimate branches slender, rigid, bearing 4–9 sessile flowers at their apex. Perianth about 1 lin. long. Fruit-perianth elliptic, 1½ lin. long, smooth or faintly striate.—Schum. & Thonn. Beskr. Guin. Pl. 17; Vahl, Enum. i. 285; Hiern in Cat. Afr. Pl. Welw. i. 882 partly. *B. ascendens,* Choisy in DC. Prodr. xiii. ii. 451.

Upper Guinea. Togo: near Lome, *Warnecke,* 367 ! Southern Nigeria: Abeokuta, *Irving*, 136 ! Quorra (Niger) River, *Vogel,* 4 ! Num River, *Mann*, 478 !

Nile Land. Upper Sennar: Fazokl, *Kotschy,* 573 partly ! Somaliland Shaile Pass, *Miss Edith Cole !*

Lower Guinea. Island of St. Thomas, *Mann,* 1102 ! Angola: Ambriz; at Quisembo, *Welwitsch,* 5382 ! Barra do Dande; hilly places near the mouth of the River Dande, *Welwitsch,* 5392 ! Loanda: Cazanga Island, *Welwitsch,* 5383 ! hilly places at Praia da Zamba Grande, *Welwitsch*, 5393 !

Mozamb. Dist. Zanzibar, *Kirk !* British Central Africa: Nyasaland; Blantyre, *Buchanan*, 86 !

4. **B. repens,** *Linn. Sp. Pl. ed.* i. 3. Herbaceous, much-branched. Stems slender, cylindrical, glabrous or nearly so, thickened at the nodes. Leaves in unequal pairs at each node, ovate or lanceolate, acute or obtuse, rounded at the base, slightly undulate, usually glabrous, rarely more than 1 in. long and 9 lin. broad. Peduncles axillary, slender, bearing 4–10-flowered umbels; bracts small, lanceolate. Perianth about 1 lin. long; tube clavate, 5-ribbed, glandular between the ribs; lobes very short, rounded, pinkish. Stamens 1–3, as long as or slightly longer than the perianth. Stigma peltate. Fruit 1½ lin. long, enclosed in the strongly 5-ribbed glandular basal part of the perianth.—Choisy in DC. Prodr. xiii. ii. 453 (incl. var. *glabra*); Delile, Fl. Égypte, ii. 2, t. 3, fig. 1 (var. *minor*); Schweinf. Beitr. Fl. Aethiop. 168, and in Bull. Herb. Boiss. iv. App. ii. 166. Hiern in Cat. Afr. Pl. Welw. i. 882 partly. *B. vulvarifolia,* Poir. Encycl. v. 55.

Upper Guinea. Senegal, *Leprieur !*

Nile Land. Nubia: El Galabeheb, *Kralik !* Erkowit Mountain, near Suakin, *Schweinfurth*, 291 ! Wady Abu Selem, *Schweinfurth*, 499 ! Ethiopia,

Kotschy, 88! 172! 358! Kordofan: Abu-Gerad, *Kotschy*, 35! Galabat: region of Matamma, *Schweinfurth*, 2430! Bara, *Pfund*, 676! Eritrea: Ras Madour, near Massowa, *Schweinfurth & Riva*, 29! Mount Ghedem, near Massowa, *Schweinfurth & Riva*, 91! near Saati, *Schweinfurth & Riva*, 342! Abyssinia: by the Tacazze River, near Gursarfa, *Schimper*, 2221!

Lower Guinea. Angola: Pungo Andongo; in sandy rocky parts of the Præsidium, &c., *Welwitsch*, 5385! Icolo e Bengo; in dried-up pools at the River Bengo, *Welwitsch*, 5387! around Lagoa de Quilonde, *Welwitsch*, 5388! Loanda; near Penedo, *Welwitsch*, 5389! and between Penedo and Conceição, *Welwitsch*, 5390! and without precise locality, *Gossweiler*, 215! 215B!

Var. *diffusa*, Hook. f. Fl. Brit. Ind. iv. 709. Stems usually several from a woody rootstock, glabrous or pubescent, Leaves ovate or ovate-rotundate, obtuse, sinuate, usually about 1 in. long and slightly less in breadth, usually pubescent or puberulous on both surfaces, pale green beneath. Inflorescence and flowers as in the type. Fruit $1\frac{1}{4}$ lin. long, clavate, strongly 5-ribbed, less glandular between the ribs than in the type.—*B. diffusa*, Linn. Fl. Zeyl. 4 and Sp. Pl. ed. 1, 3; Choisy in DC. Prodr. xiii. ii. 452; F. Muell. Key Vict. Pl. 169, t. 44. *B. hirsuta*, Willd. Phytogr. 1. *B. procumbens*, Roxb. Fl. Ind. ed. 1, 148; Wight, Ic. t. 874.—*Talu-Dama*, Rheede, Hort. Malab. vii. 105, t. 56.

Upper Guinea. Senegambia: Richard Toll, *Dollinger*, 24! Sierra Leone: N.E. from Sierra Leone, *Garrett!* Scarcies Valley, on the way to Kukuma, *Scott-Elliot*, 4721! Gold Coast: Aburi, *Johnson*, 1103! Southern Nigeria: Lagos, *Punch*, 61! 62! Yoruba, *Millson*, 79! Stirling Hill, *Ansell!* Quorra (Niger) River, *Vogel*, 127! 145! Northern Nigeria: Nupe, *Barter*, 862! 1660!

Nile Land. Nubia: Wadi Dela, *Petherick!* Wadi Halfa, *Bromfield*, 73! Kordofan: Obeyad, *Pfund*, 370! Abou Haraza, *Pfund*, 127! Arashkol Mountain, *Kotschy*, 160! Bara, *Pfund*, 675! Darfur, *Purdy*, 19! Upper Sennar: Fazokl, *Kotschy*, 573 partly! Galabat: region of Matamma, *Schweinfurth!* Keren, *Steudner*, 629! Abyssinia: without precise locality, *Schimper*, 278! *Roth!* Somaliland: Harradigit, *James & Thrupp!* British East Africa: Baringo, *Johnson!* between Mombasa and Takaunga, *Whyte!*

Lower Guinea. Angola: on the road to Bembe, 20 miles from Ambriz, Loanda, *Gossweiler*, 216! 216B! *Monteiro!*

Mozamb. Dist. German East Africa: Usambara; Tanga, *Holst*, 2067! Portuguese East Africa: between Beira and Massi Kessi, *Hon. Mrs. E. Cecil*, 14! Ngamiland: Botletle Valley, *Lugard*, 198!

Var. *viscosa*, Choisy in DC. Prodr. xiii. ii. 453. Stem and leaves densely glandular hairy, more robust than in the type. Leaves ovate or subrotundate, sinuate, up to $1\frac{1}{4}$ in. long and 1 in. broad.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 2428! sea-coast to between 3000 and 4000 ft., *Bent!* Erkowit Mountain, *Schweinfurth*, 288! Eritrea: Terrha Valley, near Saati, *Schweinfurth & Riva*, 274! Mount Zibo, near Saati, *Schweinfurth & Riva*, 535! Ethiopia, *Kotschy*, 81! 411! Kordofan, *Kotschy*, 56! Abyssinia, *Schimper*, 428! Somaliland: Adda Galla, *James & Thrupp!*

5. **B. Schinzii,** *Heimerl in Verhandl. Bot. Ver. Brandenb.* xxxi. 222. Root long, woody. Stem about $1\frac{1}{2}$ ft. high, densely and shortly hairy. Leaves in unequal pairs, varying from broadly ovate or cordate-rotundate below to ovate-lanceolate or long triangular above, about $1\frac{1}{2}$ in. long, obtuse or subacute, entire or undulate, very finely serrate, thickly clothed on both surfaces with very short stiff hairs, dark green above, paler beneath. Flowers in 3–4-flowered heads arranged in

terminal dichasial panicles; partial peduncles thickly hairy, finally nearly 1½ in. long; bracteoles 3 to each flower, lanceolate, deciduous, 1 lin. long. Upper part of perianth narrowly campanulate, sparingly shortly hairy outside, whitish (?), with 5 small rounded lobes; lower persistent part shortly ovoid, obtusely 5-angled, covered with short glandular hairs.—Schinz in Bull. Herb. Boiss. v. App. iii. 68.

Lower Guinea. German South-west Africa: Amboland; Omandongo, *Schinz*, and Omulonga, *Schinz*, 741!

Vars. *villosa* and *augustata*, Heimerl, l.c., are founded on imperfect specimens collected in Hereroland by Lüderitz.

6. **B. verticillata,** *Poir. Encycl.* v. 56. Stems tall, much-branched, diffuse, glabrous. Leaves distinctly petioled, broadly ovate, acute or obtuse, 2 in. long, 1½ in. wide, entire or slightly repand. Flowers in a lax panicle of distant 3–5-flowered whorls above the leaves; pedicels very short; bracts very minute. Upper part of the perianth broadly funnel-shaped, 1 lin. long, shallowly lobed; accrescent base clavate, 2 lin. long, with large globose stalked glands around the apex. Stamens 2, slightly exserted.—Choisy in DC. Prodr. xiii. ii. 454; Aschers. & Schweinf. in Schweinf. Beitr. Fl. Aethiop. 169; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 166; Hook. f. Fl. Brit. Ind. iv. 710. *B. repanda*, Kotschy ex Choisy, l.c. *B. stellata*, Wight, Ic. t. 875.

Upper Guinea. Senegal, *Roger! Leprieur!*

Nile Land. Nubia: Soturba Mountains, at Mirsa Elei, *Schweinfurth*, 2437! and sea-coast about 21° N., *Bent!* Wadi Sarrauib, *Schweinfurth*, 284! Wadi O-Mareg, *Schweinfurth*, Ser. 3, 123! Singa, *Schweinfurth*, 219! Kordofan: Bir Sodari, *Pfund*, 185! Arashkol Mountain, *Kotschy*, 144! Ethiopia, *Kotschy*, 109! 110! 272! Eritrea: Monkullo, near Massowa, *Schweinfurth & Riva*, 238! Keren, *Steudner*, 680! near Eilet (Ailet), *Ehrenberg*. Abyssinia: in rocky places near Gageros and Gursarfa, 3000–5000 ft., *Schimper*, 2223! Somaliland: Adda Galla, *James & Thrupp!* and without precise locality, *Mrs. Lort Phillips! Appleton! Thomson! Drake Brockman*, 352!

Lower Guinea. Angola: Loanda, *Gossweiler*, 292!

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith!*

Also in Tropical Asia.

7. **B. fallacissima,** *Heimerl in Verhandl. Bot. Ver. Brandenb.* xxxi. 223. Habit of *B. plumbaginea*. Lower leaves cordate-ovate, 2 in. long, 1½ in. wide; upper leaves ovate or cordate, acute, 1½ in. long, 1 in. wide; petiole short. Flowers in 2–3 whorls towards the end of the branchlets; pedicels longer than the flowers; bracteoles linear-lanceolate, 2 lin. long. Upper part of the perianth shortly tubular, 2½ lin. long; lower persistent part clavate, with about 10 hemispherical glands near the top. Stamens 2, slightly exserted.

Lower Guinea. German South-west Africa: Hereroland, *Lüderitz*, 171!

8. **B. plumbaginea,** *Cav. Ic. t.* 112. Stems tall, erect, glabrous or hairy. Leaves distinctly petioled, broadly ovate, thin, entire, usually obtuse. Flowers in whorls on a lax ample (usually terminal) panicle;

pedicels short; bracteoles minute. Upper part of the perianth 3–4 lin. long, funnel-shaped; lower accrescent part clavate, 3–4 lin. long, not distinctly 5-angled, with large globose glands near the apex.—Aschers. & Schweinf. Beitr. Fl. Aethiop. 166; Hiern in Cat. Afr. Pl. Welw. i. 883. *B. dichotoma*, Vahl, Enum. i. 290; Choisy in DC. Prodr. xiii. ii. 454; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 168. *B. excelsa*, Willd. Enum. 50. *B. capitata*, Schweinf. in Engl. Hochgebirgsfl. Trop. Afr. 209. *Valeriana scandens*, Forsk. Fl. Ægypt.-Arab. 12.

Upper Guinea. Senegal, *Leprieur!* Portudal, *Dollinger*, 44

Nile Land. Sudan: Sennar; Roseires, *Broun!*

Lower Guinea. Angola: Golungo Alto; at Cacarambola, *Welwitsch*, 5396! Loanda; near the convent of Santo José, *Welwitsch*, 5379! at Praia de Zamba Grande, *Welwitsch*, 5394! hilly places above Penedo, near Bon Vista, *Welwitsch!* 5395! coast region at Penedo, *Welwitsch*, 5384! and without precise locality *Gossweiler*, 217!

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Holst*, 3417 Portuguese East Africa: Mozambique Island, *Scott!* Rhodesia: Gwelo, *Gardner*, 20!

Also in North Africa, Spain and Arabia. Only those specimens which have been seen are quoted.

9. **B. pentandra,** *Burch. Trav.* i. 432. Stem long, procumbent, glabrous or pubescent; branches erect. Leaves distinctly petioled, large, cordate-ovate, obtuse or acute, finely serrate. Whorls forming a large long panicle above the leaves, both terminal and lateral; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts lanceolate, larger than in the other species. Upper portion of the perianth $\frac{1}{4}$–$\frac{1}{3}$ in. long, funnel-shaped; limb $\frac{1}{6}$–$\frac{1}{4}$ in. in diam. Stamens 3, much exserted. Persistent base of perianth accrescent, clavate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, with many globose glands at the top, not distinctly pentagonal.—Schinz in Bull. Herb. Boiss. v. App. iii. 67; Heimerl in Engl. Jahrb. x. 9. *B. Burchellii*, Choisy in DC. Prodr. xiii. ii. 455. *B. grandiflora*, A. Rich. Tent. Fl. Abyss. ii 209; Oliv. in Trans. Linn. Soc. xxix. 142. *B. plumbaginea*, var. *grandiflora*, Aschers. & Schweinf. in Schweinf. Beitr. Fl. Aethiop. 166; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 167. *B. dichotoma*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 209, not of Vahl.

Upper Guinea. Senegambia: Mbidjem, *Thierry*, 71!

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 2427! Erkowit Mountain, near Suakin, *Schweinfurth*, 272! Hor Tamanib, near Suakin, *Lord!* Eritrea: near Acrur, 6200 ft., *Schweinfurth & Riva*, 734! 1123! Keren, *Steudner*, 681! Sudan, *Broun*, 408! Abyssinia: Somak Efat, *Roth*, 125! Tigre; between Mai Gouagoua and Debra Sina, *Quartin-Dillon & Petit*, 209! Mount Sholoda, *Schimper*, 48! by the River Tacazze near Jelajeranne, *Schimper*, 1719! near Gursarfa, 3000 ft., *Schimper*, 2309! and without precise locality, *Schimper*, 761! by the White Nile, 12° 10′ N., *Schweinfurth*, 1053! Blue Nile, *Muriel*, S 28! Somaliland: Sheik Pass, *Thomson*, 62! and without precise locality, *Mrs. Lort Phillips! Miss Edith Cole! Drake-Brockman*, 363! 364! 365! 366! *Appleton!* Uganda: Wimi Valley in Ruwenzori district, *Scott-Elliot*, 7943! Jinga, Busoga,

3900 ft., *Brown*, 89! British East Africa: Makindu & Kibwezi, *Powell*, 4! Kibasi, *Powell*, 20!

Lower Guinea. Angola: Ambriz, *Monteiro!* Chella Mountains, *Johnston!* Loando, *Gossweiler*, 290! Vogelfontein, *Baum*, 38! German South-west Africa Amboland, *Rautanen*, 80! 314!

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith!* Usagara: Robeho Mountains, 4700 ft., *Speke & Grant!* Portuguese East Africa: Lower Zambesi; Tete, *Kirk!* Lake Nyasa, *Johnson*, 395! British Central Africa: Nyasaland; Shire Valley, *Waller!* Upper Shire River at Fort Johnston, *Scott-Elliot*, 8436! Ngamiland; Lake River, *Lugard*, 14! Kwebe Hills, 3300 ft., *Mrs. Lugard*, 21! Bechuanaland: near Palapye, 3000 ft., *Lugard*, 276!

Also in South Africa.

10. **B. squarrosa,** *Heimerl in Bull. Herb. Boiss.* iv. 813. Stem suffruticose, white, at first finely pubescent, divaricately branched upwards. Leaves petioled, ovate, ½–1 in. long, moderately thick, grey-green, subentire, subglabrous, the lower obtuse, the upper subacute. Umbels 3–5-flowered; pedicels capillary, 6 lin. long. Perianth glabrous, 3 lin. long; upper part between campanulate and funnel-shaped; lower persistent part oblong-clavate, 3 lin. long, with 5 viscous ribs. Stamens 3, about as long as the perianth.

Nile Land. Somaliland, *Keller.*

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Fleck*, 241a.

3. **PISONIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 9.

Flowers polygamo-diœcious. Male perianth funnel-shaped with short spreading deltoid lobes. Stamens 5–10, exserted; filaments unequal, filiform, united at the base; anthers globose or oblong. Female perianth longer and narrower, swollen at the base; stamens rudimentary; ovary sessile, elongated; style exserted, usually lateral; stigma bifid or multifid. Fruit surrounded by the hardened clavate pentagonal perianth, which often has a row of small spreading glandular bristles on each rib; achene similar in shape to the hardened part of the perianth and nearly or quite as long.—Climbing or erect shrubs or trees, sometimes spiny. Leaves alternate or opposite, simple, quite entire. Flowers small, greenish, in dense or lax corymbs.

Species about 30, cosmopolitan in the tropics, chiefly American, 4 in Mauritius.

1. **P. aculeata,** *Linn. Sp. Pl. ed.* i. 1026. A climbing shrub, with slender terete stems, armed with large axillary spines. Leaves petioled, oblong, acute, glabrous, subcoriaceous. Male flowers in dense peduncled axillary corymbs; pedicels very short. Perianth pubescent, 1 lin. long. Stamens 6–8, exserted. Female flowers in very lax panicles; pedicels at least 1 in. long. Perianth tubular-campanulate, in fruit clavate, 9 lin. long, armed with 5 rows of hard gland-tipped bristles.—Lam. Ill. t. 861; Wight, Ic. tt. 1763–4; Choisy in DC. Prodr. xiii. ii. 440;

Schmidt in Mart. Fl. Bras. xiv. ii. 354; Hook. f. Fl. Brit. Ind. iv. 711; Benth. Fl. Austral. iv. 279.

Upper Guinea. Gold Coast; base of hills near Akropong, *Johnson*, 806! Lagos; Ollaro to Ajilite, *Miller*, 162!

Mozamb. Dist. German East Africa; Kahe, near Kilimanjaro, 2000–3000 ft., *Volkens*, 2186!

Perhaps introduced from Tropical America.

4. **PHÆOPTILUM,** Radlk. in Abhandl. Naturw. Ver. Bremen, viii. (1883), 435.

Flowers polygamo-diœcious, without an involucre. Perianth calycine, funnel-shaped, cut to the middle into 4 (rarely 5) ovate spreading lobes, hairy outside. Stamens 8, shortly exserted, rudimentary in the female flower; filaments filiform, connate at the base into a fleshy cup. Ovary shortly stipitate, obovoid, 1-celled, often with the rudiment of a second carpel; style filiform, exserted; stigma penicillate. Fruit enclosed in the indurated longitudinally 4-winged perianth-tube. Seed erect; endosperm present; embryo hooked.

Monotypic. Also in South Africa.

1. **P. spinosum,** *Radlk. in Abhandl. Naturw. Ver. Bremen*, viii. 436. A spiny shrub. Branches ending in spines bearing crowded lateral branchlets, often converted into spines. Leaves fascicled, linear-cuneate, about 6 lin. long, rather thick, fragile when dry, glabrous, pale green. Flowers 1½–2 lin. long, 2 lin. in diam. when expanded, in small fascicles from above the often fallen clusters of leaves; bracts narrowly oblong, 1-nerved, densely pilose. Fruit enclosed in the persistent calyx-tube (*anthocarp*), 6 lin. long, and (including the wings) nearly as broad. —Schinz in Bull. Herb. Boiss. v. App. iii. 68. *P. Heimerli*, Engl. Jahrb. xix. 133. *Nachtrigalia protectoratus*, Schinz ex Engl. in Engl. Jahrb. xix. 133. *Amphoranthus spinosus*, S. Moore in Journ. Bot. 1902, 305, t. 441, fig. A.

Lower Guinea. German South-west Africa: Damaraland; on the southern Kaokafeld near Chorichan, *Gürich*, 20; Kamelneck, *Gürich*, 42, and without precise locality, *Een!* Hereroland, *Fleck*, 278!

Also in extra-tropical Great Namaqualand and Cape Colony.

ORDER CV. ILLECEBRACEÆ. (By J. G. Baker, with additions by C. H. Wright.)

Flowers regular, usually all hermaphrodite. Perianth herbaceous or finally coriaceous, persistent; lobes or segments usually 5. Stamens usually 5, perigynous, often alternating with subulate or petaloid staminodes; filaments short, sometimes united at the base; anthers 2-celled, dehiscing laterally. Ovary superior, sessile, 1-celled; ovule usually solitary; style obsolete or produced; stigmas 2–3. Fruit usually a utricle, enclosed in the persistent perianth. Seed erect, or

pendulous from a basal funicle; embryo annular or straight, radicle inferior; endosperm copious or scanty.—Annual or perennial herbs, rarely shrubs. Leaves entire, usually opposite and stipulate. Inflorescence usually a congested cyme. Flowers minute, usually green, subtended by large or small scarious bracts and bracteoles.

Species about 90, cosmopolitan.

Flowers all perfect.
- Embryo straight. Ovary 2-ovuled . . . . 1. POLLICHIA.
- Embryo annular. Ovary 1-ovuled.
  - Leaves stipulate.
    - Bracts large, scarious. . . . . 2. PARONYCHIA.
    - Bracts small.
      - Fruit a membranous utricle . . . . 3. HERNIARIA.
      - Fruit indehiscent . . . . . 4. CORRIGIOLA.
  - Leaves exstipulate, connate at the base . . . 5. SCLERANTHUS.

Flowers in threes, the two outer imperfect. Bracts compound . . . . . 6. COMETES.

1. **POLLICHIA**, Soland.; Benth. et Hook. f. Gen. Pl. iii. 14.

Perianth becoming slightly thickened when mature; tube campanulate; lobes 5, ovate, spreading. Stamens 1–2, inserted on the disk; filaments short, subulate; staminodes ovate. Ovary ovoid; ovules 2, basal; style bifid. Fruit a 1–2-seeded membranous utricle enclosed in the persistent perianth, subtended by fleshy bracteoles. Seeds oblong or ovoid; embryo dorsal, slightly curved; endosperm farinaceous.

Monotypic.

1. **P. campestris,** *Soland. in Ait. Hort. Kew. ed.* i. 5. A perennial. Stems much-branched, pubescent, woody, ½–1 ft. long. Leaves fascicled, linear, acute, sessile, ½–1 in. long; stipules ovate, white, scarious, persistent. Flowers in dense axillary clusters; bracts minute. Perianth green, ½ lin. long; lobes ovate, green edged with white, as long as the campanulate tube. Stamens as long as the perianth. Disk large, lobed, filling up the throat of the perianth.—Smith, Spicil. 1, t. 1; DC. Prodr. iii. 377; A. Rich. Tent. Fl. Abyss. i. 304; Schweinf. Beitr. Fl. Aethiop. 59; Engl. Hochgebirgsfl. Trop. Afr. 215; Hiern in Cat. Afr. Pl. Welw. i. 883. *Neckeria campestris*, Gmelin, Syst. Veg. i. 16. *Meerburgia glomerata*, Moench, Meth. Suppl. 116. *Bergia abyssinica*, A. Rich. Tent. Fl. Abyss. i. 49.

Nile Land. Dalak Island in the Red Sea, *Ehrenberg*. Eritrea: near Ailet and Arkiko, *Ehrenberg;* near Acrur, 6200 ft., *Schweinfurth & Riva*, 768! Aidereso, 4000 ft., *Schweinfurth & Riva*, 1452! Abyssinia: Tigre; Jaja, *Schimper*, 371! near Adowa, *Schimper*, 1106! British East Africa; Sani, *Kaessner*, 743! Naivasha, *Johnston!*

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 1088! 1088B!

Mozamb. Dist. British Central Africa: Ngamiland, *Baines!*

Also in Arabia and South Africa.

2. **PARONYCHIA**, Juss.; Benth. et Hook. f. Gen. Pl. iii. 15.

Perianth 5-partite, herbaceous or finally coriaceous; segments oblong, bearing a mucro on the back below the hooded tip. Stamens usually 5, perigynous; filaments short; staminodes often alternating with the fertile stamens. Ovary subglobose; ovule solitary, basal; style very short, bifid at the stigmatose apex. Fruit a membranous utricle included in the persistent perianth. Seeds resupinate or obliquely ascending; embryo annular.—Annual or perennial herbs. Leaves opposite, stipulate. Flowers in dense axillary and terminal clusters, mixed with numerous scarious bracts.

Species about 40, chiefly in the Mediterranean region and America.

Bracts much larger than the flowers; perianth-segments cucullate	1. *P. argentea.*
Bracts not much larger than the flowers	
Perianth becoming scarious; segments cucullate . .	2. *P. bryoides.*
Perianth remaining herbaceous; segments not cucullate .	3. *P. somaliensis.*

1. **P. argentea,** *Lam. Fl. Franc.* iii. 230. A densely tufted perennial herb. Stems slender, wiry, spreading, pubescent, 3–6 in. long. Leaves opposite; lower oblanceolate, mucronate; upper shorter, oblong, acute; stipules ovate, white, scarious. Flowers in dense terminal clusters; bracts numerous, ovate, white, scarious, $\frac{1}{8}$–$\frac{1}{6}$ in. long, quite hiding the flowers. Perianth $\frac{1}{16}$ in. long, pubescent; segments oblong, cucullate, green with a narrow white border. Stamens included; staminodes minute, subulate. — DC. Prodr. iii. 371; Schweinf. Beitr. Fl. Aethiop. 59. *Illecebrum Paronychia*, Linn. Sp. Pl. ed. i. 206; Sibth. Fl. Græca, t. 246.

Nile Land. Dongola: near Chandek, *Ehrenberg.*

Also in the Mediterranean region.

2. **P. bryoides,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* i. 302. A much-branched perennial herb, of which only the very tips of the stems protrude from the surface of the soil. Leaves few, deciduous, oblong, acute, about as long as the bracts. Flowers in small terminal clusters, quite hidden by the copious white scarious bracts. Perianth 1 lin. long; segments cucullate, becoming scarious. Stamens included. —Schweinf. Beitr. Fl. Abyss. 59; Engl. Hochgebirgsfl. Trop. Afr. 215.

Nile Land. Abyssinia: summit of Mount Silke, 13,900 ft., *Schimper,* 661! summit of Mount Bachit, 15,000 ft., *Schimper.*

3. **P. somaliensis,** *Baker in Kew Bulletin,* 1895, 226. A densely tufted perennial herb. Stems slender, glabrous. Leaves sessile, linear, acute, 2–3 lin. long; stipules large, white, lanceolate, scarious. Flowers in globose terminal heads. Perianth 1–1½ lin. long; segments lanceolate, 2 much shorter than the others, acute, not cucullate,

pubescent, green with a white margin. Stamens 5, half as long as the perianth. Ovary small, ovoid, compressed.

Nile Land. Somaliland: near Wardie, *Miss Edith Cole! Mrs. Lort Phillips!*

3. **HERNIARIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 16.

Perianth herbaceous, deeply 4–5-lobed; tube short; lobes oblong, not awned at the tip. Stamens 4–5, perigynous, shorter than the perianth; staminodes usually present. Ovary globose; style 0 or very short; stigmas 2; ovule solitary, erect. Fruit a membranous utricle enclosed in the persistent perianth. Seed erect, lenticular; embryo annular.—Densely tufted much-branched annual or perennial herbs. Leaves opposite, stipulate. Flowers minute, clustered in the axils of the upper leaves; bracts minute.

Species about 10, chiefly European and Oriental.

1. **H. hirsuta,** *Linn. Sp. Pl. ed.* i. 218. Perennial, densely matted. Stems densely hairy, 3–6 in. long. Leaves oblong or lanceolate, sessile, 2 lin. long, hairy and conspicuously ciliate; stipules short, broad, scarious. Flowers sessile in the axils of the upper leaves. Perianth very hairy, $\frac{1}{2}$ lin. long; lobes oblong, green with a narrow white edge. Stigmas sessile.—DC. Prodr. iii. 367; A. Rich. Tent. Fl. Abyss. i. 302; Schweinf. Beitr. Fl. Aethiop. 59; Engl. Hochgebirgsfl. Trop. Afr. 215.

Nile Land. Abyssinia: Samen; south side of Mount Silke near Cosso-Berri, *Schimper*, 202, Mount Bachit, *Schimper*, 1413, Mount Kubbi, *Schimper*, 744!

Also in Europe, North Africa, the Orient, North India and South Africa.

4. **CORRIGIOLA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 17.

Perianth 5-partite, herbaceous; segments oblong, obtuse, not mucronate. Stamens 5, perigynous, alternating with 5 scale-like staminodes. Ovary ovoid; style very short; stigmas 3; ovule solitary, amphitropous, suspended from a basal funicle. Fruit an indehiscent crustaceous nutlet enclosed in the persistent perianth. Seed subglobose, pendulous; embryo annular.—Small diffuse glabrous herbs. Leaves stipulate, usually alternate. Flowers minute, forming congested cymes in the axils of the upper leaves; bracts and bracteoles minute.

Species 4–6, cosmopolitan.

1. **C. litoralis,** *Linn. Sp. Pl. ed.* i. 271. An annual diffuse herb. Stems slender, glabrous, $\frac{1}{2}$–1 ft. long. Leaves alternate, oblanceolate, acute, narrowed to the base or to a short petiole, the lower about 1 in. long. Flowers in congested cymes in the axils of the upper leaves. Perianth globose, green, glabrous, $\frac{1}{2}$ lin. long. Stamens shorter than the perianth. Nutlet nearly 1 lin. long, verrucose, ovoid-trigonous.—

Schweinf. Beitr. Fl. Aethiop. 59. *C. littoralis*, DC. Prodr. iii. 366; A. Rich. Tent. Fl. Abyss. i. 305; Schkuhr, Handb. t. 85, fig. 3; Harv. & Sond. Fl. Cap. i. 132; Engl. Hochgebirgsfl. Trop. Afr. 215. *C. capensis*, Willd. Sp. Pl. i. 1507; DC. l.c.

Nile Land. Eritrea: Shoho, *Petit!* Akerland, near Halai, 8500 ft., *Schweinfurth!* Abyssinia: Adowa, *Petit*, 359! and without precise locality, *Schimper*, 1002! 1876!

Also in Europe, South Africa, and Temperate South America.

5. **SCLERANTHUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 19.

Perianth herbaceous when young, crustaceous when mature; tube campanulate; lobes usually 5. Stamens usually 5, inserted at the throat of the perianth-tube; staminodes 0. Ovary ovoid; styles 2, distinct; ovule solitary, pendulous from a basal funicle. Seed lenticular; embryo annular.—Dichotomously branched dwarf annual or perennial herbs. Leaves opposite or fascicled, connate at the base. Flowers green, in axillary and terminal clusters, not bracteate.

Species about 10. Cosmopolitan in the Old World.

1. **S. annuus,** *Linn. Sp. Pl. ed.* i. 406. Annual. Stems much-branched, slender, obscurely pubescent, 3–6 in. long. Leaves linear, often fascicled, $\frac{1}{2}$–1 in. long. Flowers in axillary and terminal clusters. Perianth $1\frac{1}{2}$ lin. long.; tube 10-ribbed; lobes lanceolate, acute, as long as the tube, finally erecto-patent. Stamens 5, short.—DC. Prodr. iii. 378; A. Rich. Tent. Fl. Abyss. i. 304; Schweinf. Beitr. Fl. Aethiop. 60; Engl. Hochgebirgesfl. Trop. Afr. 216.

Nile Land. Eritrea: around Saganeiti, *Schweinfurth & Riva*, 1372! Abyssinia: near Adowa, *Quartin Dillon & Petit*, 360! *Schimper*, 111! between Mai Goagoa and Debra Sina, *Quartin Dillon & Petit*, 51! and without precise locality, *Schimper*, 991!

Also in Europe, North Africa, the Orient, South Africa, and introduced into North America.

6. **COMETES,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 18.

Flowers 3-nate, the central perfect, the lateral imperfect, the clusters subdivided by copious deeply divided bracts with pungent subulate segments. Perianth herbaceous, 5-partite; segments oblong, tipped with a conspicuous spreading mucro. Stamens 5, almost hypogynous, alternating with large petal-like staminodes; filaments united into a cup at the base. Ovary oblong, narrowed into a long filiform style with 3 short stigmatic branches; ovule solitary, erect. Fruit a membranous utricle included in the persistent perianth. Seed erect; embryo straight, dorsal; endosperm scanty.—Dichotomously branched erect herbs. Leaves opposite, minutely stipulate. Flowers in copious clusters at the end of the branchlets.

Species 2, the other Oriental and North Indian.

1. **C. abyssinica,** *R. Br. in Wall. Pl. Asiat. Rar. t.* 18. An erect perennial herb. Stems ½–1 ft. long, pubescent, many times dichotomously branched. Leaves sessile, spreading, lanceolate, opposite or verticillate, the lower 1–1½ in. long. Clusters of flowers very numerous, terminal on the branchlets; bracts at first comparatively small, finally overtopping the flowers, with many stramineous pungent divisions, so that the heads look like a prickly ball about 1 in. in diam. Perianth 2 lin. long, green; segments oblong, tipped with a spreading mucro which becomes as long as the blade. Staminodes lingulate, longer than the fertile stamens.—Engl. Hochgebirgsfl. Trop. Afr. 216. *Saltia abyssinica*, R. Br. in Salt, Abyss. App. iv. 74.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 762! sea-coast to between 3000 and 4000 ft., *Bent!* Hor Tamanib, *Lord!* Sudan: Khor Ashat, *Broun*, 1213! Eritrea: near Mai Mafales, in Dembelas, *Schweinfurth*, 210! Mount Adaita, near Saati, *Schweinfurth & Riva*, 560! Mount Ketumbal, *Ehrenberg!* Abyssinia: Begemeder, *Schimper*, 97, Somaliland, *Miss Edith Cole! Mrs. Lort Phillips!*

Also in Arabia and the Comoro Islands.

I have not seen the doubtful plant supposed to be allied to *Cometes*, collected by Major Serpa Pinto, 64, in South Central Africa, and described by Mr. Hiern in *Trans. Linn. Soc. ser.* 2, *Bot.* ii. 25.

ORDER CVI. **AMARANTACEÆ.** (By J. G. Baker and C. B. Clarke.)

Flowers 2- (rarely 1-) sexual, many rudimentary or obsolete, monochlamydeous, chaffy or scarious. Perianth-segments united near the base, 5, much imbricated, in a few species 4 or 3 only. Stamens hypogynous, 5 (rarely 4–3), opposite the perianth-segments; filaments united at the base into a scarious (sometimes very short) tube; filaments linear to the base with processes (staminodes) on the tube alternating with them, sometimes the filaments wider at the base and uniting by an acute sinus into a longer cup-like tube without any staminodes; the processes resemble filaments or are oblong, often fimbriate, or small or nearly obsolete. Anther-cells 2 (in the last 4 genera 1), oblong, with a longitudinal slit; pollen very small, globose. Ovary superior, 1-celled; style short or long; stigma capitate or shortly 2–3-fid; ovules on basal funicles, 1 only (except in the first 3 genera). Fruit a membranous utricle (rarely a berry), irregularly breaking up or circumscissile. Seed globose, compressed or ellipsoid; testa crustaceous, smooth or nearly so; embryo annular round copious endosperm.—Herbs or undershrubs, or (*Sericostachys*) large climbers. Leaves simple, entire, opposite or alternate. Flowers in spikes, heads or rarely racemes; perfect flower often solitary, supported by 1 bract and 2 bracteoles; not rarely the solitary perfect flower is supported by 2 (less often 1) rudimentary flowers (within the bract); in some genera 2–3 perfect flowers (with their extra "bracteoles," rudimentary flowers) are clustered inside one bract. Flowers small or minute.

Species 600, in tropical and warm countries, mostly weeds.

It is sometimes a question of interpretation whether the "bracteoles" to a perfect flower are to be considered "prophylla" or as 2 rudimentary "flowers" reduced to bracts. In the flower-cluster genera the number of perfect flowers in the cluster is 2 or 1, or mostly 1, in the same flower-spike; the number of sterile flowers in the cluster is highly variable. In some of the species which are considered to have staminodes the staminal tube is a mere rim, and the staminodes are minute and hardly to be made out with the microscope; but in these cases the filaments being linear to the base (not united by an acute sinus), carry the species to the group diagnosed as having staminodes. In *Hermbstædtia* it cannot be determined absolutely what part of the tube belongs to the fertile filaments, what to the sterile; I prefer here the earlier view of Dr. Schinz to the later. In the face of these facts, the subjoined table of the genera has been drawn up, as far as practicable, to work (for the African species) from obvious characters. At the same time, it is not admitted that there exists (for instance) between *Achyranthes* and *Pandiaka* any more definite difference than that between petioled and sessile leaves.

Leaves alternate. Anthers 2-celled.
- Ovary with several ovules. Flowers glabrous or nearly so.
  - Flowers pedicelled. Fruit a berry . . . 1. DEERINGIA.
  - Flowers sessile. Utricle membranous.
    - Filaments linear to the base; no staminodes 2. CELOSIA.
    - Filaments broad or staminodes present . . 3. HERMBSTÆDTIA.
- Ovary with 1 ovule.
  - Flowers nearly glabrous. No staminodes.
    - Ovary glabrous.
      - Fertile flower supported by 2 sterile . 4. DIGERA.
      - Fertile flower solitary . . . . 5. AMARANTHUS.
    - Ovary densely woolly . . . . 6. MECHOWIA.
  - Flowers full of fine hairs. Staminodes present.
    - Fertile flower solitary . . . 7. ÆRVA.
    - Fertile flower supported by 2 sterile . 8. SERICOCOMA.

Leaves opposite.
- Anthers 2-celled.
  - Bracts of the sterile flowers ending (some of them) in hooked spines.
    - Staminodes present . . . . 9. CYATHULA.
    - No staminodes . . . . . 10. PUPALIA.
  - Bracts of the sterile flowers none ending in hooked spines.
    - Flowers (some rudimentary) clustered in partial inflorescences.
      - Staminodes 0 . . . . . 11. MARCELLIA.
      - Staminodes present.
        - Leaves either linear or elliptic . . 12. CYPHOCARPA.
        - Leaves narrowly oblong . . . 13. CENTEMA.
    - Flowers solitary.
      - Staminodes 0.
        - Perianth nearly glabrous . . . 14. PSILOTRICHUM.
        - Perianth with long white hairs . . 15. CHIONOTHRIX.
      - Staminodes present.
        - Leaves present.
          - Erect herbs or small shrubs.
            - Leaves petioled.
              - Fruit-perianth deflexed . . 16. ACHYRANTHES.

Fruit-perianth patent, obtuse .	17. ACHYROPSIS.
Leaves sessile	18. PANDIAKA.
Large scandent shrubs . . .	19. SERICOSTACHYS.
Leaves mere scales, less than $\frac{1}{5}$ in. long	20. ARTHRÆRUA.
Anthers 1-celled. Spikes dense, ovoid or short-cylindric.	
Spikes axillary, sessile.	
Fruit not, or obscurely flattened . . .	21. TELANTHERA.
Fruit very flat, winged	22. ALTERNANTHERA.
Spikes terminal, often sessile—*i.e.*, supported by 2 floral leaves.	
Staminal tube minute. Plant glabrous .	23. PHILOXERUS.
Staminal tube $\frac{1}{6}$ in. long. Plant hairy .	24. GOMPHRENA.

1. **DEERINGIA,** R. Br.; Benth. et Hook. f. Gen. Pl. iii. 23.

Flowers 2-sexual; bract 1; bracteoles 2, small, not prickly. Perianth 5-fid, glabrous; segments spreading in fruit. Stamens 5; filaments united below into a tube, linear; interjected teeth 0; anthers 2-celled, oblong. Ovary with several ovules; style hardly any; stigmas 3. Fruit a globose many-seeded berry. Seeds lenticular; embryo annular; testa crustaceous.—Rambling or climbing shrubs, nearly smooth. Leaves alternate, entire. Racemes lax, leafless, axillary and penultimate; pedicels solitary, very short.

Species 6, in Africa, South Asia and Oceania.

1. **D. celosioides,** *R. Br. Prodr.* 413. Nearly glabrous. Branches arching, sometimes 10 ft. long. Leaves 3–4 in. long, ovate, acuminate; petiole $\frac{1}{2}$–1 in. long. Racemes 4–8 in. long, often several towards the ends of the branches, panicled. Perianth whitish; segments $\frac{1}{8}$ in. long. Berry $\frac{1}{5}$ in. in diam., globose, red.—Bot. Mag. t. 2717. *D. baccata*, Moquin in DC. Prodr. xiii. ii. 236; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 97, 98, t. 49; Lopr. in Engl. Jahrb. xxx. 7. *Celosia baccata*, Retz. Obs. v. 23.

Nile Land. British East Africa: near Lake Baringo, 3400 ft., *Johnston!*

Lower Guinea. Princes Island, *Barter*, 2009!

Frequent in South-east Asia.

2. **CELOSIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 24.

Flowers 2-sexual; bract 1; bracteoles 2, small, not prickly. Perianth 5-fid, scarious; segments oblong or elliptic, obtuse or subacute. Stamens 5; filaments subulate in the upper part, united at the base into a cylindric cup; interjected teeth 0 or minute bristles; anthers 2-celled, oblong or round; pollen small, 10–20 μ in diam., globose, with few (small or large) tubercles. Ovary ovoid; ovules 2 or more on basal funicles; style long or short, 3-fid or 2-fid. Capsule ovoid or oblong, or (in 2 species) wide at the top, several-seeded (but in *C. nana* and *C. populifolia* 1-seeded), membranous, circumscissile. Seeds lenticular; embryo annular; testa crustaceous, shining, brown-black, smooth (never

even microscopically tubercular.—Annuals or undershrubs, erect or rambling; young parts and inflorescence usually minutely and sparingly hairy. Leaves alternate, petioled, mostly ovate-lanceolate, entire or (in *C. pandurata*) lobed. Cymes or flower-clusters, usually forming a leafless very narrow panicle or pseudospike, axillary or terminal or panicled.

Species 40, in the warmer parts of the world.

The bract and bracteoles are pointed when the perianth-segments are pointed; and obtuse when the perianth-segments are rounded. The seeds in all the species have similar cells on the surface arranged in a similar semi-annular way; they are more or less conspicuous as the seeds were more or less ripened, and as the examples were more or less gradually dried.

*Lestibudesia. Style 3-fid.	
Perianth $\frac{1}{3}$ in. long. Spikes dense, continuous .	1. *C. argentea.*
Perianth much less than $\frac{1}{3}$ in. long.	
Style at least $\frac{1}{3}$ the length of the young capsule.	
Leaves spathulate, elliptic-lanceolate .	2. *C. laxa.*
Leaves narrowly oblong	3. *C. cuneifolia.*
Style hardly any	4. *C. trigyna.*
**Eu-Celosia. Style 2-fid.	
†Capsule several-seeded; 1-seeded capsules very rare.	
Style distinct, with rather long ascending branches.	
Panicles reduced to rather dense pseudo-spikes.	
Leaves pandurate, lower sub-3-lobed .	5. *C. pandurata.*
Leaves entire, ovate.	
Capsule $\frac{1}{8}$ in. long. . . .	6. *C. loandensis.*
Capsule $\frac{1}{5}$ in. long. . . .	7. *C. macrocarpa.*
Spikes axillary, slender, linear, interrupted	8. *C. stuhlmanniana.*
Style very short or obsolete.	
Flowers small; perianth $\frac{1}{10}$ in. long. Capsule longer than the perianth.	
Capsule narrowed at the top; style visible	9. *C. schweinfurthiana.*
Capsule clavate at the top; stigmas alone visible	10. *C. acroprosodes.*
Flowers very small; perianth $\frac{1}{16}$–$\frac{1}{12}$ in. long. Capsule included in the perianth.	
Leaves 2–4 in. long; inflorescence white	11. *C. staticodes.*
Leaves 2 in. long; inflorescence pale brown	12. *C. leptostachya.*
Leaves less than 1 in. long; inflorescence white	13. *C. minutiflora.*
††Capsule 1-seeded.	
Leaves hardly $\frac{1}{4}$ in. long . .	14. *C. nana.*
Leaves 2–3 in. long . . .	15. *C. populifolia.*

1. **C. argentea,** *Linn. Sp. Pl. ed.* 1, 205, *ed.* 2, 296. A glabrescent branched annual, 1–4 ft. high. Leaves alternate, variable in size and

form, sometimes 1–1½ in. long and linear, sometimes spathulate-elliptic and 4–5 in. long on petioles 1–2 in. long. Spikes continuous, very dense, ½ in. broad and upwards, scarious, straw-coloured, often 4–6 in. long, sometimes ½–1 in. long. Perianth ⅓ in. long and upwards; segments oblong, subacute. Filaments linear, united into a tube at the base; interjected teeth 0, or rarely minute and bristle-like, much shorter than the filaments; anther-cells 2, oblong; pollen globose, 18 μ in diam., with a few tubercles. Ovary ellipsoid, narrowed upwards into the long style, 3-branched at top. Capsule ellipsoid, narrowed at the top, much shorter than the perianth, circumscissile; seeds several, often 4–8.—Forsk. Fl. Ægypt.-Arab. cvii.; Hook. Niger Fl. 491; Moquin in DC. Prodr. xiii. ii. 242; A. Rich. Tent. Fl. Abyss. ii. 212; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 140; Aschers. in Schweinf. Beitr. Fl. Aethiop. 178; Engl. Hochgebirgsfl. Trop. Afr. 205; Pfl. Ost-Afr. C. 172; Schinz in Engl. and Prantl, Pflanzenfam. iii. 1A, 93, fig. D, and 99, t. 51, figs. A, B, C, in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. iv. Append. ii. 163; Zarb in Cat. Spéc. Bot. Pfund, 33; Hiern in Cat. Afr. Pl. Welw. i. 885; Dur. & Schinz, Études Fl. Congo, i. 231; Dur. & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 84; De Wild. & Dur. Pl. Thonner. Congol. 14; Lopr. in Engl. Jahrb. xxx. 4, 5, t. 1, fig. A, B; Schlechter, Westafr. Kautsch.-Exped. 287. *C. margaritacea*, Linn. Sp. Pl. ed. ii. 297. *C. splendens*, Schumach. & Thonn. Beskr. Guin. Pl. 140 (the style-branches having been broken off); Moquin in DC. Prodr. xiii. ii. 244.

Upper Guinea. Liberia: Kakatown, *Whyte!* Gold Coast: Accra, *Don!* and without precise locality, *Brown*, 373! Lagos, *Dawodu*, 61! Northern Nigeria: Nupe, *Barter*, 154! Southern Nigeria: River Quorra (Niger), *Vogel*, 29! Benin, *Dennett*, 16!

North Central. Bagirmi and region of Lake Fittri, *Chevalier*, 9827!

Nile Land. Darfur, *Purdy*, 30! Kordofan, *Steudner*, 650! *Kotschy*, 84! 149! 230! *Pfund*, 890! Sennar, *Kotschy*, 259! Gallabat: Matamma, *Schweinfurth*, 635! 636, 637! Abyssinia: Tigre; 5700 ft., *Schimper*, 1350! Gageros; 4000 ft., *Schimper*, 2260! and without precise locality, *Schimper*, 456! White Nile, *Petherick! Schweinfurth*, 952! Sobat River, *Muriel*, S, 55! Uganda *Speke & Grant*, 532! British East Africa: Njemps-Mkuba, *Gregory!*

Lower Guinea. Lower Congo, *Smith*, 38! 74! *Hens*, C, 172! Coquilhatville, *Schlechter*, 12609! Angola: Cazella, *Welwitsch*, 1082; River Cuango, *Welwitsch*, 6543! 80 miles from Ambriz, *Monteiro!*

South Central. Congo Free State: Stanley Pool, *Callewaert!* Mtowa *Descamps;* Bingila, *Dupuis;* Nyangue, *Demeuse;* Mukenje, *Pogge.*

Mozamb. Dist. British East Africa: Witu, *Thomas*, 41! Mto Ndei, *Scott-Elliot*, 6215! Uganda: Kavirondo, *Scott Elliot*, 7076! Usoga, *Scott-Elliot*, 7214! Nyasaland: Tanganyika, *Carson*, 2!

Also in Arabia, South-east Asia, Malaya.

C. cristata, Linn. (Loanda, *Welwitsch*, 6512B), is a cultivated state of *C. argentea*, Linn., introduced or run wild in many warm parts of the world.

2. **C. laxa,** *Schumach. & Thonn. Beskr. Guin. Pl.* 141. A nearly glabrous branched herb, 2–4 ft. high. Leaves alternate, lower long-

petioled; blade ovate to lanceolate, often 3 in. long. Inflorescence of terminal white linear panicles 2–4 by $\frac{1}{2}$ in., much looser than those of *C. argentea*, often somewhat interrupted. Perianth $\frac{1}{6}$–$\frac{1}{5}$ in. long; segments oblong, 1-nerved, scarious, straw-coloured, acute. Filaments 5, linear, with no teeth between them; anthers short, elliptic. Capsule ovoid, narrowed at the top, hidden by the perianth; style $\frac{1}{2}$–$\frac{2}{3}$ the length of the capsule, 3-fid. Seeds several.—Moquin in DC. Prodr. xiii. ii. 241; Hook. Niger Fl. 491; Hiern in Cat. Afr. Pl. Welw. i. 885 partly (*i.e.* excl. *C. loandensis*); Engl. Pfl. Ost-Afr. C. 172; Dur. & Schinz, Études Fl. Congo, 232; Dur. & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85; Schinz in Engl. Jahrb. xxi. 180; Schlecht. West-afr. Kautsch.-Exped. 287.

Upper Guinea. Senegambia, *Heudelot*, 570! Gambia, *Brown-Lester*, 17! Sierra Leone: near Kambia, *Scott-Elliot*, 4227! near Berria, *Scott-Elliot*, 5403! Liberia, *Whyte*. Grand Bassa, *Vogel*, 82! Gold Coast: Aburi Hills, *Johnson*, 472! Lagos, *Barter*, 20145! Yoruba, *Schlechter*, 13039! Cameroons: Bipindi, *Zenker*, 2647! Yaunde, 2500 ft., *Zenker et Staudt*, 165! Northern Nigeria: Borgu, *Barter!* Bornu, *Elliott*, 123! Fernando Po, *Vogel*, 158! *Mann*, 80!

Nile Land. Niamniam: by the River Nabambisso, *Schweinfurth*, 2971!

Lower Guinea. Lower Congo: Bingila, *Dupuis;* and without precise locality, *Smith!* Angola: Loanda, *Welwitsch*, 6558! 6558B! Golungo Alto, 1000–2400 ft., *Welwitsch*, 6577! Huilla, *Welwitsch*, 6495!

South Central. Congo Free State: Bangala, 1000 ft., *Hens*, C, 175! Monbuttu: Munza, *Schweinfurth*, 3479!

Var. β *pilosa*, Schinz in Bull. Herb. Boiss. 2 sér. iii. 9. Stem feebly sparsely hairy.

Upper Guinea. Cameroons: Rio del Rey, *Johnston!*

3. **C. cuneifolia,** *Baker in Kew Bulletin*, 1897, 276, *partly*. Ends of the 3 branches seen 15 in. long, nearly bare of leaves, with several lateral branches, each terminated by a linear panicle. Leaves 1–1½ in. long, oblong, obscurely pubescent. Linear panicles 1–4 by $\frac{1}{2}$ in., altogether resembling those of *C. laxa*, Schumach.; perianth, stamens, style, capsule and seeds, undistinguishable from those of *C. laxa*, Schumach.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* Lower Shire; Moramballa Hill, *Kirk!*

The stem and leaves are more pubescent than those of *C. laxa*. Baker also cited a plant collected by Meller in the Shire valley which has pandurate leaves, and is here referred to *C. pandurata*.

4. **C. trigyna,** *Linn. Mant.* 212. A branched, straggling, nearly glabrous herb, 1–4 ft. high. Lower leaves long-petioled; blade 1–5 in. long, ovate or lanceolate, acuminate. Linear panicles 4–12 in. long, interrupted, sometimes reduced to a nearly simple spike; sometimes the distant globular cymes are 1 in. in diam., with numerous flowers. Perianth $\frac{1}{8}$ in. long, white, straw-coloured, or dusky; segments oblong, subacute, 1-nerved or nerveless. Filaments 5, without interjected teeth; anthers short elliptic. Style hardly any; branches 3, rather long. Capsule subglobose, several-seeded.—Hook. Niger Fl. 491;

Moquin in DC. Prodr. xiii. ii. 240; A. Rich. Tent. Fl. Abyss. ii. 211; T. Thoms. in Speke, Nile, Append. 646; Garcke in Peters, Reise Mossamb. Bot. 504; Zarb in Cat. Spéc. Bot. Pfund, 33; Oliver in Trans. Linn. Soc. Bot. xxix. 140, excl. syn.; Aschers. in Schweinf. Beitr. Fl. Aethiop. 179 (excl. Ehrenberg's Togodele plant); Engl. Hochgebirgsfl. Trop. Afr. 205; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 99, in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. iv. Append. ii. 162, in Engl. Pfl. Ost-Afr. C. 172; Hiern in Cat. Afr. Pl. Welw. i. 884; E. G. Baker in Trans. Linn. Soc. sér. 2, Bot. iv. 39; Dur. & Schinz, Études Fl. Congo, 232; Dur. & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85. *C. caudata*, Vahl, Symb. i. 21. *C. melanocarpos*, Poir. Encycl. Suppl. iv. 318. *C. triloba*, Meisn. in Hook. London Journ. ii. (1843), 448 (548). *C. chenopodiifolia* and *C. semperflorens*, Baker in Kew Bulletin, 1897, 276, 277 (both which I make out to be trigynous). *C. adoensis*, Hochst. & Steud. ex A. Rich. Tent. Fl. Abyss. ii. 211. *Achyranthes decumbens* and *A. paniculata*, Forsk. Fl. Ægypt.-Arab. 47, 48. *Lestibudesia trigyna*, R. Br. Prodr. 414.

Upper Guinea. Senegal, *Roger!* Senegambia, *Heudelot*, 120! Cape Verde, *Brunner*, 139! Sierra Leone, *Smeathmann! Afzelius!* Samu, *Scott-Elliot*, 4331! French Guinea: Dantilia, *Scott-Elliot*, 5267! Gold Coast: Aburi, *Brown*, 311! *Johnson*, 1096! Krobo, *Johnson*, 554! Accra, *Don! Ansell!* Togo, *Warnecke*, 27! Northern Nigeria: Stirling Hill, *Vogel*, 132! *Ansell!* Nupe, *Baikie!* Borgu, *Barter*, 1341! Fernando Po, *Barter! Vogel*, 180! Cameroons: Yaunde, 2500 ft., *Zenker & Staudt*, 345! and without precise locality, *Preuss*, 1291!

Nile Land. Nubia, *Kotschy*, 79! 369! Eritrea, *Schweinfurth*, 254, 331, 1650, 1876, 2035, 2182. Galabat: Matamma, *Schweinfurth*, 665! Abyssinia: Adowa, *Schimper*, 49! Tigre, *Schimper*, 177! and without precise locality, *Quartin-Dillon & Petit*, 221! Togodele, *Ehrenberg!* Kordofan, *Kotschy*, 75! 285! *Pfund*, 899! Upper Sennar: Fazokl, *Kotschy*, 548! White Nile, *Murie! Schweinfurth*, 1050! Khartoum, *Schweinfurth*, 782! Jur, *Schweinfurth*, 2387! Niamniam, *Schweinfurth*, 2986! Uganda: Entebbe, 3900 ft., *Brown*, 35! Busogo, in gardens, *Whyte*, B, 5! and without precise locality, *Cunningham! Wilson*, 463! *Speke & Grant!* British East Africa: Kavirondo, *Scott-Elliot*, 7019! Ribe, *Wakefield!* Mombasa, *Wakefield!*

Lower Guinea. Annabon Island, *Burton!* Loango, *Soyaux*, 194! Lower Congo: Bingila, *Dupuis;* and without precise locality, *Smith! Burton!* Angola: Dembe, *Monteiro!* Huilla, *Welwitsch*, 6485! Loanda, *Welwitsch*, 6537! *Gossweiler*, 172! 392! 6560; Ambriz, *Welwitsch*, 6557! Golungo Alto, *Welwitsch*, 6562! Ambaca, *Welwitsch*, 6571! Chella Mountains, *Johnston!*

South Central. Congo Free State: Congo Forest, *Doggett!* Mtowa *Descamps.*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1033! German East Africa: Karagwe; Kagera River, 5000 ft., *Scott-Elliot*, 8139! Nyasaland: Nyika Plateau, *McClounie*, 105! 156! Namasi, *Cameron*, 31! Masuku Plateau, 6500–7000 ft., *Whyte!* Mount Chiradzulu, *Whyte!* Mlanji, *Whyte*, 166! Blantyre, *Last! Buchanan*, 52! Manganja Hills, *Meller!* Lower Zambesi: Tete, *Kirk!* Boruma, *Menyharth*, 823! Matabeleland, *Holub!*

Also in Madagascar and Arabia.

There may be two species here: in *C. semperflorens*, J. G. Baker (nearly = *C. adoensis*, Hochst. et Steud.), the long inflorescences are reduced nearly or quite

to spikes; while in *C. trigyna* (Schweinfurth, 782, 1050; &c.) the branches of the linear panicle are compound cymulose.

5. **C. pandurata,** *Baker in Kew Bulletin*, 1897, 276. Stem erect, 2½ ft. high, divided, thinly hairy. Lower leaves long-petioled; blade 3–4 in. long, pandurate, sub-3-lobed, the two lateral lobes ovate or oblong, 1½ in. long. Panicles ½ to 4 in. long, ⅓ in. broad, condensed into continuous somewhat dense pseudospikes, scarious, straw-coloured, in fruit fuscous. Perianth ⅙ in. long; segments oblong, acute, when young 1-nerved or obscurely nerved, in fruit sometimes strongly 5-nerved. Filaments linear, without interjected teeth; anthers oblong. Style longer than ½ the capsule, with 2 ascending linear branches. Capsule nearly as long as the perianth, usually about 3-seeded.—*C. cuneifolia*, Baker in Kew Bulletin, 1897, 296 partly (*i.e.* as to Meller's example which has the lower leaves 3-lobed).

Mozamb. Dist. German East Africa: Usambara; Musa, *Holst*, 3124! Portuguese East Africa: below Shigogo on the Lower Zambesi, *Kirk!* lower part of the Shire Valley, *Meller!*

6. **C. loandensis,** *Baker in Kew Bulletin*, 1897, 277. A nearly glabrous rambler, the numerous elongate panicle-bearing branches springing at right angles from a main branch. Leaves petioled; blade 1½–2 in. long, ovate-lanceolate. Inflorescences 2–6 by ⅓–½ in.; lateral cymes small, few-flowered, or often 1–flowered, not confluent. Perianth ⅛ in. long; segments oblong, acute, scarious, straw-coloured, on the back many-nerved, often somewhat fuscous. Filaments linear, without interjected teeth; anthers oblong. Style hardly half the length of the young capsule, with 2 long ascending branches. Capsule about as long as the perianth, usually 2–3-seeded.—*C. laxa*, Hiern in Cat. Afr. Pl. Welw. i. 885 partly, not of Schumacher.

Lower Guinea. Lower Congo, *Smith!* Angola: Loanda, *Welwitsch*, 6537B! *Gossweiler*, 363! Golungo Alto, 1000–2400 ft., *Welwitsch*, 6578.

The styles I find in these plants uniformly 2-fid. But the plants will not match *C. laxa* in habit or inflorescence.

7. **C. macrocarpa,** *Volkens ex Lopr. in Engl. Jahrb.* xxx. 6. Glabrous. Leaves 1½ by ⅔ in., ovate, acute; base truncate or almost cordate, shortly decurrent; petiole hardly ¼ in. long. Spikes long, linear, rather dense, the flower-clusters hardly pedicelled. Capsule ovoid, nearly ⅓ in. long, inflated.

Mozamb. Dist. Kilimanjaro; 4500 ft., *Volkens*, 2244!

From the fragments seen in Herb. Schinz, this species must bear a close general resemblance to *C. loandensis*, Baker.

8. **C. stuhlmanniana,** *Schinz in Bull. Herb. Boiss.* iv. 419. Glabrous. Leaves alternate; blade 2½ by ¾ in., elliptic-lanceolate, base cuneate, tip lanceolate, acuminate; petiole ⅓ in. long. Spikes axillary, 1–2 together, peduncled, linear, 4 in. long, apparently simple; flowers

in clusters of 1–3, nearly sessile, distant. Style very short; branches 2, linear-oblong.

Nile Land. Uganda: Albert Nyanza, *Stuhlmann*, 3052 ! 3584.

9. **C. schweinfurthiana,** *Schinz in Engl. Jahrb.* xxi. 178, 180. A nearly glabrous rambler, attaining 4 or 5 ft. at least. Leaves long-petioled; blade 3 in. long, ovate-lanceolate. Linear panicles attaining 10 by 1 in., usually less developed, sometimes appearing as elongate simple interrupted spikes. Perianth $\frac{1}{10}$ in. long; segments oblong, rounded at the top, fuscous on the back, narrowly scarious on the margin; but in early flower they are (sometimes at least) wholly scarious straw-coloured. Filaments linear, without interjected teeth. Capsule ellipsoid, truncate at the top, often exceeding the perianth, several-seeded. Style very short, with 2 early-recurved branches.—Engl. Pfl. Ost-Afr. C. 172; Hiern in Cat. Afr. Pl. Welw. i. 884; Lopr. in Engl. Jahrb. xxx. 107.

Nile Land. Niamniam, *Schweinfurth*, 3062 ! Uganda: Albert Edward Nyanza; *Scott-Elliot*, 8053 ! 8087 ! Ruwenzori, *Scott-Elliot*, 7408 ! British East Africa: Mombasa and Ribe, *Wakefield !* Taita, *Hildebrandt*, 2530.

Lower Guinea. Angola: Golungo Alto, *Welwitsch*, 6551 ! Pungo Andongo, *Welwitsch*, 6563 ! 6569 ! Cazengo, *Gossweiler*, 489 !

Mozamb. Dist. German East Africa: Usambara, *Buchwald*, 160, 486, 489 ! *Holst*, 452, *Albers*, 147. Karagwe; Bukoba, *Stuhlmann*, 1616, 3271, 3877, 4086. Usagara, *Stuhlmann*, 6170 ! Portuguese East Africa Shire Valley, *Scott !*

Var. β *sansibariensis*, Schinz in Bull. Herb. Boiss. 2 sér. iii. 9. Young fruit elongated, oblong or narrowly ellipsoid, exserted from the perianth.—*C. sansibariensis*, Vatke ex Schinz, l.c.

Mozamb. Dist. German East Africa: Usaramo; Dar-es-Salaam, *Hildebrandt*, 1247 !

10. **C. acroprosodes,** *Hochst. in Bot. Zeit.* 1856, 598. A nearly glabrous, loosely-branched plant, 2–3 ft. long at least. Leaves petioled; blade 2–2½ in. long, cordate ovate-lanceolate. Inflorescences 6–15 by ½–¾ in., scarious-white; the small dense cymes of small flowers standing apart, except at the tip of the panicle. Perianth $\frac{1}{12}$ in. long; segments elliptic, obtuse, white. Filaments linear, without interjected teeth. Ovary when young with a thickened spongy top; capsule a little longer than the perianth, oblong-clavate, pale straw-coloured; the two curved ends of the style projecting out of a small hole depressed in the head of the capsule. Seeds several (3), all in the lower membranous part of the capsule.—*C. intermedia*, Hochst. in Bot. Zeit. 1856, 598; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100 ? *C. anthelmintica*, Ascherson in Schweinf. Beitr. Fl. Aethiop. 176; Engl. Hochgebirgsfl. Trop. Afr. 205, Pfl. Ost-Afr. C. 172; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100, and 94 t. 48, fig. G, in Engl. Jahrb. xxi. 180. *C. oblongocarpa*, Schinz in Bull. Herb. Boiss. iv. 418; Lopr. in Engl. Jahrb. xxx. 6.

C. trigyna, Oliver in Trans. Linn. Soc. xxix. 140, partly, not of Linn. *C. acroporoides*, Benth. et Hook. f. Gen. Pl. iii. 25, errore typogr.

Nile Land. Abyssinia: Dscha-Dscha, 5000 ft., *Schimper*, 2147! 2173! British East Africa: Taita; Ndi Mountain, *Hildebrandt*, 2530! Baringo, 3400 ft., *Johnston!* Uganda; Makungoni, *Elliott*, 356!

Mozamb. Dist. German East Africa: Kilimanjaro; Kahe plains, *Volkens*, 2206!

On typical examples, at the British Museum, the capsules are nearly all clavate at the top; but there are a few capsules (on the same stems) which are ovoid, conic at the top into a short style.

11. **C. staticodes,** *Hiern in Cat. Afr. Pl. Welw.* i. 886. A herb, 2–3 ft. high; the stem and nerves of the leaves more or less pubescent. Leaves up to 4 by $2\frac{1}{4}$ in., ovate-acuminate, base truncate or subcordate; petiole 1–2 in. long. Inflorescences 1 ft. long, compound paniculate; lateral panicles 3–4 in. long, loose. Perianth $\frac{1}{10}$ in. long, white; segments elliptic, acute, fuscous, scarious on margins. Stamens of *Celosia*. Ovary very young; style hardly any, with 2 branches.—*C. dewevreana*, Schinz in Comptes-rendus Soc. Bot. Belg. xxxix. 102.

Lower Guinea. Angola: Golungo Alto; outskirts of the forest in Sobato de Mussengue, *Welwitsch*, 6572!

South Central. Congo Free State, *Dewevre*, 230!

12. **C. leptostachya,** *Benth. in Hook. Niger Fl.* 491. Stem 1–2 ft. long, slender, little divided. Leaves petioled; blade 2 by $\frac{3}{4}$ in., spathulate-ovate-lanceolate. Spike 5 in. long, linear, apparently simple, the small clusters of flowers $\frac{1}{5}$ in. apart, subsessile. Perianth very small, hardly $\frac{1}{16}$ in. long, becoming brown in fruit. Filaments linear, short; anthers round. Capsule rather longer than the perianth, ovoid, several-seeded; style short, shortly 2-fid.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 99, in Engl. Jahrb. xxi. 180; Durand & Schinz, Études Fl. Congo, 232; Lopr. in Engl. Jahrb. xxx. 107.

Upper Guinea. Fernando Po, *Vogel*, 141! Cameroons: Batanga, *Bates*, 156! *Dinklage*, 106.

South Central. Congo Free State: Bangala, *Hens*, 126.

Bentham says the styles are mostly 3-fid: I think not; the over-ripe extruded styles are recurved, often twisted, and deceptive. Except by the style character, I do not see how the species is to be separated from weak examples of *C. trigyna*, Linn.

13. **C. minutiflora,** *Baker in Kew Bulletin*, 1897, 277. Branch 15 in. long, slender, little divided. Leaves small, whitened beneath; lower orbicular, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.; upper $\frac{1}{2}$–$\frac{2}{3}$ in. long, elliptic-oblong. Panicle 6 by $\frac{1}{4}$ in., reduced to a spike; the small clusters of very white flowers standing $\frac{1}{5}$ in. apart, subsessile. Perianth about $\frac{1}{16}$ in. long. Capsule small, ovoid, several-seeded; style hardly any, branches 2.

Mozamb. Dist. German East Africa: Urambo, in Unyamwezi, *Hannington!*

14. **C. nana,** *Baker in Kew Bulletin*, 1897, 277. Plant 4 in. high, branched from the base, glabrous. Leaves oblong or ovate, none so

much as $\frac{1}{4}$ in. long, including the petiole. Panicles terminal, interrupted, of small close cymes. Perianth $\frac{1}{16}$ in. long, scarious straw-coloured, becoming brown. Filaments linear at the top, without interjected teeth. Ovary subglobose, with (sometimes at least) 2–3 basal ovules. Style hardly any; branches 2 short. Capsule constantly 1-seeded.—Hiern in Cat. Afr. Pl. Welw. i. 885.

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 6566, 6566B !

15. **C. populifolia,** *Moquin in DC. Prodr.* xiii. ii. 239, *amending the description.* Undershrub, 2–3 ft. high, little hairy. Leaves petioled; blade ovate-lanceolate, 3 by $1\frac{1}{2}$ in., base rounded or truncate, hardly subcordate. The linear panicles, 4–7 by $\frac{1}{2}$ in., in a copious thyrsus at the end of the branches, when young straw-coloured, later dark-coloured. Cymes small, subsessile, close together, hardly confluent. Perianth-segments $\frac{1}{10}$ in. long, oblong, scarious white, with a dark mark down the back even when young. Filaments linear, without interjected teeth; anthers oblong; pollen globose, 15 μ in diam., with a few large tubercles. Ovary with (often at least) 2 or 3 ovules; style short, with 2 branches. Capsule as long as the perianth, ovoid, invariably 1-seeded.—A. Rich. Tent. Fl. Abyss. ii. 212; Aschers. in Schweinf. Beitr. Fl. Aethiop. 179; Schinz in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. iv. Append. ii. 163. *C. bracheata*, Zarb in Cat. Spéc. Bot. Pfund, 33 ? *Chamissoa populifolia*, Hochst. ex Moquin in DC. Prodr. xiii. ii. 239.

Nile Land. Abyssinia: Modat, *Schimper*, 1038! Togodele, *Ehrenberg!* White Nile, *Schweinfurth*, 938! 1048! *Broun!* Darfur, *Purdy*, 29! Kordofan, *Pfund*, 225!

Hochstetter put this species in *Chamissoa*, because he found the capsule 1-seeded. Moquin transferred it to *Celosia*, stating twice over that the capsule is 2–4-seeded. Among the abundant material I find the capsule always 1-seeded. Hence has arisen much confusion over this species; in particular Schweinfurth 938 and 1048 have both been distributed under the name of *Celosia anthelmintica*, Aschers.

Imperfectly known species.

16. **C. hastata,** *Lopr. in Engl. Jahrb.* xxx. 106. An erect undershrub; branches 3–4 ft. long. Leaves 1–$1\frac{2}{3}$ by $\frac{3}{4}$ in., oblong or linear, petioled, lower hastate, puberulous. Spikes $1\frac{2}{3}$ by $\frac{3}{5}$ in., dense cylindric; flowers 2–5 in a cluster. Perianth straw-coloured, $\frac{1}{6}$ in. long. Filaments subulate, hairy. Style as long as the utricle, 3-fid. Utricle obovoid, circumcissile, with numerous seeds.—Lopr. in Malpighia, xiv. 427.

Mozamb. Dist. German East Africa: Usambara; Muoa, *Holst*, 3124.

3. **HERMBSTÆDTIA,** Reichb.; Benth. et Hook. f. Gen. Pl. iii. 25.

Fertile stamens 5; sterile stamens developed as processes, sometimes alternate with and distinct from the fertile filaments, sometimes fused wholly or partially with these. Otherwise as *Celosia;* with which *Hermbstædtia* agrees perfectly in habit.

Species 15, in Tropical and South Africa.

*Eu-Hermbstædtia.—Sterile stamens alternate with and distinct from the fertile filaments, oblong, divided at the top into two lanceolate lobes.

Leaves 1½ in. long, linear.
- Sterile stamens about as long as the fertile . . 1. *H. recurva.*
- Sterile stamens much longer than the fertile . . 2. *H. elegans.*

Leaves ½–1 in. long,
- Leaves narrowly oblong, parallel-sided . . . 3. *H. dammarensis.*
- Leaves widely obovate . . . . . 4. *H. Gregoryi.*

**Gomphro-Hermbstædtia.—Filaments 5, oblong, slightly widened upwards with two lobes at the top, oblong, divergent or unequal, or very short and almost obsolete; between these lobes is the sessile anther.

This subgenus has been put back into *Celosia* by Schinz and Lopriore; a view which involves the assumption that the 5 stamens which are fertile in *Eu-Hermbstædtia* are sterile in *Gomphro-Hermbstædtia.* It is preferable, with J. G. Baker, to suppose the bifid processes of the former to be yet more deeply bifid in the latter and fused in separate halves with the fertile filaments. What Lopriore regards as a very broad filament is then a linear filament fused on either side with half a sterile filament.

Lateral lobes at the top of the filament manifest
- Style 3-fid.
  - Perianth ⅓–⅖ in. long . . . . . 5. *H. argenteiformis.*
  - Perianth ¼ in. long or less.
    - Heads short ovoid . . . . . 6. *H. Schinzii.*
    - Heads cylindric . . . . . 7. *H. falcata.*
- Style 2-fid . . . . . 8. *H. linearis.*

Lateral lobes at the shoulder of the filament obscure or obsolete.
- Plant nearly glabrous . . . . . 9. *H. longistyla.*
- Stem and leaves pubescent, at least when young.
  - Stem hairy even in age . . . . . 10. *H. scabra.*
  - Stem in age nearly glabrous . . . . 11. *H. Fleckii.*

***Pseudo-Hermbstædtia—Filaments 5, depressed-ovate; on the summit of each is a short or minute fertile filament. This subgenus has also been put back into *Celosia* by Schinz and Lopriore. It is supposed here that the broad ovate part of the filaments is formed of the fertile filaments fused in some way with the sterile. At all events, the line between *H. scabra* (with the lateral processes at the top of the filament sometimes nearly obsolete) and *H. angolensis* (with no trace of such processes) is so narrow that the two species must be placed in the same genus.

- Leaves 1½ by ⅓ in., oblong . . . . . 12. *H. angolensis.*
- Leaves ½ by ⅙ in., obovate . . . . . 13. *H. spathulæfolia.*

1. **H. recurva,** *C. B. Clarke.* Rhizome thickened, very long, perpendicular. Stem 1 ft. long, divided repeatedly from the base. Leaves 1–1½ in. long, linear, the lower linear-oblong, nearly glabrous. Spikes ¼ in. broad, continuous, simple, ½–1½ in. long. Perianth ⅛ in. long; segments oblong, triangular at the tip, striate on the back, more or less pink on the back when young, fuscous in fruit. Filaments linear, shorter than the staminal tube; anthers small, round; pollen globose, 20 μ in diam., tubercled; interjected processes (infertile stamens?) scarcely longer than the stamens, quadrate-oblong, divided at the top into two lanceolate spreading segments. Style very short, 3-fid. Capsule ovoid, with few seeds.—*H. Caffra,* Moquin in DC. Prodr. xiii. ii. 246,

? partly; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100, ? partly; Lopr. in Engl. Jahrb. xxx. 106, ? partly. *H. elegans*, var. *β recurva*, Moquin in DC. Prodr. xiii. ii. 247. *Celosia recurva*, Burchell, Travels, ii. 226.—Not *Lestiboudesia? Caffra*, Meisn.

Lower Guinea. Hereroland, *Fischer*, 27.

Also in South Africa.

Lestiboudesia? Caffra, Meisn. (in Hook. *London Journ. Bot.* ii. 1843, 549, misprinted 449), is a much larger plant than this, with spathulate-oblong leaves; Meisner's type is Krauss 37 from Natal, in the British Museum, in which the styles are all 2-fid. It was perhaps owing to the difficulty Meisner had in seeing them 3-fid that he put a ? after the genus *Lestiboudesia*.

2. **H. elegans,** *Moquin in DC. Prodr.* xiii. ii. 247. Branches 12–18 in. long, divided. Leaves 1–1½ in. long, linear or narrow-oblong, glabrous. Spikes terminal, cylindric, nearly continuous, ⅓–⅖ in. broad, 2–9 in. long. Perianth nearly ⅙ in. long. Filaments very short, linear; anthers oblong; interjected processes much overtopping the stamens, divided at the top into two lanceolate spreading segments. Ovary and capsule as of *H. Caffra*.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 G, 106. *Celosia odorata*, Burchell, Travels, i. 389; Moquin in DC. Prodr. xiii. ii. 244.

Mozamb. Dist. Bechuanaland: Kobis to North Shaw Valley, *Baines!* Kalahari Desert, near Bachakuru, *Lugard*, 236!

Frequent in South Africa.

3. **H. dammarensis,** *C. B. Clarke.* Nearly glabrous. Leaves ½–1 by ⅛–⅙ in., very obtuse, parallel-sided. Spikes several, 1–4 by ½–⅗ in., white, dense. Perianth ⅕ in. long; segments broadly elliptic, very obtuse. Staminal tube large; interjected processes bifid, about as long as the stamens. Young fruit ovoid; style very short; branches 3, thick, rather long, recurved.

Lower Guinea. Dammaraland, *Een!*

This species is very distinct by the usually broad rounded white perianth-segments.

4. **H. Gregoryi,** *C. B. Clarke.* A branched rigid undershrub, 10 in. high, nearly glabrous. Leaves ⅘ by ⅖ in., strongly obovate, rounded at the top, much narrowed at the base. Spikes very dense, 2 by ⅖ in., white. Perianth ⅙ in. long; segments round-elliptic. Processes (interjected between the linear filaments) about as long as the fertile stamens, deeply bifid. Young capsule ovoid-conic; style about ⅓ the length of the capsule; branches 3, small.

Nile Land. British East Africa: Tana River, *Gregory.*

5. **H. argenteiformis,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxxi. 209. Nearly glabrous, branched, 2 ft. high. Leaves 1½ by ⅛ in. Spikes terminal, dense, continuous, scarious white, ⅔ in. broad, long-cylindric or ovoid. Perianth ⅓–⅖ in. long; segments broad-oblong, triangular at the tip, 3-nerved on the back. Filaments fertile 5, ovate-oblong (by union with the barren filaments), the apparent filament

prolonged at the tip into two oblong processes as long as the subsessile oblong anther between them. Ovary narrowed into the long style, 3-fid at the top. Capsule hardly $\frac{1}{8}$ in. long, ovoid, few-seeded.—*H. Welwitschii*, Baker in Kew Bulletin, 1897, 278. *Celosia argenteiformis*, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100, in Engl. Jahrb. xxi. 189, in Bull. Herb. Boiss. 1 sér. v. Append. iii. 63, incl. var. *oblongifolia;* Hiern in Cat. Afr. Pl. Welw. i. 886; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 D. *C. Toenjesii*, Schinz in Bull. Herb. Boiss. 2 sér. iii. 8 (44).

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6502! German South-west Africa: Hereroland, *Nels! Belck*, 33, 45, *Guerich*, 126, *Fleck*, 732; Amboland, *Wulfhorst*, 25, *Toenjes*, 19, 25; Great Namaqualand; Rehoboth, *Fleck*, 35, 174A, 653, 939.

6. **H. Schinzii,** *C. B. Clarke.* An erect, nearly glabrous annual, 5–8 in. high. Leaves $\frac{1}{2}$–$1\frac{1}{4}$ by $\frac{1}{12}$ in. Spikes terminal, $\frac{1}{2}$ by $\frac{2}{5}$ in., shortly ovoid, dense, scarious white. Perianth $\frac{1}{4}$ in. long; segments broadly oblong, shortly acute, 3-nerved on the back, often pink on the back when young. Filaments fertile 5, broad-oblong, the apparent filament prolonged at the top into two oblong processes overtopping the oblong anther between them. Ovary ellipsoid, narrowed upwards into a short style, 3-fid at the top. Capsule ellipsoid, narrower upwards, several-seeded.—*Celosia linearis*, Schinz in Bull. Herb. Boiss. v. Append. iii. 64, partly, not any part of *Hermbstædtia linearis*, Schinz.

Lower Guinea. German South-west Africa: Amboland; Ondongo, *Rautanen*, 73!

This plant is easily separated from *Hermbstædtia linearis*, Schinz, by its 3-fid style; apart from that character, the heads and perianth are different. In his later diagnoses of new species Schinz rarely tells us whether the style is 2-fid or 3-fid.

7. **H. falcata,** *C. B. Clarke.* An annual, 10 in. high, much branched from the base. Leaves $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{10}$ in. Spikes 3 by $\frac{2}{5}$ in., cylindric, dense (or slightly interrupted at the base). Staminal tube and anthers as of *H. Schinzii*. Style 3-fid. Capsule as of *H. Schinzii*.—*Celosia falcata*, Lopriore in Engl. Jahrb. xxvii. 58, xxx. 5, 104, fig. 1 F, in Malpighia, xiv. 427.

Lower Guinea. Angola: Huilla; between Mossamedes and Capangamba, *Capello*, 4.

Not seen. From the full description of Lopriore, this species must be very close to *H. Schinzii*, possibly the full form of that species; it differs in being a stouter plant, with the inflorescence 3 in. long and cylindric, instead of $\frac{1}{2}$ in. long and ovoid.

8. **H. linearis,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxxi. 210. Nearly glabrous, much branched, 1 ft. high. Leaves 1 by $\frac{1}{12}$ in. Spikes terminal, $\frac{1}{3}$ in. broad, long-cylindric or short-ellipsoid, continuous, not dense. Perianth $\frac{1}{5}$ in. long, scarious; segments broad-oblong, hardly acute, 3-nerved on the back, pink on the back when young. Filaments fertile 5, broadly oblong (*i.e.* combined with the 5 sterile), produced at the top into two short lateral elliptic lobes, much shorter than the elliptic anther between them. Style long, 2-fid. Capsule ovoid,

narrowed at the top, several-seeded.—*Celosia linearis*, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 99, fig. 51 D, and 100, in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. 1 sér. v. Append. iii. 64 partly; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 E.

Lower Guinea. German South-west Africa: Amboland; Upingtonia, *Schinz*, 1 Dr. Schinz united this with *H. Schinzii*.

9. **H. longistyla,** *C. B. Clarke.* Nearly glabrous. Leaves 1–1½ by ⅕ in., narrowly elliptic. Spikes several, terminal one 1¼ by ⅗ in., dense, lateral ovoid. Perianth ¼ in. long; segments narrowly elliptic, hardly acute, pink on the back. Filaments 5 (apparently), oblong, slightly widened at the top with a very small lateral process on each side; anther large, oblong, subsessile between the two processes. Style ⅙–⅕ in. long, four times as long as the ovary, 3-branched at the tip.

Lower Guinea. Dammaraland; *Een!*

10. **H. scabra,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxxi. 209. Stem 2 ft high, almost shrubby, laxly and thinly hairy. Leaves 1½–2 by ⅓–½ in., oblong or narrowly elliptic, obscurely and laxly hairy. Spikes terminal, 2 by ½ in., continuous but not dense. Perianth ¼ in. long or rather longer, scarious white; segments broadly oblong, hardly acute, 3-nerved on the back, sometimes pink on the back when young. Filaments fertile 5, broad-oblong; the apparent filament prolonged at the top into two processes shorter than the intermediate oblong anther, often unequal or very small. Style very long, much exserted from the perianth, 3-fid. Capsule small ovoid, narrowed at the top, few-seeded. —*Celosia scabra*, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 100, in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. v. Append. iii. 64; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 C.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 3! *Rautanen*, 74! 52.

Mozamb. Dist. Ngamiland: Kwebe Hills, *Lugard*, 151! *Mrs. Lugard*, 196!

Schinz (in *Bull. Herb. Boiss. 2 sér.* iv. 8 (44) in obs.) says this species is of subgenus *Pseudo-Hermbstædtia*, because the filaments are not lobed at the top. The lobes are shorter than the anther; but the oblong "filaments" widened at the top (not broad-ovate, as in *Pseudo-Hermbstædtia*) place this species in the subgenus *Gomphro-Hermbstædtia*.

11. **H. Fleckii.** Annual. Leaves 1½ by ⅛ in., obtuse, pubescent when young, soon glabrate. Spikes cylindric, interrupted at the base. Perianth-segments ⅕ in. long, acute, when young rose-coloured on the back. Filaments not lobed at the top. Style-branches not described. Allied to *C. scabra*, Schinz, but much less hairy.—*Celosia Fleckii*, Schinz in Bull. Herb. Boiss. 2 sér. iii. 8 (44).

Lower Guinea. Great Namaqualand: Rehoboth, *Fleck*, 35, 939.

Not seen. Schinz puts this in the subgenus *Pseudo-Hermbstædtia*, because he considers *Celosia scabra* to be of the same subgenus.

12. **H. angolensis,** *C. B. Clarke.* Nearly glabrous; stem 1–2 ft. high. Leaves 1½ by ⅓ in., oblong. Spikes terminal, ½–⅔ in. wide, dense, scarious straw-coloured, cylindric or ovoid. Perianth ¼ in. long; segments broadly oblong, subacute, 3-nerved on the back. Staminal tube divided at the top into 5 broadly ovate segments, rounded at the top; on the summit of each is a minute linear filament carrying the oblong anther. Style rather short (hardly half the length of the young capsule), with 3 short recurved branches. Capsule narrowly ellipsoid, several-seeded.—*Celosia Welwitschii*, Schinz in Engl. Jahrb. xxi. 179, 180, in Engl. & Prantl, Pflanzenfam. iii. 1A, 100; Hiern in Cat. Afr. Pl. Welw. i. 885; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 A; not *Hermbstædtia Welwitschii*, J. G. Baker.

Lower Guinea. Angola: Huilla, 3800–5500 ft., *Welwitsch*, 6486! 6490

13. **H. spathulæfolia,** *J. G. Baker.* A small, nearly glabrous, much-branched undershrub, 6–12 in. high. Leaves ½ by ⅙ in., obovate, obtuse. Spikes terminal, sessile, ⅓–½ in. in diam., depressed-globose, scarious straw-coloured, rather dense. Perianth ⅓ in. long; segments broadly oblong, acute, 3-nerved on the back. Staminal tube divided at the top into 5 broadly ovate obtuse segments, rounded at the top; on the summit of each is a linear (moderately long) filament carrying the elliptic anther. Style long, 3-branched. Capsule ovoid, narrowed at the top, several-seeded.—*Celosia spathulæfolia*, Engl. in Engl. Jahrb. x. 6; Schinz in Engl. Jahrb. xxi. 180, in Bull. Herb. Boiss. v. Append. iii. 64; Lopr. in Engl. Jahrb. xxx. 5, 104, fig. 1 B. *C. intermedia*, Schinz in Engl. Jahrb. xxi. 179, 180, in Bull. Herb. Boiss. v. Append. iii. 64, not of Hochst.

Lower Guinea. German South-west Africa: Hereroland; Hykamkab, 800 ft., *Marloth*, 1205! *Nees*, 62. Damaraland; Otjimbingue, *Lindner!* Great Namaqualand; Rehoboth, *Fleck*, 177A!

There may be two species here, as *C. intermedia*, Schinz, is larger than *C. spathulæfolia*, Schinz, but they must be very nearly allied, the staminal tube being identical.

4. DIGERA, Forsk.; Benth. et Hook. f. Gen. Pl. iii. 28.

Flower 2-sexual. Perianth 4–5-fid, nearly to the base; segments oblong, membranous, erect in fruit. Stamens 5; filaments 5, linear, without rudimentary stamens between them; anthers 2-celled, oblong; pollen globose, 20 μ in diam., irregularly tubercled. Ovary ellipsoid, flattened; style filiform, 2-fid; ovule 1, erect. Nut globose, crustaceous; seed 1, subglobose; embryo annular.—Annual; leaves alternate; flowers spicate, in clusters of 3, the middle one perfect, the two lateral rudimentary. Bract 1; bracteoles 2, not prickly.

Species 1 (or 2), in Tropical Africa and Asia.

1. **D. arvensis,** *Forsk. Fl. Ægypt.-Arab.* cvi. *and* 65. An annual, 8–20 in. high, branched from the base, usually nearly glabrous, some-

times with many feeble hairs on the stems and leaves. Leaves alternate; blade 2 in. long, lanceolate or subovate, entire, cuneate at the base; petiole 1 in. long. Peduncles axillary, 1–3 in. long; spikes 1–4 in. long, nearly continuous. Perianth $\frac{1}{6}$ in. long; segments elliptic, subacute. Style 2–3 times the length of the young ovary. Nut $\frac{1}{12}$ in. in diam.—Moquin in DC. Prodr. xiii. ii. 324; Hook. f. Fl. Brit. Ind. iv. 717; Zarb in Cat. Spéc. Bot. Pfund, 33; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 141, and ser. 2, Bot. ii. 348; Dur. & Schinz, Études Fl. Congo, i. 232. *D. alternifolia*, Aschers. in Schweinf. Beitr. Fl. Aethiop. 180; Boiss. Fl. Orient. iv. 994; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 104, and 93, fig. 46 G, in Bull. Herb. Boiss. iv. Append. ii. 164, in Engl. Pfl. Ost-Afr. C. 172; not *Achyranthes alternifolia*, Linn. f.

Nile Land. Ethiopia, *Kotschy*, 119! Nubia: Suakin to Berber, *Schweinfurth*, 444! Eritrea; *Schweinfurth*, 11, 131, 225. Abyssinia: between Hawash and Maki Rivers, *Welby!* Kordofan; *Kotschy*, 114! 128! Khartoum, *Petherick!* White Nile, *Schweinfurth*, 900 (or 906?)! Nile, near El Damar, *Grant!* Blue Nile, *Muriel*, 77! British East Africa: Lake Rudolph, *Welby!* Lake Stephanie, *Donaldson Smith!* Baringo, 3400 ft., *Johnston!* Taita; Maungu Mountain, 2000 ft., *Johnston!* Tana River, *Gregory!* near Mombasa, *Johnston!* between Mombasa and Witu, *Whyte!*

South Central. Congo Free State; Lisha, *Hens*, 370; Lutete, *Hens*, 216.

Mozamb. Dist. German East Africa: Usambara; Pangani, *Volkens*, 459! Mascheua, *Holst*, 8718!

Extends to India—a weed.

5. **AMARANTHUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 28.

Flowers polygamo-diœcious; the central flower of a cluster often perfect, the lateral reduced, sometimes male or obsolete, never spinescent. Perianth of the perfect flower 5- or 3-fid, or 3-fid with sometimes 2 smaller interior segments added (as shown by Schinz for one species). Stamens 5, 3, or fewer; filaments linear, nearly free, without interjected rudiments; anthers 2-celled, shortly oblong; pollen small, globose, irregularly tubercled. Ovary ellipsoid; ovule 1, on a basal funicle; style short, with 2–3 short linear branches. Fruit mostly membranous, more or less definitely a pyxis, sometimes indehiscent; seed globose, compressed; embryo annular.—Annuals. Leaves alternate, simple, entire, long-petioled, tip often obtuse or emarginate, nearly always glabrous; principal nerves parallel, straight, often conspicuous. Flowers in clusters, arranged in dense heads or long (loose or dense) spikes; bract 1; bracteoles 2, in many species overtopping the flower, in some species shorter than it.

Species 25; common weeds in all the warmer parts of the world; the first two species extensively cultivated as grain (the small abundant seeds).

This genus has been subdivided on the character of the fruit, a pyxis or a berry; and on the character of the perianth, 5-fid or 3-fid.

As to the fruit.—The pyxis in *A. caudatus* and *A. tricolor* is very thin, neatly circumscissile, the seeds all scattered early. In *A. viridis* it is herbaceous, wrinkled,

the seed never escaping. In *A. Blitum* it is sometimes thin, more or less dehiscent, but not rarely it becomes succulent and is altogether indehiscent. In most of the other species the fruit is thin.

In some of the species with 3-merous perianth, two additional segments (smaller and interior) are added in the stronger perfect flowers, as shown by Schinz (in Engl. & Prantl, Pflanzenfam. iii. 1A, 93, t. 46, fig. A). Boissier says the perianth in *A. gangeticus* (*tricolor*, Linn.) is always 5-fid.; Hooker f. says it is 3-fid. Both Moquin and others found their *Euxolus caudatus* with 3 perianth-segments on a plate which shows 5 perianth-segments (as see under *A. viridis*, below). As far as I have seen, the small-flowered species of *Amaranthus* have always 3 perianth-segments. In the subjoined table of species I have endeavoured to evade these disputed points.

Spikes linear, panicled at the ends of the branches; some shorter axillary spikes sometimes added.	
Perianth-segments $\frac{1}{10}$ in. long, overtopping the fruits.	
Perianth-segments 5; axillary spikes rare . .	1. *A. caudatus.*
Perianth-segments 3; axillary spikes frequent .	2. *A. tricolor.*
Perianth-segments $\frac{1}{16}$ in. long, about as long as the fruits.	
Lower leaves (some of them) with 2 axillary spines .	3. *A. spinosus.*
Plants without spines.	
Fruit a pyxis	4. *A. patulus.*
Fruit wrinkled, herbaceous, indehiscent . .	5. *A. viridis.*
Spikes axillary, running into a single oblong dense spike	6. *A. oleraceus.*
Spikes all axillary, short.	
Perianth-segments long-lanceolate, overtopping the fruits	7. *A. græcizans.*
Perianth-segments suddenly acute, hardly as long as the fruit.	
Decumbent, much branched	8. *A. Blitum.*
Branches elongate	9. *A. polygamus.*

1. **A. caudatus,** *Linn. Sp. Pl. ed.* 1, 990, *ed.* 2, 1406. An erect annual, 1–3 ft. high. Leaf-blade narrow-elliptic, 2–5 in. long, sometimes a foot long. Spikes numerous (often 20, sometimes 80), 1–4 in. long, dense, in a dense terminal panicle (the terminal spike often 6 in. long) yellowish, usually becoming brown in fruit. Perianth $\frac{1}{10}$ in. long, of 5 oblong scarcely acute segments, many with a short subterminal mucro; bracts (many of them) long-cuspidate, overtopping the perianth. Capsule membranous, ultimately circumscissile; style-branches (usually 3) very long; seeds yellow with a rounded margin, or black with a compressed margin.—Moquin in DC. Prodr. xiii. ii. 255; A. Rich. Tent. Fl. Abyss. ii. 213; Aschers. in Schweinf. Beitr. Fl. Aethiop. 176; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 140; Hook. f. Fl. Brit. Ind. iv. 719; Zarb in Cat. Spéc. Bot. Pfund, 33; Boiss. Fl. Orient. iv. 988; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 103, fig. 56; Engl. Hochgebirgsfl. Trop. Afr. 205; Engl. Pfl. Ost-Afr. C. 172; Hiern in Cat. Afr. Pl. Welw. i. 886; Durand & Schinz, Études Fl. Congo, i. 233; Schinz in Bull. Herb. Boiss. iv. Append. ii. 163. *A. paniculatus*, Hook. Niger Fl. 492; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 103; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85; Schinz in Bull. Herb. Boiss. v. Append. iii. 64;

cf. Lopr. in Engl. Jahrb. xxx. 34, 35. *A. alopecurus* and *A. sanguineus*, A. Braun & Bouché in Ind. Sem. Hort. Berol. 1872, Append. 1–2.

Upper Guinea. Sierra Leone: Sherboro, *Scott-Elliot*, 5761! Scarcies, *Scott-Elliot*, 4653! Quorra (Niger) River, *Vogel*, 129!

Nile Land. Kordofan, *Pfund*, 258! Galabat: Matamma, *Schweinfurth*, 619, 620! Abyssinia: near Adowa, *Schimper*, 359! 1077! 1513! 1535! 1537! Amba Sea, 6500 ft., *Schimper*, 276! and without precise locality, *Quartin-Dillon & Petit*, 98 (185)! *Pearce!* Madi, *Speke & Grant*, 449! Uganda: Kampala, *Scott-Elliot*, 7301! British East Africa: Ribe, *Wakefield!*

Lower Guinea. Lower Congo: Embowa, *Burton!* Stanley Pool, 900 ft., *Hens*, B, 99! Bingila, *Dupuis!* Angola: Golungo Alto, *Welwitsch*, 6513B! Cazengo, *Welwitsch*, 6513! Loanda, *Welwitsch*, 6512! German South-west Africa: Amboland; Olukonda, *Schinz*, 2, *Rautanen*, 138.

Mozamb. Dist. German East Africa: Karagwe, *Speke & Grant*, 449! and without precise locality, *Busse*, 182! Portuguese East Africa: Mozambique, *Forbes!* Zambesi, *Stewart!* Nyasaland: North Nyasa, *Scott!* Nyika Plateau, *McClounie*, 159! Kondowe to Karonga, 2000–6000 ft., *Whyte!* near Muata Manja stream, 4000 ft., *Kirk!* Manganja Hills, *Meller!* Likoma Islands, *Johnson*, 31!

Cultivated throughout warm Africa as a grain; as is *A. paniculatus* throughout India; the two are separable, as the red wheat of Essex is separable from the white wheat of Wilts. In accordance with the canon of Darwin, the nut, being the part economically used, is the part of the plant that varies; see the excellent account by Hook. f. (*Fl. Brit. Ind.* iv. 719).

2. **A. tricolor,** *Linn. Sp. Pl. ed.* 1, 989, *ed.* 2, 1403. An erect annual, 1–5 ft. high. Leaf-blade spathulate-ovate, acuminate, often 4 in. long; petioles 1–2½ in. long. Spikes numerous, the terminal one long-cylindric, often with several penultimate forming a panicle; nearly always axillary spikes, even in the lower axils, are added. Perianth $\frac{1}{10}$ in. long; segments 3, lanceolate, acuminate, mucronate; bracts long-awned, equalling or overtopping the perianth. Capsule membranous, ultimately circumscissile; style-branches usually 3.—Hiern in Cat. Afr. Pl. Welw. i. 887. *A. melancholicus*, Linn. Sp. Pl. ed. 1, 989, ed. 2, 1403; Schinz in Bull. Herb. Boiss. iv. Append. ii. 163. *A. gangeticus*, Linn. Syst. Nat. ed. 10, 1268, Sp. Pl. ed. 2, 1403; Moquin in DC. Prodr. xiii. ii. 261; Hook. Fl. Brit. Ind. iv. 719; Schinz in Bull. Herb. Boiss. iv. Append. ii. 163. *A. tristis*, Garcke in Peters, Reise Mossamb. Bot. 504; Linn. Sp. Pl. ed. 1, 989?

Nile Land. Eritrea: Ginda, 3000 ft., *Schweinfurth & Riva*, 2180! Massowa, *Schweinfurth*, 231; Geleb, 6000 ft., *Schweinfurth*, 1148. Galabat: Matamma, *Schweinfurth*, 615, 617!

Lower Guinea. Angola: Loanda, 0–1000 ft., *Welwitsch*, 6516!

Mozamb. Dist. Mozambique, *Forbes!*

In India, cultivated and a weed.

Boissier (*Fl. Orient.* iv. 990) says that he found, in his specimens of *A. gangeticus* from India, the perianth-segments always 5. From this it would appear that his specimens were some form of *A. caudatus*.

3. **A. spinosus,** *Linn. Sp. Pl. ed.* 1, 991, *ed.* 2, 1407. Stem 1–3 ft. high, suberect. Leaves long-petioled; blade 2–3 in. long, ovate,

narrowed upwards, shortly cuneate at the base; two stipulary spines, $\frac{1}{4}$ in. long, in the axils of some of the lower petioles. Spikes cylindric, about $\frac{1}{4}$ in. broad, the upper long, often closely panicled, the terminal often 3–4 in. long, sometimes much interrupted at the base; in the lower axils globose spikes are often added. Bracts shortly ovate, cuspidate, hardly overtopping the flowers. Perianth hardly $\frac{1}{16}$ in. long; segments 5, oblong, often mucronate. Style often 2-fid. Capsule membranous, circumscissile.—Hook. Niger Fl. 492; Moquin in DC. Prodr. xiii. ii. 260; Hook. f. Fl. Brit. Ind. iv. 718; Schinz in Engl. Pfl. Ost-Afr. C. 172; Schlechter, Westafr. Kautsch.-Exped. 287; Hiern in Cat. Afr. Pl. Welw. i. 887.

Upper Guinea. Senegambia, *Heudelot*, 735! Gambia: Bathurst, *Brunner*, 159! Sierra Leone: Sherboro, *Scott-Elliot*, 5834! Freetown, *Welwitsch*, 6514! *Vogel*, 13! Liberia: near Kakatown, *Whyte!* Gold Coast: Aburi, *Brown*, 411! Ashanti, *Cummins*, 32! Lagos, *Maloney!* Togo: near Lome, *Warnecke*, 292! Fernando Po; *Vogel! Mann*, 32!

Lower Guinea. Angola: Ambriz, *Welwitsch*, 6515!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1037! Nyasaland: Ntondwe *Cameron*, 127!

Also in India.

4. **A. patulus,** *Bertol. Comm. Neap.* 19, *t.* 2. Stem 1–3 ft. long, less erect and more branched than in *A. caudatus.* Leaves 2–3½ in. long, ovate, narrowed upwards; no spines in the axils. Spikes cylindric, about $\frac{1}{4}$ in. broad, the upper long, often closely panicled, the terminal often 3–4 in. long; in the lower axils globose spikes are often added. Bracts ovate, cuspidate, about as long as the perianth, or frequently shorter than it. Segments of the perianth 5, broadly oblong, obtuse, scarcely mucronate. Capsule thin (the seed escaping), more or less distinctly circumscissile.—Webb & Berth. Iles Canaires, Phyt. iii. 286; Boiss. Fl. Orient. iv. 989.

Nile Land. British East Africa; Tana River, *Gregory!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1036! German East Africa: Usambara; Tanga, *Holst*, 2068! Amboni, *Holst*, 2771! and without precise locality, *Busse*, 183! Portuguese East Africa: Mozambique, *Scott!* British Central Africa: North Nyasa, *Whyte!*

A native of the Southern United States, now spread in the Mediterranean region, with the Cape Verde Isles and the Canaries.

This plant is issued by Gilg without a specific name. It differs from most of the plants with which it has been mixed by the short bracts. It is, in one word, *Amaranthus spinosus,* Linn., without any spines. It is reduced by Moquin (in *DC. Prodr.* xiii. ii. 259) to *A. chlorostachys,* Willd., a plant with "acuminate sepals," as Moquin says; and which does not, therefore, match it superficially.

5. **A viridis,** *Linn. Sp. Pl. ed.* 2, 1405. Suberect, 1–3 ft. high. Leaves long-petioled; blade 1–3 in. long, ovate or elliptic. Spikes linear, the terminal 2–4 in. long, panicled towards the ends of the branches, much looser than in the allied species, the pedicels visible. Perianth $\frac{1}{16}$ in. long; segments 3, elliptic, acute. Fruit as long as the perianth, indehiscent, wrinkled, shrinking on the nut, herbaceous,

not membranous, with no trace of a transverse line.—Hook. f. Fl. Brit. Ind. iv. 720; Hiern in Cat. Afr. Pl. Welw. i. 888; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85; Durand & Schinz, Études Fl. Congo, i. 233 (excl. syn. *Euxolus viridis*, Moquin). *Euxolus caudatus*, Hook. Niger Fl. 492 in obs.; Moquin in DC. Prodr. xiii. ii. 274, partly. *Chenopodium caudatum*, Jacq. Ic. Pl. Rar. t. 344? *Albersia caudata*, Boiss. Fl. Orient. iv. 992; Schinz in Bull. Herb. Boiss. iv. Append. ii. 164.

Upper Guinea. Togo: near Lome, *Warnecke*, 295! 363. Northern Nigeria: Nupe, *Barter*, 1055!

Nile Land. Eritrea, *Schweinfurth*, 191, 231, 1433.

Lower Guinea. Lower Congo, *Burton!* Tondoa, *Buettner*, 322. Angola: Loanda, *Welwitsch*, 6512, 6517! *Gossweiler*, 277! Barra do Bengo, *Welwitsch*, 6518! Golungo Alto, *Welwitsch*, 6519! Mossamedes, *Welwitsch*, 6520!

South Central. Congo Free State: Lunfundi? *Demeuse.*

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, between Tete and Kaorabassa Rapids, *Kirk!*

Widely distributed in warm countries—a weed.

This species is easily recognised by the small pedicellate flowers in panicled long spikes; also by the absolutely indehiscent herbaceous fruits.—Jacquin (*Ic. Pl. Rar.* t. 344) shows the perianth-segments 5, equal; which, so far as known, does not occur in this species. Either, therefore, the synonymy of Moquin (and others) founded on it falls to the ground, or an error must be assumed in the plate.

6. **A. oleraceus,** *Linn. Sp. Pl. ed.* ii. 1403. Inflorescence copiously axillary, the terminal running into a dense cylindric leafless mass; otherwise as *A. polygamus*, Linn.—Forsk. Fl. Ægypt.-Arab. cxxi. *A. Blitum*, var. *oleracea*, Hook. f. Fl. Brit. Ind. iv. 721. *Euxolus viridis*, Moquin in DC. Prodr. xiii. ii. 273; ? Hook. Niger Fl. 492. *Albersia oleracea*, Kunth, Fl. Berol. ii. 144; Boiss. Fl. Orient. iv. 991.

Upper Guinea. Senegal, *Farmar*, 3! 24!

Nile Land. Abyssinia: near Adowa, *Schimper*, 1069!

Mozamb. Dist. Portuguese East Africa: Machemga, *Johnson*, 269! British Central Africa: Nyasaland; near Mbashe Lagoon, *Scott!* near Zomba, *Whyte!*

In all warm countries—a weed.

Var. β *maxima*, C. B. Cl. Leaf-blade $4\frac{1}{2}$ by $2\frac{1}{2}$ in.; terminal inflorescence 4 by 1–$1\frac{1}{4}$ in., dense; fruits thin, larger than in *A. oleraceus*, the seeds plentifully escaping.

Nile Land. Uganda: Ruwenzori, "in banana patches," *Scott-Elliot*, 7941!

I suppose this to be a garden (or cultivated?) form of *A. oleraceus*, Linn.

7. **A. græcizans,** *Linn. Sp. Pl. ed.* i. 990, *ed.* ii. 1405. Decumbent or spreading; branches 1–2 ft. long. Leaves long-petioled; blade 1–2 in. long, elliptic, narrowed at either end. Spikes globose, copious, axillary, the uppermost running sometimes into a single terminal oblong inflorescence 1–$1\frac{1}{2}$ in. long. Perianth-segments 3 (2 inner rather narrower added in the well-developed bisexual flowers), broadly elliptic,

subobtuse, with a long filiform recurved tail, about $\frac{1}{16}$ in. long exclusive of the tail. Bracts elongate-lanceolate, mucronate, as long as the perianth-segments (including their tails). Capsule thin, circumscissile. —Zarb in Cat. Spéc. Bot. Pfund, 33; Aschers. in Schweinf. Beitr. Fl. Aethiop. 176; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 93, fig. A, in Bull. Herb. Boiss. iv. Append. ii. 163, in Engl. Pfl. Ost-Afr. C. 172; Engl. Hochgebirgsfl. Trop. Afr. 206; Hiern in Cat. Afr. Pl. Welw. i. 887. *A. Thunbergii*, Moquin in DC. Prodr. xiii. ii. 262. *A. Blitum*, var. δ *græcizans*, Moquin, l.c. 263.

Nile Land. Eritrea, *Schweinfurth*, 39, 64, 528.

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6527! 6528! Huilla, *Welwitsch*, 6497!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi at Shupanga, *Kirk!* British Central Africa: Nyasaland; Fort Hill, *Whyte!* Shire Valley, *Scott!*

This is a larger plant than *A. Blitum*, Linn., with larger leaves and flowers, and much longer tails to the perianth-segments. In Engl. & Prantl, *Pflanzenfam.* iii. 1A, 103, *A. viridis*, Linn., is referred to this species, to which I do not accede.

8. **A. Blitum,** *Linn. Sp. Pl. ed.* i. 990, *ed.* ii. 1405. A glabrous, much-branched, small annual, decumbent or erect, rarely more than 15 in. high. Leaves (including the petiole) usually small, $\frac{1}{2}$–$1\frac{1}{2}$ (rarely 2) in. long, varying from narrow-oblong to obovate. Inflorescence copious, entirely axillary. Perianth hardly $\frac{1}{16}$ in. long, shorter than the fruit; segments 3, elliptic or lanceolate. Fruit small, $\frac{1}{12}$–$\frac{1}{10}$ in. long, ovoid; sometimes succulent, indehiscent; sometimes thin, the seed escaping, more or less obscurely circumscissile.—Forsk. Fl. Ægypt.-Arab. cxxi; Moquin in DC. Prodr. xiii. ii. 263, partly; Hook. f. Fl. Brit. Ind. iv. 721; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 103, in Engl. Pfl. Ost-Afr. C. 172; Hiern in Cat. Afr. Pl. Welw. i. 888. *A. sylvestris*, Zarb in Cat. Spéc. Bot. Pfund, 33 ? *A. Dinteri*, Schinz in Mém. Herb. Boiss. xx. 15 e descript. *Euxolus polygamus*, Hook. Niger Fl. 492. *Albersia Blitum*, Kunth, Fl. Berol. ii. 144; Boiss. Fl. Orient. vi. 991.

Upper Guinea. French Sudan; Lom, *Chevalier*, 1022! Gold Coast: Accra, *Vogel*, 21! Southern Nigeria: Onitsa, *Barter*, 539! Northern Nigeria: Kuka, *Vogel*, 31! Nupe, *Barter*, 1716! 1727!

Nile Land. Nubia: sea-coast, *Lord! Bent!* Suakin, *Schweinfurth*, 625! Ethiopia, *Kotschy*, 167! Abyssinia, *Schimper*, 489! Kordofan, *Pfund*, 147! 500! *Kotschy*, 48! Uganda, *Bagshawe!* British East Africa: Gilgil River, *Scott-Elliot*, 6664!

Lower Guinea. Angola: Loanda, *Welwitsch*, 6524! 6525! Icolo e Bengo; on the coast, *Welwitsch*, 6523! Golungo Alto: about Sange, *Welwitsch*, 6521! Cazengo; base of Muxaula Mountain, *Welwitsch*, 6526! Pungo Andongo; Condo, *Welwitsch*, 6522!

Mozamb. Dist. German East Africa: Dar-es-Salaam, *Hildebrandt*, 1035! British Central Africa: Nyasaland; between Mpata and the Tanganyika Plateau, 2000–3000 ft., *Whyte!* Namasi, *Cameron*, 23! Shire Highlands, *Scott-Elliot*, 8634!

In all warm countries.

Sir J. D. Hooker has examined *Amarantaceæ* with great exactness, and has named the Tropical African species in Kew herbarium. I follow him closely, and have nothing to add (as regards the present group) to his remarks (cited above in the *Flora Brit. Ind.*). *A. Blitum*, T. Thoms. in Speke, *Nile*, *Append.* 646; Oliver in *Trans. Linn. Soc.* xxix. 141, was (*fide* Thomson) 3 to 5 ft. high, and could not have been the plant here called *A. Blitum*, Linn.

9. **A. polygamus,** *Linn. Amœn. Acad.* iv. 294, and *Sp. Pl. ed.* ii. 1403. Suberect, stouter, up to 2 ft. high, with long branches. Leaves variable in size; petioles often very long; blade (in Schweinfurth, 626) 2 by 1 in., ovate-elliptic. Inflorescence wholly axillary, not running into a leafless terminal spicate mass; otherwise as *A. Blitum*, Linn.—Hook. f. Fl. Brit. Ind. iv. 721; Engl. Pfl. Ost-Afr. C. 172. *Euxolus polygamus*, Moquin in DC. Prodr. xiii. ii. 272. *Albersia polygama*, Aschers. in Schweinf. Beitr. Fl. Aethiop. 175; Boiss. Fl. Orient. iv. 991; Schinz in Bull. Herb. Boiss. iv. Append. ii. 164. *A. polygonoides*, Zarb in Cat. Spéc. Bot. Pfund, 33.

Upper Guinea. Togo: near Lome, *Warnecke*, 363!

Nile Land. Eritrea: Saati, *Schweinfurth*, 486; Massowa, *Schweinfurth*, 499; Shoho, *Quartin-Dillon & Petit*, 223! Galabat: Matamma, *Schweinfurth*, 626! Kordofan: Arashkol Mountain, *Kotschy*, 82! British East Africa: near Nairobi, *Whyte!*

Mozamb. Dist. British Central Africa: Nyasaland, Shire Highlands, *Adamson*, 309! *Buchanan*, 703!

Widely distributed in all warm regions.

Imperfectly known species.

10. **A. abyssinicus,** *Schinz in Engl. & Prantl, Pflanzenfam.* iii. 1A, 103.

It has not been discovered where Schinz has described this species.

6. **MECHOWIA,** Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 110.

Perfect flower solitary; supported by 2 bracteoles, much shorter than the flower. Perianth-segments elliptic-oblong, obtuse, hard, glabrous. Filaments 5, linear, slightly widened at the base and connate into a short tube, without any staminodes. Ovary ovoid, covered with copious long wool; style long linear; stigma small capitate; ovule 1, suspended on a basal funicle.—Leaves alternate. Heads ovoid, dense, on terminal and penultimate peduncles.

Species 1, endemic.

1. **M. grandiflora,** *Schinz in Engl. & Prantl, Pflanzenfam.* iii. 1A, 110. Branches 6–10 in. long, rigid, from a woody base; at the top angular and pubescent. Leaves 2 by $\frac{4}{5}$ in., elliptic or oblong, tip obtuse, sometimes apiculate, base narrowed, hardly petioled, nearly glabrous. Peduncles 1–2 in. long, pubescent. Heads $\frac{1}{2}$–$\frac{2}{3}$ in. in diam., dense,

reddish. Bracteoles 2, oblong, about $\frac{1}{6}$ in. long. Perianth-segments $\frac{1}{3}$ in. long.—Schinz in Engl. Jahrb. xxi. 186; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85; Gilg in Baum, Kunene-Samb. Exped. 231, 433, 469.

Lower Guinea. Angola: Longa River, 4000 ft., *Baum*, 634!
South Central. Congo Free State: Mpweto, *Descamps*.

7. **ÆRVA**, Forsk.; Benth. et Hook. f. Gen. Pl. iii. 34.

Flowers polygamous, monœcious or subdiœcious, in dense cylindric or ovoid spikes. Bracts and perianth white or tawny, thin, often pointed, but very soft, not spinous. Perianth usually of 5 segments, with much fine soft hair. Stamens 5; filaments linear, on the staminal tube, with 5 interposed staminodes (or the tube rudimentary and stamens 1–2 only in *Æ. brachiata*); anthers 2-celled. Ovary ovoid, with 1 ovule on a basal funicle; style shorter than the ovary, branches 2, oblong or very short. Utricle thin; seed ovoid, flattened; embryo annular.—Herbs or small shrubs, hairy. Leaves alternate, entire, flat. Spikes axillary, or running into terminal leafless panicles.

Species 10—in the warmer parts of Africa and Asia.

The name of this genus has been changed lately to *Uretia* by O. Kuntze, and then to *Ouret*, Adans., by Hiern; then back again to *Ærva* by Torre and Harms in accordance with the Berlin rule of 50 years' user.

Stem tomentose with stellate hair. Inflorescence terminal, leafless at the top.
- Leaves flat, often 2 in. long . . . . . 1. *Æ. tomentosa.*
- Leaves $\frac{1}{2}$ in. long, brown-yellow, recurved . . . 2. *Æ. Ruspolii.*

Stem without stellate hairs, villous or glabrate.
- Upper branches of stem obliquely erect, elongate; spikes in leafless panicles terminal on these . . 3. *Æ. leucura.*
- Spikes axillary, or on very short axillary branches; stamens 5.
  - Stem ending in a leafy linear condensed panicle . 4. *Æ. lanata.*
  - Stem ending in a leafless linear panicle . . . 4. *Æ. lanata*, var. *oblongata.*
- Spikes axillary; stamens 1–2 . . . . . 5. *Æ. brachiata.*

1. **Æ. tomentosa,** *Forsk. Fl. Ægypt.-Arab.* cxxii. *and* 170. Stem suberect, 2–4 ft. high, branched, tomentose with stellate and branched hairs. Leaves alternate, 4 by 1 in., woolly when young, often in age glabrate. Spikes of flowers cylindric, 2 by $\frac{1}{4}$ in., dense, collected in terminal leafless panicles. Flowers $\frac{1}{8}$ in. long. Bracts and perianth-segments triangular at the tip, hardly mucronate, very soft; hairs of numerous short cells, minutely papillose. Style-branches oblong, sometimes nearly as long as the style.—*Æ. ægyptiaca*, Gmel. Syst. Nat. 1026. *Æ. incana*, Mart. in Nova Acta Nat. Cur. xiii. (1826), 291. *Æ. javanica*, Wight, Ic. t. 876; Hook. Niger Fl. 492; Hook. f. Fl. Brit. Ind. iv. 727; Boiss. Fl. Orient. iv. 992; A. Rich. Tent. Fl. Abyss. ii. 214; Moquin in DC. Prodr. xiii. ii. 299, partly; Garcke in Peters, Reise Mossamb. Bot.

504; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 141; Engl. Hochgebirgsfl. Trop. Afr. 207; Boiss. Fl. Orient. iv. 992; Zarb in Cat. Spéc. Bot. Pfund, 33; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 109, in Bull. Herb. Boiss. iv. Append. ii. 165, in Engl. Pfl. Ost-Afr. C. 173; Aschers. in Schweinf. Beitr. Fl. Aethiop. 174, not of Juss. *Iresine persica*, Burm. Fl. Ind. 212, t. 65, fig. 1. *Achyranthes incana*, Roxb. Fl. Ind. i. 671. *A. tomentosa*, Tuckey, Congo Voy. 249. *Uretia persica*, O. Kuntze, Rev. Gen. Pl. i. 544, partly. *Ouret persica*, Hiern in Cat. Afr. Pl. Welw. i. 893.

Upper Guinea. Gambia, *Park!* French Sudan: El Araladji, *Chevalier*, 1174! Timbuctu, *Chevalier*, 1286! Senegal, *Roger! Schotte! Döllinger*, 11! Cape Verde, *Brunner*, 2! Northern Nigeria: Bornu; Kuka, *Vogel*, 15! Maigumeri, *Elliott*, 124!

Nile Land. Ethiopia, *Kotschy*, 314! Nubia: Mesne & Derr, *Ehrenberg!* sea-coast, *Bent!* Sagudi, *Schweinfurth*, 601! Otao, *Johnston!* Dongola, *Bromfield!* Eritrea: Shoho, *Quartin-Dillon & Petit*, 225! Habab, *Hildebrandt*, 398! Ghedem Mountain, *Schweinfurth & Riva*, 90! near Massowa, *Schweinfurth*, 17, 79; Ginda, *Schweinfurth*, 252; Keren, *Schweinfurth*, 993; Geleb, *Schweinfurth*, 1411. Abyssinia: Tacazze River Valley, *Schimper*, 1773! and without precise locality, *Salt! Schimper*, 207! 480! Somaliland: coast at Kismayo, *Kirk!* Berbera, *Perry!* Haud, *Thomson*, 86! Milmil, *Donaldson Smith!* and without precise locality, *Mrs. Lort Phillips!* Sudan: near Khartoum, *Petherick!* Nile, south of Khartoum, *Speke & Grant!* Sennar, *Schweinfurth*, 652! Kordofan, *Kotschy*, 40! *Pfund*, 51! Darfur, *Purdy*, 7! British East Africa: Ukambani, *Gregory*, 115! Taita Mountains, *Hildebrandt*, 2479! Mombasa to Takaunga, *Whyte!* Witu, *Thomas*, 45!

Mozamb. Dist. German East Africa: Dar-es-Salaam, *Hildebrandt*, 1238! Rufidji, 800 ft., *Goetze*, 52! Portuguese East Africa: Lower Zambesi, *Stewart!* between Lupata and Tete, *Kirk!* Ngamiland, Kwebe, *Lugard*, 180!

Extending into North Africa and through the Orient to the North and West of India.

Var. β *Bovei*, C. B. Cl. A smaller, burnt-up form; leaves about 1 in. long, often less, oblong or obovate, sometimes recurved; flowers smaller, spikes much more slender and often much interrupted. *Æ. javanica*, var. *Bovei*, Webb in Hook. Niger Fl. 173; Moquin in DC. Prodr. xiii. ii. 300; Aschers. in Schweinf. Beitr. Fl. Aethiop. 174.

North Central. Tebu: Agadem, *Vogel!*

Nile Land. Desert near Debba, *Brown!* Nubia: between Suakin and Berber, *Schweinfurth*, 653, 654, 681! Dalac Islands; Sarat, *Steudner*, 656! Kordofan, *Kotschy*, 16!

Forskal gives the full name of this species on page cxxii., and an excellent description on page 170. Jussieu (in *Ann. Mus. Par.* ii. 1803, 131) mentions "*javanicum*" as a species he would transfer to *Ærva*; and, by tracing back, it is found that he meant *Iresine javanica*, Burm. (*Fl. Ind.* t. 65, fig. 2). It is evident, from Burmann's figures, that *Æ. tomentosa*, Forsk., is *Iresine persica*, Burm., which does not extend so far east as the Malay Peninsula and Java. If, therefore, either of Burmann's names is to be taken, it will be *persica* (as has been done by O. Kuntze and Hiern); but *Æ. tomentosa*, Forsk., is not only the older name, but expresses the one characteristic on which the species stands.

2. **Æ. Ruspolii,** *Lopr. in Engl. Jahrb.* xxvii. 57. Stem $\frac{1}{3}$ in. in diam., woody. Branches from the base numerous, repeatedly divided, rigid, with tawny tomentum. Leaves $\frac{1}{2}$ in. long, oblong and obovate, tawny tomentose, many reflexed. Spikes small, narrow, interrupted, as

of *Æ. tomentosa*, Forsk., var. *Bovei*.—Lopr. in Ann. Istit. Bot. Rom. ix. 18, in Malpighia, xiv. 431.

Nile Land. Nubia: in the shingle-desert in the vicinity of Berber, *Speke & Grant!*

I describe above the Kew specimen, which I esteem an extreme desert burnt-up state of *Æ. tomentosa*, var. *Bovei*. I have not got an authentic example of Lopriore's *Æ. Ruspolii*, and only guess this to be his plant from his full description, and the identic habitat.

3. **Æ. leucura,** *Moquin in DC. Prodr.* xiii. ii. 302. Stem 3–4 ft. high, suberect, often much branched towards the top, simply hairy, or in age often glabrate (without stellate hairs). Leaves alternate, 2–3 in. long, broadly oblong, simply hairy when young. Spikes 1 by $\frac{1}{4}$ in., dense, white (smaller than those of *Æ. tomentosa*), on the elongate obliquely ascending upper branches of the stem. Bracts and sepals mucronate or subaristate, the glabrous white soft points shining through the plentiful fine hair of the flowers. Style-branches 2, short, sometimes very short.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 109, in Bull. Herb. Boiss. v. Append. iii. 65; Warb. in Baum, Kunene-Samb. Exped. 231, 433. *Ouret scandens*, Hiern in Cat. Afr. Pl. Welw. i. 893, excl. syn. *O. lanata*, Hiern, l.c. 893, partly (*i.e.*, Welwitsch, 6494).

Lower Guinea. Angola: Huilla; in maize-fields near Eme, 3500–5800 ft., *Welwitsch*, 6494! Bumbo; edges of saccharum-fields, *Welwitsch*, 6496! Chitanda River, 3700 ft., *Baum*, 946! German South-west Africa: Hereroland; Rehoboth, *Schinz*, 5, *Fleck*, 149; Otjitambe, *Belck*, 41, *Fleck*, 528.

Mozamb. Dist. Portuguese East Africa: east coast of Lake Nyasa, *Johnson*, 17! British Central Africa: Nyasaland; Zomba, *Sharpe*, 199! Blantyre, *Buchanan*, 1246! Namasi, *Cameron*, 17! Shire and Shupanga, *Stewart!* Lower Shire, *Meller!* Malanga, *Scott!* Magomero, *Meller!*

Also in South Africa.

The Indian *Æ. scandens* is a large climber, the lateral branches springing at right angles from the stem, the inflorescence running off into "linear panicles," unlike that of *Æ. leucura*.

4. **Æ. lanata,** *Juss. in Ann. Mus. Par.* ii. (1803), 131. Villous or pubescent, 1–4 ft. high; branches often long, curved. Leaves alternate, $1\frac{1}{2}$ in. long, ovate, when young woolly beneath, in age usually thin and nearly glabrate. Inflorescence axillary; spikes $\frac{1}{4}$ in. long in the lower axils, upper spikes often $\frac{1}{2}$ in. long, not running into leafless terminal inflorescences. Flowers small, with much dense fine white wool, whence the soft glabrous points of the bracts very shortly stand out. Stamens 5, united into a tube with teeth interposed. Style shorter than the ovary, shortly or obscurely 2-branched.—Moquin in DC. Prodr. xiii. ii. 303; A. Rich. Tent. Fl. Abyss. ii. 214; Garcke in Peters, Reise Mossamb. Bot. 504; Zarb. in Cat. Spéc. Bot. Pfund, 33; Aschers. in Schweinf. Beitr. Fl. Aethiop. 174; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 141; Wight, Ic. t. 723; Hook. f. Fl. Brit. Ind. iv. 728; Boiss. Fl. Orient. iv. 993; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 109, in Bull. Herb. Boiss. iv. Append. ii.

165, Engl. Pfl. Ost-Afr. C. 173; Engl. Hochgebirgsfl. Trop. Afr. 207; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 1897, 85; Durand & Schinz, Études Fl. Congo, i. 234. *Achyranthes lanata*, Linn. Sp. Pl. ed. i. 204, ed. ii. 296. *A. villosa*, Forsk. Fl. Ægypt.-Arab. 48. *Illecebrum lanatum*, Linn. Mant. 344; Schumach. Beskr. Guin. Pl. 144. *Ouret lanata*, Hiern in Cat. Afr. Pl. Welw. i. 893 partly.

Upper Guinea. Sierra Leone: Talla, *Scott-Elliot*, 4865! Gold Coast: Assin Yan Kumassi, *Cummins*, 195! Krobo Plains, *Johnson*, 518! Togo: near Lome, *Warnecke*, 14! Lagos, *Dawodu*, 38! *Millen*, 59, 165! Cameroons: Efulen, *Bates*, 433!

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 659! Coast-land, *Bent!* Erkowit, *Broun!* Eritrea: various localities, *Schweinfurth*, 237, 739, 1114, 1440. Abyssinia: various localities, *Quartin-Dillon & Petit*, 96! *Schimper*, 249! 490! 1030! 2110! *Welby!* Somaliland: various localities, *James & Thrupp! Mrs. Lort Phillips! Hildebrandt*, 867! *Donaldson Smith!* Niamniam: at the Nabambisso River, *Schweinfurth*, 2966! Uganda, *Speke & Grant! Scott-Elliot*, 7289! British East Africa: Machakos, *Scott-Elliot*, 6754! Kapte Plateau, *Thomson!* near Mombasa and region around it, *Wakefield! Whyte!* Sabaki Valley, *Gregory!* Witu, *Teede*, 2!

Lower Guinea. Lower Congo: Bingula, *Dupuis*; near the mouth, *Smith*, 36, 72! Angola: Golungo Alto; near the Cuango River, *Welwitsch*, 6575!

South Central. Congo Free State; Mtowa, *Descamps*; Basoko, *Demeuse*.

Mozamb. Dist. Pemba Island, *Bojer!* Zanzibar, *Hildebrandt*, 1034! German East Africa: Usambara; Tanga, *Heinsen*, 86! Usaramo; Dar-es-Salaam, *Kirk*, 127! Khutu; Zungomero, *Speke & Grant!* Portuguese East Africa: Mozambique, *Forbes*. British Central Africa: Nyasaland; Masuku Plateau, 6500–7000 ft., *Whyte!* Nyika Plateau, *McClounie*, 89! 139! 176! Shire Highlands, *Buchanan! Adamson*, 84! Zambesi; *Stewart!*

Throughout Africa, and warm parts of Asia to the Philippines.

Var. β *oblongata*, Aschers. in Schweinf. Beitr. Fl. Aethiop, 174. Leaves thick, densely woolly beneath even in age, usually very close together. Inflorescence a dense narrow panicle, often 1 foot by 1 in., continuous, leafless at top.—Engl. Hochgebirgsfl. Trop. Afr. 207.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 661! Eritrea: Hababb, 5000 ft., *Hildebrandt*, 397! Abyssinia, *Salt! Schimper*, 532, 658! Somaliland: Golis Range, *Brockman!* British East Africa: Lake Elmeteita, *Gregory!* Lake Naivasha, *Scott-Elliot*, 6529! Kidung Ndogo, *Scott-Elliot*, 6659!

Mozamb. Dist. German East Africa: Umba Valley, *Smith!* Kilimanjaro, 5000 ft., *Volkens*, 392! British Central Africa: Nyasaland; Zomba and vicinity, 2500–3500 ft., *Whyte!*

5. **Æ. brachiata,** *Mart. in Nova Acta Nat. Cur.* xiii. (1826), 291. Stem 12–18 in. long, much branched from the base; lower branches often opposite or nearly so. Leaves alternate, nearly glabrate; blade $\frac{1}{2}$–$1\frac{1}{2}$ in. long, ovate-elliptic or obovate. Spikes axillary, sessile, often many clustered, $\frac{1}{3}$ by $\frac{1}{12}$ in. (much narrower than in *Æ. lanata*), dense, white. Flowers hardly $\frac{1}{20}$ in. long, globose; perianth-segments not acute, 5 or more, often 4–3. Stamens 2–1, the staminal tube usually very imperfect and no staminodes to be found.—Moquin in DC. Prodr. xiii. ii. 304; Hook. Niger Fl. 492. *Achyranthes brachiata*, Linn. Mant. 50.

Illecebrum brachiatum, Linn. Mant. 213. *Pseudanthus brachiata*, Wight, Ic. t. 1776 partly. *Nothoscerua brachiata*, Benth. et Hook. f. Gen. Pl. iii. 34; Hook. f. Fl. Brit. Ind. iv. 726; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 105, 109, in Engl. Pfl. Ost-Afr. C. 173; Hiern in Cat. Afr. Pl. Welw. i. 892.

Upper Guinea. Senegambia, *Heudelot*, 239! Northern Nigeria: Kuka, near Lake Chad, *Vogel*, 7!

North Central. Kanem: near Nguri, *Chevalier*, 10071!

Nile Land. Kordofan, *Kotschy*, 112! 139! 372! Darfur, *Purdy*, 31! White Nile; *Schweinfurth*, 987!

Lower Guinea. Angola: Loanda; *Welwitsch*, 6534! *Gossweiler*, 324!

Also in the Mascarene Islands and India.

This plant is so like *Ærva lanata*, Juss., that, as Hooker f. shows (in the *Flora of Brit. Ind.* l.c.), it has been mistaken for, and mixed with, it by Wight. The flowers being minute, are usually much reduced in the perianth and staminal tube.

8. **SERICOCOMA**, Fenzl (partly); Benth. et Hook. f. Gen. Pl. iii. 30.

Perfect flower supported by 1–2 sterile flowers reduced to bracts or bracteoles, which are spinose, not uncinate; 2–3 (rarely 1) perfect flowers under each floral leaf, constituting partial inflorescences, which are arranged in dense compound spikes, and full of fine hairs. Perianth-segments oblong or elliptic. Stamens 5; filaments linear to the base, there united into a very short cup; between each pair is a staminode or process on the rim of the cup; anthers with 2 oblong cells. Ovary ovoid; ovule one, suspended from a basal funicle; style about as long as the ovary; stigma small. Seed orbicular, flattened; embryo annular. —Leaves all alternate.

Species 6, in Tropical and South Africa.

This genus is here separated, as by Schinz (in Engl. & Prantl, *Pflanzenfam.* iii. 1A, 105), by its alternate leaves, which distinguish it from *Cyphiocarpa* (and from nearly all the less closely allied genera).

Leaves oblong, elliptic. Branches pubescent . . .	1. *S. pungens.*
Leaves linear. Branches glabrous	2. *S. capitata.*

1. **S. pungens,** *Fenzl in Linnæa*, xvii. 326. Undershrub, less than 1 ft. high, much branched, rigid, pubescent with grey or brownish hairs. Leaves all alternate, less than $\frac{1}{2}$ in. long, oblong-elliptic, obtuse. Inflorescences terminal, short-peduncled; in fruit $\frac{3}{4}$ in. broad, ovoid, with much fine brown hair. Staminodes small, ovate.—Moquin in DC. Prodr. xiii. ii. 308; Hook. f. in Benth. et Hook. f. Gen. Pl. iii. 30. *S. pungens*, var. *longearistata*, Schinz in Engl. Jahrb. xxi. 181, in Bull. Herb. Boiss. v. Append. iii. 64. *S. leucoclada*, Lopr. in Engl. Jahrb. xxvii. 45, 47.

Lower Guinea. Great Namaqualand; *Fleck*, 22A.

Also in Western South Africa.

Fleck's plant may have been collected near Rehoboth, or may have been extra-

tropical. Lopriore says that *S. pungens*, Fenzl, has glabrous brown branches (but the South African examples have not), and makes *S. leucoclada*, Lopr., a new species because it has white-silky branches.

2. **S. capitata,** *Moquin in DC. Prodr.* xiii. ii. 308. A harsh, small, nearly glabrous shrub, repeatedly branching; branches alternate. Leaves all alternate, $\frac{1}{2}$–1 by $\frac{1}{12}$ in., linear, obtuse. Inflorescences terminal, short-peduncled; spikes cylindric, 1–1$\frac{1}{2}$ in. long, or subcapitate. Perianth $\frac{1}{4}$ in. long, greatly overtopped by the long straight hairs on its segments. Staminodes very short, obtuse. Ovary glabrous; style long.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107. *Calicorema capitata*, Hook. f. in Benth. & Hook. f. Gen. Pl. iii. 31, 35; Schinz in Bull. Herb. Boiss. v. Append. iii. 66. *Ærua* (*Arthrærua*) *Pechuelii*, O. Kuntze in Jahrb. Königl. Bot. Gart. Berlin, iv. 272.

Lower Guinea. German South-west Africa: Hereroland; Namib, *Fleck*, 677, *Luederitz*, 3, *Stapff!* Rehoboth, *Fleck*, 876. Damaraland, *Een!*

Also in South Africa.

Imperfectly known species.

3. **S. ? alternifolia,** *C. B. Cl.* Leaves petioled, alternate, elliptic or oblanceolate, $\frac{4}{5}$ by $\frac{2}{5}$ in. Inflorescences 2 in. long; partial inflorescences of 3 fertile and 4 sterile (short-aristate) flowers. Perianth $\frac{1}{6}$ in. long. Staminodes (intermediate processes of the staminal tube) wanting. Ovary obovoid, glabrous; style linear, with 2 short branches. In fruit, the thorny points of the sterile flowers grow out and the partial inflorescence becomes very hard.—*Centema alternifolia*, Schinz in Bull. Herb. Boiss. iv. 419.

Mozamb. Dist. German East Africa: South Masai Steppe, *Stuhlmann*, 4287!

The fruits of this plant are $\frac{1}{4}$ in. in diam., spinose, the bracteoles very rigidly united with the fertile perianth—in a word, typically that of *Centema*. The broad leaves and curved branches do not suit *Centema*. As there are no staminodes, it cannot be put into *Centema* without setting that point aside, which would necessitate a reconstruction of the existing scheme of Amaranthaceous genera. Perhaps the most feasible resource might be to make it a monotypic genus, next to *Sericocoma*.

9. **CYATHULA,** Lour. (partly); Benth. et Hook. f. Gen. Pl. iii. 31.

Partial inflorescences of clustered fertile and sterile flowers; bracts of the sterile or rudimentary flowers ending (some of them) in strong hooked spines. Inflorescences globose, cylindric or linear, dense, or interrupted at the base. Perianth with long fine hairs; segments 5, lanceolate, often mucronate. Filaments 5, with interposed staminodes; anthers 2-celled. Ovary obovoid, glabrous; style longer than the ovary; stigma very small; ovule 1, suspended from a basal funicle. Capsule thin; seed ellipsoid, flattened; embryo curved.—Herbs or small shrubs, hairy. Leaves opposite, entire, elliptic-ovate or obovate. Inflorescences terminal.

Species 15, in the warmer parts of Africa, Asia, and South America.

The diagnosis of "*Cyathula*" given by Loureiro is worthless and may include various things; but he cites, as one of his original species, *Rumph. Herb. Amboin.* vi. t. 11, which is (as Willdenow notes) certainly *Cyathula prostrata*, Blume. *Desmochæta* DC. (*Cat. Hort. Monspel.* 102) is diagnosed as having no staminodes, and is stated to be equal to *Pupalia*, Kunth. It is therefore impossible to apply the name *Desmochæta* to our species of *Cyathula* unless by a writer who unites the genera *Cyathula* and *Pupalia*. Hiern keeps these two genera separate, and then applies the name *Desmochæta* to *Cyathula*, Benth. et Hook. f., and *Pupal* to *Pupalia*, Juss.

Flowers spicate, *i.e.* subsessile.

*Inflorescence long, the lower partial inflorescences usually distinct; flowers $\frac{1}{12}$–$\frac{1}{8}$ in. long.	
Flowers $\frac{1}{12}$–$\frac{1}{10}$ in. long, often 2 in a cluster . .	1. *C. prostrata.*
Flowers $\frac{1}{8}$ in. long, usually solitary . . .	2. *C. geminata.*
**Inflorescences globose, dense, the partial inflorescences stellate in fruit; flowers $\frac{1}{5}$ in. long, or more.	
Heads solitary, or a few subterminal.	
Style longer than the ovary	3. *C. globulifera.*
Style short	4. *C. erinacea.*
Heads 15–30 in a close leafless panicle . .	5. *C. polycephala.*
***Inflorescences cylindric, hardly interrupted at the base; flowers $\frac{1}{5}$ in. long or more.	
Inflorescence nearly 1 in. wide	6. *C. schimperiana.*
Inflorescences $\frac{1}{2}$–$\frac{2}{3}$ in. wide.	
Branches numerous, often close . . .	7. *C. cylindrica.*
Rambler, with elongate branches . . .	8. *C. Mannii.*
Inflorescence ovoid-conic, less than $\frac{1}{2}$ in. wide .	9. *C. distorta.*
Flowers racemose; lower distinctly pedicellate . .	10. *C. pedicellata.*

1. **C. prostrata,** *Blume, Bijdr.* 549. Suberect, 1–3 ft. high, branched, not woody, hairy or ultimately nearly glabrous. Leaves 1–4 in. long, ovate or obovate, narrowed at either end. Spikes terminal, peduncled, ultimately linear, 2–6 by $\frac{1}{4}$ in., at the top dense, at the base ultimately lax; partial inflorescences $\frac{1}{12}$–$\frac{1}{10}$ in. long, ultimately fuscous, reflexed, ovoid, with 1–3 flowers; bracts aristate, many of the spines rigid, ultimately hooked. Perianth-segments $\frac{1}{12}$ in. long, mostly muticous, sometimes ending in spines. Filaments 5, linear to the base, with processes (sterile filaments) between them. Ovary obovoid, glabrous; style as long as the ovary; stigma subcapitate. Seed ellipsoid, compressed; embryo curled.—Moquin in DC. Prodr. xiii. ii. 326; Hook. Niger Fl. 493; Hook. f. Fl. Brit. Ind. iv. 723; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 108, in Engl. Pfl. Ost-Afr. C. 173; Lopr. in Engl. Jahrb. xxvii. 63 in obs., xxx. 28 in obs.; Durand & Schinz, Études Fl. Congo, i. 233, partly. *Achyranthes prostrata*, Linn. Sp. Pl. ed. ii. 296. *A. Thonningii*, Schumach. Beskr. Guin. Pl. 139. *Desmochæta prostrata*, DC. Cat. Hort. Monspel. 102; Wight, Ic. t. 733; Hiern in Cat. Afr. Pl. Welw. i. 890. *D. micrantha*, DC. Cat. Hort. Monspel. 102. *Pupalia Thonningii*, Moquin in DC. Prodr. xiii. ii. 333. *Auris canis femina*, Rumph. Herb. Amboin. vi. 26, t. 11.

Upper Guinea. Sierra Leone; Sherboro, *Scott-Elliot*, 5844! near Wallia, *Scott-Elliot*, 4133! and without precise locality, *Don! Barter!* Liberia: region

of Kakatown, *Whyte!* Gold Coast: Akim plains, *Johnson!* Assin Yan Kumasi, *Cummins*, 123! Togo, *Warnecke*, 180! Lagos: Ikorim, *Millson!* Lagos, *Moloney!* French Congo: Upper Ubange River, *Chevalier*, 5684! Cameroons, *Braun!* Fernando Po, *Vogel*, 33! *Barter! Mann*, 39!

Nile Land. Niamniam: Kulenjo, *Schweinfurth*, 2841! Uganda, *Scott-Elliot*, 7346!

Lower Guinea. Princes Island, *Welwitsch*, 6540! Gaboon: Sibange Farm, *Soyaux*, 7! Lower Congo: Lukungu, *Hens*, A, 338! Angola: Golungo Alto, *Welwitsch*, 6550! 6579!

South Central. Congo Free State: Bangala, *Demeuse.*

Also in the Mascarene Islands and South-east Asia.

2. **C. geminata,** *Moquin in DC. Prodr.* xiii. ii. 330. Stem and leaves nearly glabrate. Leaves 5 by $2\frac{1}{8}$ in., gradually narrowed at either end, subsessile. Partial inflorescences $\frac{1}{8}$ in. long, with 1 perfect flower, oblong, or in fruit ellipsoid, scarcely ovoid; otherwise as *C. prostrata*, Blume.—Benth. in Hook. Niger Fl. 494; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 108. *C. prostrata*, Durand & Schinz, Études Fl. Congo, i. 233, partly. *Achyranthes geminata?* Schumach. Beskr. Guin. Pl. 138.

Upper Guinea. Northern Nigeria: at the confluence of the Niger and Benue Rivers, *Barter!* Fernando Po; *Vogel*, 253! 258!

Lower Guinea. Lower Congo: Lutete, 2000 ft., *Hens*, A, 233!

I here describe the plant of Vogel, the "type" of Bentham. As to *Cyathula geminata*, Moquin in DC. Prodr. xiii. ii. 330, it is copied only from Schumacher, and differed from *C. prostrata* in having three spikes at the end of the branches—instead of one—a difference of no importance. In spite of the authority of Bentham and Schinz, I doubt whether *C. geminata* is separable from *C. prostrata*.

3. **C. globulifera,** *Moquin in DC. Prodr.* xiii. ii. 329. Stem 3–4 ft. long, hairy. Leaves 2–$4\frac{1}{2}$ in. long, ovate or obovate, narrowed at either end, hairy beneath (at least when young); petioles $\frac{1}{2}$–$\frac{2}{3}$ in. long. Heads globose, 1–$1\frac{1}{3}$ in. in diam., straw-coloured, very dense, sometimes 1 or 2 at the ends of the branches, sometimes 3–5 in cymose inflorescences (rarely leafless). Partial inflorescences with usually 1 perfect flower, the imperfect flowers (bracts) ending in strong hooked bristles. Perianth-segments $\frac{1}{5}$ in. long, mostly muticous. Staminodes small, oblong. Ovary obovate, glabrous; style longer than the ovary.—Zarb in Cat. Spéc. Bot. Pfund, 33; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, fig. 61, B, in Engl. Pfl. Ost-Afr. C. 173, Engl. Hochgebirgsfl. Trop. Afr. 206, partly; Lopr. in Engl. Jahrb. xxvii. 63 in obs., xxx. 28 in obs. *Desmochæta uncinulata*, Hiern in Cat. Afr. Pl. Welw. i. 890. *Pupal huillensis*, Hiern, l.c. 892.

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 6564! Huilla; near Lopollo, *Welwitsch*, 6493!

Mozamb. Dist. German East Africa: east shore of Lake Tanganyika; *Scott-Elliot*, 8340! Kilimanjaro, *New!* British Central Africa: Nyasaland; Namasi, *Cameron*, 47! Mount Chiradzulu, 4000 ft., *Whyte!* Manganja Hills,

Meller! near Muata Manga stream, *Kirk!* and without precise locality, *Buchanan*, 1441!

Also in Madagascar.

Var. β *abyssinica*, Moquin in DC. Prodr. xiii. ii. 329. A more slender plant, with smaller leaves, and heads $\frac{1}{2}$–$\frac{3}{4}$ in. in diam.—*C. globulifera*, A. Rich. Tent. Fl. Abyss. ii. 216; Aschers. in Schweinf. Beitr. Fl. Aethiop. 179; Schinz in Bull. Herb. Boiss. iv. Append. ii. 164.

Nile Land. Eritrea: Mount Bizen, 6800 ft., *Schweinfurth & Riva*, 1846! near Golei, *Schweinfurth*, 589; Lalamba Mountain, near Keren, *Schweinfurth*, 977. Abyssinia: Tigre, *Schimper*, 224! Adowa, *Schimper*, 392! Uganda: Churozi, *Bagshawe*, 101!

4. **C. erinacea,** *Schinz in Engl. Jahrb.* xxi. 189. Annual, herbaceous, erect. Leaves opposite, petioled, oblong-ovate or elliptic, acute, attenuate at the base, sparsely hirsute; inflorescence globose; perfect flowers arranged with other imperfect flowers in globose clusters; segments of the imperfect flowers finally produced into elongate bristles; staminodes dilated at the emarginate top; style short.—Schinz in Engl. Pfl. Ost-Afr. C. 173.

Mozamb. Dist. German East Africa: Turu, *Stuhlmann*, 4253! and without precise locality, *Fischer*, 70!

This description is copied from Schinz. Except by the short style (which I have not seen) the species hardly seems to differ from *C. globulifera*.

5. **C. polycephala,** *Baker in Kew Bulletin*, 1897, 278. Heads $\frac{3}{4}$ in. in diam., 15–28 in a terminal leafless panicle 10 by $1\frac{1}{2}$–3 in.; otherwise as *C. globulifera*, Moquin.

Nile Land. British East Africa: Kapti Plateau, 5000–6000 ft., *Thomson*. Maramata, *Elliott*, 300! Galunka, *Kaessner*, 863!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5200 ft., *Volkens*, 430!

6. **C. schimperiana,** *Moquin in DC. Prodr.* xiii. ii. 328. Stem 3 ft. high, herbaceous, stout, ultimately glabrescent in the lower part. Leaves opposite, petioled, 3–5 in. long, broadly elliptic, narrowed at either end, softly hairy. Inflorescence 1 (or 2) on terminal peduncle, 3–4 by 1 in., dense, shining white; partial inflorescences $\frac{2}{5}$–$\frac{1}{2}$ in. long, ovoid, with frequently 2 perfect flowers; outermost bracts ovate, scarious; sterile or rudimentary flowers few, ending in strong hooked spines. Perianth nearly $\frac{1}{3}$ in. long, hairy; segments lanceolate, mostly mucronate. —A. Rich. Tent. Fl. Abyss. ii. 216; Aschers. in Schweinf. Beitr. Fl. Aethiop. 180; Engl. Hochgebirgsfl. Trop. Afr. 206, partly; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, partly, in Engl. Pfl. Ost-Afr. C. 173?; Lopr. in Engl. Jahrb. xxvii. 64 in obs.

Nile Land. Abyssinia: Mount Kubbi, *Schimper*, 3! and without precise locality, *Quartin-Dillon & Petit*, 94! *Schimper*, 326! 867! British East Africa: Aberdare Mountains, *James!*

Mozamb. Dist. Kilimanjaro; Marangu, ex *Schinz*.

7. **C. cylindrica,** *Moquin in DC. Prodr.* xiii. ii. 328. Innovations brown hairy; mature stem (often much branched) with the leaves nearly glabrate, and usually smaller than in *C. schimperiana.* Spikes usually more numerous and smaller than in *C. schimperiana,* $\frac{1}{2}$–2 by $\frac{1}{2}$ in.; partial inflorescences similar, but rather smaller, scarcely exceeding $\frac{1}{4}$ in. in length, ovoid, often with 2 perfect flowers.—Lopr. in Engl. Jahrb. xxvii. 64 in obs., xxx. 28 in obs.; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Engl. Pfl. Ost-Afr. C. 173. *C. albida,* Lopr. in Engl. Jahrb. xxvii. 53, e descript.

Nile Land. British East Africa: Lake Naivasha, *Johnston!* Galunka, *Kaessner,* 806! between Machakos and Kikiyu, 5000–6000 ft., *Scott-Elliot,* 6590! rocks above Lake Elmeteita, 6000–7000 ft., *Scott-Elliot,* 6716!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens,* 592! Usambara; Kwa Mshuza, *Holst,* 8938! British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 132! 601! Mount Chiradzulu, *Whyte! Meller!* Plateau of Nyika Mountains, 6000–7000 ft., *Whyte!*

Also in Madagascar.

8. **C. Mannii,** *Baker in Kew Bulletin,* 1897, 278, *partly.* A rambler 6–10 ft. high, with long little-divided branches and long internodes, rusty hairy; otherwise as *C. cylindrica,* Moquin.—*C. cylindrica,* var. *schimperiana,* Hook. f. in Journ. Linn. Soc. vii. 214.

Upper Guinea. Fernando Po, *Mann,* 296! Cameroon Mountain, 7000–10,000 ft., *Mann,* 2007! *Johnston!*

Nile Land. British East Africa: Ukamba; *Scott-Elliot,* 6453! 7702!

Mozamb. Dist. British Central Africa: Nyasaland; Panda Peak, 5000–6000 ft., *McClounie,* 148!

This is very near *C. cylindrica,* Moquin, and perhaps should not be specifically separated.

9. **C. distorta,** *C. B. Cl.* A crooked, hairy undershrub, 2–3 ft. high, much branched. Leaves opposite; blade 1 by $\frac{1}{2}$–$\frac{2}{3}$ in., ovate; petiole $\frac{1}{5}$ in. Spikes terminal, and on very short axillary peduncles, solitary, $\frac{2}{3}$ by $\frac{1}{3}$ in. when young, doubtless elongating in fruit; very similar to the heads of *C. Mannii,* Baker, but smaller.—*Desmochæta distorta,* Hiern in Cat. Afr. Pl. Welw. i. 891.

Lower Guinea. Angola: Huilla; in thickets at Lopollo, *Welwitsch,* 6487!

10. **C. pedicellata,** *C. B. Cl.* Branches 2 ft. long, slender, slightly hairy, much divided. Leaves opposite, slightly hairy; blade attaining $1\frac{3}{4}$ by $\frac{3}{4}$ in., elliptic, narrowed at either end; petiole less than $\frac{1}{3}$ in. Racemes terminal on the branches, 2–4 in. long, peduncled, loose at the base both in flower and in fruit; lower pedicels attaining $\frac{1}{12}$ in. Clusters both in flower and in fruit resembling those of *C. prostrata,* Blume.

Nile Land. Uganda: Entebbe, 3900 ft., *Brown,* 8!

Imperfectly known species.

11. **C. lindaviana,** *Volkens ex Lopr. in Engl. Jahrb.* xxvii. 62 *in obs., name only.*

Africa. Without locality or name of collector. Known to me by name only.

12. **C. Merkeri,** *Gilg in Engl. Jahrb.* xxxvi. 207. An undershrub, 1 ft. high. Leaves opposite, $\frac{2}{3}$ by $\frac{1}{3}$ in., obovate-oblong or oblong, sparingly strigose, base narrowed; petiole $\frac{1}{8}$ in. long. Heads spherical, terminal, $\frac{2}{5}$ in. in diam., silvery; partial inflorescences 3-flowered, of perfect, male or sterile flowers. Perianth-segments $\frac{1}{3}$ by $\frac{1}{10}$ in., lanceolate, rigid. Staminodes ovate-triangular. Style long.

Mozamb. Dist. German East Africa: Masai Steppe, *Merker*.

Not seen. It is not stated whether the sterile flowers have (or have not) hooked tips.

10. PUPALIA, Juss.; Benth. et Hook. Gen. Pl. iii. 31.

Filaments 5, linear at the top, lanceolate at the base, where they unite at an acute angle into a cup, with no interposed staminodes; otherwise as *Cyathula.*

Species 6, in the warmer parts of Africa and Asia.

Branches straight; leaves shortly attenuate at either end	1. *P. lappacea.*
Branches more slender, curved; leaves attenuate at either end	2. *P. atropurpurea.*

1. **P. lappacea,** *Juss. in Ann. Mus. Paris,* ii. (1803) 132. Hairy. Stem 2–4 ft. high. Leaves often 4 by $1\frac{1}{2}$ in. (sometimes nearly 7 in. long), elliptic-lanceolate, shortly acuminate at either end; petiole usually short, sometimes 1 in. long. Inflorescences linear, terminal, 2–4 (sometimes 10) in. long; partial inflorescences sometimes at regular intervals, sometimes in globose distant clusters, $\frac{1}{4}$–$\frac{1}{3}$ in. long, short-ellipsoid or subglobose; sterile bracts with prominent exserted rigid hooked tips, copiously hairy with very fine long wool. Fertile flowers in the partial inflorescences, or more seldom 2–3. Filaments 5, at the base lanceolate and united at an acute angle into a cup, with no intermediate teeth.—Moquin in DC. Prodr xiii. ii. 331; A. Rich. Tent. Fl. Abyss. ii. 217; Hook. Niger Fl. 494; Hook. f. Fl. Brit. Ind. iv. 724; Zarb in Cat. Spéc. Bot. Pfund, 33; Garcke in Peters, Reise Mossamb. Bot. 504; Aschers. in Schweinf. Beitr. Fl. Aethiop. 180; Boiss. Fl. Orient. iv. 995; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 108, and 93, fig. 46, E, H, in Bull. Herb. Boiss. iv. Append. ii. 164, v. Append. iii. 65, in Engl. Pfl. Ost-Afr. C. 173; Engl. Hochgebirgsfl. Trop. Afr. 207; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85. *P. distantiflora,* A. Tent. Rich. Fl. Abyss. ii. 217?; cf. Aschers. in Schweinf. Beitr. Fl. Aethiop. 181. *Achyranthes lappacea,* Linn. Sp. Pl. ed. i. 204, ed. ii. 295, in great part. *Desmochæta*

flavescens, DC. Cat. Hort. Monspel. 102. *Pupal lappacea*, Hiern. in Cat. Afr. Pl. Welw. i. 891.

Upper Guinea. Senegal, *Heudelot*, 486! *Roger*, 78! Gambia, *Ingram!* Gold Coast: Cape Coast Castle, *Vogel*, 26! Ashanti; Dunquah, *Cummins*, 19! Lagos: Abbeokuta, *Irving!* Southern Nigeria: Aboh, *Barter*, 474! Oloke Meji, *Foster*, 300! Northern Nigeria: Kuka, *Vogel*, 61!

North Central. Bagirmi: Tjecna, *Chevalier*, 9558!

Nile Land. Nubia: coast-land, *Bent!* Hor Tamanib, *Lord!* Wady O-Mareg, *Schweinfurth*, 400! Eritrea: various localities, *Schweinfurth & Riva*, 317! *Schweinfurth*, 189, 231, 317, 457, 932. *Hildebrandt*, 653! Abyssinia: various localities, *Schimper*, 116! 1221! British Somaliland, *Miss Edith Cole! Mrs. Lort Phillips! Brockman!* Ethiopia, *Kotschy*, 79! 295! Kordofan, *Pfund*, 41! 388! *Kotschy*, 96! Jur: Dimo, *Schweinfurth*, 4291! Bongo: Matuoli, *Schweinfurth*, 2025! Uganda: east side of Lake Albert Edward, *Scott-Elliot*, 8060! Chulima, *Bagshawe*, 246! British East Africa: Kikuyu, *Gregory!* between Mombasa and Lamu, *Whyte!*

Lower Guinea. Annabon Island, *Burton!* Lower Congo: Bingila, *Dupuis.* Loango, *Soyaux*, 216! Angola: various localities, *Welwitsch*, 6500! 6529! 6529B! 6552! German South-west Africa: Amboland, *Schinz*, 4, *Rautanen*, 139; Rehoboth, *Schinz*, 5, *Fleck*, 27A, 148; Dammaraland, *Een*, 75!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1178! German East Africa: Muoa, *Holst*, 3128! Portuguese East Africa: Lower Zambesi; between Lupata and Tete, *Kirk!* British Central Africa: Nyasaland; various localities, *Buchanan*, 1277! *Whyte! McClounie*, 28! *Johnson*, 22! Ngamiland: Kwebe, *Lugard*, 175!

Also common in Madagascar and South-east Asia.

2. **P. atropurpurea,** *Moquin in DC. Prodr.* xiii. ii. 331. More slender, more rambling than *P. lappacea;* leaves smaller, more acuminated at either end; inflorescences weaker, often 1–2 in. long; perianth often less copiously woolly.—A. Rich. Tent. Fl. Abyss. ii. 218; Hook. Niger Fl. 494; Hook. f. Fl. Brit. Ind. iv. 723; Zarb in Cat. Spéc. Bot. Pfund, 33; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 108, and 93, fig. 46, F, in Engl. Pfl. Ost-Afr. C. 173. *Achyranthes lappacea*, Linn. Sp. Pl. ed. ii. 295, in small part. *A. atropurpurea*, Lam. Encycl. i. 546.

Nile Land. British East Africa: Lake Baringo, *Johnston!*

Mozamb. Dist. Pember Island, *Bojer!* German East Africa: mouth of Rovuma River, *Meller!* Umba River, *Kaessner*, 110! Portuguese East Africa: Lower Zambesi, between Lupata and Tete, *Kirk!* Lower valley of the River Shire, *Meller!*

Also in British India.

This species appears to me not distinctly separable from *P. lappacea*, Juss.

Imperfectly known species.

3. **P. Robecchii,** *Lopr. in Engl. Jahrb.* xxvii. 55. Stem woody, 12–15 in. high, with short internodes. Leaves opposite, 1 in. long, ovate, tomentose, the tomentum peeling off. Inflorescence spicate, at the base loose, above dense, of opposite clusters. Sterile bracts ending in hooks. Filaments subulate, somewhat broader at the base. Ovary

obovoid; style twice as long as the ovary.—Lopr. in Ann. Istit. Bot. Roma, ix. 21, and in Malpighia, xiv. 446.

Nile Land. Somaliland, *Robecchi*, 491.

Not seen. I have not seen tomentose indumentum in *Pupalia*. The description of Lopriore does not say definitely that there are no staminodes.

4. **P. mollis,** *Moquin in DC. Prodr.* xiii. ii. 333. Stem and leaves beneath tomentose. Bracteoles ending in hooks, few.—*Achyranthes mollis*, Thonn. in Schumach. Beskr. Guin. Pl. 137.

Upper Guinea. Gold Coast: common, *Thonning*.

5. **P. Thonningii,** *Moquin in DC. Prodr.* xiii. ii. 333. Branches tetragonous, hairy. Leaves ovate-rhomboid, hairy above, nearly bare beneath. Spike terminal, solitary, racemose. Bracteoles ending in hooks, few.—*Achyranthes Thonningii*, Thonn. in Schumach. Beskr Guin. Pl. 139.

Upper Guinea. Gold Coast: Aquapim, *Thonning*.

I have no example of this or of the preceding species; nor can I find that any author (since Schumacher) has seen either of them.

6. **P. affinis,** *K. Schum. ex Engl. in Hans Meyer, East Afr.* 369.

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Meyer*.

I have failed to find any description of this.

11. MARCELLIA, Baill. in Bull. Soc. Linn. Paris, i. 625.

Perfect flower supported by 1–2 sterile flowers reduced to bracts or bracteoles, which are spinose, not uncinate; 2–3 (rarely 1) perfect flowers under each floral leaf, constituting partial inflorescences, which are arranged in dense compound spikes, and full of fine hairs. Perianth-segments oblong or elliptic. Stamens 5; filaments linear, united into a cup (without intermediate processes) by a narrow sinus; anthers with 2 oblong cells. Ovary obovoid; ovule 1, suspended from a basal funicle; style about as long as the ovary; stigma small, nearly capitate, slightly penicillate. Seed orbicular, flattened; embryo annular.—Leaves opposite, simple, entire.

Species 15, in Tropical and South Africa.

The genus, in characters, hardly differs from *Pupalia*; the sterile flowers become hardened, and curve over the ripe fruit; but the heads are without the hooked spines of *Pupalia*.

Leaves linear.

Stem and branches nearly glabrous.

Inflorescence not interrupted at the base.

Leaves 1 in. long; internodes 1–2 in. long . 1. *M. mirabilis.*

Leaves 2 in. long; internodes 2–4 in. long . 2. *M. denudata.*

Inflorescence interrupted at the base . . . 3. *M. sericea.*

Stem and branches tomentose.

Partial inflorescences red . . . . . 4. *M. Dinteri.*

Partial inflorescences yellow . . . . 5. *M. splendens.*

Leaves obovate or lanceolate.
Heads in fruit ovoid. Ovary hairy . . . 6. *M. Bainesii.*
Heads in fruit elongating. Ovary glabrous.
Partial inflorescences of 3 fertile flowers.
Leaves 2 in. long, silky hairy . . . . 7. *M. prostrata.*
Leaves 1 in. long, tomentose . . . . 8. *M. lanata.*
Partial inflorescences of 5–6 fertile flowers . . 9. *M. tomentosa.*
(See also *Centema subfusca*, Hook. f., in which the staminodes are 0.)

1. **M. mirabilis,** *Baill. in Bull. Soc. Linn. Paris*, i. 625. Glabrous, except the inflorescence. Root long, tough; from its top several branched rigid crooked stems, 3–6 in. long. Leaves 1 by $\frac{1}{12}$ in., flat, opposite and apparently whorled. Peduncles terminal, 6 in. long or more; inflorescence a dense spike, ultimately 9 by $\frac{1}{2}$ in., but when young 1 in. long. Floral leaves orbicular, thin, $\frac{1}{5}$ in. in diameter. Fertile flowers $\frac{1}{8}$ in. long. Ovary hairy at the top. Hairs elongated, enveloping the fruits, pale brown, hardly 10 μ in diam., simple, with very long cells, smooth.—Hiern in Cat. Afr. Pl. Welw. i. 888. *M. Welwitschii*, Lopr. in Engl. Jahrb. xxvii. 40, t. 1, fig. C. *Sericocoma Welwitschii*, Hook. f. in Benth. & Hook. f. Gen. Pl. iii. 30; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Engl. Jahrb. xxi. 182, 183, not of Baker.

Lower Guinea. Angola: Mossamedes; in sandy thickets by the River Bero, *Welwitsch*, 6508!

2. **M. denudata,** *Lopr. in Engl. Jahrb.* xxvii. 41. Branches 1 ft. long, with internodes 4 in. long. Leaves 1–2 by $\frac{1}{10}$ in., upper more or less alternate. Peduncles terminal, 2–3 in. long. Inflorescence in fruit 4–6 by $\frac{1}{2}$ in., dense, thickly involved in long pale-brown fine hairs. Bracts to the clusters $\frac{1}{6}$ in. long, ovate. Fertile flowers $\frac{1}{12}$ in. long. Ovary hairy at the top. Hairs enveloping the fruit hardly 10 μ in diam., simple, with long cells, smooth.—Hiern in Cat. Afr. Pl. Welw. i. 889. *Sericocoma denudata*, Hook. f. in Benth. & Hook. f. Gen. Pl. iii. 30; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Engl. Jahrb. xxi. 182, 183.

Lower Guinea. Angola: near Mossamedes, *Welwitsch*, 6503!

3. **M. sericea,** *C. B. Cl.* Stem annual, erect, glabrous or nearly so. Leaves 2 by $\frac{1}{12}$ in., opposite. Inflorescences 4 in. long, interrupted below; partial inflorescences $\frac{1}{2}$ in. long, with white hair, of 2–3 fertile, 4–6 sterile flowers. Staminal tube without staminodes. Ovary glabrous.—*Sericocoma sericea*, Schinz in Engl. Jahrb. xxi. 181, 183, in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Bull. Herb. Boiss. v. Append. iii. 65. *Sericorema sericea*, Lopr. in Engl. Jahrb. xxvii. 40.

Lower Guinea. German South-west Africa: Amboland; Omandongo, *Schinz*, 2001, *Rautanen*; Great Namaqualand; Rehoboth, *Fleck*, 37B; Dammaraland, *Een!*

Mozamb. Dist. Ngamiland: Kwebe, *Lugard*, 181! *Mrs. Lugard*, 165!

4. **M. Dinteri,** *Schinz in Mém. Herb. Boiss.* xx. 15. Straggling, 3 ft. high, clothed especially on the young parts with snow-white felt. Leaves 1¼ by $\frac{1}{12}$ in., opposite and in part alternate. Each partial inflorescence consists of 2 fertile and 2 sterile flowers, the latter clothed with silky hairs; sterile flowers and bracts red, $\frac{1}{12}$ in. long. Staminal tube without staminodes. Ovary hairy.

Lower Guinea. German South-west Africa: Hereroland; Abassi, *Dinter*, 1452!

5. **M. splendens,** *Schinz in Mém. Herb. Boiss.* xx. 16. Erect, perennial, clothed with snow-white felt. Leaves 2 by $\frac{1}{8}$–$\frac{1}{6}$ in., opposite and in part alternate, ultimately glabrate. Inflorescence 3 by 1 in.; partial inflorescences of 2 fertile and 2 sterile flowers, the latter with long hairs; sterile flowers and bracts yellow. No staminodes. Ovary hairy.

Lower Guinea. German South-west Africa: Hereroland; Salem, *Dinter*, 152!

This has the leaves broader than those of *M. Dinteri*, and very much fewer.

6. **M. Bainesii,** *C. B. Cl.* Much branched, at least 10 in. high, clothed with soft short white simple hair. Leaves opposite, 1 by $\frac{1}{3}$ in., narrowly obovate-elliptic. Inflorescences dense, white, ovoid, up to $\frac{3}{5}$ by $\frac{1}{2}$ in.; partial inflorescences of 2–1 perfect, 4–2 sterile flowers; hairs on the sterile flowers long, with short joints, scabrid and often branched. Staminal tube ending in 5 depressed-ovate lobes, on the summit of each a very minute white filament (resembling *Pseudo-Hermbstædtia*). Ovary subglobose, hairy.—*Sericocoma Bainesii*, Hook. f. in Benth. & Hook. f. Gen. Pl. iii. 31; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, 106, fig. 60. *Sericocomopsis Bainesii*, Schinz in Engl. Jahrb. xxi. 185, in Bull. Herb. Boiss. v. Append. iii. 65. *Leucosphæra Bainesii*, Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 153; Lopr. in Engl. Jahrb. xxvii. 41, xxx. 107.

Mozamb. Dist. Ngamiland: Kobis to North Shaw Valley, *Baines!* Kwebe Hills, *Mrs. Lugard*, 158!

7. **M. prostrata,** *C. B. Cl.* Rather thickly covered with bristly white hairs. Leaves opposite; lamina 2¼ by ¼ in., round-elliptic, very obtuse, shortly acuminate at the base; petioles ½ in. long. Inflorescence dense; partial inflorescence of 3 fertile flowers and several sterile flowers. Bracts of the sterile flowers linear, spinescent, ⅓ in. long; straight, glabrous at the tip, towards the base with white hair. Stamens 5, without staminodes between them. Ovary glabrous.—*Kentrosphæra prostrata*, Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 153.

Mozamb. Dist. German East Africa: Nashorn Hill, Ugweno Mountain, *Volkens*, 472!

For this plant I have only Gilg's diagnosis of the genus and some scraps of Volkens, 472.

8. **M. lanata,** *C. B. Cl.* A small shrub, densely white (or yellowish) tomentose, the leaves soon glabrous. Leaves opposite; blade up to 1 by $\frac{3}{5}$ in., obovate, very obtuse. Inflorescences ovoid, in fruit elongated into a loose spike 2 in. long of few clusters; partial inflorescences including 3 fertile and several sterile flowers. Perianth-segments densely villous on the margins. Sterile flowers elongating in fruit into 25–30 long straight bristles, spreading on all sides. Staminal tube very short; filaments 5, at the base triangular, united at an acute angle without intermediate rudiments. Ovary glabrous.—*Dasysphæra lanata*, Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 153. *D. Robecchii*, Lopr. in Engl. Jahrb. xxvii. 53, t. 1A, in Ann. Istit. Bot. Roma, ix. 21, in Malpighia, xiv. 447.

Nile Land. Somaliland: Merehan, *Robecchi-Bricchetti*, 402.

The above description is taken from Lopriore's picture.

9. **M. tomentosa,** *C. B. Cl.* Felted and glabrous branches mixed together. Partial inflorescences of 5–6 fertile flowers and a greater number of sterile flowers; otherwise as *M. lanata.* — *Dasysphæra tomentosa*, Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 153; Lopr. in Engl. Jahrb. xxvii. 53.

Mozamb. Dist. German East Africa: Kilimanjaro; *Volkens.*

12. **CYPHOCARPA**, Lopr. in Engl. Jahrb. xxvii. 42.

Perfect flower supported by 1–2 sterile flowers reduced to bracts or bracteoles, which are muticous or spinous not uncinate in flower; 2–3 (rarely 1) perfect flowers under each floral leaf, constituting partial inflorescences, which are arranged in compound spikes and full of fine hairs. Perianth-segments oblong or elliptic, often in fruit shortly connate and thickened at the base. Stamens 5; filaments linear, united at the base into a (usually) very short cup, with a tooth or oblong process between each two; anther-cells 2, oblong. Ovary obovoid or ovoid; ovule 1, suspended from a basal funicle; style linear-cylindric; stigma simple or minutely fimbriate. Seed orbicular, flattened; embryo annular.—Leaves opposite, linear or elliptic, simple, entire.

Species 8, in Tropical and South Africa.

This genus only differs from *Marcellia* by the presence of sterile stamens as teeth or processes between the filaments. *Centema* differs (a little only) by having the sterile flowers and perianth-segments rigidly connate to form a burr-like fruit.

*Cyphocarpa. Leaves linear, glabrate. Ovary hairy, with a lateral horn.	
Inflorescence elongate-cylindric, obtuse . .	1. *C. angustifolia.*
Inflorescence shorter, conic at the top . . .	2. *C. Petersii.*
**Sericocomopsis. Leaves elliptic or obovate, hairy. Ovary glabrous, obovoid.	
West African species. Ovary almost urn-shaped.	
Leaves $1\frac{1}{2}$ in. long	3. *C. Welwitschii.*
Leaves 4 in. long	4. *C. quadrangula.*

East African species. Ovary obovoid.
Leaves tomentose. . . . . 5. *C. pallida.*
Leaves silky.
Heads without rigid spines . . . 6. *C. Hildebrandtii.*
Heads with rigid straight spines . . 7. *C. orthacantha.*

1. **C. angustifolia,** *Lopr. in Engl. Jahrb.* xxvii. 45. An undershrub, glabrate, except the inflorescence, often 2 ft. high, much branched below. Leaves opposite, 2 in. long, narrowly linear. Inflorescences dense, in fruit 1–7 in. long, $\frac{2}{3}$ in. broad, with much brown hair ; hair very long and fine, with rather long joints and papillæ or minute prickles at many of the joinings ; bracts ovate, hairy, with short straight spines at the tip. Perianth-segments oblong, acute or mucronate, in fruit hardened and connate at the base. Staminal tube exceedingly short ; filaments linear to the base ; the interjected processes triangular, minute. Ovary ovoid, hairy, with a horn on its shoulder.—Hiern in Cat. Afr. Pl. Welw. i. 889. *Sericocoma angustifolia*, Hook. f. in Benth. & Hook. f. Gen. Pl. iii. 30. *Cyathula angustifolia*, Moquin in DC. Prodr. xiii. ii. 328, fide Hook. f. (but Moquin says twice that his flower-clusters were glochidiate).

Lower Guinea. Angola : Huilla ; Lopollo, in thickets at the borders of fields, rare, *Welwitsch*, 6489 !

Mozamb. Dist. Portuguese East Africa : Lower Zambesi ; between Lupata and Tete, *Kirk !* Sena, *Kirk !* Rhodesia : Maitengue Valley, *Holub !* Bulawayo, *Gardner*, 87 !

Also in South Africa.

2. **C. Petersii,** *Lopr. in Engl. Jahrb.* xxvii. 43, 45. Inflorescences shortened, conic, very thin, $3\frac{1}{2}$ by $\frac{1}{3}$ in., otherwise as *C. angustifolia*, Lopr.—Lopr. in Malpighia, xiv. 439.

Mozamb. Dist. Portuguese East Africa : Lower Zambesi ; Tete, *Peters.* British Central Africa : Nyasaland ; Kambole, 6000 ft., *Nutt !*

I have seen no authentic example of *C. Petersii*, and refer Nutt's collection to it only from Lopriore's description. From that description, *C. Petersii* would appear to differ from *C. angustifolia* only in the shortened inflorescence. In Nutt's example the young inflorescences are ovoid, less than 1 in. long ; the perianth-segments are much less hairy than those of *C. angustifolia.*

3. **C. Welwitschii,** *C. B. Cl.* Erect, 18 in. high, pubescent ; branches opposite. Leaves opposite, $1\frac{1}{2}$ by $\frac{4}{5}$ in., ovate-elliptic, shortly triangular at either end ; petiole $\frac{1}{6}$ in. long. Inflorescence up to 4 by $\frac{4}{5}$ in., white-hairy in fruit ; hairs very thin, scabrous at the joinings of the cells. Partial inflorescences often with 2–3 perfect flowers ; sterile flowers ending in straight short spines. Perianth-segments $\frac{1}{5}$ in. long, white-hairy, hardly spinescent. Filaments linear to the base, with an oblong lacerate process between each pair. Ovary glabrous, obovoid, truncate at the top.—*Sericocoma Welwitschii*, Baker in Kew Bulletin, 1897,

278, not of Hook. f. *Sericocomopsis Welwitschii*, Lopr. in Engl. Jahrb. xxvii. 42, t. 1E; Hiern in Cat. Afr. Pl. Welw. i. 889.

Lower Guinea. Angola: Mossamedes; in sandy places by the Bero River, *Welwitsch*, 6501!

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe, *Lugard*, 170!

4. **C. quadrangula,** *C. B. Cl.* Branches quadrangular, hairy. Leaves opposite, thinly hairy; blade 4 by 1–1¼ in., oblong-elliptic. Inflorescence of 4 or 5 short-peduncled spikes (2½ in. long), terminal and from the penultimate axils, springing nearly from the same point.—*Sericocoma quadrangula*, Engl. in Engl. Jahrb. x. 7; Schinz in Engl. Jahrb. xxi. 183, in Bull. Herb. Boiss. v. Append. iii. 65. *Sericocomopsis quadrangula*, Lopr. in Engl. Jahrb. xxvii. 42.

Lower Guinea. German South-west Africa: Hereroland; Usakos, 3000 ft., *Marloth*, 1255; and without precise locality, *Chapman & Baines!*

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe Hills, *Mrs. Lugard*, 221!

This is a larger plant, with larger leaves and inflorescence, than *C. Welwitschii*; but the stamens and ovary are so closely alike that I doubt its being specifically different.

5. **C. pallida,** *C. B. Cl.* A branched, grey-tomentose undershrub, 18 in. high or more. Leaves opposite; blade 1½ by 1 in., obovate-elliptic, obtuse, the tomentum flaking off in patches; petiole hardly ⅕ in. long. Inflorescence terminal, short-peduncled, 1½ by ⅗ in., rather loose, not spinous, at least when young; partial inflorescences ¼ in. long, white at the top, full of hair, with often 2 fertile flowers; cells of the hairs rather long, minutely scabrid at the joinings. Filaments linear to the base, joined in a very short cup; the intermediate processes obovate-lacerate, ⅓ the length of the filaments. Ovary hairy, somewhat obovoid, not truncate.—*Sericocoma pallida*, S. Moore in Journ. Bot. 1877, 70. *Sericocomopsis pallida*, Schinz in Engl. Jahrb. xxi. 185; Schweinf. & Volk. in Ghika, Pays des Somalis, 201; Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 152; Lopr. in Engl. Jahrb. xxvii. 42.

Nile Land. Somaliland: Ahl Mountains, 4000 ft., *Hildebrandt*, 880! 1521! Harradigit, *James & Thrupp!* and without precise locality, *Drake-Brockman*, 361!

6. **C. Hildebrandtii,** *C. B. Cl.* A branched, hairy (not tomentose) undershrub. Leaves opposite; blade 1¼ by ⅗ in., elliptic, triangular at either end; petiole ⅒ in. long. Inflorescences 6–7 by ⅔ in., straw-colour; partial inflorescences broadly ovoid, lower standing apart, of 4–12 fertile flowers (being themselves compound). Hairs in the flower-clusters white, very fine, cells rather long, scabrid at the joinings. Fertile flowers ⅕ in. long; perianth-segments lanceolate, subobtuse, sterile flowers not spinescent. Filaments linear to the base, with a quadrate hairy process between each pair; staminal tube very short. Ovary obovoid, glabrous; style longer than the ovary.—*Sericocomopsis Hildebrandtii*, Schinz in Engl. Jahrb. xxi. 184, 185, in Engl. Pfl. Ost-

Afr. C. 172, Gilg in Engl. & Prantl, Pflanzenfam. Nachtr. 152; Lopr. in Engl. Jahrb. xxvii. 42.

Nile Land. British East Africa: Taita, *Hildebrandt*, 2584

7. **C. orthacantha,** *C. B. Cl.* An erect annual, hairy (not tomentose). Leaves opposite; blade $1\frac{1}{4}$ by $\frac{3}{5}$ in., elliptic, triangular at either end; petiole $\frac{1}{8}$ in. long. Inflorescence terminal, 2 by $\frac{3}{4}$ in., dense, straw-coloured, hairy; partial inflorescences crowded, of several fertile flowers; hairs in the flower-clusters copious; bracts of the rudimentary flowers ending in rigid yellow spines standing out prominently, not hooked. Filaments linear to the base; staminodes very short, oblong, emarginate. Ovary obovoid, glabrous; style longer than the ovary; stigma small.—*Pupalia orthacantha*, Hochst. in Bot. Zeit. 1856, 598, name only; Aschers. in Schweinf. Beitr. Fl. Aethiop. 181; Engl. Hochgebirgsfl. Trop. Afr. 206. *Cyathula orthacantha*, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 108, in Engl. Pfl. Ost-Afr. C. 173.

Nile Land. Abyssinia; Jaja, 4000–6000 ft., *Schimper*, 2153!

13. **CENTEMA,** Hook. f.; Benth. et Hook. f. Gen. Pl. iii. 31.

Perfect flower supported by 1–2 sterile flowers reduced to bracts or bracteoles, which are muticous or spinous not uncinate in flower, and in fruit are connate with the thickened base of the perfect flower; 2–3 (rarely 1) perfect flowers under each floral leaf, constituting partial inflorescences, which are arranged in compound spikes, and full of long hairs. Stamens 5; filaments linear to the base, united into a short cup, with an oblong process between each two; anthers with 2 oblong cells. Ovary ovoid, glabrous or pubescent, narrowed into a linear style; ovule one, suspended from a basal funicle. Seed orbicular, flattened; embryo annular.—Leaves opposite, narrowly oblong.

Species 6, in Tropical and South Africa.

It is difficult to draw a line between this genus and *Cyphocarpa angustifolia*, Lopr., in which the perianth-segments are thickened at the base in fruit. The 4 following species, however, all have their leaves wider than the first section of *Cyphocarpa*, and narrower than the second.

Stem strongly tubercular-scabrid on the ribs . . 3. *C. biflora.*
Stem smooth, or hardly minutely scabrid.
Fruit-spike prickly; ovary glabrous . . . 1. *C. angolensis.*
Fruit-spike hard, scarcely prickly; ovary hairy
Inflorescence straw-coloured . . . . 2. *C. Kirkii.*
Inflorescence red . . . . . 4. *C. rubra.*

1. **C. angolensis,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 31. Stem erect, 2–3 ft. high, smooth or with obscure tubercles. Leaves opposite; blade 2 by $\frac{1}{4}$–$\frac{1}{3}$ in., hairy, ultimately glabrescent. Inflorescence $2\frac{1}{2}$ by $\frac{1}{2}$ in., straw-coloured, dense, in fruit harsh and prickly; peduncled (apparently) or with 2 floral leaves at its base (*i.e.* sessile). Partial inflorescences usually with 2–3 fertile flowers; sterile flowers in fruit curved outwards, rigidly spinescent; hairs white, cells long,

scabrid at the joinings of the cells, still finer than in the preceding genera. Stamens of the genus; staminodes obovate, toothed. Ovary glabrous.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107; Hiern in Cat. Afr. Pl. Welw. i. 889; Lopr. in Engl. Jahrb. xxvii. 47 in obs.

Lower Guinea. Angola: Loanda, *Welwitsch*, 6538! *Rattray! Gossweiler!* 221! 291!

2. **C. Kirkii,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 31. Stem erect, 2–3 ft. high, smooth. Leaves opposite, 2 by $\frac{1}{4}$ in., when young hairy, soon glabrate. Inflorescences terminal, peduncled, straw-coloured, up to $2\frac{1}{2}$ by $\frac{1}{2}$ in., very dense, in fruit rigid but very slightly prickly; short ovoid inflorescences not rare. Partial inflorescences usually with 2 fertile flowers; sterile flowers short, the midrib excurrent as a minute spine with scanty fine long hair on the back, which often disappears altogether in fruit. Processes between the filaments obovate, toothed. Ovary ovoid, hairy, narrowed at the top. —Lopr. in Engl. Jahrb. xxvii. 47 in obs.; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Engl. Pfl. Ost-Afr. C. 172. *Achyranthes breviflora*, Baker in Kew Bulletin, 1897, 280.

Nile Land. British East Africa: Ribe to Galla Country, *Wakefield!* between Mombasa and Witu, *Whyte!* Ngomeni, 2500 ft., *Scott-Elliot*, 6365!

Mozamb. Dist. Lake Tanganyika, *Cameron!* British Central Africa: Nyasaland; west shore of Lake Nyasa, *Kirk! Simons!* Likoma Isles, *Johnson!* Elephant Marsh, *Scott!* between Kondowe and Karonga, *Whyte!* and without precise locality, *Buchanan*, 1158!

3. **C. biflora,** *Schinz in Engl. Jahrb.* xxi. 183. Stem erect, 2–3 ft. high, scabrid with tubercles on the ribs. Leaves opposite, up to 3 by $\frac{1}{2}$ in. (usually much smaller), pubescent; petioles in the large leaves $\frac{1}{2}$ in. long, in the small leaves hardly any. Inflorescences terminal, peduncled, up to 2 by $\frac{1}{2}$ in., very dense, with often ovoid heads $\frac{1}{2}$ in. long on the same stem. Partial inflorescences with 1 or 2 fertile flowers, brown-reddish or red; sterile flowers with scanty long fine hairs on their back, the bracts ending in straight scabrid short spines. Staminal tube and sterile filaments of the genus. Ovary ovoid, hairy, conic at the top.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 107, in Engl. Pfl. Ost-Afr. C. 172; Hiern in Cat. Afr. Pl. Welw. i. 889; Lopr. in Engl. Jahrb. xxvii. 47 in obs. *C. polygonoides*, Lopr. in Engl. Jahrb. xxvii. 48, in Malpighia, xiv. 442. *Psilotrichum rubellum*, Baker in Kew Bulletin, 1897, 279.

Lower Guinea. Angola: Huilla; Morro de Lopollo, *Welwitsch*, 6509! Humpata; Chella Mountains, *Johnston!*

Mozamb. Dist. German East Africa: Uhehe, 5000 ft., *Goetze*, 656!

The Nyasa example is altogether larger than the Angola plants, and has mostly 2-flowered partial inflorescences.

4. **C. rubra,** *Lopr. in Engl. Jahrb.* xxvii. 49. Stem striate. Leaves $1\frac{1}{4}$ by $\frac{1}{10}$ in., linear-lanceolate. Inflorescence $\frac{3}{4}$ by $\frac{1}{3}$ in., cylindric;

partial inflorescences 2-flowered, red; sterile flowers subspinescent. Perianth $\frac{1}{6}$ in. long. Staminodes obovate, lacerate at the top. Ovary acutely ovate, sparsely hairy.—Lopr. in Malpighia, xiv. 442.

Mozamb. Dist. German East Africa: Masai Plateau; Albi Plains, *Pospischil.* British Central Africa: Nyasaland: Nyika Plateau at Nymkowa, 6500 ft., *McClounie*, 46 !

The type of Lopriore has not been seen.—In McClounie, 46, referred here by description; stems not scabrid; spikes high-red; barren flowers rigid, prickly even in young flower.—The colour suggests that his plant may be a form of Baker's "*rubella*" = *Centema biflorum*, Schinz; but that has a much softer spike and a scabrid stem.

5. **C. glomerata,** *Lopr. in Engl. Jahrb.* xxvii. 49, *t.* 1H. Leaves decussate, 1 by $\frac{1}{25}$ in., narrowly linear. Inflorescence subglobose, $\frac{2}{5}$ in. long, $\frac{3}{5}$ in. thick, dense, made up of short-peduncled heads; flowers yellow-red. Perianth $\frac{1}{6}$–$\frac{1}{5}$ in. long; segments acute, hardened at the base, sparsely hairy on the back. Staminodes (between the filaments) obovate, lacerate at the top. Ovary top-shaped, hairy.—Lopr. in Malpighia, xiv. 443.

Lower Guinea. Angola: Huilla, *Antunes.*

This species is contrasted by Lopriore with *C. polygonoides* (= *C. biflora*, Schinz); but it does not appear to have a tubercular scabrid stem.

14. **PSILOTRICHUM,** Blume; Benth. et Hook. f. Gen. Pl. iii. 32.

Flowers perfect, solitary; bracteoles 2, ovate, much shorter than the flower. Perianth scarcely $\frac{1}{5}$ in. long; segments 5, elliptic-oblong, muticous, rather thick, glabrous or sometimes minutely hairy. Filaments 5, linear, at the base lanceolate, united by an acute sinus into a cup, without staminodes between them; anther-cells 2, short. Ovary ovoid or subovoid, glabrous or obscurely granular at the top; style shorter than the ovary; stigma small, capitate; ovule 1, suspended from a basal funicle. Capsule thin, imperfectly circumscissile; seed lenticular; embryo curled.—Herbs or small shrubs. Leaves opposite.

Species 20, in the warmer parts of the Old World.

*PSILOTRICHUM. Inflorescence in cylindric, short or long, spikes, mostly terminal on the branches, simple or nearly so.
- Leaves elliptic or ovate.
  - Leaves narrowed at the base to a short petiole.
    - Leaves puberulous, scarcely pubescent on both surfaces.
      - Branches woody, closely branching . 1. *P. africanum.*
      - Branches elongate, herbaceous, hairy . 2. *P. concinnum.*
    - Leaves with short hairs on both surfaces . 3. *P. trichophyllum.*
  - Leaves rounded at the base, subsessile . 4. *P. Elliottii.*

Leaves linear or linear-oblong.	
Leaves $\frac{1}{6}$ in. broad; flowers green . .	5. *P. Schimperi.*
Leaves $\frac{1}{12}$ in. broad; flowers white, pinkish or brown.	
Spikes cylindric, rather dense . . .	6. *P. gracilentum.*
Spikes cylindric, very dense . . .	7. *P. confertum.*
**Psilostachys. Inflorescence of lax spikes in thin panicles with capillary branches.	
Main branches ending in a nearly leafless panicle.	
Panicle branches trichotomous; perianth hairy	10. *P. cordatum.*
Panicle branches racemosely branched; perianth glabrous	11. *P. Kirkii.*
Main branches ending in a tuft of leaves; panicles axillary.	
Stem glabrate; perianth hispid . . .	12. *P. axillare.*
Stem hairy; perianth glabrous . . .	13. *P. edule.*

1. **P. africanum,** *Oliver in Hook. Ic. Pl. t.* 1542. A small much-branched shrub; branches woody, glabrate. Leaves 1–2 in. long, elliptic or ovate, narrowed at either end, when mature puberulous or obscurely pubescent; petiole $\frac{1}{10}$–$\frac{1}{6}$ in. long. Spikes $\frac{2}{3}$ by $\frac{1}{3}$ in. (or shorter), 8–20-flowered, white, very short-peduncled; rhachis hairy, terminal and axillary. Perianth-segments $\frac{1}{8}$ in. long, minutely hairy.—Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 348; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 111 and 112, fig. 65, in Engl. Pfl. Ost-Afr. C. 173.

Nile Land. British East Africa: Ribe, near Mombasa, *Wakefield!* Siani, 300 ft., *Kaessner*, 340!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Tanga, *Volkens*, 178! *Holst*, 2119! Portuguese East Africa: Lower Zambesi; between Lupata and Tete, *Kirk!* opposite Sena, *Kirk!*

2. **P. concinnum,** *Baker in Kew Bulletin*, 1897, 279. Stem stout, woody; branches 16 in. long, slender, hairy, with slender secondary branches ending in spikes. Leaves 1 in. long; petioles $\frac{1}{10}$ in. long. Ovary granular-subtubercular at the top; otherwise as *P. africanum*, Oliver.—*P. africanum*, var. *debilis*, Schinz in Engl. Jahrb. xxi. 185.

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Last!*

3. **P. trichophyllum,** *Baker in Kew Bulletin*, 1897, 279. Branch a foot long. Leaves 2 by $\frac{3}{4}$ in., shortly copiously hairy on both surfaces; otherwise as *P. concinnum*, Baker.

Mozamb. Dist. Portuguese East Africa: at Shamo, near the mouth of the River Shire, *Kirk!*

4. **P. Elliottii,** *Baker.* Leaves 1 by $\frac{3}{4}$ in., ovate, rounded at the base, subsessile; otherwise as *P. concinnum* or *P. trichophyllum.*

Nile Land. Uganda: east side of Lake Albert Edward, *Scott-Elliot*, 8062!

5. **P. Schimperi,** *Engl. Hochgebirgsfl. Trop. Afr.* 207. Glabrous, except the flowers, 18 in. high, repeatedly branched. Leaves 2 by $\frac{1}{6}$ in., linear-oblong, obtuse, subsessile. Spikes at the end of the branches 1–2 in. long, linear, lengthening in fruit to 5 in., green; small quasi-axillary spikes also added. Perianth-segments broadly elliptic, 3-nerved, minutely hairy. Stamens of the genus. Ovary obovoid; style shorter than the ovary; stigma small, capitate.—Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 111.

Nile Land. Abyssinia: Begemeder; region of the River Reb, *Schimper*, 1388

6. **P. gracilentum,** *C. B. Cl.* Glabrous, except the axis of the spikes. Branches 1–2 ft. long, remotely dividing. Leaves opposite, $2\frac{1}{2}$ by $\frac{1}{12}$ in. Spikes simple, terminal on long peduncles, $1\frac{1}{2}$ in. long when young (3 in. long in fruit); axis very hairy. Perianth of the genus, $\frac{1}{8}$ in. long, nearly glabrous. Ovary of the genus; style rather longer than the ovary; stigma small, capitate.—*Centema gracilenta*, Hiern in Cat. Afr. Pl. Welw. i. 890.

Lower Guinea. Angola; Huilla, 3800–5500 ft., *Welwitsch*, 6511!

Mozamb. Dist. Portuguese East Africa: Mendwe, *Johnson*, 315! British Central Africa: Nyasaland; Fort Young, *Nicholson!*

The flowers are solitary, and Hiern states that there are no staminodes; so that the genus is not *Centema*.

7. **P. confertum,** *C. B. Cl.* Glabrate; branches long, with few distant leaves. Leaves opposite, $1\frac{3}{4}$ by $\frac{1}{12}$ in. Peduncle long, terminal; compound spike pale brown, cylindric, $1\frac{3}{4}$ by $\frac{1}{3}$ in., very dense. Perianth in fruit $\frac{1}{6}$ in. long; segments ellipsoid-oblong, striate, acute. Seed 1, half-ellipsoid, hard, brown.—*Achyranthes conferta*, Schinz in Bull. Herb. Boiss. iv. 420.

Mozamb. Dist. German East Africa: Muansa, on Lake Victoria, *Stuhlmann*, 4502! Tabora, *Stuhlmann*, 606!

This appears very near *P. gracilentum*, but has the spike much denser. Schinz by some accident, says the leaves are alternate, but nevertheless puts the plant in *Achyranthes*.

8–9 are imperfectly known species of Psilotrichum proper.

8. **P. Ruspolii,** *Lopr. in Ann. Istit. Bot. Roma*, ix. 19. A glabrous herb; branches 8 in. long. Leaves opposite, 1 by $\frac{1}{4}$ in.; lower attenuated into a petiole, upper sessile, often subcordate. Heads on terminal peduncles, $\frac{2}{5}$ by $\frac{1}{5}$ in., dense; partial inflorescences of 1 or 2 flowers. Ovary ovoid; style cylindric; stigma bifid.—"Resembles *P. africanum*, Oliver."—Lopr. in Engl. Jahrb. xxvii. 59, in Malpighia, xiv. 452.

Nile Land. Somaliland: between Bela and Daua Rivers, *Riva*, 1467.

9. **P. Robecchii,** *Lopr. in Ann. Istit. Bot. Roma*, ix. 19. A glabrous much-branched herb, a foot high. Leaves all alternate, 1–2 in. long, ovate, attenuate on the petiole. Spikes terminal on long peduncles,

3–7-flowered; each perfect flower $\frac{1}{6}$ in. long, supported by two rudimentary. Filaments linear, shortly connate at the base. Ovary shortly turbinate; style cylindric; stigma bifid.—Lopr. in Engl. Jahrb. xxvii. 60, in Malpighia, xiv. 451.

Nile Land. Somaliland: Merehan, *Robecchi*, 401.

This differs from all known species of *Psilotrichum* by its alternate leaves.

10. **P. cordatum,** *Moquin in DC. Prodr.* xiii. ii. 280. Stem 2–4 ft. high; branches nearly glabrous, ending in large panicles. Leaves opposite; blade 1–1$\frac{1}{2}$ in. long, ovate, hairy; base rounded or somewhat cordate; petioles hardly $\frac{1}{4}$ in. long. Panicle 1–2 ft. long, very thin, nearly bare of leaves; branches often trichotomous, nearly or quite glabrous, Spikes $\frac{1}{2}$–1$\frac{1}{2}$ in. long, very loose, with 4–12 flowers. Bracteoles hardly $\frac{1}{3}$ the length of the perianth, ovate, slightly hairy. Perianth-segments $\frac{1}{8}$ in. long, green, strongly 3-nerved, with many spreading hairs. Ovary glabrous; style longer than ovary, linear, with small stigma.—Aschers. in Schweinf. Beitr. Fl. Aethiop. 183; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 111, in Bull. Herb. Boiss. iv. Append. ii. 165. *Psilostachys gnaphalobrya*, Hochst. in Flora, 1844, Beil. 6, t. 4, *Pœchia*, Endl. Gen. Suppl. iv. ii. 43. *Achyranthes cordata*, Hochst. in Flora, 1844, Beil. 6.

Nile Land. Nubia: coastland, *Bent!* Soturba Mountains, *Schweinfurth*, 642, 643! Eritrea: various localities, *Schweinfurth*, 65, 190, 1681. British Somaliland, *Mrs. Lort Phillips!*

Also in Arabia.

11. **P. Kirkii,** *C. B. Cl.* Leaves (imperfectly preserved) much as of *P. cordatum*, Moquin. Panicle 1–2 ft. long or more, glabrate, with a central rhachis and numerous suberect lateral branches, which again are divided repeatedly dichotomously. Ultimate branches and the small spikes nearly glabrous. Bracteoles hardly $\frac{1}{3}$ the length of the perianth, nearly glabrous. Perianth in fruit hardly $\frac{1}{8}$ in. long, strongly ribbed, glabrous or obscurely gland-puberulous between the ribs, more ovoid than that of *P. cordatum*, Moquin, and the seed less flattened.—*Psilostachys Kirkii*, Baker in Kew Bulletin, 1897, 279.

Nile Land. British East Africa: Sabaki River, near Malindi, *Kirk!*

12. **P. axillare,** *C. B. Cl.* Branches 1–2 ft. long, ending in silky leaves, tips very hairy. Leaves opposite; blade 1–1$\frac{1}{2}$ in. long, ovate, acuminate, hairy, base rounded; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long. Panicles 2–8 in. long, axillary, subtrichotomous, the ultimate branches with some long slender several-celled hairs. Bracteoles $\frac{1}{3}$ the length of the perianth, ovate, hairy. Perianth $\frac{1}{10}$ in. long; segments hispid, with spreading hairs, at least on the upper half.—*P. cordatum*, Schinz in Engl. Pfl. Ost-Afr. C. 173.

Nile Land. British East Africa: Mombasa, *Hildebrandt*, 1985!

Mozamb. Dist. German East Africa: Usambara; Tanga, *Volkens*, 177

13. **P. edule,** *C. B. Cl.* Stem very stout, with much long brown hair; tips of the branches leafy, densely silky. Leaves opposite; blade $2\frac{1}{2}$ in. long, ovate, acuminate, hairy, base rounded; petioles $\frac{1}{4}$–$\frac{1}{2}$ in. long. Panicles 4–8 in. long, very straggling, with long spreading fine brown hairs. Bracteoles $\frac{1}{3}$–$\frac{1}{2}$ the length of the perianth, villous. Perianth $\frac{1}{10}$ in. long, strongly ribbed, glabrous.

Mozamb. Dist. Pemba Island, *Lyne*, 108! 129!

"A vegetable" (*Lyne*).

Imperfectly known species.

14. **P. villosiflorum,** *Lopr. in Ann. Istit. Bot. Roma.* ix. 20. An erect herb, 20 in. high; branches opposite, glabrous. Leaves 0 (probably scales only). Inflorescence of *Psilostachys*. Bract small; bracteoles longer than the bract, densely clothed with white hair. Perianth-segments ovate, acute, densely hairy. Filaments broad, subtriangular; anthers very small. Ovary subglobose; style filiform; stigma small, capitate.—Lopr. in Engl. Jahrb. xxvii. 59, in Malpighia, xiv. 452.

Nile Land. Somaliland: between Robe Mountain and Daua River, *Riva*, 1455.

15. **P. angustifolium,** *Gilg in Notizbl. Königl. Bot. Gart. Berl.* i. 328. An annual, very glabrous herb, 1–2 ft. high. Leaves opposite, sessile, 1–$2\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{5}$ in. Panicles elongate, 12–30-flowered. Flowers $\frac{1}{8}$ in. long; perianth glabrous.

Mozamb. Dist. German East Africa: Usinja district, *Stuhlmann*, 3470.

This species, from the description, appears close to *P. Kirkii*; but the leaves are linear-lanceolate or linear.

16. **Psilostachys filipes,** *Baill. in Bull. Soc. Linn. Paris,* i. 622 *in obs.*

Mozamb. Dist. Zanzibar, *Boivin.*

Said to approach *Digera* both in its habit and other characters.

17. **Psilostachys nervulosum,** *Baill. in Bull. Soc. Linn. Paris,* i. 622 *in obs.*

Nile Land. British East Africa: Mombasa, *Boivin.*

Neither of these species of Baillon has been seen; they possibly are near *P. Kirkii* or *P. axillare,* above; but they may belong to some other genus, so far as the descriptions go.

15. CHIONOTHRIX, Hook. f. in Benth. et Hook. f. Gen. Pl. iii. 33.

Flowers perfect, solitary, each supported by 1 bract and 2 bracteoles. Perianth $\frac{1}{4}$ in. long; segments oblong, muticous, densely covered with long white hairs. Filaments 5, linear, at the base lanceolate, united

into a cup by an acute sinus, without intermediate staminodes; anthers with 2 oblong cells. Ovary ovoid, glabrous; style linear, as long as the ovary; stigma small, capitate; ovule 1, suspended on a basal funicle.—Shrubs. Leaves opposite. Spikes linear, 1–4 at the end of the branches.

Species 2, endemic.

This genus differs as to characters very little from *Psilotrichum*.

Leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long, obscurely pubescent beneath .	1. *C. somalensis.*
Leaves $1\frac{1}{2}$ in. long, thickly tomentose beneath . .	2. *C. latifolia.*

1. **C. somalensis,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 33. A grey pubescent shrub, nearly 10 ft. high. Leaves opposite; blade $\frac{1}{2}$–$\frac{3}{4}$ in. long, obovate; petioles $\frac{1}{10}$ in. long. Spikes 5–7 in. long, with 40–60 flowers, but sometimes very much smaller. Bract and bracteoles hardly $\frac{1}{6}$ in. long, obscurely pubescent. Young perianth oblong, snow-white.—Hook. Ic. Pl. t. 2226; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 111. *Sericocoma somalensis*, S. Moore in Journ. Bot. 1877, 70.

Nile Land. British Somaliland: Ahl Mountains, 3600 ft., *Hildebrandt*, 1519!

2. **C. latifolia,** *Rendle in Journ. Bot.* 1896, 54. A woody shrub, several feet high. Leaves opposite; blade $1\frac{1}{2}$ by 1 in., ovate, obtuse, closely tomentose beneath; petiole $\frac{1}{8}$ in. long. Spikes 1–2 in. long, terminal and from the upper axils, forming a quasi-paniculate inflorescence. Perianth nearly as of small examples of *C. somalensis*.

Nile Land. Somaliland: Shebele River, *Donaldson Smith!*

16. **ACHYRANTHES,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 35.

Flowers perfect, solitary, *i.e.* without sterile flowers or rudimentary bracts, each between 2 bracteoles, usually acute or spinescent. Perianth-segments $\frac{1}{5}$ in. long or more, oblong, muticous or mucronate, glabrous (except in *A. lanuginosa*). Filaments 5, linear to the base; the interposed staminodes quadrate, usually fimbriate at the top; anther-cells 2, oblong. Ovary ovoid or obovoid, glabrous or minutely granular-papillose at the top; style linear; stigma small, capitate; ovule 1, on a basal funicle. Utricle obovoid; seed ellipsoid; embryo curled. Perianth in fruit deflexed, close to the rhachis, pointed vertically downwards.—Leaves opposite, petioled. Spikes linear-cylindric, in fruit often a foot long and (except in *A. lanuginosa*) interrupted at the base.

Species 6, in the warm parts of the Old World. *A. aspera*, Linn., is a weed, wide-spread, and various subspecies have been carved out of it.

Perianth glabrous.

Bracteoles longer than half the perianth.

Leaves 2–3 in. long	1. *A. aspera.*
Leaves 4–10 in. long	2. *A. bidentata.*
Bracteoles one-fourth the length of the perianth .	3. *A. aquatica.*
Perianth densely white-woolly .	4. *A. lanuginosa.*

1. **A. aspera**, *Linn. Sp. Pl. ed.* i. 204, *ed.* ii. 295. An erect, hairy herb, 1–4 ft. high. Leaves opposite, petioled; blade 2–3 in. long, elliptic, narrowed at either end. Spikes in flower 2–4 in. long, dense; in fruit usually much elongated, up to 12–18 in. long, with the lower flowers distant. Perianth $\frac{1}{4}$–$\frac{1}{3}$ in. long; segments lanceolate, mucronate, glabrous; bracteoles $\frac{1}{2}$ or $\frac{2}{3}$ the length of the perianth, appearing as simple spines, really springing from a small quadrate or emarginate base. Staminodes quadrate, fimbriate. Ovary obovoid, the top depressed hemispherical granular-tubercular. Perianth in fruit rigidly deflexed close to the rhachis, becoming very hard.—Moquin in DC. Prodr. xiii. ii. 314; Benth. in Hook. Niger Fl. 493; A. Rich. Tent. Fl. Abyss. ii. 215; Garcke in Peters, Reise Mossamb. Bot. 503; T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix. 141; Aschers. in Schweinf. Beitr. Fl. Aethiop. 172; Boiss. Fl. Orient, iv. 993; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 112, and 94, fig. 47, D, E, in Bull. Herb. Boiss. iv. Append. ii. 165, in v. Append. iii. 66, in Engl. Pfl. Ost-Afr. C. 173; Engl. Hochgebirgsfl. Trop. Afr. 208; Durand & Schinz, Études Fl. Congo, 234; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 85; Hiern in Cat. Afr. Pl. Welw. i. 893; Lopr. in Engl. Jahrb. xxx. 12, t. 1, fig. G–J; Gilg in Baum, Kunene-Samb. Exped. 232, 433.

Upper Guinea. Senegal, *Sieber*, 57! *Roger*, 26! Gold Coast: Assin Yan Kumassi, *Cummins*, 175! Southern Nigeria: Ikirun, *Millson*, 119! Lagos, *Millen*, 101!

Nile Land. Eritrea: various localities, *Hildebrandt*, 652! *Steudner*, 658! *Schweinfurth & Riva*, 94, 177, 231, 1025! 1053, 1156, 1646. Galabat: Matamma, *Schweinfurth*, 646! Abyssinia: various localities, *Schimper*, 193! 209! 1234! *Quartin-Dillon & Petit! Salt!* Somaliland: various localities, *Mrs. Lort Phillips! Miss Edith Cole! Hildebrandt*, 1520! *Donaldson Smith!* Sennar, *Schweinfurth*, 644! White Nile, *Petherick!* Kordofan, *Kotschy*, 415! *Pfund*, 286! 876! Darfur, *Purdy*, 6! Blue Nile, *Muriel*, 32! *Broun*, 724! Khartoum, *Broun*, 476! Bahr el Jebel, *Muriel*, 71! Bahr el Ghazal; Nuer Country, *Speke & Grant*, 768! Moru: Neangara, *Murie!* Uganda: various localities, *Scott-Elliot*, 6942! 7248! 7753! *James! Mahon! Brown*, 66! *Bagshawe*, 242! 457! British East Africa: various localities, *Thomas*, 74! *Whyte! Gregory! Powell*, 13!

Lower Guinea. Lower Congo: near the mouth, *Smith*, 7! Stanley Pool, *Hens*, B, 28! Angola: various localities, *Welwitsch*, 6492! 6499! 6510! 6530! 6530B! 6547B! 6548! 6576! German South-west Africa: Hereroland, *Belck*, 43, *Fleck*, 491, 532, 561; Rehoboth, *Schinz*, 12, *Fleck*, 175A.

South Central. Congo Free State: Mtowa, *Descamps*.

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1150! German East Africa: Kilimanjaro, *Volkens*, 678! 1390! Amboni, *Holst*, 2694A! Kwa Mshuza, *Holst*, 9086! Mininga, *Speke & Grant*, 184! Usambara, *Holst*, 8719! Portuguese East Africa: east coast of Lake Nyasa, *Johnson*, 144! Lower Zambesi, near Sena and at Shupanga, *Kirk!* British Central Africa: near Lake Moero, *Carson*, 7! Rhodesia; Tamafopa, *Holub!*

An abundant weed in the hotter parts of the Old World.

Var. β *argentea*, C. B. Cl.; leaves silky strigose beneath with white hairs, often silvery; perianth frequently smaller than in the type.—*A. argentea*, Lam. Encycl. i. 545; Benth. in Hook. Niger Fl. 493; Hook. f. in Journ. Linn. Soc. vii. 214; Moquin in DC. Prodr. xiii. ii. 315; Zarb in Cat. Spéc. Bot. Pfund, 33; Engl. in Hans Meyer, East Afr. 368.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–8000 ft., *Mann*, 1307! 1977! *Johnston*, 94!

Nile Land. Kordofan, *Kotschy*, 148! Abyssinia: Begemeder, *Schimper*, 188! Amba Sea, *Schimper*, 249! Mount Sholoda, *Schimper*, 1144! Uganda, *Wilson*, 103! British East Africa: Kapte Plateau, 5000 ft., *Thomson!*

Lower Guinea. Lower Congo, *Burton!* Angola: Golungo Alto, *Welwitsch*, 6547! 6552! 6552B! 6573! 6574! 6579!

Var. γ *pinguispicata*, C. B. Cl. Axis of the inflorescence much thicker; perianth larger than usual; leaves thicker.—*A. aspera*, Rolfe in Oates, Matabeleland, ed. ii. 408; Warburg in Baum, Kunene-Samb. Exped. 433.

Lower Guinea. Angola: near the Kunene River, between Kiteve and Humbe, *Baum*, 961!

Mozamb. Dist. Matabeleland, *Oates!*

2. **A. bidentata,** *Bl. Bijdr.* 545. Leaves large; blade attaining 9 by $3\frac{1}{2}$ in., drying a black green. Perianth shining, dried a black green, spreading in young fruit; otherwise as *A. aspera*, Linn.—Moquin in DC. Prodr. xiii. ii. 312; Hook. f. Fl. Brit. Ind. iv. 730; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 112; Hiern in Cat. Afr. Pl. Welw. i. 894.

Upper Guinea. Cameroons: Johan-Albrechtshöhe, *Staudt*, 546! Fernando Po, *Mann!*

Lower Guinea. Angola: Golungo Alto; in the forest on Queta Mountains, above Ndelle, *Welwitsch*, 6544!

Mozamb. Dist. British Central Africa: Nyasaland; Mount Chiradzulu, 4000 ft., *Whyte!*

The authors who admit this as a species diagnose it by the bifid small base to the bracteoles, whence the spine springs. I cannot sort the present plant by that character.

3. **A. aquatica,** *R. Br. Prodr.* 417. A stout, sparsely hairy herb, 2–4 ft. high, rooting from the lower nodes; the roots elongate, often in water. Leaves opposite, petioled; the blade 3–4 in. long, ovate or lanceolate, acute; base shortly narrowed on the petiole. Spikes 3 by $\frac{2}{3}$ in., rhachis hairy; bracteoles hardly $\frac{1}{4}$ the length of the perianth, ovate, pointed. Perianth $\frac{1}{3}$ in. long, glabrous, straw-colour; segments lanceolate, striate, muticous. Staminodes long quadrate, sparingly fimbriate at the top. Ovary glabrous. Nut large, very little flattened.—Hook. f. Fl. Brit. Ind. iv. 730; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 112; Engl. Hochgebirgsfl. Trop. Afr. 208; Lopr. in Engl. Jahrb. xxx. 13, t. 1, fig. K, L, M. *Centrostachys aquatica*, Moquin in DC. Prodr. xiii. ii. 321; Benth. in Hook. Niger Fl. 493. *C. flabelligera*, Fenzl ex Moquin in DC. Prodr. xiii. ii. 321.

Nile Land. Nubia, *Kotschy*, 198! Ethiopia, *Kotschy*, 32! Abyssinia: Begemeder; in a swamp by the River Reb, 5700 ft., *Schimper*, 1376! White Nile *Schweinfurth*, 985!

Also in India.

4. **A. lanuginosa,** *Schinz in Engl. Jahrb.* xxi. 186. A thinly hairy herb; branches a foot long. Leaves opposite, petiolate; blade

2–3 in. long, elliptic, narrowed at either end. Fruiting spikes up to 12 by ½ in., dense to the base, white; bracteoles about ½ as long as the perianth, similar to its segments. Perianth ¼ in. long; segments copiously white-woolly on the back, with long entwined (not straight) very fine hairs, lanceolate, with a very short hard glabrous mucro. Staminodes oblong, copiously fimbriate at the top. Ovary obovoid, glabrous; style linear; stigma small. Fruiting perianths deflexed, pointing vertically downwards.—Schinz in Engl. Pfl. Ost-Afr. C. 174.

Nile Land. Uganda: Unyoro, *Stuhlmann*, 335!

In the hairy, densely-placed white perianths and the uninterrupted linear spikes this species resembles *Pandiaka*; but the leaves are distinctly petiolate.

Imperfectly known species.

5. **A. pedicellata,** *Lopr. in Engl. Jahrb.* xxvii. 56. A very hairy undershrub, 16 in. high. Leaves opposite, sessile, 1 by ⅓ in., obovate. Spikes ⅔–1⅓ in. long; flowers manifestly pedicellate. Flowers ⅙ in. long; perianth-segments hairy on the back; bracteoles ⅙ in. long, hairy. Staminodes short quadrate, fimbriate. Ovary obconoid; style longish.—Lopr. in Malpighia, xiv. 433.

Mozamb. Dist. German East Africa: Kimoani Plateau, in Bukoba district, 6000 ft., *Stuhlmann*, 3390.

The above copied from Lopriore, who says nothing of deflexed fruit-perianths. From the sessile leaves, and perianth-segments hairy on the back, the plant would appear to be a *Pandiaka*.

6. **A. rubrolutea,** *Lopr. in Engl. Jahrb.* xxvii. 57. A hairy annual. Leaves opposite, sessile, 1 by ⅓ in., oblong-lanceolate, acute. Spikes terminal, 1 by ½ in., dense (smaller axillary spikes added), ovate, acuminate, red-yellow. Perianth-segments elliptic-lanceolate, long-attenuate, scabrid, hairy. Bract and bracteoles similar, elliptic-lanceolate. Staminodes short, broad, hairy. Ovary obovoid; style long; stigma capitate.—Lopr. in Malpighia, xiv. 432.

South Central. Congo Free State: Lualaba River, *Descamps*.

7. **A. nodosa,** *Vahl ex Schumach. Beskr. Guin. Pl.* 139. Stems flexuose or scandent, jointed, the joints thickened-nodose. Leaves ovate-lanceolate, shaggy, somewhat scabrid. Heads terminal, involucrate. Branches nodose.—Moquin in DC. Prodr. xiii. ii. 317; Benth. in Hook. Niger Fl. 493.

Upper Guinea. Dahomey: Whydah, *Isert*.

Bentham, l.c., supposes this was a species of *Pandiaka*.

8. **A. viridis,** *Lopr. in Engl. Jahrb.* xxvii. 55. A herb, branched from the base. Branches striate, angular, suberect, sparingly bristly hairy. Leaves opposite, ovate-lanceolate, adpressedly hairy on both surfaces, base cuneate, tip obtuse. Inflorescence terminal, short, simply spicate, the rhachis densely hairy; bracts ovate, hyaline, bristle-pointed;

bracteoles 2, subulate. Stamens connate into a short tube; staminodes strap-shaped, irregularly fimbriate.—Lopr. in Malpighia, xiv. 432.

Mozamb. Dist. German East Africa: Usambara; Magamba Forest, *Holst*, 3800.

17. **ACHYROPSIS,** Hook f. in Benth. et Hook. f. Gen. Pl. iii. 36.

Perfect flower solitary, supported by 2 small bracteoles. Perianth segments glabrous, muticous, often 4. Stamens often 4; anther-cells 2, elliptic; filaments linear to the base; interposed staminodes quadrate. Ovary ovoid, glabrous; style linear; stigma small; ovule 1, on a basal funicle. Utricle ovoid; seed ellipsoid; embryo curled.—Leaves opposite, shortly petioled. Spikes narrow, cylindric; perianths in fruit spreading (not reflexed). Much smaller in leaves and flowers than any species of *Achyranthes* or *Pandiaka*.

Species 4, in Tropical and South Africa.

Fruit spike apparently glabrous, the rhachis hairy.	
Spikes shortly peduncled, axillary, and terminal .	1. *A. leptostachya.*
Spikes all terminal	2. *A. fruticulosa.*
Fruiting perianth overtopped by wool . . .	3. *A. laniceps.*

1. **A. leptostachya,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 36. Erect, 1–2 ft. high, sparsely hairy. Leaves 1 by $\frac{1}{6}$ in. Spikes axillary and terminal, 1–2 by $\frac{1}{5}$ in., straw-coloured, dense, apparently glabrous, the rhachis hairy. Perianth $\frac{1}{12}$–$\frac{1}{10}$ in. long.—*A. alba*, Hook. f. in Benth. et Hook. f. Gen. Pl. iii. 36. *Achyranthes leptostachya*, E. Meyer ex Meisn. in Hook. London Journ. ii. (1843), 548. *A. alba*, Moquin in DC. Prodr. xiii. ii. 311; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 112.

Mozamb. Dist. Matabeleland: Shasha River, *Holub!*

Frequent in South Extratropical Africa.

2. **A. fruticulosa,** *C. B. Cl.* A small shrub; branches divided, spreading, hardly 6 in. long. Leaves $\frac{1}{2}$ in. long, opposite, oblong, silky white beneath. Spikes all terminal on the branches, 1 in. long, nearly $\frac{1}{3}$ in. broad, straw-coloured, dense, apparently glabrous, the rhachis hairy. Perianth $\frac{1}{6}$ in. long, conic, subacute at the tip.

Nile Land. British East Africa: Kukui, *Kaessner*, 1011!

This species, from the larger subacute perianth, is allied to the Cape *Achyranthes avicularis*, E. Meyer, from which it hardly differs except in habit, its woody base and short spreading branches.

3. **A. laniceps,** *C. B. Cl.* Stems slender; branches opposite, erect, thinly hairy, with long internodes. Leaves opposite, linear, $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{6}$ in., thinly hairy, attenuate at the base, shortly petioled. Spikes in fruit $\frac{3}{4}$ by $\frac{1}{4}$ in., dense, cylindric, the glabrous perianths embedded in dense white wool; solitary at the top of long branches, or peduncles (as there is rarely a leaf at the top). Perianth in fruit scarcely $\frac{1}{12}$ in. long, enclosing the utricle; segments elliptic, green, muticous.

Mozamb. Dist. Nyasaland: Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!*

This is in ripe fruit, so that I have not been able to see the staminal tube.

18. **PANDIAKA**, Hook. f. in Benth. et Hook. f. Gen. Pl. iii. 35.

Flowers perfect, solitary, each (without sterile flowers or rudimentary bracts) between two bracteoles, which are usually more than half the length of the flower and acute or spinescent. Perianth-segments oblong, acute or spinescent, $\frac{1}{4}$ in. long or more, with straight white hairs on the back or glabrate. Filaments 5, linear to the basal tube, the interposed staminodes quadrate, truncate or fimbriate at the top; anther-cells 2, oblong. Ovary ovoid, obtuse or truncate, glabrous; style linear; stigma small, capitate; ovule 1, on a basal funicle. Utricle oblong-obovoid; seed ellipsoid, flattened; embryo curled.—Leaves opposite, sessile. Spikes dense, ovoid or cylindric. Perianth in fruit not reflexed rigidly against the rhachis.

Species.—The 11 or 12 following confined to Tropical Africa.

*Perianth-segments with many straight white hairs on the back.
- Heads short, ovoid.
  - Floral leaves prominent; flowers $\frac{2}{5}$ in. long . 1. *P. involucrata.*
  - Spikes not mixed with leaves.
    - Flowers $\frac{1}{5}$ in. long . . . . . 2. *P. ramulosa.*
    - Flowers $\frac{2}{5}$ in. long . . . . . 3. *P. lanceolata.*
- Heads cylindric, many twice as long as broad.
  - Bracteoles with very long points, exceeding the perianth (leaves oblong-elliptic) . 4. *P. cylindrica.*
  - Bracteoles shorter than, or hardly equalling the perianth.
    - Leaves linear or scarcely linear-oblong . 5. *P. Heudelotii.*
    - Leaves obovate.
      - Staminodes notched; plant erect, brown . 6. *P. Welwitschii.*
      - Staminodes shortly hairy; plant decumbent, brown . . . . . 7. *P. debilis.*
      - Staminodes long-fimbriate; plant green-yellow . . . . . 8. *P. Schweinfurthii.*
    - Leaves oblong, wider upwards, subauricled . 9. *P. andongensis.*

**Perianth-segments glabrous, or minutely pubescent on the back.
- Perianth-segments pale-brown, aristellate . . 10. *P. oblanceolata.*
- Perianth-segments white, subacute, muticous . 11. *P. Carsoni.*

1. **P. involucrata,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 36. A hairy erect branched herb, 3 ft. high. Leaves opposite, subsessile, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, ovate to elliptic-oblong. Spikes $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad, 3 to 6 approximated or crowded at the ends of the branches, white often apparently mixed with the green oblong floral leaves $\frac{1}{2}$ in. long; bracteoles similar to the perianth-segments, and very nearly as long. Perianth-segments $\frac{2}{5}$ in. long, oblong-acute, with many long white hairs on the back. Staminodes quadrate, emarginate at the top. Ovary truncate.—*Achyranthes involucrata*, Moquin in DC. Prodr. xiii. ii. 310; Benth. in Hook. Niger Fl. 492.

Upper Guinea. Togo, *Warnecke*, 470! Dahomey, *Burton!* Southern Nigeria: Abeokuta, *Irving!* interior of Western Lagos, *Rowland!* Pandiaki Village, *Ansell!* Attah (Idda), *Vogel!* Stirling, *Vogel*, 138B! Abadan Awurabe, *Foster*, 320! Northern Nigeria: Nupe, *Barter*, 944!

2. **P. ramulosa,** *Hiern in Cat. Afr. Pl. Welw.* i. 894. Branches slender, numerous, pubescent. Leaves opposite, subsessile, 1 to $1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., oval-oblong, cuspidate, base cuneate. Spikes ovoid-globose, $\frac{1}{2}$ to $\frac{2}{3}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. Perianth $\frac{1}{6}$–$\frac{1}{5}$ in., segments lanceolate-oblong, hairy on the back, glabrate at the tip; bracteoles as long as the perianth, subulate, acuminate. Staminodes oblong, truncate-crenulate at the top. Ovary glabrous.

Lower Guinea. Angola: Huilla; in rough places near Mumpulla, *Welwitsch*, 6498.

3. **P. lanceolata,** *C. B. Cl.* Branches 6–8-ribbed, obscurely tomentose between the ribs. Leaves opposite, 1–$1\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., oblong, narrowed at the base, hardly petiolate, minutely and obscurely grey- (or white-) pubescent. Spikes ovoid-globose, $\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in. Perianth $\frac{2}{5}$ in. long; segments lanceolate, acute, shortly hairy on the back. Staminodes quadrate, emarginate. Ovary glabrous.—*Cyathula lanceolata*, Schinz in Engl. Jahrb. xxi. 188, in Bull. Herb. Boiss. v. Append. iii. 65, in Engl. Pfl. Ost-Afr. C. 173.

Lower Guinea. German South-west Africa: Amboland, *Rautanen;* Hereroland, *Hoepfner*, 91.

Mozamb. Dist. German East Africa, *Fischer*, 256! 561.

4. **P. cylindrica,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 36. A hairy herb, much branched at the top. Leaves opposite, subsessile, 1–$1\frac{1}{4}$ by $\frac{1}{4}$ in., oblong, attenuate at the base. Spikes $1\frac{1}{2}$ by $\frac{1}{2}$ in., straw-coloured; bracteoles usually exceeding the perianth, having a long white mucro adorned with some very long white hairs. Perianth $\frac{1}{4}$ in. long; segments oblong-lanceolate, subacute, with much short white hair on the back. Staminodes quadrate, hairy, especially with long hairs at the top. Ovary truncate.—*Achyranthes elegantissima*, Schinz in Engl. Jahrb. xxi. 186.

Nile Land. Bahr el Ghazal: between Limbo's and Abu Shakka's, *Brown*, 58! Jur: Majob, *Schweinfurth*, 1542!

5. **P. Heudelotii,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 36. A long-branched hairy herb, 2 or 3 ft. high. Leaves opposite, sessile, 2–3 by $\frac{1}{5}$–$\frac{1}{4}$ in., linear or narrow-oblong. Spikes 1 by $\frac{2}{5}$ in., green-white, ultimately straw-coloured; bracteoles about $\frac{3}{4}$ the length of the perianth, elliptic, with a short lanceolate point. Perianth $\frac{1}{5}$ in. long; segments oblong, long-linear at the top, with many hairs on the back, the linear point pale-brown, glabrate. Staminodes quadrate, glabrous, or very nearly so. Ovary truncate.—Hiern in Cat. Afr. Pl. Welw. i. 894; Durand & Schinz, Études Fl. Congo, i. 234. *Achyranthes Heudelotii*, Moquin in DC. Prodr. xiii. ii. 310; Benth. in Hook. Niger Fl. 493.

A. angustifolia, Benth. in Hook. Niger Fl. 492; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 113, in Engl. Pfl. Ost-Afr. C. 174; Durand & Schinz, Études Fl. Congo, 234.

Upper Guinea. Sierra Leone: near Makunde, *Scott-Elliot*, 5699! Gold Coast: Accra, *Brown*, 390! Togo, *Warnecke*, 182! Quorra (Niger) River, *Vogel*, 98! Northern Nigeria: Nupe, *Barter*, 1724! French Congo: Upper Ubangi River, at Fort Sibut, *Chevalier*, 5677!

Nile Land. Jur: Seriba Ghattas, *Schweinfurth*, 2309!

Lower Guinea. Lower Congo: Goma, *Hens*, A, 360! Stanley Pool, *Demeuse*. Angola: Pungo Andongo; in Pedras de Guinga, *Welwitsch*, 6565! at Cadumba, on the River Quanza, *Welwitsch*, 6568! 6588B!

South Central. Congo Free State: Lunda; Mukenge, *Pogge*, 226.

Mozamb. Dist. Likoma Islands, in Lake Nyasa, *Johnson*, 15!

6. **P. Welwitschii,** *Hiern in Cat. Afr. Pl. Welw.* i. 894. A hairy erect herb, 1–2 ft. high. Leaves opposite, subsessile, $1\frac{1}{4}$ in. long, obovate, rounded at the top. Spikes $1\frac{1}{2}$ by $\frac{3}{5}$ in., straw-coloured; bracteoles about $\frac{2}{3}$ the length of the perianth, ovate, acuminate, subspinescent. Perianth $\frac{1}{4}$ in. long; segments elliptic-oblong, suddenly shortly acuminate, subspinescent, with many long white hairs on the back. Staminodes quadrate, slightly toothed at the top. Ovary obtusely obovate at the top.—*Achyranthes Welwitschii*, Schinz in Engl. Jahrb. xxi. 187, in Engl. Pfl. Ost-Afr. C. 174.

Lower Guinea. Angola: Huilla; at Lopollo, *Welwitsch*, 6488! 6491!

Welwitsch 6487 (not cited by Hiern) is a proliferous form of the same species, each flower being represented by a spike of bracts an inch long. A similar monstrosity occurs in *Achyranthes aspera*.

7. **P. debilis,** *Hiern in Cat. Afr. Pl. Welw.* i. 894. The example is 30 in. long, weak, hairy, rooting at the lower nodes with long branches. Leaves opposite, hardly petioled, $1–1\frac{1}{4}$ in. long, obovate, rounded at the top. Spikes $1–1\frac{1}{4}$ by $\frac{1}{2}$ in., white; bracteoles about $\frac{2}{3}$ the length of the perianth, elliptic, shortly acute, mucronate, hairy. Perianth $\frac{1}{5}–\frac{1}{4}$ in. long; segments oblong, shortly acute, submucronate, with much straight white hair on the back. Staminodes quadrate, with long hairs at the top. Ovary obtusely obovoid at the top.—*Psilotrichum debile*, Baker in Kew Bulletin, 1897, 279.

Lower Guinea. Angola: Pungo Andongo; in Pedras de Guinga, *Welwitsch*, 6570!

8. **P. Schweinfurthii,** *C. B. Cl.* Leaves sessile, broadly elliptic or oblanceolate, acute, mucronate, thinly hairy, yellow-green. Inflorescence terminal; bracts acuminate, hairy. Perianth-segments lanceolate, acute, thickened at the base, hairy. Staminodes long fimbriate. Ovary glabrous.—*Achyranthes Schweinfurthii*, Schinz in Bull. Herb. Boiss. iv. 421.

Nile Land. Dar Fertit; *Schweinfurth*, iii. 66!

Schinz doubts whether this is more than a geographical variety of *P. Welwitschii*; it is of a different colour, and the perianth is slightly longer. The only definite difference is the very long fimbriæ to the staminodes.

9. **P. andongensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 895. A hirsute erect herb, 20 in. high. Leaves opposite, sessile, 2 in. long, oblong-elliptic, base obscurely auricled. Spikes $1\frac{1}{2}$ by $\frac{1}{2}$ in., white; bracteoles about $\frac{3}{4}$ the length of the perianth, elliptic, acuminate, submucronate, hairy. Perianth $\frac{1}{5}$ in. long; segments oblong-linear, with many white hairs on the back, glabrate at the points. Staminodes quadrate. Ovary glabrous.

Lower Guinea. Angola: Pungo Andongo, *Welwitsch,* 6567 !

10. **P. oblanceolata,** *C. B. Cl.* An erect sparsely hairy herb. Leaves opposite, sessile, $1\frac{3}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., oblong, widening upwards. Spikes 2 by $\frac{3}{4}$ in., very pale brown; bracteoles $\frac{1}{5}$ in. long, bristle-pointed. Perianth $\frac{1}{3}$ in. long; segments oblong, ending in a bristle, with some minute hairs on the back or glabrate. Staminodes quadrate, lacerate. Ovary glabrous.—*Achyranthes oblanceolata,* Schinz in Engl. Jahrb. xxi. 187.

Nile Land. Bongo: Addai, *Schweinfurth,* 2185 !

This is moved from *Achyranthes* to *Pandiaka,* (1) because the leaves are sessile; (2) because the fruiting perianth, though slightly deflexed, is not reflexed close to the rhachis; (3) because the fruiting spikes are hardly interrupted at the base.

11. **P. Carsoni,** *C. B. Cl.* A sparsely hairy herb; branches erect, 18 in. long. Leaves opposite, sessile, 2 by $\frac{1}{4}$ in., oblong, often slightly widened upwards. Spikes $2\frac{1}{2}$ by $\frac{1}{2}$ in., cylindric, dense, white; bracteoles about half as long as the perianth, ovate, minutely mucronate. Perianth $\frac{1}{3}$ in. long; segments oblong, subacute, muticous, glabrous. Staminodes shortly quadrate, fimbriate. Ovary obovoid, glabrous.—*Achyranthes Carsoni,* Baker in Kew Bulletin, 1897, 280. *Argyrostachys splendens,* Lopr. in Engl. Jahrb. xxx. 109, fig. 2, in Malpighia, xiv. 436.

Mozamb. Dist. Fwambo, in Urungu, south of Lake Tanganyika, *Carson,* 8 ! 50 !

Imperfectly known species.

12. **P.? heterochiton,** *C. B. Cl.* Stem 16 in. high, erect, branched. Leaves decussate, 1–$1\frac{1}{2}$ in. long, linear. Spikes terminal, short, few-flowered, composed of solitary flowers; bract spinescent; bracteoles hairy, acute. Perianth-segments ovate, acute, silky hairy above. Staminodes short. Ovary densely hairy; style linear; stigma capitate. —*Sericocoma heterochiton,* Lopr. in Malpighia, xiv. 441.

Lower Guinea. German South-west Africa: Damaraland; Otyimbingue, *Fischer,* 193.

As the flowers are all solitary, with one bract and two bracteoles each, it cannot be of the genus *Sericocoma.*

19. **SERICOSTACHYS,** Gilg et Lopr. in Engl. Jahrb. xxvii. 50.

Cluster consisting of 1 perfect flower and 2 or 3 very hairy rudiments (sterile flowers); bract 1; bracteoles 2, short, ovate. Perianth-

segments 5, subacute, muticous, glabrous. Stamens 5; filaments linear to the base, the very short staminal tube having quadrate or small staminodes between each 2 filaments; anther-cells 2, oblong. Ovary ovoid, glabrous; style linear; stigma small, capitate; ovule 1, from a basal funicle.—Scandent shrubs. Leaves opposite. Spikes linear-cylindric, 4–6 in. long, panicled; flowers rather large.

Species 2, endemic.

Leaves glabrate. Perianth $\frac{1}{5}$ in. long . . . . 1. *S. scandens.*
Leaves hairy. Perianth $\frac{1}{3}$ in. long . . . . 2. *S. tomentosa.*

1. **S. scandens,** *Gilg et Lopr. in Engl. Jahrb.* xxvii. 51. A stout climber, glabrate except the flower-spikes. Leaves opposite; blade 3 by 1 in., elliptic, narrowed at either end; petiole $\frac{1}{2}$ in. long. Peduncles axillary, 1–3 in. long, each carrying 3 or 4 spikes. Flowers densely approximate; bract and bracteoles scarious. Perianth $\frac{1}{5}$ in. long. Hair on the sterile bracts twice or thrice as long as the perianth. Staminodes $\frac{1}{3}$ the length of the filaments, quadrate, toothed at the top. —Lopr. in Malpighia xiv. 449.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 1420!

Nile Land. Uganda: Mawokota, 3900 ft., *Brown*, 167!

2. **S. tomentosa,** *Lopr. in Engl. Jahrb.* xxvii. 51. A tomentose robust climber, 30 to 40 ft. long. Leaves opposite; blade 3 by $1\frac{1}{3}$ in., elliptic or ovate, shortly acuminate at the tip, obtuse at the base, hairy on both faces; petioles scarcely $\frac{1}{4}$ in. long. Spikes axillary, and forming at the ends of the branches compound open panicles 1–2 ft. long. Flowers densely approximate; bract and bracteoles scarious; hair on the sterile bracts not much exceeding the perianth. Perianth $\frac{1}{3}$ in. long. Staminodes very small, 2-toothed.—Lopr. in Engl. Jahrb. xxx. 26 in obs., t. 1, fig. P, Q, in Malpighia, xiv. 450.

Nile Land. Uganda: Ruwenzori; Kivata, 6000–9000 ft., *Scott-Elliot*, 7657!

20. ARTHRÆRUA, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 109.

Perfect flowers solitary. Perianth-segments 5, acuminate, scarious, silky. Filaments 5, with short staminodes interposed; anther-cells 2, divergent at the base. Ovary with 1 ovule on a basal funicle; style linear.—Leaves opposite, reduced to scales. Spikes terminal, cylindric, dense. Branches succulent, articulated.

Species 1, endemic.

1. **A. Leubnitziæ,** *Schinz in Engl. & Prantl, Pflanzenfam.* iii. 1A, 110, *fig.* 63. Leaves $\frac{1}{6}$ in. long, reduced to ovate triangular scales.—O. Kuntze in Jahrb. Königl. Bot. Gart. Berlin, iv. 272; Schinz in Bull. Herb. Boiss. v. Append. iii. 66. *Ærua desertorum*, Engl. in Engl. Jahrb. x. 7.

Lower Guinea. German South-west Africa: Hereroland; coast, *Pechuel;* Namib, near Walfisch Bay, 500 ft., *Marloth*, 1178.

21. **TELANTHERA**, R. Br.; Benth. et Hook. f. Gen. Pl. iii. 38.

Flowers perfect, solitary, each (without sterile flowers or rudimentary bracts) supported by 2 bracteoles. Perianth rigid; segments lanceolate-triangular, muticous, glabrate. Filaments 5, linear to the base; staminodes interjected, long; anthers 1-celled. Ovary obovoid; ovule 1, on a basal funicle; style short; stigma capitate. Fruit obovoid, hardly at all flattened; seed lenticular; embryo curled.—Leaves opposite. Spikes axillary, ovoid. Perianth in fruit adpressed erect.

Species the 1 following and 40 endemic in America.

1. **T. maritima,** *Moquin in DC. Prodr.* xiii. ii. 364. A nearly glabrous decumbent branched herb. Leaves 2–3 by $\frac{3}{4}$–1 in., elliptic, narrowed at either end, scarcely petioled. Spikes $\frac{1}{3}$–$\frac{1}{2}$ in. long, rigid. Perianth-segments $\frac{1}{5}$ in. long, brown, strongly striate, with scarious margins. Staminodes, including their long fimbriations, as long as the stamens.—Benth. in Hook. Niger Fl. 495. *Bucholzia maritima*, Mart. Nov. Gen. ii. 50, t. 147. *Alternanthera maritima*, St. Hil. Voy. Brésil, ii. 437; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 115; Hiern in Cat. Afr. Pl. Welw. i. 895.

Upper Guinea, a sea-coast plant. Senegal, *Döllinger*, 51! *Chevalier*, 4449! Liberia: Bassa, *Vogel*, 4! Sierra Leone, *Afzelius! Smeathmann! Don!* Gold Coast, *Burton!* Southern Nigeria: Lagos, *Maloney!* Nun River, *Vogel*, 20! *Mann*, 472! Cameroons: Batanga, *Bates*, 37!

Lower Guinea. Princes Island, *Barter*, 1949! St. Thomas Island, *Rattray!* Lower Congo: shore at the mouth, *Smith!* Banana, *Monteiro!* Angola: Ambriz, *Welwitsch*, 6553! shores of Loando and Barra do Dande, *Welwitsch*, 6535! 6559!

Also on the sea-coast of South America.

22. **ALTERNANTHERA**, Forsk.; Benth. et Hook. f. Gen. Pl. iii. 38.

Flowers perfect, solitary, each (without sterile flowers or rudimentary bracts) supported by 2 bracteoles. Perianth thin; segments elliptic, lanceolate or mucronate, nearly glabrate or minutely hairy. Filaments linear to the base; staminodes interjected, often very small; anthers 1-celled. Ovary obovoid, truncate; ovule 1, on a basal funicle; style very short, subsetaceous. Utricle much flattened, broadly obovoid, with a notch at the top in which remains the small style, winged with thin margins; seed lenticular; embryo curled.—Leaves opposite. Spikes small, globose or ovoid, axillary. Perianths in fruit stellate.

Species 25, in the warm parts of both hemispheres.

Leaves oblong or elliptic, narrowed towards the top.	
Perianth-segments $\frac{1}{6}$ in. long, mucronate or very acute	1. *A. nodiflora.*
Perianth-segments $\frac{1}{12}$–$\frac{1}{10}$ in. long, not very acute	2. *A. achyranthoides.*
Leaves obovate, not narrowed towards the top .	3. *A. echinata.*

1. **A. nodiflora,** *R. Br. Prodr.* 417. Rootstock often woody. Branches several, procumbent, pubescent or hairy towards the top, 6–24 in. long. Leaves $\frac{1}{2}$–$2\frac{1}{2}$ in. long, oblong or elliptic-lanceolate, narrowed at either end, hardly petioled, glabrate or obscurely hairy. Spikes solitary or clustered in the axils, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., white, apparently glabrate. Perianth-segments $\frac{1}{6}$ in. long, elliptic-lanceolate, acuminate, acute or mucronate, glabrate or with a few very thin simple hairs scattered near the base and on the margins. Staminal tube a short broad cup; staminodes reduced to minute notched teeth. —Moquin in DC. Prodr. xiii. ii. 356; Benth. in Hook. Niger Fl. 494; A. Rich. Tent. Fl. Abyss. ii. 219; Aschers. in Schweinf. Beitr. Fl. Aethiop. 175; Zarb in Cat. Spéc. Bot. Pfund, 33; Engl. Hochgebirgsfl. Trop. Afr. 208; Schinz in Bull. Herb. Boiss. iv. Append. ii. 165. *A. achyranthoides*, partly, Hiern in Cat. Afr. Pl. Welw. i. 896. *A. sessilis*, var. *nodiflora*, Gilg in Warb. Kunene-Samb. Exped. 232.

Upper Guinea. Senegal: M'Bidjem, *Thierry*, 222! *Roger!* Senegambia, *Heudelot*, 130! Northern Nigeria: Kuka, *Vogel*, 61!

Nile Land. Eritrea, *Schweinfurth*, 226. Abyssinia: Mount Sholoda, *Schimper*, 15! near Adowa, *Schimper*, 1068! Galabat: around Matamma, *Schweinfurth*, 617! 621! Sennar, *Kotschy*, 287! *Broun*, 854! near Khartoum, *Bromfield!* Kordofan, *Kotschy*, 165! *Pfund*, 210! Darfur, *Purdy*, 11! Ethiopia, *Kotschy*, 287! White Nile region, *Schweinfurth*, 944! *Broun*, 1072!

Lower Guinea Angola: Loanda, *Gossweiler*, 325! Mossamedes, *Welwitsch*, 6504! 6505! near Chihinde, *Baum*, 52!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Sena, *Kirk!* British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte!* Shire Highlands, *Buchanan*, 384! Rhodesia: Mapani Forest, *Holub!* Batoka Plateau, *Allen*, 438!

Also in India, Malaya, and Australia.

2. **A. achyranthoides,** *Forsk. Fl. Ægypt.-Arab.* lix. *and* 28. Heads in fruit $\frac{1}{6}$–$\frac{1}{5}$ in. in diam. Perianth-segments $\frac{1}{12}$–$\frac{1}{10}$ in. long, not mucronate, often triangular at the top; otherwise as *A. nodiflora.*— Hiern in Cat. Afr. Pl. Welw. i. 896. *A. sessilis*, R. Br. Prodr. 417; Moquin in DC. Prodr. xiii. ii. 357; Benth. in Hook. Niger Fl. 495; Zarb in Cat. Spéc. Bot. Pfund, 33; Garcke in Peters, Reise Mossamb. Bot. 503; Boiss. Fl. Orient. iv. 996; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 115, and 94, fig. 48, H, in Engl. Pfl. Ost-Afr. C. 174; Durand & Schinz, Études Fl. Congo, i. 235; Schlechter, Westafr. Kautsch. Exped. 287. *A. denticulata*, R. Br. Prodr. 417; Moquin in DC. Prodr. xiii. ii. 356. *A. ficoides*, Beauv. Fl. Owar. ii. 66, t. 99, fig. 1. *Illecebrum sessile*, Linn. Sp. Pl. ed. ii. 300; Schumach. Beskr. Guin. Pl. 143.

Upper Guinea. Senegal, *Roger*, 15! Sierra Leone: near Musaia (Mussia) *Scott-Elliot*, 5103! Samu Country, *Scott-Elliot*, 4204! Gold Coast: Aburi, *Brown*, 316! Ashanti, *Bowdich!* Southern Nigeria: Sawewe, *Dawodu*, 20! banks of the Niger, *Barter*, 126! 872! Cameroons: Efulen, *Bates*, 191! 384! Yaunde, 2700 ft., *Zenker & Staudt*, 298! Fernando Po, *Vogel*, 204!

Nile Land. Abyssinia: Begemeder, *Schimper*, 1341! White Nile, *Petherick!* Sagadi, *Schweinfurth*, 521! Sennar, *Kotschy*, 469! Jur; by the Wau River, *Schweinfurth*, 1647! British East Africa: Lake Losuguta, *Gregory!*

Lower Guinea. Island of St. Thomas, *Don!* Princes Island, *Welwitsch*, 6539! 6542! Loango, *Soyaux*, 129! Lower Congo: Stanley Pool, *Hens*, B, 16! near the mouth of the Congo, *Smith*, 31! 37! Angola, banks of rivers: Barra do Dande, *Welwitsch*, 6533! Icolo e Bengo, *Welwitsch*, 6531, 6532! Golungo Alto, *Welwitsch*, 6549, 6561! Libongo, *Welwitsch*, 6555!

Mozamb. Dist. German East Africa: Amboni, *Holst*, 2760! Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* British Central Africa: Nyasaland; Nsessi River, *Scott!* Mandala, *Scott-Elliot*, 8561! Nyika Plateau, *McClounie!*

Also a weed in South Asia and Australia. This species is not distinguished by Hiern from *A. nodiflora*.

3. **A. echinata,** *Smith in Rees, Encycl. Suppl. n.* 10. Stems procumbent, 1–2 ft. long, branched, hairy. Leaves ½–1½ in. long, obovate-spathulate, shortly petioled. Spikes ⅓ in. long, ovoid or ellipsoid, very pale brown. Perianth-segments ¼ in. long, lanceolate, mucronate, almost prickly in fruit, glabrous, but near the base of 3 of them is a dense tuft of small white hairs linear with glochidiate tip. Otherwise as *A. nodiflora*.—Moquin in DC. Prodr. xiii. ii. 360; Hiern in Cat. Afr. Pl. Welw. i. 896. *A. Achyrantha*, R. Br. Prodr. 417 in obs.; Moquin in DC. Prodr. xiii. ii. 358; Engl. in Engl. Jahrb. x. 7. *A. repens*, Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 115, in Bull. Herb. Boiss. v. Append. iii. 66; Durand & Schinz, Études Fl. Congo, i. 235; Schlechter, Westafr. Kautsch. Exped. 287. *Achyranthes repens*, Linn. Sp. Pl. ed. i. 205. *Illecebrum Achyrantha*, Linn. Sp. Pl. ed. ii. 299. *I. obliquum*, Schumach. Beskr. Guin. Pl. 142.

Upper Guinea. Gold Coast: Cape Coast Castle, *Vogel*, 37! Aburi, *Brown*, 410! Togo: near Lome, *Warnecke*, 279! Southern Nigeria: between Ibadan and Abeokuta, *Schlechter*, 13033! Northern Nigeria: Nupe, *Barter*, 852! 1708!

Lower Guinea. Princes Isle, *Welwitsch*, 6541! Lower Congo: near the mouth, *Smith!* Lutete, *Hens*, A, 300! Angola: Golungo Alto, *Welwitsch*, 6556! Loanda, *Welwitsch*, 6536! 6536B! *Gossweiler*, 374! German South-west Africa: Damaraland; Okahandya, *Lindner!* Hereroland, *Marloth*, 1345!

23. **PHILOXERUS**, R. Br.; Benth. et Hook. f. Gen. Pl. iii. 40.

Perfect flowers with two bracteoles. Perianth thickened at the base; segments 5, oblong. Filaments 5, lanceolate at the base, united into a short cup, without staminodes; anthers 1-celled. Ovary ovoid; style hardly any, branches 2, linear; ovule 1, from a basal funicle. Utricle ovoid, compressed; seed lenticular; embryo curled.—Leaves opposite. Spikes dense, ovoid or oblong, terminal, straw-coloured, solitary or clustered.

Species 10, on the sea-coasts of America, Africa and Australia.

1. **P. vermiculatus,** *R. Br. Prodr.* 416 *in obs.* A prostrate branched rooting succulent nearly glabrous herb; branches often thickened just below the nodes. Leaves 1–2 by $\frac{1}{8}$–$\frac{1}{6}$ in., linear or linear-oblong, long-tapering to the base, scarcely petioled. Spikes globose, $\frac{1}{2}$ in. in diam., and oblong, 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., nearly always terminal sessile, *i.e.* with 2 green floral leaves close under each; bracteoles $\frac{1}{6}$ in. long, keeled. Perianth-segments $\frac{1}{5}$ in. long, acute, very sparsely hairy, except near the base.—Hiern in Cat. Afr. Pl. Welw. i. 897. *P. vermicularis*, Beauv. Fl. Owar. ii. 65, t. 98. *P. aggregatus*, H. B. & K. Nov. Gen. et Sp. ii. 203. *Illecebrum vermiculatum*, Linn. Sp. Pl. ed. ii. 300. *Iresine vermicularis*, Moquin in DC. Prodr. xiii. ii. 340; Hook. Niger Fl. 494; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 117. *I. aggregata*, Moquin in DC. Prodr. xiii. ii. 340. *I. portulacoides*, Moquin in DC. Prodr. xiii. ii. 341; Schlechter, Westafr. Kautsch. Exped. 287.

Upper Guinea. Senegal, *Sieber*, 7! *Perrottet*, 482! *Roger! Brunner! Döllinger*, 59! Gambia, *Don!* Sierra Leone, *Smeathmann! Morson!* Gold Coast: coast at Accra, *Brown*, 376! 422! Sekondi, *Johnson*, 977! French Sudan: at Niayes, *Chevalier*, 3448! Togo, *Warnecke*, 50! Southern Nigeria: Brass, *Barter*, 1874! Nun River, *Vogel*, 59! Cameroons: beach near Batanga, *Bates*, 115!

Lower Guinea. Loango, *Soyaux*, 152! Corisco Island, *Mann*, 1859! Angola: Loando, *Welwitsch*, 6538B! 6554! Mossamedes, *Welwitsch*, 6506! 6506B! 6507!

A coast plant, found also on the coast of the hotter parts of America.

24. **GOMPHRENA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 40.

Perfect flower between 2 bracteoles; perianth-segments elliptic-lanceolate, acute, woolly on the back. Staminal tube $\frac{1}{6}$ in. long, divided only near the contracted top; anthers 1-celled. Ovary ovoid; style 2-branched; ovule on a basal funicle. Utricle ovoid, compressed; seed lenticular; embryo curled.—Leaves opposite. Spikes dense, terminal.

Species 90, in warm countries, especially in South America.

1. **G. globosa,** *Linn. Sp. Pl. ed.* i. 224, *ed.* ii. 326. A hairy, erect, branched annual, 3 ft. high. Leaves 2–4 by $\frac{3}{4}$ in., oblong, short petioled. Spikes $\frac{2}{3}$ in. in diam., subglobose, often pink or yellow, terminal, often supported by 1 or 2 green floral leaves. Bracteoles $\frac{1}{3}$ in. long, lanceolate, woolly, keeled (sometimes crested) on the back. Perianth $\frac{1}{5}$ in. long; segments mucronate. Ovary glabrous; style linear, longer than the ovary; the two branches at equal height with the anthers.—Moquin in DC. Prodr. xiii. ii. 409; Hook. f. Fl. Brit. Ind. iv. 732; Schinz in Engl. & Prantl, Pflanzenfam. iii. 1A, 117, and 93, fig. 46, C, and 94, fig. 47, F, in Bull. Herb. Boiss. iv. Append. ii. 165, in Engl. Pfl. Ost-Afr. C. 174.

Upper Guinea. Southern Nigeria: shore at the mouth of the River Brass, *Barter*, 116! Old Calabar, *Holland*, 121! Cross River, *Holland*, 251!

Nile Land. Uganda: Wakoli, in Busoga, *Scott-Elliot*, 7207!

A native of South America; cultivated, and a weed in the Old World.

ORDER CVII. CHENOPODIACEÆ. (By J. G. Baker and C. B. Clarke.)

Flowers small, 1- or 2-sexual. Perianth inferior, usually 5-fid. Stamens 5, or sometimes fewer; anther-cells 2, oblong. Ovary free, or sometimes immersed in a disc; style short or long, with 2 or 3 branches. Ovule 1, suspended from, rarely supported upon, a basal funicle. Utricle included in the persistent perianth. Embryo peripheric (making one complete coil or less) round albumen; or spiral (making more than one coil) with no (or hardly any) albumen.—Herbs or small shrubs (or *Basella* a twiner). Stems continuous, or (in several genera) with numerous approximate transverse articulations (or pseudo-articulations). Leaves alternate, sometimes flat, sometimes thick subcylindric, or even obovoid, in several genera 0 or nearly 0. Flowers mostly in clusters in the axils of the leaves, or sunk in the articulations of the stem, but often running into (apparently terminal) spikes.

Species 520, cosmopolitan; many are weeds of cultivation, some are seaside plants, or inhabit inland deserts.

*Stem and branches continuous, without apparent articulations. Leaves present, sometimes very small. Stamens often 5–4.	
Albumen present; embryo making one coil or less round it.	
Leaves flat, not very small.	
Bracteoles inconspicuous. Flowers mostly 2-sexual	1. CHENOPODIUM.
Bracteoles 2 large, enclosing the female flower	2. ATRIPLEX.
Leaves 1 in. long, linear	3. PLEUROPTERANTHA.
Leaves small, linear-oblong or cylindric	4. KOCHIA.
Leaves $\frac{1}{10}$ in. long, obovate, apparently perfoliate	5. HALOPEPLIS.
Albumen none or next to none; embryo spiral—*i.e.*, making more than one complete coil.	
Leaves linear, cylindric or obovoid, muticous	10. SUÆDA.
Leaves when young ending in a spine	11. CORNULACA.
**Stem or branches with many apparent articulations. Leaves 0, or hardly any. Stamens 2–1.	
Albumen present; embryo peripheric.	
Articulations obscure; flower-clusters exserted	6. HALOCNEMUM.
Flowers 3–1, immersed in the pockets of the articulations	7. ARTHROCNEMUM.
Albumen 0.	
Embryo conduplicate. Flowers 3–1, immersed in the pockets of the articulations	8. SALICORNIA.
Embryo spiral. Flowers exserted	9. SALSOLA.
***Stem twining; inflorescences coloured	12. BASELLA.

1. CHENOPODIUM, Linn.; Benth. et Hook. f. Gen. Pl. iii. 51.

Flowers very small, mostly 2-sexual. Perianth of 5 lobes united below; lobes triangular or oblong, persistent, herbaceous in fruit. Stamens 5 or fewer; filaments short. Ovary superior, sessile, ovoid, smooth or often scabrid or glandular in the upper part; styles or stigmas 2 (or in *C. ambrosioides* 3), linear; ovule 1, usually oblique on a short basal stalk. Fruit a membranous utricle surrounded by or enclosed in the perianth. Seed globose, compressed, usually horizontal, brown or black, nearly or quite smooth; embryo annular, surrounding or partly surrounding the albumen.—Herbs. Stems not transversely marked nor as though jointed. Leaves alternate, petioled; blade flat, often toothed or pinnatifid. Flowers numerous; cymes axillary and running into copious terminal panicles, leafy or more often nearly leafless; bracts (to the flowers) none.

Species 50; mostly weeds, spreading throughout the world, abounding in temperate regions.

*Ultimate branches of inflorescence straight, often 1–2 in. long, with the flower-clusters sessile on them, without stalked glands. Perianth-segments mealy, without hairs or stalked glands. Embryo forming one complete circle round the albumen.

Styles 2.

Leaves subentire, or obscurely lobed, or remotely toothed.

Leaves ovate, base obversely triangular . . 1. *C. album.*

Leaves subquadrate, base very obtuse . . 2. *C. opulifolium.*

Leaves with many teeth, sometimes twice serrate . . . . . 3. *C. murale.*

Styles 3. Leaves oblong . . . . . 4. *C. ambrosioides.*

**Ultimate branches of inflorescence short, dichotomous, slender, divaricate and often zigzag, papillose or glandular. Perianth-segments with stalked glands and no meal. Embryo forming about $\frac{2}{3}$ of a circle round the albumen.

Leaves broad in outline, deeply pinnatifid.

Perianth-segments oblong, not keeled upwards . 5. *C. Botrys.*

Perianth-segments triangular, keeled . . . 6. *C. schraderianum.*

Leaves oblong, shallowly toothed . . . . 7. *C. suberifolium.*

1. **C. album,** *Linn. Sp. Pl. ed.* i. 219, *and ed.* ii. 319. Suberect, 1–3 ft. high. Leaves more or less mealy; blade often 1–1½ by ½–⅔ in., ovate or elliptic, subentire, obscurely lobed, or remotely toothed; petioles of most shorter than the blade. Panicles axillary, running into a large terminal nearly leafless inflorescence; ultimate branches nearly straight, linear, not papillose-scabrid. Perianth-segments ovate-triangular, mealy, thickened (hardly keeled) on the back, tips in fruit folded over the horizontal seed. Ovary glandular in the upper part; styles 2. Nut dark brown, minutely puberulous, flat; the embryo

forming nearly a circle round the albumen.—Sowerby, Engl. Bot. t. 1723; Moquin in DC. Prodr. xiii. ii. 70; A. Rich. Tent. Fl. Abyss. ii. 220; Schweinf. Beitr. Fl. Aethiop. 183; Boiss. Fl. Orient. iv. 901; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 61; W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 2206; Schinz in Bull. Herb. Boiss. v. Append. iii. 59. *C. murale*, Zarb in Cat. Spéc. Bot. Pfund, 34. *C. Olukondæ*, Murr in Bull. Herb. Boiss. sér. 2, iv. 992, t. 5, fig. 8AB.

Nile Land. Abyssinia: Adowa, *Quartin-Dillon & Petit*, 332! Kordofan, *Kotschy*, 8! *Pfund*, 454! Uganda: near Lake Victoria, *Scott-Elliot*, 7215! British East Africa: near Nairobi, *Whyte!* Taita; Ndi Mountain, *Hildebrandt*, 2636!

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 467!

A cosmopolitan weed.

Var. *viride*, Moquin in DC. Prodr. xiii. ii. 71. Greener; leaves less mealy, lanceolate, nearly entire, acute at the base.—W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 207. *C. viride*, Linn. Sp. Pl. ed. ii. 319. *C. album*, T. Thoms. in Speke, Nile, Append. 645; Oliver in Trans. Linn. Soc. xxix. 140.

Nile Land. Uganda: Unyoro, *Speke & Grant*, 609!

Mozamb. Dist. Portuguese East Africa: Mozambique, *Forbes!*

2. **C. opulifolium,** *Schrader in DC. Fl. Franç.* v. 372. Leaves mealy; blade often $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., ovate or elliptic, subquadrate, entire or with few irregular lobes, mostly very obtuse at the base; otherwise as *C. album*, Linn.—Schweinf. Beitr. Fl. Aethiop. 184, in Bull. Herb. Boiss. iv. Append. ii. 156; Boiss. Fl. Orient. iv. 901; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 61; Hiern in Cat. Afr. Pl. Welw. i. 897; W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 2206. *C. mucronatum*, Murr in Bull. Herb. Boiss. sér. 2, iv. 992, not of Thunb.

Nile Land. Eritrea: various localities at 5000–7000 ft., *Schweinfurth*, 165, 705, 1181, 1349. Somaliland, *Miss Edith Cole!* Uganda: Busoga, 3900 ft., *Brown*, 282! British East Africa: Gilgil River, *Scott-Elliot*, 6661!

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6323, 6326! Pungo Andongo, *Welwitsch*, 6324. Amboland, *Hoepfner*, 111.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 1227! Usambara; Kwa Mshuza, *Holst*, 8894!

Also in Europe, the Orient, and Arabia.

3. **C. murale,** *Linn. Sp. Pl. ed.* i. 219, *and ed.* ii. 318. Spreading, branching. Leaves more or less mealy; blade 1–4 in. long, ovate-oblong or ovate, acute, serrate with many teeth, not rarely doubly serrate; inflorescence largely axillary, the terminal leafless panicle much shorter than in *C. album*; perianth as of *C. album*.—Sowerby, Engl. Bot. t. 1722; Moquin in DC. Prodr. xiii. ii. 69; A. Rich. Tent. Fl. Abyss. ii. 220; Schweinf. Beitr. Fl. Aethiop. 183, in Bull. Herb. Boiss. iv. Append. ii. 157; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 348; Boiss. Fl. Orient. iv. 902; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 61, fig. 27, D; Schinz in Bull. Herb. Boiss. v. Append. iii. 60; Hiern in Cat. Afr. Pl. Welw. i. 898; W. D. J.

Koch, Syn. Deutsch. Fl. ed. 3, iii. 2208; O. Kuntze in Jahrb. Königl. Bot. Gart. Berlin, iv. 273.

Nile Land. Nubia: coast region, *Bent!* Berber, *Schweinfurth*, 706! Abyssinia: Adowa, *Quartin-Dillon & Petit*, 315! Begemeder, *Schimper*, 357! Ankober, *Roth!* Somaliland, 5000 ft., *Hildebrandt*, 1452! Khartoum, *Kotschy*, 315! *Miss Edith Cole!* Uganda: Kampala, *Scott-Elliot*, 7302! British East Africa: Kibosi, *Powell*, 9! Gilgil River, 6000–7000 ft., *Scott-Elliot*, 6571!

Lower Guinea. Angola: Loanda, *Welwitsch*, 6309! Gardens near the Bengo River, *Welwitsch*, 6310! Mubango, *Welwitsch*, 6312. Hereroland, *Rautanen*, 138! *Pechuel Loetsche.*

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!*

4. **C. ambrosioides,** *Linn. Sp. Pl. ed.* i. 219, *and ed.* ii. 320. Suberect, 2 ft. high, nearly glabrous. Leaves short-petioled, 1–3 in. long, oblong, narrowed at either end, sinuate-toothed or nearly entire; said to be "gland-punctate beneath." Inflorescence running into a copious terminal panicle; ultimate branches straight, often 1–2 in. long, hairy under a $\frac{1}{2}$-in. glass, nearly leafless or with numerous oblong leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long. Perianth very small, glabrous or obscurely verrucose (neither mealy nor hairy). Ovary in the upper part scabrid or with large glands; style-branches 3, short, or 2 with a smaller branch. Nut horizontal, with the 5 lobes of the perianth folded over it, or not rarely vertical. Embryo in the seed almost completely surrounding the albumen.—Moquin in DC. Prodr. xiii. ii. 72; Boiss. Fl. Orient. iv. 904; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 61, fig. 25, K–Q; Hiern in Cat. Afr. Pl. Welw. i. 898; W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 2209.

Lower Guinea. Lower Congo: Lutete, 1500–2000 ft., *Hens*, A, 318! Princes Island, *Welwitsch*, 6316. Angola: Loanda, *Welwitsch*, 6314! Golungo Alto, *Welwitsch*, 6315B. Pungo Andongo, *Welwitsch*, 6315. Mossamedes, *Welwitsch*, 6313.

Mozamb. Dist. Zambezi Expedition, without locality, *Kirk!*

A widely spread weed, except in cold countries.

5. **C. Botrys,** *Linn. Sp. Pl. ed.* i. 219, *and ed.* ii. 320. Stem erect, 1–2 ft. high, pubescent in the upper part. Leaves of middle stem:—blade 1–3 in. long, broadly elliptic, pinnatifid about half-way to the midrib, pubescent on the midrib beneath; petiole $\frac{1}{4}$–1 in. long. Inflorescence copious, dense, forming oblong leafless panicles, often 10 by 2–3 in.; ultimate branchlets short, slender, minutely papillose and glandular, divaricate and zigzag. Perianth-segments elliptic-triangular, with stalked glands on the back, without meal or hairs, suberect on the ripe fruit. Ovary without glands; style-branches 2. Embryo forming $\frac{2}{3}$ of a circle round the albumen.—Moquin in DC. Prodr. xiii. ii. 75; Boiss. Fl. Orient. iv. 903; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 61, fig. 25, J; Schinz in Bull. Herb. Boiss. v. Append. iii. 59; W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 2209.

Nile Land. Abyssinia: Begemeder, *Schimper*, 723! Uganda, *Scott-Elliot*, 7505! British East Africa: near Nairobi, *Whyte!* Gilgil River, 6000–7000 ft., *Scott-Elliot*, 6665! Lake Elmeteita, 6000–7000 ft., *Scott-Elliot*, 6624!

Mozamb. Dist. British Central Africa: Nyasaland; Masuku Plateau, 6500–7000 ft., *Whyte!* Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!* and without precise locality, *Buchanan*, 845!

The abundant glands on the inflorescence make this plant aromatic.

Var. β *procera*, C. B. Cl. Stem 6 ft. high. Leaves larger than in the type. Ultimate branches of the inflorescence and sepals with papillæ, but much fewer stalked glands than in the type.—*C. procerum*, Moquin in DC. Prodr. xiii. ii. 75; A. Rich. Tent. Fl. Abyss. ii. 221; Schweinf. Beitr. Fl. Aethiop. 184. *C. Botrys*, T. Thoms. in Speke, Nile, Append. 646; Oliver in Trans. Linn. Soc. xxix: 140; Baum in Warb. Kunene-Samb. Exped. 231.

Nile Land. Abyssinia: near Adowa, *Schimper*, 882! 1506! Somaliland Golis Range, *Drake-Brockman*, 242!

Lower Guinea. Angola: Quiriri River, *Baum*, 724.

Mozamb. Dist. German East Africa: Karagwe, *Speke & Grant*, 465! Usui, *Speke & Grant*, 200! British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 405!

6. **C. schraderianum,** *Roem. & Schultes, Syst. Veg.* vi. 260. Stem 2–5 ft. high, pubescent upwards. Leaves pinnatifid; blade 1–4 in. long; midrib pubescent and with scattered stalked glands beneath; surface with numerous yellow subsessile glands beneath. Inflorescence more loose than that of *C. Botrys*, Linn. Perianth-segments triangular, subcarinate.—*C. graveolens*, Lag. et Rodr. in Anal. Cienc. Nat. v. (1802), 70; Hiern in Cat. Afr. Pl. Welw. i. 898; not of Willd. *C. fœtidum*, Schrad. in Ges. Naturf. Fr. Berlin Mag. ii. (1808), 79; Moquin in DC. Prodr, xiii. ii. 76; Boiss. Fl. Orient. iv. 903; Schweinf. Beitr. Fl. Aethiop. 183, in Bull. Herb. Boiss. iv. Append. ii. 156; Engl. Pfl. Ost-Afr. C. 171; W. D. J. Koch, Syn. Deutsch. Fl. ed. 3, iii. 2209 in obs., not of Lam.

Nile Land. Eritrea: various localities, 3000–7000 ft., *Schweinfurth*, 328, 597, 700, 1328, 1375; *Steudner*, 637! Abyssinia: near Adowa, 4000–7000 ft., *Schimper*, 252! Ankober, *Roth*, 67!

Lower Guinea. Angola: Pungo Andongo; between Luxillo and Cazello, *Welwitsch*, 6318! by the River Cuanza, near Quisonde, *Welwitsch*, 6319! Huilla; about Lopollo, *Welwitsch*, 6317!

Mozamb. Dist. German East Africa: Usambara; *Buchwald*, 539!

Also in South Africa and America.

This species is so near *C. Botrys*, Linn., that high authorities do not agree in the sorting of the tropical African material. Nevertheless, Volkens (in Engl. & Prantl, *Pflanzenfam.* iii. 1A, 61) appears to accept *C. fœtidum* as distinct from *C. graveolens*. Though the species was originally distinguished from *C. Botrys* by its heavy unpleasant odour, Moquin says it is "highly aromatic."

As to the specific name to be applied to the species, both the names *graveolens* and *fœtidum* have been confused and misused, even a century ago; the name "*C. schraderianum*" stands clear.

It is to be noted that this species varies in size much as does *C. Botrys* (including its var. *procera*), and occupies much the same area.

7. **C. suberifolium,** *Murr in Bull. Herb. Boiss. sér.* 2, iv. 990. Stem erect; upper part 2 ft. long, undivided. Lower leaves:—**blade**

3 by $\frac{3}{4}$–1 in., narrowed at both ends, remotely and shallowly toothed or sinuate; midrib pubescent and with scattered stalked glands beneath; surface obscurely verrucose and very sparingly glandular beneath. Inflorescence and flowers as of *C. schraderianum*, Roem. et Sch.

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 8926!

This plant, a fine example, is issued by Engler as *C. fœtidum*, Schrader; the leaves are very unlike.

2. **ATRIPLEX**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 53.

Flowers small, 1-sexual. Perianth of male of 5 lobes united below, without bracteoles. Stamens 5, or 4–3. Female flower without perianth, enclosed between 2 erect ovate or triangular bracteoles. Ovary ovoid, free, with one ovule on a basal stalk, oblique; style cylindric, with usually 2 branches. Capsule dry, ovoid, flattened, enclosed between the 2 erect (often enlarged thickened or hardened) bracteoles; pericarp thin, membranous. Seed erect; embryo forming one circle round the enclosed albumen.—Herbs or undershrubs, mealy, scaly or closely tomentose. Leaves alternate, undivided; blade flat, often toothed or lobed. Flowers numerous, clustered, in cymes running into terminal spikes and panicles. Branches (and not rarely plants) carrying flowers all of one sex.

Species 120; throughout the world, less numerous in the tropics.

*Leaves green or mealy, with many teeth . .	1. *A. hastata.*
**Leaves closely minutely white-tomentose, without meal or scales.	
Leaves narrowed at the base into the petiole.	
Fruit bracteoles flat, separate nearly to the base	2. *A. Halimus.*
Fruit bracteoles united at the base, woody, prickly	3. *A. amboensis.*
Leaves (towards middle of stem) cordate-auricled at the base	4. *A. farinosa.*

1. **A. hastata,** *Linn. Sp. Pl. ed.* i. 1053, *and ed.* ii. 1494. Stem herbaceous, erect, 2 ft. high. Leaves alternate, petioled; blade 2–3 in. long, ovate, acute, toothed, base hastate, sparingly mealy or glabrate. Spikes running into terminal panicles, sometimes dense; bracteoles $\frac{1}{6}$ in. long, deltoid-triangular, united only at the base, smooth or sparsely tuberculate on the back, toothed on the margin. Fruit erect, flattened between the two bracteoles; pericarp thin.—Reichb. Pl. Crit. i. 18, t. 16; Moquin in DC. Prodr. xiii. ii. 94; Boiss. Fl. Orient. iv. 909; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 66; W. D. J. Koch, Syn. Fl. Deutsch. ed. 3, iii. 2215.

Mozamb. Dist. German East Africa: "Great Lakes," ex *Engler*.

Abundant in Europe; found in nearly all temperate and warm-temperate climates. No example from tropical Africa is preserved at Kew, but it is a weed that may occur anywhere.

2. **A. Halimus,** *Linn. Sp. Pl. ed.* i. 1052, *and ed.* ii. 1492. An erect undershrub, 2–4 ft. high. Leaves alternate, petioled; blade 1 in. long, oblong, narrowed at the base, with very close short whitish tomentum underneath. Branches mostly of one sex; inflorescences axillary, but running especially in the males into terminal panicles, leafless at the top. Male perianths with close tomentum. Two bracteoles of the fruit $\frac{1}{6}$–$\frac{1}{4}$ in. long and broad, triangular or ovate, smooth on the back, entire, sinuate or somewhat toothed on the margin, united only at the base. Fruit flattened, erect, between the two erect bracteoles.—Moquin in DC. Prodr. xiii. ii. 100; Boiss. Fl. Orient. iv. 916; Schinz in Bull. Herb. Boiss. v. Append. iii. 60; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 64, 66. *A. capensis*, Moquin in DC. Prodr. xiii. ii. 100; Schinz in Bull. Herb. Boiss. v. Append. iii. 60; O. Kuntze in Jahrb. Königl. Bot. Gart. Berlin, iv. 273. *A. paludosa*, Hiern in Cat. Afr. Pl. Welw. i. 899, not of R. Br.

Lower Guinea. Angola: Mossamedes; about Caroca, *Welwitsch*, 6327! German South-west Africa: Hereroland, *Marloth*, 1456, *Fleck*, 725, *Rautanen*, 137, *Guerich*, 55, 145, 151, *Pechuel Loesche.*

Europe and the Mediterranean region.

As to the synonymy, the names given refer (for tropical Africa) to one example viz., Welwitsch, 6327, showing male branches. The *A. paludosa*, R. Br., is procumbent, and his Australian specimens do not match in leaves the Mossamedes plant. Schinz keeps up *A. capensis*, Moquin, as distinct from *A. Halimus*, Linn., by the considerably larger bracteoles to the fruit—a character difficult to work as specific in European *Atriplex*. And Welwitsch, 6327, shows no fruit or female flowers.

3. **A. amboensis,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxxi. 211. Closely resembling *A. Halimus* in habit, leaves and inflorescence. Fruits about $\frac{1}{4}$ in. long, the lower part globose, prickly, formed of the 2 confluent bracteoles, which become woody with a wall $\frac{1}{16}$ in. thick, the pericarp exceedingly thin. Seed enclosed, small.—Schinz in Bull. Herb. Boiss. v. Append. iii. 60.

Lower Guinea. German South-west Africa: Amboland; Omandongo, *Schinz*, 468!

This is described by Schinz as lepidote; I find in scraping off the indumentum no scales, but a minute tomentum, as in *A. Halimus*, Linn. Indeed, except by the fruit, I do not see how it could be distinguished from *A. Halimus.*

4. **A. farinosa,** *Forsk. Fl. Ægypt.-Arab.* cxxiii. An undershrub, 3 ft. high, not mealy. Leaves alternate; blade $1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., in the middle stem-leaves cordate or auricled (sometimes with acute auricles), margin entire or sparingly toothed, under surface with dense minute white tomentum; petioles 0–$\frac{1}{5}$ in. Two bracteoles in fruit orbicular, $\frac{1}{5}$ in. in diam., flattened, densely tomentose, without tubercles in the few examples seen.—Ascherson & Schweinf. in Schweinf. Beitr. Fl. Aethiop. 289; Boiss. Fl. Orient. iv. 917, not of Dumort., nor of Moquin.

Nile Land. Nubia: coast region, *Bent!* Red Sea, *Lord!* British East Africa: Sabaki River, near Melindi, *Kirk!* Mombasa, *Kirk!*

Also in North Africa and Arabia.

The expediency of reviving this name of Forskal, in use for another species, and applying it to a plant that is not mealy may be doubted.

3. **PLEUROPTERANTHA**, Franch.; Benth. et Hook. f. Gen. Pl. iii. 1218.

Flowers hermaphrodite. Perianth 5-lobed, the 2 outer lobes longer than the others. Stamens 5, hypogynous; filaments united into a short basal ring; anthers wide, introrse, dorsifixed. Ovary ovoid; ovule slightly campylotropous; style short; stigma thick, bifid. Utricle ovoid, enclosed between two orbicular reticulate wings (abortive flowers). —A glabrous stiff herb, divaricately branched. Leaves linear. Flowers small, in 3-flowered clusters arranged in spikes near the ends of the branches, the central flower fertile, the two lateral reduced to wings.

Endemic, monotypic.

1. **P. Revoili,** *Franch. Sert. Somal.* 60, *t.* 5. Branches slender, glabrous. Leaves linear, 1 in. long, 1 lin. wide, subacute. Flowers very small; bracts and bracteoles minute, deltoid, concave. Perianth: two outer segments herbaceous, finely ciliate on the margin, three inner flat, thinly membranous, slightly erose at the apex. Stamens rather shorter than the perianth. Perianth of barren florets at length 6 lin. in diam., shallowly cup-shaped, finely and abundantly reticulate. Seed vertical; embryo slender, annular; albumen abundant.

Nile Land. Somaliland: Tigieh, *Revoil.*

A barren specimen collected by W. Wickham Perry at Berbera on the Somali coast may belong to this species.

4. **KOCHIA,** Roth; Benth. et Hook. f. Gen. Pl. iii. 60.

Flowers very small, 2-sexual or female. Perianth ovoid-cylindric, with 5 lobes; lobes persistent, incurved over the fruit, a scale or horizontal crest developed in fruit spreading from the base of each lobe. Stamens 5. Ovary sessile, ovoid; styles 2, or sometimes 3; ovule 1, on a short basal stalk. Utricle membranous; seed horizontal; embryo annular, surrounding the often scanty albumen.—Small shrubs or herbs; stems not transversely marked nor as though jointed. Leaves alternate, small; blade linear-oblong or cylindric, not acute prickly. Flowers in clusters of 2–3 or solitary, axillary and running into terminal leafless panicles.

Species 30; many in Australia; a few scattered throughout the Old World.

Leaves linear, when mature scarcely pubescent . .	1. *K. salsoloides.*
Leaves oblong, when mature very hairy . . .	2. *K. cana.*

1. **K. salsoloides,** *Fenzl in Endl. et Fenzl, Nov. Stirp. Decad. Vindob.* 1839, 74. A branched undershrub, 1–2 ft. long; young parts pubescent; stem when in fruit pubescent at the top or nearly glabrate.

Leaves $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{20}$ in., flat or subcylindric.—Moquin in DC. Prodr. xiii. ii. 131; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 70; Schinz in Bull. Herb. Boiss. v. Append. iii. 60; O. Kuntze in Jahrb. Königl. Bot. Gart. Berlin, iv. 273. *K. pubescens*, Moquin, Chenop. Enum. 192, in DC. Prodr. xiii. ii. 131; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 70.

Lower Guinea. German East Africa: Hereroland, *Pechuel Loesche, Fleck*, 406.

Also in South-west Africa.

The variations in degree of pubescence which constitute two species with Volkens are (for me) altogether insufficient. J. G. Baker, indeed, doubts whether this species is well separated from the Mediterranean *K. prostrata*, Schrad.

2. **K. cana,** *Boiss. Fl. Orient.* iii. 924. Branches white, obscurely silky. Leaves $\frac{1}{5}$ in. long or less, oblong or narrowly elliptic, obtuse, very hairy even in age. Inflorescences subglobose, embedded in long brown hair.

Nile Land. Nubia: coast region, *Bent!*

Also in South-east Persia.

This plant differs from the widespread *K. prostrata* in having much shorter, blunter leaves. Boissier defines his *K. cana* as annual; but the example at Kew (viz., Bornmueller, 4184) is an undershrub. The examples of Bent do not provide means of analysis of either flower or fruit; they appear to me to match Bornmueller's 4184.

5. **HALOPEPLIS**, Bunge; Benth. et Hook. f. Gen. Pl. iii. 64.

Flowers very small, 2-sexual. Perianth obconic, with 3 teeth. Stamens 1 or 2. Ovary ovoid, superior; style short, with 2 short linear branches; ovule 1, suspended on a basal funicle. Seed erect, orbicular, compressed; embryo peripheric round the albumen.—Annuals or shrubs, glabrous or nearly so; branches not jointed. Leaves $\frac{1}{10}$ in. long, obovate or orbicular, amplexicaul and appearing perfoliate in the tropical African specimens. Bracts in small spikes, with usually 3 flowers under each.

Species 3, in the Mediterranean region, Arabia and Persia.

1. **H. perfoliata,** *Schweinf. Beitr. Fl. Aethiop.* 289, *name only.* A woody branched glabrous shrub, 1–2 ft. high; branches with closely placed nodes, not jointed. Leaves $\frac{1}{10}$ in. long, obovate or orbicular, sessile and minutely decurrent at the base. Spikes of flowers small, dense; floral bracts similar to the leaves, with usually 3 flowers under each bract, more or less adnate thereto.—Boiss. Fl. Orient. iv. 935; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 74; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 157. *H. amplexicaulis*, Ces. Pass. & Gib. Compend. Fl. Ital. 271, t. 41, fig. 2. *Salicornia perfoliata*, Forsk. Fl. Ægypt.-Arab. 3, t. 1.

Nile Land. Nubia: coast region, *Bent!*

Also in North-east Africa and Arabia.

The Mediterranean *H. amplexicaulis* resembles altogether the young examples of *H. perfoliata*, but appears never more than annual, and is maintained as a distinct species by Boissier.

6. HALOCNEMUM, M. Bieb.; Benth. et Hook. f. Gen. Pl. iii. 64.

Flowers very small, 2-sexual. Perianth of 3 unequal obovate segments united below. Stamen 1. Ovary ovoid, narrowed upwards; style short, branches 2, sometimes 3; ovule 1, suspended on a basal funicle. Seed vertical; embryo peripheric round the albumen.—A small shrub; stem continuous, the branchlets and spikes apparently articulated. Leaves 0. Bracts in small spikes, with usually 3 flowers under each.

Species 1, also in Europe, North Africa, the Orient and Central Asia.

1. **H. strobilaceum,** *M. Bieb. Fl. Taur. Cauc.* iii. 3. A woody much-branched nearly glabrous shrub, 12–18 in. high.—Moquin in DC. Prodr. xiii. ii. 149; Boiss. Fl. Orient. iv. 936; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 76, fig. 35 A–G. *Salicornia strobilacea*, Pallas, Voy. i. 744, t. 23, fig. 1, 2.

Nile Land. Eritrea: Massowa, *Schweinfurth & Riva*, 75!

7. ARTHROCNEMUM, Moquin; Benth. et Hook. f. Gen. Pl. iii. 65.

Flowers very small, 2-sexual. Perianth funnel-shaped, shortly 3–4-lobed. Stamens 2–1. Ovary ovoid; style short, branches 2; ovule 1, suspended on a basal funicle. Seed vertical; embryo peripheric round the albumen.—Small shrubs; stem branched, of short joints. Leaves 0. Flowers in cylindric dense spikes; in clusters of 3 sunk in the hollows of the joints.

Species 7, in saline marshes of the Old World.

The seed is very much like that of *Ficoideæ* or small *Caryophyllaceæ*. From the "eye" lines of longitudinal cells radiate; as these approach the round back of the seed the cells shorten, so that the curved back of the seed is covered by subquadrangular cells, usually inflated; this inflation is sometimes sufficient to make the seed subpapillose on the back. The degree to which these markings are to be seen in the fully ripe seed varies considerably in those examined from one plant. Volkens' picture in Engl. & Prantl, *Pflanzenfam.* iii. 1A, fig. 35, M, is a very rough imperfect view of an average seed through a pocket lens. The characters of the seed have been much used in distinguishing the species of this genus, but in my opinion are of little value.

Stems erect.
- Fruiting spikes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 2 lin. broad . . 1. *A. fruticosum.*
- Fruiting spikes $\frac{3}{4}$ to $1\frac{1}{4}$ in. long, $2\frac{1}{2}$ lin. broad . 2. *A. macrostachyum.*

Stems prostrate . . . . . 3. *A. indicum.*

1. **A. fruticosum,** *Moquin in DC. Prodr.* xiii. ii. 151. Glabrous; stems erect, branched, 6–20 in. high. Fruiting spikes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 2 lin. broad, rough, *i.e.*, not forming smooth cylinders, the flowers being partially emergent.—*A. glaucum*, Ung. Sternb. in Atti, Congr. Bot. Firenze, 1874, 283; Boiss. Fl. Orient. iv. 932; Hook. f. Fl. Brit. Ind. v. 12; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 76, fig. 35, H–N; Schweinf. in Bull. Herb. Boiss. v. Append. iii. 61; W. D. T. Koch, Syn. Fl. Deutsch. ed. 3, iii. 2222. *A. macrostachyum*, Hiern in Cat. Afr. Pl. Welw. i. 899, partly. *Halocnemum glaucum*, Presl, Bot. Bemerk. 109.

Nile Land. Nubia: coast region, *Bent!*

Lower Guinea. Angola: Mossamedes; near Boca de Giraul, *Welwitsch*, 6328! Loanda; sandy maritime places, *Welwitsch*, 6331! German South-west Africa: Walfisch Bay, *Guerich*, 22.

2. **A. macrostachyum,** *Mor. & Delp. in Ann. Sc. Nat. 4 sér.* ii. 377. Stem and branches stouter, very succulent. Spikes in fruit numerous, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $2\frac{1}{2}$ lin. broad, "rough," but less so than in *A. fruticosum*.—Hiern in Cat. Afr. Pl. Welw. i. 899, partly. *A. fruticosum*, var. *macrostachyum*, Moquin in DC. Prodr. xiii. ii. 151.

Lower Guinea. Angola: Loanda, *Gossweiler*, 198! Ambriz; by the River Onço, *Welwitsch*, 6330.

Also in North Africa, Europe, and the Orient.

3. **A. indicum,** *Moquin in DC. Prodr.* xiii. ii. 151. Stem prostrate, throwing up many suberect fruiting spikes, $2\frac{1}{2}$ lin. in diam., *i.e.*, about as stout and succulent as in *A. macrostachyum*. Spikes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $2\frac{1}{2}$ lin. broad, "smooth," *i.e.*, the flowers wholly hidden.—Hook. f. Fl. Brit. Ind. v. 12; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 76. *A. sp.*, Hiern in Cat. Afr. Pl. Welw. i. 900. *Salicornia indica*, Wight, Ic. Pl. t. 737.

Upper Guinea. Senegal, ex *Moquin.*

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6329.

Also in India.

8. **SALICORNIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 66.

Seed without, or nearly without, albumen; the seed suddenly bent where the radicle joins the cotyledons, so that the radicle lies nearly parallel with (but in an opposite direction to) the cotyledons. Otherwise as *Arthrocnemum*.

Species 9, on the sea-coasts of the world.

1. **S. herbacea,** *Linn. Sp. Pl. ed.* i. 3, *and ed.* ii. 5. An erect, glabrous, much-branched annual, 6–12 in. high. Leaves none, the numerous branches usually terminating in a spike of flowers. Spikes in fruit $\frac{1}{2}$–1 by $\frac{1}{8}$ in., cylindric, continuous, more slender than in the species of *Arthrocnemum*.—Moquin in DC. Prodr. xiii. ii. 144; Boiss. Fl. Orient. iv. 933; Engl. Pfl. Ost-Afr. C. 171; Volk. in Engl. & Prantl,

Pflanzenfam. iii. 1A, 77, fig. 36, G–L; W. D. T. Koch, Syn. Fl. Deutsch. ed. 3, iii. 2223. *S. annua*, Smith in Sowerby, Engl. Bot. t. 415.

Mozamb. Dist. Portuguese East Africa: Mozambique, ex *Engler*.

Also on the coasts of Europe, Africa, and America.

9. **SALSOLA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 71.

(By C. H. Wright.)

Flowers hermaphrodite, subtended by 2–3 bracteoles. Perianth 5-partite; segments concave, thickened on the back, in fruit furnished on the back with a large horizontal scarious wing; parts below the wing free or connate into an indurated cup. Stamens 5, usually hypogynous; anthers obtuse or with the connective variously produced. Ovary globose or ovoid; style long or short; stigmas 2, spreading, subulate; ovule subsessile or pendulous from the tip of a long funicle. Utricle included in the persistent winged perianth. Seed usually horizontal, orbicular; testa membranous; albumen none; embryo spiral.—Annual or perennial herbs or undershrubs of various habit. Leaves alternate or rarely opposite, sometimes wide sheathing, short, long or scale-like, sometimes mucronate. Flowers small, solitary in the axils of the upper reduced leaves of the branchlets or spicate.

Species about 40, chiefly in temperate Asia and North Africa, several in South Africa, 1 in temperate North and South America and 1 in Australia.

Flowers in spikes.	
Leaves minute, orbicular. Disk cupular . .	1. *S. fœtida.*
Leaves 2–4 lin. long, ovate. Disk 0 . . .	2. *S. vermiculata.*
Flowers in dense terminal heads	3. *S. rubescens.*
Flowers solitary.	
Leaves 2–8 lin. long, villous	4. *S. crassa.*
Leaves 2–3 lin. long, tomentose	5. *S. Zeyheri.*
Leaves minute.	
Branchlets not at right angles to the branches.	
Fruiting wings obovate, below the middle of the segments	6. *S. aphylla.*
Fruiting wings suborbicular, at the middle of the segments	7. *S. Forskalii.*
Branchlets nearly at right angles to the branches	8. *S. Bottæ.*

1. **S. fœtida,** *Del. Fl. Égypte*, 57. A shrub 1–4 ft. high, with the odour of decaying fish; branchlets many, pallid, ascending, slender, woody. Leaves minute, alternate, orbicular, fleshy with membranous margins. Flowers forming very short dense cylindrical spikes, solitary in the axils of broad ovate imbricate leaves; bracteoles like the leaves in size and shape. Perianth-segments ovate-triangular. Anthers with a small appendage. Disk membranous, faintly 10-lobed. Stigmas exserted from the perianth, recurved. Wings of fruiting perianth inserted at the middle of the lobes, white, subequal, obcuneate, erose-laciniate.—Boiss. Fl. Orient. iv. 961; Hook. f. Fl. Brit. Ind. v. 18; Barbey, Levant, t. 8, fig. 11; Franch. in Journ. de Bot. i. 134. *Caroxylon fœtidum*, Moquin in DC. Prodr. xiii. ii. 178; Aschers. in

Schweinf. Beitr. Fl. Aethiop. 183. *Chenopodium baryosmon*, Roem. & Schultes, Syst. Veg. vi. 269.

Nile Land. Nubia: Oobisch, near Berber, *Schweinfurth*, 740! Wady Halfa, in crevices of sandstone rocks, *Scott-Elliot*, 3420! between Berber and Khartoum, *Bromfield!* sea-coast, *Bent!* Somaliland: shore at Obock, *Faurot*.

Also in North Africa, Western Asia and India. Native name in Egypt "*mulley*," in Nubia "*deberrah*."

2. **S. vermiculata,** *Linn. Sp. Pl. ed.* i. 223. A much-branched undershrub. Branches alternate, ascending, not jointed, pubescent. Leaves alternate or fascicled, ovate, slightly dilated and keeled at the base, 2–4 lin. long, more or less hairy. Flowers in dense spikes; bracts elliptic, very obtuse, keeled, membranous at the margin. Perianth 5-lobed; segments ovate-triangular, subacute, wings inserted below the middle, obovate. Filaments long, exserted, dilated at the base; anthers oblong, not appendiculate. Disk none. Wings of fruiting perianth inserted at the middle of the lobes, about 2 lin. long, the two inner slightly smaller.—Moquin in DC. Prodr. xiii. ii. 181; Boiss. Fl. Orient. iv. 962; Aschers. in Schweinf. Beitr. Fl. Aethiop. 186. *S. flavescens*, Cav. Ic. t. 288.

Nile Land. Nubia: banks of the Nile near Tingur, *Ehrenberg* ex *Ascherson*.

Var. *microphylla*, Moquin in DC. Prodr. xiii. ii. 181. Branches glabrous. Leaves very short.—*S. microphylla*, Cav. Ic. t. 287. *S. brevifolia*, Desf. Fl. Atl. i. 218.

Upper Guinea. Senegal, *Roger!*

This species occurs in various forms in South Europe, the Canary Islands, North Africa and Western Asia.

3. **S. rubescens,** *Franch. Sert. Somal.* 60. A small much-branched shrub, entirely covered with very short silky whitish indumentum; branches articulate. Leaves alternate, about 2 lin. long, thick, obtuse, concave above. Flowers in dense heads at the ends of the branches, each one nestling in a bract similar to, but smaller than, the leaves. Perianth 5-partite; segments obovate, conniving and pilose at the apex, reddish when mature; wings inserted in the middle of the back, rotundate, coriaceous, the three outer nearly three times the size of the inner. Disk small, with short rounded lobes. Stamens 5, free. Style bifid to the middle. Utricle depressed.

Nile Land. Somaliland: Bender Gasem, *Revoil*.

Native name "*arkado*."

4. **S. crassa,** *M. Bieb. in Mém. Soc. Nat. Mosc.* i. (1811), 100. Stem ascending, much-branched, villous; branches alternate, not jointed. Leaves alternate, 2–8 lin. long, semiterete from a sheathing base, obtuse; whitish villous. Flowers solitary; bracts shortly ovate, concave, densely silky. Perianth-segments ovate, acuminate, silky outside above the insertion of the wing. Disk very shallowly cup-shaped. Anthers oblong, terminated by an erect obovate white appendage.

Style short, thick; stigmas long, subulate, acute. Wings of fruiting perianth inserted above the middle of the segments, broadly obcuneate, the 3 outer 1 lin. long, $2\frac{1}{2}$ lin. wide, the 2 inner narrower.—Moquin in DC. Prodr. xiii. ii. 186; Boiss. Fl. Orient. iv. 956. *S. cana*, C. Koch in Linnæa, xxii. 190.

Nile Land. Somaliland: Berbereh, *Wykeham Perry!* Behendula, maritime plain, 1000 ft., on bare limestone rocks, *Thomson!*

Also in Western Asia and South-eastern Europe. A very variable plant, especially as to the indumentum.

5. **S. Zeyheri,** *Schinz in Bull. Herb. Boiss.* v. *Append.* iii. 62. An erect shrub. Stem much-branched, pubescent; branches terete, not articulate, pubescent, ashy grey. Leaves alternate, 2–3 lin. long, about 1 lin. wide, thick and fleshy, concave above, broadly keeled beneath, tomentose. Flowers subsolitary; bracts triangular-ovate or ovate-orbicular, obtuse, thick, very concave, rather tomentose. Perianth-segments lanceolate, rather obtuse, villous on the back. Filaments dilated below; anthers oblong-hastate, with a minute terminal yellow appendage. Disk fleshy, with 5 entire very obtuse lobes. Style elongate; stigmas lanceolate-subulate, compressed. Wings of fruiting perianth inserted near the base, membranous, unequal, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, 3 obovate-reniform and 3–4 lin. wide, 2 lanceolate and $\frac{1}{2}$–1 lin. long.—*S. aphylla*, Hiern in Cat. Afr. Pl. Welw. i. 900. *Caroxylon Zeyheri*, Moquin in DC. Prodr. xiii. ii. 176.

Lower Guinea. Angola: Mossamedes] sides of sandhills at Cavalheiros, *Welwitsch*, 6320! German South-west Africa: Damaraland; sand dunes, Walfisch Bay, *Pearson*, 538!

Also in South Africa.

6. **S. aphylla,** *Linn. f. Suppl.* 173. A much-branched shrub, reaching a height of 6 ft. Branches slender, terete, not jointed, pallid, pubescent. Leaves alternate, ovate, minute, amplexicaul, densely pubescent. Flowers solitary; bracts suborbicular, keeled, pubescent. Perianth-segments ovate-lanceolate, obtuse, slightly pubescent. Filaments dilated below; anthers oblong, with a minute terminal appendage. Disk fleshy, obtusely 5-lobed. Style elongate; stigma subulate. Wings of the fruiting perianth inserted below the middle of the segments, obovate, membranous, yellowish or dull purple, the two inner narrower than the others.—Schinz in Bull. Herb. Boiss. v. Append. iii. 61. *Caroxylon Salsola*, Thunb. Diss. Med. Afr. (1785), 8; Moquin in DC. Prodr. xiii. ii. 176.

Lower Guinea. German South-west Africa: Hereroland; Potmine, *Gürich*, 110; Sandfontein, *Stapff*, 2; Amboland; Ombuja J'oohama, *Rautanen*, 19; Great Namaqualand; near Rehoboth, *Fleck*, 366A.

Also in South Africa.

7. **S. Forskalii,** *Schweinf. in Bull. Herb. Boiss.* iv. *Append.* ii. 160. A glabrous shrub. Branches erect, much divaricate, white, slender; branchlets hard, very slender, patent, quite straight, white pubescent at

the apex. Leaves in small glomerules spaced out on the branchlets, minute, hemispherical, membranous at the edge, puberulous at the apex. Flowers solitary, axillary; bracteoles triangular-hemispherical, cucullate, with a membranous margin. Perianth very small, 5-partite; lobes broadly ovate-triangular, cucullate, thickened in the centre of the back, membranous at the edge, ciliate towards the base; wings inserted at the centre of the back, membranous, suborbicular. Stamens 5; anthers sagittate, apiculate. Disk indistinctly lobed. Ovary depressed globose; style short; stigmas 2 (rarely 3), oblong-linear.

Nile Land. Eritrea: on plains on the way to Saberguma, *Schweinfurth*, 95 of 1891 collection.

Also in Arabia.

8. **S. Bottæ,** *Boiss. Fl. Orient.* iv. 964 *in obs.* A much-branched glabrous shrub. Branches patent, 3–7 in. long, virgate, pinnately branched. Leaves few, minute, fleshy, shortly deltoid, adpressed, keeled. Flowers spaced out on the branches, sessile; bracts 3, ovate, concave, hyaline-margined. Perianth-segments 5, persistent, lanceolate, 2 lin. long, $\frac{3}{4}$ lin. wide, very dark brown, hyaline-margined. Filaments short; anthers sagittate, about 1 lin. long, with a short apical appendage. Ovary ovoid; style shortly subulate; stigmas 2, subulate, divergent. Wings of fruiting perianth inserted below the middle of the segments, 3 outer larger, 2 lin. long, nearly 3 lin. wide, flabellate, 2 inner slightly shorter and about half the width of the outer.—Var. *Fauroti*, Franch. in Journ. de Bot. i. 134. *Halothamnus Bottæ*, Jaub. & Spach, Ill. Pl. Orient. ii. 50, t. 136. *Caroxylon Bottæ*, Moquin in DC. Prodr. xiii. ii. 178.

Nile Land. Somaliland: on rocks near Obock, *Faurot*, and without precise locality, *Mrs. Lort Phillips!*

Also in Arabia.

Imperfectly known species.

9. **S. candida,** *Fenzl ex Schinz in Bull. Herb. Boiss.* v. *Append.* iii. 62, *name only.*

Lower Guinea. German South-west Africa: Hereroland, *Lüderitz*, 168.

Probably identical with *S. Zeyheri*, Schinz.

10. **S. globuliflora,** *Fenzl ex Schinz in Bull. Herb. Boiss.* v. *Append.* iii. 62, *name only.*

Lower Guinea. German South-west Africa: Great Namaqualand, Obib (Ubib?), *Schenck*, 336.

11. **S. tuberculata,** *Fenzl ex Moquin in DC. Prodr.* xiii. ii. 178; *Schinz in Bull. Herb. Boiss.* v. *Append.* iii. 62. *Caroxylon tuberculatum*, Moquin, l.c

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Fleck*, 336A.

10. **SUÆDA,** Forsk.; Benth. et Hook. f. Gen. Pl. iii. 66.

Flowers polygamous, monœcious, or 2-sexual. Perianth urn-shaped in the bud; lobes 5, often deeper in the male flowers. Stamens 5; ovary ovoid, truncate at the top; style hardly any, branches 3; ovule 1, suspended on a basal funicle. Fruit enclosed in the succulent perianth, which is sometimes subbaccate; seed erect or rarely horizontal; embryo coiled, with little or no albumen.—Undershrubs, glabrous except *S. vermiculata*, much-branched. Stem continuous. Leaves alternate, or in *S. vermiculata* to a small extent pseudopposite, fleshy, linear or cylindric, or in *S. vermiculata* obovoid-subglobose. Flowers solitary or in small dense clusters, in the axils, sometimes running into leafy quasi-terminal spikes.

Species 10 (several of these ill-defined), scattered nearly throughout the world.

Each leaf without a tubercle supporting its base.
- Upper leaves nearly an inch long; flowers unisexual — 3. *S. monoica.*
- Upper leaves much less than an inch long.
  - Flowers very small; perianth not angular.
    - Perianth in fruit fleshy — 1. *S. fruticosa.*
    - Perianth in fruit berry-like — 2. *S. baccata.*
  - Flowers rather larger; perianth somewhat pentagonal — 4. *S. Volkensii.*

Each leaf with a tubercle supporting it at the base — 5. *S. vermiculata.*

1. **S. fruticosa,** *Forsk. Fl. Ægypt.-Arab.* cix. *and* 70, *Ic.* 9. A glabrous, much-branched shrub, 1–2 ft. in diam. Leaves alternate, scattered, linear, narrowed at the very base without any supporting tubercle beneath; leaves on the branches usually $\frac{1}{4}$–$\frac{1}{3}$ in. long, the lower leaves longer, often $\frac{1}{2}$–$\frac{2}{3}$ in. long. Flowers very small, axillary, many solitary 2-sexual, some in few-flowered clusters. Perianth broadly cylindric in bud, hardly at all pentagonal.—Moquin in Ann. Sc. Nat. 1re sér. xxiii. 311, t. 20, and in DC. Prodr. xiii. ii. 156; Boiss. Fl. Orient. iv. 939; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 80; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 157. *Chenopodium fruticosum*, Linn. Sp. Pl. ed. i. 221. *Salsola fruticosa*, Linn. Sp. Pl. ed. ii. 324; Sowerby, Engl. Bot. t. 635. *Lerchea obtusifolia*, Steud. Nomencl. ed. i. 187, 474; Hiern in Cat. Afr. Pl. Welw. i. 900. *L. maritima*, γ *fruticosa*, O. Kuntze, Rev. Gen. Pl. ii. 549.

Nile Land. Eritrea: Massowa, *Schweinfurth & Riva*, 27! 67! High Island, Harnish group, *Slade*, 11! Somaliland: Shebele River, near Magodoxo, *Kirk!*

Lower Guinea. Angola: Benguella, *Welwitsch*, 6322! Mossamedes, *Welwitsch*, 6321, 6321B!

Also in North Africa and Europe, extending to England and through the Orient to Western India.

The Shebele River example has the leaves linear-oblong, very densely crowded, and may be called *S. fruticosa*, var. *maritima*, C. B. Cl.

2. **S. baccata,** *Volk. in Engl. & Prantl, Pflanzenfam.* iii. 1A, 80. Leaves linear. Perianth in fruit more fleshy, coalescent and berry-like.

—Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 157. *Schanginia baccata*, Moquin in DC. Prodr. xiii. ii. 154; Boiss. Fl. Orient. v. 944.

Nile Land. Eritrea: Massowa, *Schweinfurth & Riva*, 49!

Also in Egypt and Arabia.

This plant appears hardly different from *S. fruticosa;* it can scarcely be *S. baccata*, Forsk., as Forskal says of his plant "leaves ovate."

3. **S. monoica,** *Forsk. Fl. Ægypt.-Arab.* cix. *and* 70. Upper leaves nearly an inch long. Flowers rather larger than in *S. fruticosa*, and mostly 1-sexual; otherwise as *S. fruticosa*.—Moquin in DC. Prodr. xiii. ii. 156; Boiss. Fl. Orient. iv. 940; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 80; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 158; Engl. Pfl. Ost-Afr. C. 171.

Nile Land. Eritrea: Mount Ghedem, near Massowa, *Schweinfurth & Riva*, 172! Kordofan, *Pfund*, 262! Somaliland, *James & Thrupp!* British East Africa: Mombasa, *Wakefield!*

Mozamb. Dist. German East Africa: Tanga, *Holst*, 2111!

Also in North Africa and the Orient, extending to Western India.

4. **S. Volkensii,** *C. B. Cl.* Glabrous. Upper leaves $\frac{1}{3}$ in. long, oblong. Flowers in clusters, running into nearly continuous spikes. Perianth larger than in *S. fruticosa*, somewhat pentagonal, in fruit half-baccate.—*S. vermiculata*, Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 80, fig. 38, A–E.

Nile Land. Nubia: coast region, *Bent!* Eritrea: Massowa, *Schweinfurth & Riva*, 212! Somaliland: Shebele River, near Magodoxo, *Kirk!* Sudan, *Brown*, 1217!

Also in Northern Africa.

This species is Balansa 1046 (collected at Biskra, in Algiers), and issued as *S. vermiculata*. It is not *S. vermiculata*, Forsk., but probably is *S. vermiculata*, Moquin, partly.

5. **S. vermiculata,** *Forsk. Fl. Ægypt.-Arab.* 70, *Ic.* 18 *B.* A much-branched spreading shrub, sometimes 18 in. in diam. Branches white-tomentose and in the upper part hairy. Leaves $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovate, subglobose, farinose, glandular-pubescent; beneath each leaf is a tubercle decurrent on the stem. Leaves sessile, on some of the upper branches not rarely pseudopposite, as figured by Forskal. Flowers in dense spikes; bracts spirally placed, suborbicular, whitened on the margins; filaments conspicuously exserted.

Nile Land. Nubia: coast region, *Bent!*

Also in Egypt.

Var. *puberula*, C. B. Cl. Branches with white tomentum, but scarcely pubescent at the tips. Leaves $\frac{1}{4}$ in. long, and (in Schweinfurth's fine examples) $\frac{1}{3}$ in. long, nearly linear, but have the small supporting tubercle beneath them.—*Sevada Schimperi*, Moquin in DC. Prodr. xiii. ii. 154; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 159.

Nile Land. Makaur Island, on the Nubian coast, *Schweinfurth*, 746! Eritrea: Massowa, *Schweinfurth & Riva*, 31! 68!

Also in Arabia.

Suæda puberula, Moquin (in *DC. Prodr.* xiii. ii. 157), had very farinose puberulous leaves, each seated on a minute tubercle, and white branches, and was probably the present plant. *S. vermiculata*, Moquin (in *DC. Prodr.* xiii. ii. 155), is probably partly the present species as to description; but the specimen issued is *S. Volkensii*, above.

11. **CORNULACA**, Delile; Benth. et Hook. f. Gen. Pl. iii. 69.

Flowers polygamous, mostly imperfect. Perianth-segments 5, united into a hard cup at the base; segments lanceolate, dilated upwards, membranous, or 1 or 2 of them spinous. Stamens 5; staminodes short, quadrate. Ovary ovoid, free or immersed in a disc; style short, with 2 branches; ovule 1, nearly sessile. Utricle enclosed within the hardened base of the perianth; embryo spiral, without albumen; seed (where known) horizontal.—Small harsh undershrubs; stem (and branches) continuous. Leaves small, alternate, when young ending in a spine. Flowers axillary, solitary or clustered, buried in wool in all the species except *C. Ehrenbergii*.

Species 4 or 5, extending from North Africa to Kabul.

Many leaves distant. Flowers immersed in wool . . 1. *C. monacantha*.
Leaves densely imbricate. Flowers not immersed in wool . . . . . 2. *C. Ehrenbergii*.

1. **C. monacantha,** *Del. Fl. Égypte*, 206, *t.* 22. A much-branched rigid low undershrub. Leaves $\frac{1}{6}$–$\frac{1}{4}$ in. long, lanceolate, curved, ending in a spine, the base ovate, many distant; in age the spine often disappears, and the base of the leaf on the old branches becomes a cushion. Flowers clustered, buried in wool. Perianth in flower $\frac{1}{8}$ in. long; the spathulate lobes elongate in fruit, and one at least usually becomes spinescent.—Moquin in DC. Prodr. xiii. ii. 218; Schweinf. Beitr. Fl. Aethiop. 186; Zarb in Cat. Spéc. Bot. Pfund, 34; Boiss. Fl. Orient. iv. 984; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 89, fig. 44, A–D.

North Central. Sahara Desert in the Teda country, south of Tedjerri, *Vogel!*

Nile Land. Nubia: Dongola, *Ehrenberg*.

Also in North Africa and Western Asia.

2. **C. Ehrenbergii,** *Aschers. in Schweinf. Beitr. Fl. Aethiop.* 184. A densely-branched undershrub. Leaves $\frac{1}{6}$–$\frac{1}{4}$ in. long, closely imbricate, curved outwards, lanceolate, mucronate; in age the branches are clothed with ovoid cushions from which the spines have entirely disappeared. Flowers solitary in the axils, not immersed in wool. Segments of perianth lanceolate, all shortly mucronate.

Nile Land. Ketumbal Island, *Ehrenberg!* Eritrea: Massowa, *Steudner*. Somaliland: coast, *Faurot*.

12. **BASELLA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 76.

Flowers 2-sexual. Perianth urn-shaped, fleshy; lobes 5, short, incurved over the fruit. Stamens 5, inserted near the top of the perianth-tube. Ovary ovoid, free; stigmas 3, linear; ovule 1, on a short basal stalk. Utricle globose, thin; seed erect, subglobose; embryo spiral, with hardly any albumen.—Twining much-branched herbs. Leaves alternate, ovate, entire. Spikes axillary, peduncled, elongating; bracteoles 2, united into a 2-lipped cup, adnate to the perianth. Flowers white or rose or violet.

Species 2, in Asia and Africa.

Petiole 1–2½ in. long . . . . . 1. *B. alba.*
Petiole ¼ in. long . . . . . 2. *B. paniculata.*

1. **B. alba,** *Linn. Sp. Pl. ed.* i. 272, *ed.* ii. 390. Glabrous, branched, several feet long, or the cultivated forms yards long, succulent; stems green or red. Leaves long-petioled, 2–4 in. long, ovate or cordate; in dry weather the plant is often nearly leafless. Spikes 1–6 in. long, sometimes branched. Fruits ⅕ in. in diam., globose, red, white, or black.—Moquin in DC. Prodr. xiii. ii. 223; Volk. in Engl. & Prantl, Pflanzenfam. iii. 1A, 126, fig. 73, A–F. *B. rubra,* Linn. Sp. Pl. ed. i. 272, ed. ii. 390; Hook. f. Fl. Brit. Ind. v. 20. *B. nigra, B. cordifolia, B. ramosa,* Moquin in DC. Prodr. xiii. ii. 223, and *B. japonica, B. lucida,* Moquin in DC. Prodr. xiii. ii. 224, not of others.

Upper Guinea. Sierra Leone: cultivated at Kukuna, *Scott-Elliot,* 4664! Cameroons: Cameroon Mountain, 1000 ft., *Mann,* 1250!

Nile Land. Abyssinia: Begemeder; Sanka Berr, *Schimper,* 1447! and without precise locality, *Plowden.* Niamniam: at Nabambisso River, *Schweinfurth,* 3040!

Lower Guinea. Island of St. Thomas, *Mann,* 1088!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens,* 739! Usambara: Kwa Mshuza, *Holst,* 9072!

Extensively cultivated as a "spinach."

2. **B. paniculata,** *Volk. in Engl. Jahrb.* xxxviii. 81. Glabrous, twining. Leaves succulent (in the dried examples almost horny), shortly petioled, ovate, 1½ in. long, 1 in. wide, acute. Flowers small, spiked, becoming white; spikes forming lax panicles. Sepals ovate, adnate at the base with the corolla. Petals broadly oval, connate at the base.

Mozamb. Dist. German East Africa: Usambara, *Engler,* 1515.

ORDER CVIII. PHYTOLACCACEÆ. (By J. G. Baker, with additions by C. H. Wright.)

Flowers hermaphrodite or unisexual. Perianth inferior, herbaceous or coriaceous, rarely coloured, 4–5-partite, regular or nearly so; segments equal or unequal, imbricate. Stamens 4–5 or many, usually

inserted on a hypogynous disk; filaments subulate, sometimes connate at the base; anther-cells parallel, dehiscing longitudinally. Ovary superior; carpels one or many, concrete or distinct; style none or short; stigmas as many as the carpels, linear or capitate; ovules solitary, basal, with a short funicle. Fruit of one or many carpels, fleshy or dry. Seed erect, compressed; testa membranous or crustaceous; embryo peripheric, enclosing the albumen; cctyledons foliaceous or subcylindrical; radicle long.—Shrubs or herbs, rarely trees. Leaves alternate, entire; stipules none or small. Flowers usually racemose, green or whitish, small.

Species about 60, concentrated in tropical America.

Carpel 1; style simple	1. MOHLANA.
Carpels 2 or more, united into a 1-celled ovary; styles 2–5 .	2. MICROTEA.
Carpels several, free, or united into a several-celled ovary; styles free	3. PHYTOLACCA.

1. **MOHLANA,** Mart.; Benth. et Hook. f. Gen. Pl. iii. 81.

Flowers hermaphrodite, racemose. Perianth campanulate, oblique, herbaceous, cut down nearly to the base into 4 unequal oblong segments, the lowest the largest. Stamens 4, hypogynous, not longer than the perianth; filaments filiform; anthers versatile, sagittate. Ovary globose or ovoid, 1-celled; style short, erect; stigma penicillate; ovule sessile, amphitropous. Fruit lenticular; pericarp rather fleshy, adnate to the seed. Seed erect, lenticular; testa crustaceous, black, shining; embryo annular, encircling the farinose albumen; cotyledons linear, convolute.

Monotypic.

1. **M. nemoralis,** *Mart. Nov. Gen. et Sp.* iii. 171, *t.* 290. An erect annual herb. Stems erect, slender, branched, glabrous, 3–4 ft. long. Leaves alternate, petioled, oblong, acute or acuminate, entire, membranous, up tc 6 by 2 in. Racemes moderately dense, 2–5 in. long, shortly peduncled; rhachis sometimes pubescent; pedicels erecto-patent, as long as the flowers; bracts lanceolate, acuminate, green, deciduous. Perianth obliquely campanulate, glabrous, dark green, 2 lin. long; segments strongly veined in fruit. Fruit lenticular, as long as the flower.—Moquin in DC. Prodr. xiii. ii. 16; Schmidt in Mart. Fl. Bras. xiv. ii. 338, t. 77; Cummins in Kew Bulletin, 1898, 78. *M. secunda,* Mart. l.c. 172. *M. guineensis,* Moquin, l.c. 15. *M. latifolia,* Moquin, l.c. 16. *M. apetala,* Engl. Pfl. Ost-Afr. C. 174. *Rivina latifolia,* Lam. Ill. i. 324. *R. apetala,* Schum. & Thonn. Beskr. Guin. Pl. 84. *R. affinis,* Nees et Mart. Nov. Act. Nat. Cur. xi. 30. *R. inæqualis,* Hook. Ic. Pl. ii. t. 130. *Hilleria elastica,* Vell. Fl. Flum. i. 47, t. 122; Hiern in Cat. Afr. Pl. Welw. i. 900. *H. secunda,* O. Kuntze, Rev. Gen. Pl. ii. 551.

Upper Guinea. Guinea, *Thonning.* Gold Coast: Assin Yan Kumassi, *Cummins,* 54! Togo: near Lome, *Warnecke,* 427! Southern Nigeria: Lagos,

Millen, 92! *Roland*, 36! Otto, *Millen*, 20! Ikoradu, *Schlechter*, 13002! Oloke Meji, *Foster*, 283! Abeokuta, *Irving*, 73! Angiama, *Barter*, 196. Cameroons: Ambas Bay, *Mann*, 775! and without precise locality, *Preuss*, 1160! 1344!

Lower Guinea. Angola: Golungo Alto; banks of the River Cuango, about Sange, *Welwitsch*, 2440! at the cataracts of the River Cuango and by streams in Mata de Quibanga, *Welwitsch*, 2440B!

Nile Land. Niamniam, *Schweinfurth*, 3064! Uganda: east side of Lake Albert Edward, *Scott-Elliot*, 8070! Kampala, *Scott-Elliot*, 7368! *Brown*, 47! Buddu, *Scott-Elliot*, 7517!

Mozamb. Dist. German East Africa: Tanga; Lutindi, *Holst*, 3416!

Also in tropical America, Madagascar, and naturalised in Ceylon.

2. **MICROTEA**, Sw.; Benth. et Hook. f. Gen. Pl. iii. 82.

Flowers hermaphrodite. Perianth 5-partite; segments equal or nearly so, usually erect in fruit. Stamens 3–8, hypogynous; filaments free, filiform; anthers subglobose, 2-celled. Ovary 1-celled; styles 2–5, free or united at the base, papillose above. Fruit obovoid, more or less warted or spiny, seated on the persistent perianth. Seed vertical; embryo peripheral, surrounding the central farinaceous albumen. —Annual, usually branched, herbs. Leaves alternate, quite entire. Flowers small, white, in long slender spikes or racemes; bracts membranous, persistent.

Species about 10, chiefly in tropical South America; 3 in South Africa, 1 of which extends into the tropics.

1. **M. tenuissima,** *N. E. Br. in Kew Bulletin*, 1909, *nied.* An annual herb, 4–16 in. high, with the appearance of *Reseda.* Leaves linear, up to 1 in. long and $\frac{1}{3}$ lin. wide, mucronate, brittle when dry, glabrous. Flowers in spikes up to 7 in. long; bracteoles 2–3 under each flower, about as long as the perianth. Perianth 5-partite, 1 lin. in diam.; segments subregular, obovate, finely 1-nerved. Stamens 3–4; filaments longer than the perianth; anthers subglobose, dorsifixed. Ovary ovoid, warted, $\frac{1}{2}$ lin. high; styles 2–4; ovule campylotropous on a basal funicle. Fruit obovoid, 1 lin. long, mucronate.—*Lophiocarpus tenuissimus*, Hook. f. in Hook. Ic. Pl. xv. 50, t. 1463, figs. 10–11.

Lower Guinea. German South-west Africa: Amboland; Omupanda, *Wulfhorst*, 33! Oshando, *Schinz*, 900!

Mozamb. Dist. Ngamiland: Okavango Valley, 3000 ft., *Lugard*, 277!

Also in South Africa.

3. **PHYTOLACCA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 84.

Flowers hermaphrodite or dicœcious. Perianth green or slightly coloured, 5-partite; segments equal, oblong, obtuse, spreading or reflexing at a late stage. Stamens 5–25, inserted at the base of the perianth, rudimentary in the female flowers; filaments subulate, some-

times connate at the base; anthers oblong, incumbent. Ovary globose; carpels 6–12, free or more or less connate; styles as many as the carpels; ovules solitary, basal, campylotropous. Fruit depressed-globose, fleshy; carpels free or connate. Seeds reniform, compressed, beaked or obtuse at the base; testa black, crustaceous, shining; embryo annular, enclosing the endosperm; cotyledons semiterete; radicle long.—Herbs or shrubs, rarely trees, erect or scandent. Leaves alternate, entire, petiolate. Flowers in dense racemes; pedicels bracteate and bibracteolate.

Species about 10, chiefly natives of America.

A shrubby climber. Carpels free or nearly so . .	1. *P. dodecandra.*
An erect herb. Carpels united.	2. *P. octandra.*

1. **P. dodecandra,** *L'Hérit. Stirp.* 143, *t.* 69. A woody climber. Stems slender, sometimes 15–20 ft. long. Leaves alternate, ovate or oblong, acute, 3–4 in. long, cuneate or rounded at the base, distinctly petioled. Racemes dense, many-flowered, at first 3–4 in., finally ½–1 ft. long; rhachis pubescent; pedicels erecto-patent, as long as or longer than the flowers; bracts minute, lanceolate, greenish. Perianth greenish, campanulate, 1–1½ lin. long; segments ovate, finally reflexed. Stamens 10–20, much longer than the perianth. Carpels 5–8. Fruit bright red; pulp staining the fingers yellow; carpels about 5, not connate.—Hiern in Cat. Afr. Pl. Welw. i. 901. *P. abyssinica,* Hoffm. in Comm. Goett. xii. 25, t. 2; T. Thoms. in Speke, Nile, Append. 646; Oliv. in Trans. Linn. Soc. xxix. 140, and ser. 2, Bot. ii. 348; Engl. Hochgebirgsfl. Trop. Afr. 209, and Pfl. Ost-Afr. C. 175; Wood, Natal Pl. t. 263; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 166, not of Hook. & Arn. *Pircunia abyssinica,* Moquin in DC. Prodr. xiii. ii. 30; Schweinf. Beitr. Fl. Aethiop. 58; var. *latifolia,* A. Rich. Tent. Fl. Abyss. ii. 222. *P. saponacea,* Welw. Apont. 558.

Upper Guinea. Sierra Leone: Talla Hills; on Mount Gonkwi, *Scott-Elliot,* 4827! Elugu, *Barter,* 3416! Gold Coast: by the way to Larteh, *Ansah,* 173! Southern Nigeria: Lagos, *Millen,* 62! Cameroons: Yaunde, *Zenker & Staudt,* 97! *Zenker,* 1509!

Nile Land. Eritrea: Geleb, *Schweinfurth,* 1793! Saganeiti, *Schweinfurth & Riva,* 842! Abyssinia: Ankober, *Roth!* Adowa, *Quartin-Dillon & Petit,* 333! Ghaba, *Steudner,* 557! near Gennia, *Schimper,* 131; near Axun, *Schimper,* 1541! and without precise locality, *Schimper,* 986! Uganda: Nakuru stream, 6000 ft., *Scott-Elliot,* 6785! Berkeley Bay, *Scott-Elliot,* 7066! in gardens, *Wilson,* 101!

Lower Guinea. Island of St. Thomas, *Mann,* 1090! Lower Congo, *Smith!* Angola: Golungo Alto; near Trombeta and in thin forests among the Alto Queta Mountains, *Welwitsch,* 2438! Pungo Andongo; between Caghay and Mutollo, *Welwitsch,* 2439! Loando, *Gossweiler,* 412! Bembe, *Monteiro!*

Mozamb. Dist. German East Africa: opposite Zanzibar, *Last!* Kilimanjaro, 6000 ft., *Johnston,* 106! Uluguru Mountains, *Goetze,* 228! Moschi, 3600 ft., *Volkens,* 1588! Karagwe, *Speke & Grant,* 217! Portuguese East Africa: near Shamo, near the mouth of the River Shire, *Kirk!* British Central Africa: Nyasaland; Mount Chiradzulu, *Whyte!* Tanganyika Plateau, *Whyte!* Nyika Plateau, *Whyte!*

Var. *apiculata,* Baker & Wright. Leaves smaller, apiculate. Carpels 3–5.—*P. abyssinica,* var. *apiculata,* Engl. Pfl. Ost-Afr. C. 175.

Lower Guinea. Angola, without precise locality, ex *Engler*.

Mozamb. Dist. Without precise locality, ex *Engler*.

Var. *macrophylla*, Baker & Wright. Leaves up to 3–4 in. broad, with a mucro 1½ lin. long. Stamens shorter than the perianth.—*P. abyssinica*, var. *macrophylla*, De Wild. & Dur. Pl. Thonn. Congol. 15.

South Central. Congo Free State: Ngali, 1200 ft., *Thonner*, 33.

2. **P. octandra,** *Linn. Sp. Pl. ed.* ii. 631. A perennial herb. Stems stout, erect, branched, 2–3 ft. long. Leaves oblong, acute, cuneate at the base, 3–4 in. long, distinctly petioled. Flowering racemes very dense; pedicels very short. Flowers hermaphrodite. Perianth green; segments ovate. Stamens and carpels about 8. Fruit globose, umbilicate, purplish black, syncarpous.—Moquin in DC. Prodr. xiii. ii. 32. *P. mexicana baccis sessilibus*, Dill. Hort. Eltham. ii. t. 239, fig. 308.

Upper Guinea. Lagos, *Rowland!*

Also in Natal and Tropical America.

ORDER CIX. **POLYGONACEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers regular, hermaphrodite or polygamo-diœcious. Perianth inferior, coloured or greenish; tube short; lobes 4–6, imbricate. Stamens usually 6–9, inserted at the base of the perianth; filaments filiform, free or connate at the base; anthers 2-celled, dehiscing longitudinally. Disk annular. Ovary superior, sessile, trigonous or lenticular; styles 2–3, distinct; stigmas dilated or capitate; ovule solitary, orthotropous, basal, sessile or stipitate. Fruit an indehiscent trigonous or lenticular nut. Seed similar in shape to the nut; testa membranous; endosperm abundant; embryo usually more or less excentric; cotyledons flat, narrow or broad; radicle long.—Herbs or shrubs. Leaves alternate, with the base of the petiole dilated into a membranous sheath. Flowers small, racemose or axillary, usually fascicled in the axils of persistent membranous bracts.

Species about 600, cosmopolitan.

Stems herbaceous (except in *Rumex nervosus*).
- Base of the perianth accrescent and becoming nut-like . . . . . 1. OXYGONUM.
- Base of the perianth not accrescent.
  - Perianth-segments equal . . . . . 2. POLYGONUM.
  - Inner and outer perianth-segments very unequal . . . . . 3. RUMEX.

Stems shrubby.
- Flower diœcious. Female perianth very accrescent . . . . . 4. SYMMERIA.
- Flowers hermaphrodite. Pedicel with a coriaceous wing . . . . . 5. BRUNNICHIA.

1. **OXYGONUM**, Burch.; Benth. et Hook. f. Gen. Pl. iii. 96.

Flowers polygamous. Perianth-tube in the hermaphrodite flowers constricted above the ovary, in the male flowers almost obsolete; limb coloured, 5-lobed, marcescent. Stamens 8, inserted on the perianth; filaments filiform; anthers oblong. Ovary included in the perianth-tube; styles 3, filiform, connate at the base; stigmas capitate. Perianth-tube accrescent in the fruiting stage and hardened, with wings or spines on the 3 angles, enclosing the nut. Seed erect, turbinate, 3-angled; embryo straight, subcentral in the endosperm; cotyledons flat, oblong; radicle short, superior.—Annual and perennial herbs. Leaves alternate, petioled, entire or pinnatifid; ochreæ membranous, truncate. Flowers red or whitish, fascicled in the axils of the bracts, forming long lax racemes.

Species about 11; also in Arabia and extra-tropical South Africa.

*Fruit without spines.	
Fruit narrowly 3-winged . .	1. *O. Acetosella.*
Fruit broadly 3-winged . . .	2. *O. alatum.*
Fruit triquetrous, without wings .	3. *O. delagoense.*
Fruit obovoid, 9-ribbed . . .	4. *O. pubescens.*
**Fruit with 3 spreading spines.	
Leaves ovate, entire . . .	5. *O. atriplicifolium.*
Leaves ovate, pinnatisect . .	5. *O. atriplicifolium*, var. *sinuatum.*
Leaves lyrate	6. *O. elongatum.*
Leaves lanceolate.	
Stamens exserted.	
Stem glabrous . . .	7. *O. Stuhlmannii.*
Stem slightly pubescent; fruit pubescent	8. *O. salicifolium.*
Stamens included; fruit glabrous	9. *O. fasciculatum.*

1. **O. Acetosella,** *Welw. in Trans. Linn. Soc.* xxvii. 60. An annual herb, much-branched from the crown of the root. Stems ascending, finely pubescent, 6–8 in. long. Leaves lanceolate or rhomboid, 1–1½ in. long, entire or with a tooth on each side at the middle, narrowed gradually to a short petiole; ochreæ loose, funnel-shaped, pallid, membranous, loosely clasping, not ciliate with bristles. Racemes very lax, 3–6 in. long; flowers 2–3 to a cluster; pedicels about as long as the bract. Perianth-limb pinkish-white, 1½ lin. long; tube in fruit oblong, with 3 narrow wings.—Ficalho, Pl. Uteis, 244; Hiern in Cat. Afr. Pl. Welw. i. 903.

Lower Guinea. Angola: Mossamedes, in grassy places near the sea-shore, *Welwitsch*, 1757!

Native name "*Azedas bravas.*"

2. **O. alatum,** *Burch. Trav.* i. 548. An annual herb, much-branched from the crown of the root. Stems erect, finely pubescent, up to 1 ft. long. Leaves lanceolate or rhomboid, entire or pinnatisect,

1–1½ in. long, acute, narrowed gradually at the base to a short petiole; ochreæ greenish-white, funnel-shaped, ciliate-dentate or nearly entire. Racemes very lax, 4–8 in. long; flowers 2–3 to a cluster; pedicels much longer than the ovate membranous bract. Perianth-limb pinkish or milk-white, 2 lin. long. Perianth-tube in fruit ovoid, 4 lin. long, broadly winged at the 3 angles.—Meisn. in DC. Prodr. xiv. 38; Hook. Ic. Pl. xiv. 14, t. 1321; Hiern in Cat. Afr. Pl. Welw. i. 902; Schinz in Bull. Herb. Boiss. iv. Append. iii. 57.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 1755! German South-west Africa: Damaraland, *Chapman & Baines!* Amboland; Olukonda, *Schinz*, 500! *Rautanen*, 135, *Höpfner*, 111c; Hereroland, *Belck*, 27; Great Namaqualand, *Fleck*, 151A.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe, *Lugard*, 89! 90! *Mrs. Lugard*, 109! Rhodesia; Victoria Falls, *Allen*, 287!

Also in extra-tropical South Africa.

I have not seen the nearly allied *O. canescens*, var. *subglabra*, Schinz in *Bull. Herb. Boiss.* iv. *Append.* iii. 57, from Amboland, *Schinz*, 2058, and *Wulfhorst*, 4.

3. **O. delagoense,** *O. Kuntze*, *Rev. Gen. Pl.* iii. 268. Herbaceous. Stem erect or ascending, up to 3 ft. high; branches slender, more or less distinctly triquetrous, papillose. Leaves from linear to lanceolate, 1–2 in. long, 1–3 lin. wide, acuminate, sometimes trifid, pubescent; ochreæ 3 lin. long, tubular, pubescent, setæ about 10, pallid, shorter than the tubular part. Racemes terminal, lax, slender, up to 6 in. long; bracts oblique, subulate, not setose, pubescent; pedicels 2–4 in the axil of each bract, shortly exserted. Perianth nearly 3 lin. long, cylindrical and densely pubescent below, campanulate and less densely so above; lobes twice as long as the tube, oblong, acute. Stamens half as long as the perianth; anther-cells diverging at the base. Fruit triquetrous, acuminate, not winged nor spiny.

Mozamb. Dist. Rhodesia: Leshumo Valley, *Holub*, 720! 732! 795! 796!

Also in South Africa.

Var. *strictum*, C. H. Wright. Rootstock woody. Stems erect, puberulous, reddish and woody below, slender. Leaves linear, 1 in. long, 1 lin. wide or less, almost glabrous; setæ longer than the tubular part of the ochreæ. Bracts with about 2 setæ besides the terminal cusp.

Mozamb. Dist. German East Africa: east side of Lake Tanganyika, *Scott-Elliot*, 8365!

The habit of the variety suggests development after prairie fires.

4. **O. pubescens,** *C. H. Wright.* Stems ascending, ½–1 ft. high, slightly sulcate, not much swollen at the nodes, 1 lin. in diam., finely pubescent; ochreæ 2 lin. long, setæ nearly as long as the tube. Leaves linear, 1 in. long, ½ lin. wide, acute, puberulous. Racemes lax, about 5 in. long; bracts campanulate, cuspidate, without setæ; flowers 2–3 in each cluster; pedicels longer than the bracts. Perianth "whitish-yellow" (*Cecil*), campanulate, about 3 lin. long, puberulous outside; lobes ovate, obtuse, half as long as the tube. Stamens included; filaments ¾ lin.

long; anthers blue. Fruit obovoid, 9-ridged, obscurely puberulous; ridges connected by close, less prominent transverse ones.

Mozamb. Dist. Portuguese East Africa: Morebane Chara, 2500 ft., *Johnson*, 247! Rhodesia: Mashonaland; between Salisbury and Headlands, *Hon. Mrs. Evelyn Cecil*, 155! at Umtali, *Hon. Mrs. Evelyn Cecil*, 235A! between Umtali and Salisbury, *Hon. Mrs. Evelyn Cecil*, 44!

This species is allied to the South African *O. dregeanum*, Meisn., which has a perfectly glabrous stem and usually broader leaves.

5. **O. atriplicifolium,** *Martelli*, *Fl. Bogos.* 69. Stems slender, diffuse, ascending, finely pubescent along one side. Leaves deltoid to lanceolate, acute, entire or slightly lobed, abruptly cuneate at the base, puberulous, 10 lin. long, 6 lin. wide; petiole 3 lin. long; ochreæ 3 lin. long, pubescent, setæ as long as the tube. Racemes lax, usually about 6 in. long, slender; bracts similar to the ochreæ, 2–3-flowered. Perianth $1\frac{1}{2}$ lin. long, pale pink; lobes ovate. Fruiting-perianth 3 lin. long, conical at the base and apex, with a spreading spine from each of the three angles below the middle.—*Ceratogonon atriplicifolium*, Meisn. in Wall. Pl. As. Rar. iii. 63. *Ceratogonum atriplicifolium*, Meisn. in DC. Prodr. xiv. 39. *Polygonum atriplicifolium*, Wall. Cat. 1719. *P. Oweni*, Bojer in Ann. Sc. Nat. 2me sér. iv. 267, t. 9.

Nile Land. British East Africa: Mombasa, *Blackburn!* north of Mombasa, *Whyte!*

Mozamb. Dist. Portuguese East Africa: Mozambique, *Forbes!*

Var. *sinuatum*, Baker. More robust than the type. Leaves thicker, more or less deeply pinnately lobed.—*O. sinuatum*, Dammer in Engl. & Prantl, Pflanzenfam. iii. 1A, 30; Hiern in Cat. Afr. Pl. Welw. i. 903. *O. cordofanum*, Dammer, l.c.; Hiern, l.c. 902. *Ceratogonum sinuatum*, Hochst. & Steud. ex A. Rich. Tent. Fl. Abyss. ii. 231; Meisn. in DC. Prodr. xiv. 40; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170. *C. cordofanum*, Meisn. l.c. 39. *C. atriplicifolium*, A. Rich. Tent. Fl. Abyss. ii. 231; Oliv. in Trans. Linn. Soc. xxix. 141. *Polygonum* No. 2, Speke, Nile, Append. 645. *Raphanopsis sp.*, Welw. Apont. 547. *Diplopyramis æthiopica*, Welw. l.c. 591; J. Britt. in Journ. Bot. 1895, 75.

Nile Land. Nubia: Hor Tamanib, *Lord!* Eritrea: Keren, *Beccari*, 151! Galata, *Schweinfurth & Riva*, 1619! Abyssinia: near Gennia, *Schimper*, 264! Somak Efat, *Roth!* and without precise locality, *Quartin-Dillon & Petit*, 86! *Schimper*, 197! *Parkyns!* Somaliland, *Mrs. Lort Phillips! Drake Brockman*, 413! Kordofan, *Kotschy*, 94! 117! *Pfund*, 364! 607! British East Africa: near Nairobi, *Whyte!* Galunka, *Kaessner*, 840!

Lower Guinea. Angola: Pungo Andongo; from Ambaca to the Præsidium, *Welwitsch*, 1756! Ambaca: near Ngombe, *Welwitsch*, 1756B! Huilla: near Lopollo, *Welwitsch*, 1758!

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Johnston!* Mamba, *Volkens*, 901! Karagwe, *Speke & Grant*, 437!

The characters by which Meisner (l.c.) separated *atriplicifolium*, *cordofanum*, and *sinuatum* are not satisfactory, as the length and density of the raceme and the relative length of the setæ and the tubular part of the ochrea vary in each species.

6. **O. elongatum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 170. Stems ascending, striate, pilose; ochreæ membranous, cylindrical, pubescent,

with a few long bristles. Leaves petioled, lyrate, acuminate, tapering to the base, thick, glaucous, pubescent on both surfaces, 1 in. long 4–7 lin. wide. Spikes up to 1 ft. long; bracts ciliate, densely pilose; flowers exserted from the bracts. Male: Perianth smaller than the female, eglandular; segments linear. Stamens scarcely exserted. Ovary rudimentary; style 3-fid, much longer than the stamens. Female: Perianth-tube 4 lin. long, with 3 spines below the middle. Nut pilose, trigonous.

Mozamb. Dist. German East Africa: Usagara, *Stuhlmann*, 288; Usambara; Nyika, *Holst*, 3899; Southern Masailand, *Stuhlmann*, 4286.

7. **O. Stuhlmannii,** *Dammer in Engl. Pfl. Ost-Afr. C.* 171. Stem much branched from a woody base, striate, glabrous; ochreæ nearly as long as the internodes, cupuliform, glabrous except for a few long bristles. Leaves petioled, lanceolate, 1–2 in. long, 4–9 lin. wide, much narrowed to the base, thick, glabrous on both surfaces. Spike 4–6 in. long; bracts turbinate, obliquely truncate, ciliate, the upper close together. Male: Perianth smaller than the female, eglandular; segments oblong. Stamens 7, slightly exserted. Ovary rudimentary; style 3-partite, half as long as the stamens. Female: Perianth-tube $2\frac{1}{2}$ lin. long. Style 3-partite. Nut small, trigonous, with 3 spines from the middle.

Mozamb. Dist. German East Africa: Mwanza, on Lake Victoria, *Stuhlmann*, 4628.

8. **O. salicifolium,** *Dammer in Engl. Pfl. Ost-Afr. C.* 171. Stem creeping, slender, slightly pubescent; ochreæ cylindrical, obtuse, membranous, bordered with a few long bristles, brown when dry. Leaves linear-lanceolate, long tapering at both ends, entire, glabrous, 2–3 in. long, 3 lin. wide. Spikes lateral, long, very lax; rhachis very slender; bracts small, at first very minutely pubescent, soon glabrous, bordered with a few long bristles. Male: Perianth funnel-shaped, 3 lin. long; segments oblanceolate, glandular-punctate outside. Stamens 7, exserted. Ovary rudimentary; style 3-partite, much shorter than the stamens. Female flower larger than the male. Nut pubescent, with 3 spines at the middle.

Nile Land. British East Africa: near Changamwe, 300 ft., *Kaessner*, 262!

Mozamb. Dist. German East Africa: Usambara; Bote, on the River Umba, *Kaessner*, 100! Duga, *Holst*, 3186! Karagwe; Ihangiro, 4000 ft., *Stuhlmann*, 3333; Usmawo; Kageyi, on Lake Victoria, *Fischer*, 551.

A plant collected by Sir John Kirk at Kilwa, in German East Africa, may be a form of this species; it differs in having subhastate leaves.

9. **O. fasciculatum,** *C. H. Wright.* Stem ascending, reddish, very slightly puberulous. Leaves lanceolate, tapering towards both ends, 2 in. long, 5 lin. wide, papillose on both surfaces, quite entire; petiole slender, 3 lin. long; ochreæ tubular, 3–4 lin. long, membranous, setæ numerous, slender, brownish, slightly shorter than the tube.

Racemes terminal, up to 10 in. long; bracts cuspidate and with about two lateral setæ; pedicels slightly longer than the bracts, 2–3 together. Perianth campanulate; tube very short; lobes about 2 lin. long, oblong, obtuse. Stamens about $1\frac{1}{2}$ lin. long; 3 inner filaments much dilated at the base. Style shorter than the stamens, divided about half-way down; stigmas subcapitate. Fruit triquetrous, with 3 spines below the middle, glabrous.

Nile Land. British East Africa: Gilgil River, 6000–7000 ft., *Scott-Elliot*, 6651! Ngomeni, in shallow sand, *Scott-Elliot*, 6265!

Mozamb. Dist. German East Africa: east shore of Lake Tanganyika, *Scott-Elliot*, 8322!

When additional material has been obtained this may prove to be a form of *O. salicifolium*, Dammer.

Imperfectly known species.

10. **O. Baumii,** *Dammer in Baum, Kunene-Samb. Exped.* 231 (*name only*). A shrub about 4 ft. high. Stem erect, cylindrical, hirsute. Leaves broadly lanceolate or subhastate, acuminate, cuneate at the base, papillate especially on the upper surface, up to 2 in. long and 8 lin. wide, margin cartilaginous, minutely ciliate; ochreæ cylindrical, 5 lin. long, white pubescent, setæ about 10, nearly as long as the tube, pallid. Raceme slender; bracts whitish pubescent, shortly and obliquely campanulate, cuspidate, shortly and finely ciliate. Perianth about 3 lin. long, pubescent outside; lobes oblong, acute, about twice as long as the tubular portion. Stamens about half as long as the perianth. Styles nearly twice as long as the stamens. Fruit not seen.

Lower Guinea. Angola: Kuito River, near Onjimba, 3760 ft., *Baum*, 532!
The specimen seen bears only young flowers.

11. **O. fruticosum,** *Dammer in Baum, Kunene-Samb. Exped.* 231. A bush about 4 ft. high.

Lower Guinea. Angola: Kulleis, Maramba, in white sandy soil at the edge of woods, *Baum*, 221.

2. **POLYGONUM,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 97.

Flowers hermaphrodite, rarely polygamous. Perianth coloured, deeply 5- (rarely 4-) lobed or partite, persistent; segments equal or the three outer rather larger, but little accrescent. Stamens usually 8, inserted near the base of the perianth; filaments filiform; anthers oblong, the two cells united only by a short connective. Ovary trigonous with 3 styles or lenticular with 2 styles; stigmas capitate, usually entire; ovule solitary, basal. Fruit a trigonous or lenticular nut enclosed in the persistent perianth. Seed similar in shape to the nut; embryo eccentric or lateral in the endosperm; cotyledons usually narrow, longer or shorter than the incumbent or accumbent radicle.—

Herbs or shrubs, erect, prostrate or scandent. Leaves alternate; ochreæ membranous, clasping the stem, often fringed with bristles. Flowers usually fascicled in the axils of membranous bracts, fascicles often arranged in terminal racemes, spikes, or panicles; pedicels articulated.

Species about 150, cosmopolitan.

*Flowers in heads or clusters (see also 6, *strigosum*).
- Leaves ovate. Nutlet pitted . . . . 1. *P. alatum.*
- Leaves linear or linear-oblong.
  - Nutlet rugose, dull . . . . . 2. *P. aviculare.*
  - Nutlet smooth, shining . . . . . 3. *P. plebeium.*

**Flowers in spikes, racemes, or panicles.
- Leaves oblong, $1\frac{1}{2}$ in. broad, glabrous . . . 4. *P. amphibium.*
- Leaves ovate, 2 in. broad, glandular beneath . . 5. *P. Buchanani.*
- Leaves lanceolate or oblong-lanceolate.
  - Racemes very short, in lax panicles.
    - Leaves truncate at the base, hairy . . 6. *P. strigosum.*
    - Leaves cuneate at the base, glabrous . . 7. *P. pedunculare.*
  - Racemes elongated, slender; clusters of flowers not congested.
    - Nutlet usually trigonous; styles 3 . . . 8. *P. serrulatum.*
    - Nutlet lenticular; styles 2 . . . . 9. *P. lapathifolium.*
  - Racemes elongated, more robust; clusters of flowers congested.
    - Ochreæ with a herbaceous spreading limb.
      - Leaves hairy; bracts ciliate . . . 10. *P. limbatum.*
      - Leaves soon glabrescent; bracts not ciliate . 11. *P. Schinzii.*
    - Ochreæ without a herbaceous limb.
      - Nutlets trigonous . . . . . 12. *P. barbatum.*
      - Nutlets lenticular.
        - Leaves densely white hairy beneath.
          - Bracts not ciliate . . . . 13. *P. lanigerum.*
          - Bracts ciliate . . . . . 14. *P. tomentosum.*
        - Leaves slightly hairy on the nerves and margins only.
          - Ochreæ glabrous.
            - Leaves glandular . . . . 15. *P. sambesicum.*
            - Leaves not glandular . . . 16. *P. senegalense.*
          - Ochreæ bristly.
            - Stamens included.
              - Stem glabrous . . . . 17. *P. Tanganikæ.*
              - Stem pubescent . . . 18. *P. acuminatum.*
            - Stamens exserted . . . . 19. *P. erythropus.*
        - Leaves quite glabrous . . . . 20. *P. glabrum.*

1. **P. alatum,** *Buch.-Ham. ex D. Don, Prodr. Fl. Nep.* 72. Annual. Stems very slender, naked, branched. Leaves ovate, acuminate, membranous, about 1 in. long, narrowed suddenly to a short winged petiole; ochreæ not ciliate. Heads of flowers 1–2 to a branch, 3 lin. in diam., usually subtended by a leaf; bracts ovate, not ciliate; pedicels slender, hispid at the tip. Perianth eglandular, $1\frac{1}{2}$ lin. long. Stamens 7–8. Nut biconvex or trigonous, reticulated.—Spreng. Syst. Veg. cur. post. 154; Hook. f. Fl. Brit. Ind. v. 41. *P. nepalense,*

Meisn. Monogr. Polyg. 84, t. 7, fig. 2, and in DC. Prodr. xiv. 128; Wight, Ic. t. 1804; A. Rich. Tent. Fl. Abyss. ii. 227; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170, incl. var. *simense*; Engl. Hochgebirgsfl. Trop. Afr. 203. *P. perforatum*, Meisn. in DC. Prodr. xiv. 128.

Upper Guinea. Fernando Po, 7500 ft., *Mann*, 1449!

Nile Land. Abyssinia: near Adowa, *Schimper*, 293! Debra-Eski, *Schimper*, 69; Amogoi, *Schimper*, 256; Gondar, *Schimper*, 677; and without precise locality, *Schimper*, 303! Uganda: Ruwenzori, *Scott-Elliot*, 7738!

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 411! 163!

Also in Madagascar and Tropical Asia.

2. **P. aviculare,** *Linn. Sp. Pl. ed.* i. 362. Annual, glabrous, much-branched from the base. Stems slender, spreading or ascending. Leaves linear or linear-oblong, the lower 1–1½ in. long, narrowed to a short winged petiole; ochreæ white, membranous, bifid, many-nerved. Flowers from the axils of the upper leaves and forming a short dense terminal raceme; bracts ovate, white, membranous, not ciliate; pedicels shorter than the bracts. Perianth 1 lin. long. Nut ovoid-trigonous, not longer than the perianth, minutely rugose, not shining.—Meisn. in DC. Prodr. xiv. 97; A. Rich. Tent. Fl. Abyss. ii. 228 (excl. syn. *P. herniarioides*, Del.); var. *diffusum*, Meisn. l.c.; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170; Engl. Hochgebirgsfl. Trop. Afr. 201.

Nile Land. Abyssinia: Amogoi, *Schimper*, 245! and without precise locality, *Schimper*, 968!

A native of the North Temperate Zone of the Old World; now widely dispersed.

3. **P. plebeium,** *R. Br. Prodr.* 420. Very similar to *P. aviculare*. Stems trailing, with shorter internodes. Leaves linear-oblong, 3–6 lin. long; ochreæ more lacerate, with fewer ribs. Flowers smaller. Nut smaller, ovoid-trigonous, smooth and shining.—Meisn. in DC. Prodr. xiv. 94; Hook. f. Fl. Brit. Ind. v. 27. *P. herniarioides*, Delile, Fl. Ægypt. Illustr. 61; Meisn. l.c.; Garcke in Peters, Reise Mossamb. Bot. 502 (var. *foliosum*); Engl. Hochgebirgsfl. Trop. Afr. 201; Hiern in Cat. Afr. Pl. Welw. i. 903; Baum, Kunene-Samb. Exped. 230. *P. aviculare*, A. Rich. Tent. Fl. Abyss. ii. 228, partly. *P. Roxburghii* and *P. Perrottetii*, Meisn. in DC. Prodr. xiv. 93–94. *P. Dryandri*, Spreng. Syst. ii. 255. *P. linifolium*, Perrottet ex Meisn. Monogr. Polyg. 90. *P. exiguum*, Meisn. Monogr. Polyg. 90; Benth. in Hook. Niger Fl. 496, not of others.

Upper Guinea. Senegal, *Roger*, 16! *Perrottet!*

Nile Land. Eritrea: Saganeiti, *Schweinfurth & Riva*, 1247! Plateau of Kohaito, *Schweinfurth*, 185. Abyssinia: near Adowa, *Schimper*, 142! near Djeladjeranne, *Schimper*, 1581! Sudan: Khartoum, *Broun*, 6475! Banks of the Nile, *Sieber!*

Lower Guinea. Angola: Mossamedes; at the River Bero, *Welwitsch*, 5372! Huilla; near Ohai, *Welwitsch*, 5373! Chitanda River, *Baum*, 131! German Soutl.-west Africa: Amboland; Olukonda, *Rautanen*, 20!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; near Lupata, *Kirk!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 499! Rhodesia; Gwelo, *Gardner*, 44!

4. **P. amphibium,** *Linn. Sp. Pl. ed.* i. 361. Perennial. Stem trailing at the base and rooting from the nodes. Leaves in the Abyssinian plant floating, oblong, obtuse, broadly rounded at the base, 4 in. long, 1½ in. wide, smooth at the margins, long-petioled; ochreæ membranous, truncate, not ciliate. Spikes oblong, dense, 1–2 in. long; peduncles erect, eglandular; bracts green, obtuse, not ciliate. Perianth bright red, 2 lin. long. Stamens 5. Styles 2, united half-way up. Nut lenticular, shining, much shorter than the perianth.—Meisn. in DC. Prodr. xiv. 115; A. Rich. Tent. Fl. Abyss. ii. 224; Engl. Hochgebirgsfl. Trop. Afr. 202; Hook. f. Fl. Brit. Ind. v. 34; Engl. Bot. ed. 3, tt. 1241–2; Gage in Rec. Bot. Surv. Ind. ii. 423.

Nile Land. Eritrea: Saganeiti, *Schweinfurth*, 901! Zazega, near Asmara, *Schweinfurth*, 2102! near Fort Adi-Ugre, *Schweinfurth*, 187. Abyssinia: Begemeder; in Lake Tana, *Schimper*, 1356! Shireh; mountain-lakes, *Schimper! Quartin-Dillon & Petit*, *Rohlfs & Stecker*.

Also at the Cape and in the North Temperate Zone of both hemispheres.

5. **P. Buchanani,** *Dammer in Engl. Pfl. Ost-Afr. C.* 170. Stem erect, glabrous. Leaves shortly petioled, ovate or oblong-ovate, much narrowed to the base, 4–5 in. long, 2 in. broad, glabrous on both surfaces, copiously gland-dotted beneath; ochreæ ciliate with long bristles. Spikes lax, cylindrical; bracts not ciliate. Perianth glandular, campanulate, 2 lin. long, 5-lobed rather more than half-way down; lobes oblong, slightly cucullate at the apex. Stamens 7; 3 filaments flattened and ovate at the base, the others filiform. Ovary oblong; style tripartite. Nut trigonous.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 550! 775! Namasi, *Cameron*, 3!

6. **P. strigosum,** *R. Br. Prodr.* 420. Annual. Stem slender, branched, furnished with recurved bristles. Leaves lanceolate, truncate at the base, hairy, membranous, distinctly petioled, the lower 5–6 in. long; ochreæ not ciliate. Racemes subglobose, 3 lin. long, at the ends of the slender glandular-hispid branches of a lax panicle; bracts orbicular, not ciliate. Perianth pink, not glandular, 1 lin. long. Stamens 5. Styles 2. Nut lenticular, subglobose, shorter than the perianth.—Meisn. in DC. Prodr. xiv. 134; Benth. Fl. Austral. iv. 268; Hook. f. Fl. Brit. Ind. v. 47; Dammer in Engl. Pfl. Ost Afr. C. 170.

Lower Guinea. Upper Congo, ex *Dammer*.

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, 4500–5000 ft., *Holst*, 9026!

Also in Natal, Tropical Asia and Australia.

7. **P. pedunculare,** *Wall. Cat. n.* 1718. Stem erect, glabrous or slightly puberulous. Leaves oblong-lanceolate, acuminate, cuneate at the base, minutely ciliate on the margins, otherwise glabrous, thinly membranous, up to 6 in. long and 1 in. wide; petiole slender, $\frac{3}{4}$ in. long; ochreæ obtusely truncate, very shortly ciliate at the mouth only, membranous, strongly nerved. Panicle terminal, pseudo-dichotomous, axis finely glandular; bracteoles ovate, very short, ciliate, brown, membranous; pedicels about as long as or shorter than the bracteoles. Perianth-lobes oblong, obtuse. Stamens 5. Styles 2, united about half-way. Nutlet orbicular, biconvex, straw-coloured.—Wight, Ic. t. 1802; Meisn. in DC. Prodr. xiv. 133, partly; Hook. f. Fl. Brit. Ind. v. 48; Gage in Rec. Bot. Surv. Ind. ii. 426; Schuster in Bull. Herb. Boiss. 2me sér. viii. 710.

Mozamb. Dist. British Central Africa: Nyasaland, without precise locality, *Buchanan,* 430 ! 677 !

Var. *angustissima,* Hook. f. Fl. Brit. Ind. v. 48. Leaves narrowly linear-lanceolate, acuminate at both ends.—Gage, l.c. 426.

Lower Guinea. Angola: Malange, *Theusch !*

Also in Tropical Asia and Australia.

8. **P. serrulatum,** *Lag. Gen. et Sp. Nov.* 14. Annual. Stem slender, glabrous, 2–3 ft. long, erect or decumbent at the base. Leaves lanceolate, acuminate, rounded at the base, subsessile, glabrous or slightly hairy, the lower 3–4 in. long; ochreæ ciliate with long bristles. Spikes slender, cylindrical, often several to a stem, $1\frac{1}{2}$–2 in. long; peduncle very slender, glabrous; bracts rigidly ciliate. Perianth pink, eglandular, 1 lin. long. Stamens 6–8. Styles usually 3. Nut usually trigonous, polished, shorter than the perianth.—Meisn. in DC. Prodr. xiv. 110; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170; Engl. Hochgebirgsfl. Trop. Afr. 202; De Wild. Études Fl. Bas et Moyen Congo, i. 238; Gage, Rec. Bot. Surv. Ind. ii. 425. *P. salicifolium,* Del. Fl. Ægypt. Illustr. 12; Meisn. l.c. *P. abyssinicum,* A. Rich. Tent. Fl. Abyss. ii. 225. *P. scabrum,* Hiern in Cat. Afr. Pl. Welw. i. 903, an Poir.?

Upper Guinea. Senegambia: Cape de Nase, *Döllinger !* Senegal, *Roger !* Sierra Leone: near Kambia, Scarcies Valley, *Scott-Elliot,* 4352 ! Western Lagos: interior, *Rowland !* Northern Nigeria: Nupe; Lom, *Barter,* 1551 ! Cameroons: Ambas Bay, *Mann,* 762 ! Yaunde, *Zenker,* 1520 !

Nile Land. Abyssinia: near Adowa, *Schimper,* 182 ! Niamniam: Nabambisso River, *Schweinfurth,* 2999 ! Uganda: Mawokota, 3900 ft., *Brown,* 197 ! Kampala, *Scott-Elliot,* 7395 ! British East Africa: Muka, *Kaessner,* 911 !

Lower Guinea. Angola: Chella mountains, *Johnston !* Golungo Alto, *Welwitsch,* 5367 ! Mossamedes; swampy places at the mouth of the River Giraûl, *Welwitsch,* 5369 ! Huilla; at Lopollo, *Welwitsch,* 5368 ! in the River Caculuvar, near Lake Ivantâla, *Welwitsch,* 5370 !

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst,* 9027 ! British Central Africa: Nyasaland; Namasi, *Cameron,* 9 ! Tanganyika Plateau, 4000 ft., *Whyte !* Zomba, *Whyte !* Masuku Plateau, *Whyte !* Karonga, 1564 ft., *Scott !*

Var. *Donii,* Hook. f. Fl. Brit. Ind. v. 38. Leaves elliptic or lanceolate,

acuminate at both ends, 3 in. long, 9 lin. wide. Spikes very slender; lower bracts distant.—*P. Donii*, Meisn. Monogr. Polyg. 72, excl. syn.

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!*

Welwitsch, 5371, from marshy places at the River Panda, Huilla, has much broader leaves, and is doubtfully referrable to this species.

9. **P. lapathifolium,** sub-sp. **maculatum,** *Dyer & Trim. in Journ. Bot.* 1871, 36. Annual. Stem glabrous, erect, 2–3 ft. long. Leaves lanceolate, green, glabrous except for some short bristles on the underside of the midrib; ochreæ short, membranous, not ciliate; petiole short, with short adpressed bristles. Racemes cylindrical, not very dense, $1\frac{1}{2}$–2 in. long, several to a stem; peduncles slender, rough with glands; bracts orbicular, not ciliate. Perianth pale pink, glandular, 1 lin. long. Styles 2. Nut lenticular, orbicular, black, shining, nearly as long as the perianth.—*Persicaria maculata*, S. F. Gray, Nat. Arr. Brit. Pl. ii. 270.

Mozamb. Dist. Portuguese East Africa: lower valley of the River Shire, *Meller!*

Also in South Africa and the North Temperate Zone. I have not seen var. *vestitum*, Schuster (in *Bull. Herb. Boiss.* 2me sér. viii. 705), founded upon Schimper's 56 from Addi Abun, Abyssinia.

10. **P. limbatum,** *Meisn. in DC. Prodr.* xiv. 123. Perennial. Stem pilose at first, then glabrescent, 3–4 ft. long. Leaves lanceolate, nearly sessile, 3–4 in. long, clothed on both sides with short adpressed hairs; ochreæ hairy, large, tightly clasping the stem in their lower two-thirds, with a patent crisped herbaceous limb ciliate with rigid bristles. Racemes about 3 to a branch, dense, 2–3 in. long; bracts ciliate with rigid bristles; peduncles clothed with adpressed hairs. Perianth pink, $1\frac{1}{2}$ lin. long. Stamens 7. Styles 2. Nut lenticular, convex, glossy, nearly black, shorter than the perianth.—Hook. f. Fl. Brit. Ind. v. 30; Hiern in Cat. Afr. Pl. Welw. i. 904.

Upper Guinea. Senegambia, *Lelièvre.* Northern Nigeria: North Bornu, *Elliott*, 140!

Nile Land. Kordofan: Birket Rahal, *Pfund*, 409! 668! Jur: Seriba Ghattas, *Schweinfurth*, 1361!

Lower Guinea. Angola: Huilla; in marshy wooded places from Ferrão da Sola towards Jau, *Welwitsch*, 5374!

Also in Egypt and Tropical Asia.

11. **P. Schinzii,** *C. H. Wright.* Stem stout, glabrous. Leaves oblong-lanceolate, tapering to both ends, hairy at first, but soon becoming glabrous except on the upper side of the midrib, undulate near the margin, $4\frac{1}{2}$ in. long, 1 in. wide; petiole about 6 lin. long; ochreæ membranous, more or less campanulate, with a patent herbaceous limb, at first densely hairy, soon glabrescent. Racemes axillary, about 3 together, dense-flowered; bracts pinkish, broadly ovate, obtuse, not ciliate, about as long as the $1\frac{1}{2}$ lin. long pedicels. Perianth 2 lin. long,

5-lobed more than half-way down; lobes oblong, rounded at the apex. Stamens 7, slightly shorter than the perianth. Ovary compressed; styles united about half-way up; stigmas subcapitate. Nutlet compressed trigonous.

Lower Guinea. German South-west Africa: Amboland, Olukunda, *Schinz*, 499!

12. **P. barbatum,** *Linn. Sp. Pl. ed.* i. 362. Perennial. Stem slender, erect, hairy upwards or throughout. Leaves lanceolate, acuminate, narrowed to the base, nearly sessile, usually hairy on both surfaces, the lower 4–6 in. long. Spikes cylindrical, slender, 2–3 in. long; peduncles hairy; bracts conspicuously ciliate with rigid bristles. Perianth pink, eglandular, 1 lin. long. Stamens 6–8. Ovary shortly conical; styles 3. Nut trigonous, small, smooth.—Thunb. Fl. Cap. ed. Schult. 385; Wight, Ic. t. 1798; Meisn. in DC. Prodr. xiv. 104 (incl. var. *vulgare*, Meisn.); A. Rich. Tent. Fl. Abyss. ii. 226; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170; Hook. f. Fl. Brit. Ind. v. 37; Engl. Hochgebirgsfl. Trop. Afr. 201; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 155; De Wild. Études Fl. Bas et Moyen Congo, i. 238; Gage in Rec. Bot. Surv. Ind. ii. 425.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 874! Cameroons: Sanaga, *Zenker*, 1451!

Nile Land. Eritrea: Arrot Valley, *Schweinfurth & Riva*, 676! Galabat: Matamma, *Schweinfurth*, 684! 685! Sennar: Fazokl, *Kotschy*, 505!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* British Central Africa: Nyasaland; Fort Johnston, *Scott-Elliot*, 8416! Blantyre, *Buchanan*, 137!

Var. *Fischeri*, Dammer in Engl. Pfl. Ost-Afr. C. 169. Leaves with adpressed bristles on the nerves beneath. Bracts smaller.

East Tropical Africa. Without precise locality, *Fischer*, 231.

Also in Tropical Asia.

13. **P. lanigerum,** *R. Br. Prodr.* 419. Perennial. Stem stout, erect, 4–5 ft. high, white-tomentose upwards. Leaves shortly petioled, lanceolate, acute, clothed densely beneath and thinly above with persistent white tomentum, the lower 6–9 in. long, 1½–2 in. broad at the middle; ochreæ long, membranous, ciliate. Racemes dense or moderately dense, oblong or oblong-cylindrical, 1–3 in. long; bracts orbicular, shortly ciliate; peduncles pubescent, eglandular. Perianth eglandular, 1½–2 lin. long. Stamens usually 6. Styles 2. Nut lenticular, orbicular, black, shining.—DC. Prodr. xiv. 117; Hook. f. Fl. Brit. Ind. v. 35; Benth. Fl. Austral. v. 271; Gage in Rec. Bot. Surv. Ind. ii. 424. *P. arachnoideum*, Klotzsch ex Meisn. l.c.

Upper Guinea. Gambia, *Ingram!* Sierra Leone: wet place by river at Dantilla, *Scott-Elliot*, 5265! Southern Nigeria: Lagos, *Millen*, 92! Aboh, *Barter*, 175! Northern Nigeria: North Bornu, *Elliott*, 156!

Nile Land. Sudan: Bahr-el-Jebel, *Muriel*, 74! Gazelle River, at Meshera,

Schweinfurth, 1273! Bongo: Seriba Agad Ngulfala, *Schweinfurth*, ser. 3, 93! Lake Rudolf, *Wellby!* Uganda: Mawokoto, 3900 ft., *Brown*, 141!

Lower Guinea. Lower Congo: Stanley Pool, *Hens*, B, 40! and without precise locality, *Smith!* Angola: Barra do Bengo; by the River Bengo, near Quifandongo, *Welwitsch*, 5365! Pungo Andongo; by the River Luxillo, towards Cambanbe, *Welwitsch*, 5364! Huilla; near Lopollo, *Welwitsch*, 5363!

Mozamb. Dist. Zanzibar, *Bojer!* Portuguese East Africa: Lower Zambesi; Tette, *Kirk!* Lower valley of the River Shire, *Meller!* British Central Africa: Nyasaland; Lake Shirwa, *Buchanan*, 207! Matope, *Scott-Elliot*, 8496! Zomba, *Whyte!* between Kondowe and Karonga, *Whyte*, 371!

Also in extra-tropical South Africa, Tropical Asia and North Australia.

14. **P. tomentosum,** *Willd. Sp. Pl.* ii. 447. Perennial. Stems stout, hairy, 3–4 ft. long. Leaves shortly petioled, oblong-lanceolate, acute, narrowed gradually to the base, the lower 6–8 in. long, 1½–2 in. broad at the middle, persistently hairy on both surfaces; ochreæ large, membranous and clasping the stem to the tip, ciliate with long rigid bristles. Spikes dense, cylindrical, 2–3 in. long; peduncles clothed with adpressed hairs; bracts strongly ciliate. Perianth pink, not glandular, 1½ lin. long. Stamens usually 7. Ovary globose; styles 2. Nut lenticular, orbicular, black, shining, shorter than the perianth.—Meisn. in DC. Prodr. xiv. 124 (incl. vars. *sericeo-velutinum*, *denudatum* and *strigillosum*); Oliv. in Trans. Linn. Soc. xxix. 142; Gartenfl. 1874, 291, t. 810; Engl. Hochgebirgsfl. Trop. Afr. 202; Hiern in Cat. Afr. Pl. Welw. i. 905; Dammer in Engl. Pfl. Ost-Afr. C. 170; De Wild. Études Fl. Bas et Moyen Congo, i. 238; Schuster in Bull. Herb. Boiss. 2me sér. viii. 706; var. *limnogenes*, Hiern in Cat. Afr. Pl. Welw. i. 905. *P. setulosum*, A. Rich. Tent. Fl. Abyss. ii. 227. *P. limnogenes*, Vatke ex Engl. Hochgebirgsfl. Trop. Afr. 202.

Upper Guinea. Southern Nigeria: Lagos, *Moloney!* Nun River, *Mann*, 493!

Nile Land. Abyssinia, *Quartin-Dillon & Petit*, 79! mouth of the River Sobat, *Schweinfurth*, 1108! *Speke & Grant!* Niamniam: Nabambisso River, *Schweinfurth*, 3147! at Bodumoh swamp, *Schweinfurth*, 3709! Uganda: banks of the Nile, *Speke & Grant!* Busoga, *Brown*, 61! by streams, *Wilson*, 131! Victoria Nyanza, at Berkeley Bay, *Scott-Elliot*, 7079! British East Africa: near Nairobi, *Whyte!*

Lower Guinea. Loango: swamp at Salowe, *Soyaux*, 223! Lower Congo Stanley Pool, *Hens*, B, 48! Angola: Huilla; river banks near Humpata, *Welwitsch*, 5362! Ambaca: by streams between Puri-Cacarambola and Ngombe, *Welwitsch*, 5361! Pungo Andongo: near the River Luxillo, *Welwitsch*, 5360! Loanda, *Gossweiler*, 420! Malange, *Mechow*, 388, Pungo Andongo, *Mechow*, 71.

Mozamb. Dist. German East Africa: Zanguebar, *Kirk!* Usambara; Masheua, *Holst*, 3517! Portuguese East Africa: Lower Zambesi; Boruma, *Menyharth*, 104A. River Shire near Moramballa, *Kirk!* Shire and Shupanga, *Stewart!* between Unango and Mtonia, *Johnson!* near Pachei, *Johnson*, 339! East side of Lake Nyasa, *Johnson*, 21! British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte!* North Nyasaland, *Whyte!* Nyika Plateau, at Mwanemba, 8000 ft., *McClounie*, 75! 138! and without precise locality, *Buchanan*, 1265! *Cameron*, 2! Mashonaland; Salisbury, *Marshall!*

Also in extra-tropical South Africa, North Africa and Tropical Asia.

Dammer refers most of the Tropical African material to the variety *sericeo-velutinum*, Meisn. in *Wall. Pl. As. Rar.* iii. 55.

15. **P. sambesicum,** *Schuster in Bull. Herb. Boiss.* 2^{me} *sér.* viii. 708. Stem erect, rather tall, thick, reddish, sulcate, thickened at the nodes, glabrous; internodes about 9 lin. long. Leaves 3½–9 in. long, ⅓–2 in. wide, long lanceolate, acuminate, tapering downwards, glabrous except for the slightly hairy under-surfaces of the nerves, dotted with golden or dark brown glands beneath; ochreæ naked, except sometimes for short slender hairs at the mouth; petiole 2–9 lin. long. Racemes panicled, 1–2¼ in. long, straight, rarely slightly flexuous; bracts turbinate, naked, with minute oil-glands or hairs at the mouth; pedicels 1½ lin. long, glabrous. Perianth rose-coloured, with many oil-glands; nerves very firm, suberect, divaricate. Stamens 6. Style bipartite, shorter than the perianth. Nut 1½ lin. long, 1 lin. in diam., compressed, with concave faces, shining. Cotyledons incumbent.

Mozamb. Dist. Portuguese East Africa: by the Zambesi, *Menyharth*, 710.

16. **P. senegalense,** *Meisn. Monogr. Polyg.* 54. Perennial. Stems robust, erect, glabrous, 4–5 ft. high. Leaves distinctly petioled, oblong-lanceolate, glabrous except on the midrib and margins, acute, narrowed very gradually to the base, the lower 6–8 in. long, 1½–2 in. broad at the middle; ochreæ large, truncate, not ciliate with bristles. Racemes few or several, cylindrical, moderately dense, 2–3 in. long; bracts broadly ovate, not fringed; pedicels 3–4-nate, finally about as long as the bract. Perianth pale pink, 1½ lin. long. Stamens usually 7. Styles 2. Nut orbicular, with flattened faces, shining, nearly black.—Meisn. in DC. Prodr. xiv. 123; Aschers. in Schweinf. Beitr. Fl. Aethiop. 171; Engl. Hochgebirgsfl. Trop. Afr. 202; Durand & Schinz, Études Fl. Congo, i. 236; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 156; Hiern in Cat. Afr. Pl. Welw. i. 904. *P. macrochæton*, Fresen. in Flora, 1838, 601; A. Rich. Tent. Fl. Abyss. ii. 225. *P. nodosum*, Pers. Syn. i. 440; Garcke in Peters, Reise Mossamb. Bot. 503; Engl. Hochgebirgsfl. Trop. Afr. 202; Hemsl. in Journ. Linn. Soc. xxvi. 343; Gage in Rec. Bot. Surv. Ind. ii. 396. *P. lapathifolium*, var. *nodosum*, Hook. f. Fl. Brit. Ind. v. 35.

Upper Guinea. Senegal, *Roger*, 21! *Döllinger!* Gold Coast: Aburi, *Johnson*, 1080! Southern Nigeria: interior of Western Lagos, *Rowland!* Ogun River, *Millen*, 136!

Nile Land. Eritrea: Ainsaba, *Steudner*, 672! Abyssinia: River Assam near Adoa, *Schimper*, 163! and without precise locality, *Plowden!* Somaliland: Darra-as, *Miss E. Cole!* and without precise locality, *Mrs. Lort-Phillips!* British East Africa: Lake Navaisha, *Johnston!* Muka, *Kaessner*, 912! Kitui, in Ukamba, *Hildebrandt*, 2688!

Lower Guinea. Island of St. Thomas, *Don!* Gaboon: bank of Como River, *Bates*, 460! Lower Congo, *Burton!* Angola: by the River Bengo, *Welwitsch*, 5359! Mossamedes: pools at the banks of the River Bero, *Welwitsch*, 5358! Loanda, *Gossweiler*, 220B!

South Central. Congo Free State: Monbuttu; Kibali River, *Schweinfurth*, 3549!

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Johnston!* Portuguese East Africa: east side of Lake Nyasa, *Johnson*, 391! Lower Zambesi; near Expedition Island, *Kirk!* Shamo, *Kirk!* mouth of the Zambesi, *Peters!* British Central Africa: Nyasaland; Umbaka River, *Scott!* Kondowe to Karonga, *Whyte*, 369! Upper Shire River, *Scott-Elliot*, 8490!

Also in Egypt, Madagascar and Tropical Asia.

17. **P. Tanganikæ,** *Schuster in Bull. Herb. Boiss. 2me sér.* viii. 709. Root fibrous. Stem erect, about 3 ft. high, red, glabrous, thickened at the nodes; internodes $\frac{1}{2}$–2 in. long. Leaves 4–10 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. wide, lanceolate, acuminate, tapering downwards, with small setæ on the midrib and margins and cystoliths in the lamina, otherwise glabrous; petiole 4–9 in. long. Racemes 3 or more together, 2–4 in. long, densely flowered; bracts turbinate, not glandular, glabrous; pedicels naked. Perianth rose-coloured, glandular; nerves rather firm and straight, parallel, once or twice forked. Stamens 8. Style bipartite. Nut enclosed in the perianth, $1\frac{1}{2}$ lin. long, about 1 lin. wide, compressed with concave faces, shining. Cotyledons incumbent.

Nile Land. Somaliland: Webi Abaallah, *Keller.*

Lower Guinea. Congo, *Schimper*, 48.

Mozamb. Dist. German East Africa: Lake Tanganyika, near Karema, *Böhm.*

18. **P. acuminatum,** *H. B. & K. Nov. Gen. et Sp.* ii. 178. Stem stout, pubescent. Leaves lanceolate, acuminate, pubescent, the upper 3–4 in. long, the lower up to 1 ft. long; ochreæ densely ciliate with bristles. Spikes dense, cylindrical, 2–3 in. long, 2–4 to a stem; bracts ovate, usually ciliate. Perianth pink, not glandular, 1 lin. long; segments 4–5, ovate. Stamens included. Style bifid. Nut lenticular, black, glossy.—Meisn. in DC. Prodr. xiv. 114 (not in Monogr. Polyg. 78), and in Mart. Fl. Bras. v. i. 14, t. 4, fig. 1 (var. *Humboldtii*); Engl. Pfl. Ost-Afr. C. 170; Durand & Schinz, Études Fl. Congo, i. 235. *P. Poiretii*, Meisn. in DC. Prodr. xiv. 113; var. *latifolium*, Dammer in Engl. l.c. *P. barbatum*, T. Thoms. in Speke, Nile, Append. 645; Oliv. in Trans. Linn. Soc. xxix. 142, not of Linn. *P. nyikense*, Baker in Kew Bulletin, 1897, 280.

Lower Guinea. Angola and French Congo, ex *Dammer.*

South Central. Congo Free State: Kingunchi, *Buettner*, 314, ex *Durand & Schinz.*

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 2028! Kilimanjaro, 6000 ft., *Johnston*, 90! in moist places in the Coast Range, *Speke & Grant!* British Central Africa: Nyasaland; Nyika Mountains, 4000–6000 ft., *Whyte!* Mount Chiradzulu, *Whyte!* and without precise locality, *Buchanan*, 1265 partly!

Var. *microstemon*, Mart. ex Meisn. in Mart. Fl. Bras. v. i. 15, t. 4, fig. 2. Leaves linear-lanceolate, long acuminate, about 6 in. long, 4 lin. wide, adpressed hairy on both surfaces; ochreæ with cilia 3 lin. long. Bracts deciduously ciliate.

Upper Guinea. Sierra Leone: in a stagnant pond at Erimakuna, *Scott-Elliot*, 4454!

Nile Land. Jur: Seriba Ghattas, *Schweinfurth*, 2284!

Also in South Africa and Tropical America.

19. **P. erythropus,** *Dammer in Engl. Pfl. Ost-Afr. C.* 170. Stem erect, bright red and glabrous in the lower part, nodose, pubescent in the flowering region. Leaves shortly petioled, long linear-lanceolate, attenuate towards both ends, 4–5 in. long, ½ in. broad, densely and minutely pilose above, but finally glabrous towards the centre, hairy principally on the veins beneath, margins revolute and setose-ciliate; ochreæ obliquely truncate, slightly and adpressedly pilose, densely ciliate with bristles. Spikes cylindrical, 1–2 in. long, solitary or geminate, panicled; bracts obliquely truncate, obtuse, not glandular, setose-ciliate, otherwise glabrous. Perianth glandular. Stamens 6, exserted. Styles 2. Nut lenticular, shining.

Nile Land. Uganda: Evonde, *Böhm*, 34.

20. **P. glabrum,** *Willd. Sp. Pl.* ii. 447. Perennial. Stems stout, erect, glabrous, 3–4 ft. long. Leaves oblong-lanceolate, shortly petioled, glabrous, or slightly hairy on the midrib beneath, narrowed gradually to the base, the lower sometimes 6–8 in. long, 1½–2 in. broad at the middle; ochreæ large, membranous, not ciliate. Spikes dense, oblong-cylindrical, 1½–2 in. long; bracts not ciliate; peduncles glabrous, not glandular. Perianth pink, not glandular, 1½ in. long. Stamens 6–8. Styles usually 2. Nut lenticular, orbicular, shorter than the perianth. —Wight, Ic. t. 1799; Meisn. in DC. Prodr. xiv. 114, and in Mart. Fl. Bras. v. i. 14; Aschers. in Schweinf. Beitr. Fl. Aethiop. 170; A. Rich. Tent. Fl. Abyss. ii. 226; Engl. Hochgebirgsfl. Trop. Afr. 201; Hook. f. Fl. Brit. Ind. v. 34; Gage in Rec. Bot. Surv. Ind. ii. 424. *P. Hippopotami*, Ehrenb. ex Meisn. in DC. Prodr. xiv. 121; Aschers. l.c. *P. nodosum*, Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 155, not of Pers.—*Schovanna-Modela-Muccu*, Rheede, Hort. Malab. xii. t. 77.

Nile Land. Nubia: Dongola, *Ehrenberg!* Eritrea: Saganeiti, *Schweinfurth & Riva*, 828! Abyssinia: Begemeder; Gafat, *Schimper*, 1537! shore of Lake Tana, *Schimper*, 1542! Amba Sea, *Schimper*, 569! Kordofan, *Kotschy*, 38! 141! White Nile: Aba (Abu ?) Island, *Schweinfurth*, 992! banks of the Nile between Khartoum and Shendy, *Bromfield*, 126! Jur: Wau, *Schweinfurth*, 1702!

Also in Tropical Asia and Tropical America.

A specimen cultivated in Jamaica is said to have been received from Aburi, Gold Coast.

Imperfectly known species.

21. **P. Schimperi,** *Vatke in Engl. Hochgebirgsfl. Trop. Afr.* 202, *name only.*

Nile Land. Abyssinia: Gafat, in marshy places at 8500 ft., *Schimper*, 1542.

22. **P. tumidum,** *Delile, Fl. Ægypt. Illustr.* 60, *and Mém. Pl. Spont. Égypte,* 12; *Meisn. in DC. Prodr.* xiv. 142; *Dammer in Engl. Pfl. Ost-Afr. C.* 170.

Mozamb. Dist. German East Africa: Unyamwesi and Karema, ex *Dammer.*

Also in Egypt.

I have been unable to verify the first two references above cited, and do not know whether any description accompanied the name. Meisner (*l.c.*) places this amongst the doubtful species.

3. **RUMEX**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 100.

Flowers hermaphrodite or unisexual. Perianth-segments usually 6, three inner much enlarged in fruit, three outer unchanged. Stamens 6, inserted at the base of the perianth; filaments short; anthers linear-oblong. Ovary trigonous; styles 3, spreading; stigmas fimbriate; ovule solitary, erect. Nut trigonous, included in the persistent perianth. Seed similar in shape to the nut; embryo on one side of the endosperm, straight or curved; cotyledons linear or oblong.—Leaves alternate, often cordate or hastate; ochreæ membranous. Flowers in whorls, forming leafy or leafless terminal panicles.

Species about 100. Cosmopolitan, but most numerous in the temperate regions.

Leaves hastate or sagittate.
- Flowers in much-branched panicles.
  - Leaves 8 in. long; terminal lobe deltoid . . 1. *R. abyssinicus.*
  - Leaves 8 in. long; terminal lobe linear . . 1. *R. abyssinicus*, var.
  - Leaves $1\frac{1}{2}$–2 in. long; terminal lobe ovate . 2. *R. maderensis.*
  - Leaves 1–$1\frac{1}{2}$ in. long; terminal lobe linear . 3. *R. Ellenbeckii.*
- Flowers in leafy whorls . . . . . 4. *R. hararensis.*

Leaves not hastate nor sagittate.
- Panicles small, diffuse; flowers in scattered fascicles.
  - A shrub; leaves oblong or lanceolate . . 5. *R. nervosus.*
  - A herb; leaves deltoid or ovate . . . 6. *R. vesicarius.*
- Panicles with a few long branches; flowers in distinct pseudo-whorls . . . . . 7. *R. nepalensis.*

1. **R. abyssinicus,** *Jacq. Hort. Vind.* iii. 48, *t.* 93. Rootstock perennial, 1 in. in diam. Stems annual, erect, up to 12 ft. high, fistular, terete, reddish, glabrous. Leaves triangular or ovate, hastate at the base, up to 8 in. long and 6 in. wide, glabrous or slightly puberulous on the under-side of the nerves, thin; petiole of lower leaves 4 in. long, blood-red as are the midribs (*Grant*); ochreæ 9 lin. long, glabrous. Panicle terminal, much-branched, 1 ft. long; branches ascending; flowers polygamous; pedicels about as long as the perianth, slender; bracteoles lanceolate, scarious. Perianth-lobes elliptic, $\frac{3}{4}$ lin. long, the 3 outer slightly narrower and more herbaceous than the inner, eglandular; the 3 inner increasing in fruit to 3 lin. long and $2\frac{1}{2}$ lin. wide, cordate at the base, strongly reticulate. Stamens about as long

as the perianth-lobes. Nutlet 1½ lin. long, acutely triquetrous, light brown.—A. Br. in Flora, 1841, i. 278; Meisn. in DC. Prodr. xiv. 68; T. Thoms. in Speke, Nile, Append. 645; A. Rich. Tent. Fl. Abyss. ii. 229; Aschers. in Schweinf. Beitr. Fl. Aethiop. 171; Oliv. in Trans. Linn. Soc. xxix. 141; Engl. Hochgebirgsfl. Trop. Afr. 203; Hiern in Cat. Afr. Pl. Welw. i. 905; var. *Schimperi*, Aschers. l.c.; Engl. l.c.; var. *Kilimandschari*, Engl. l.c. *R. Schimperi*, Meisn. l.c. 67, not of Vatke.

Upper Guinea. Cameroons: Yaunde, *Zenker & Staudt*, 603!

Nile Land. Abyssinia: Mount Sholoda, *Schimper*, 398! Ankober, *Roth*, 541! and without precise locality, *Schimper*, 514! *Petit! Quartin-Dillon!* Uganda: Mawokota, *Brown*, 180! Ruwenzori, at Kinata, 6000–9000 ft., *Scott-Elliot*, 7700! Unyoro, *Speke & Grant*, 625!

Lower Guinea. Cameroons, 2600 ft., *Zenker & Staudt!* Angola: Pungo Andongo; in rocky places by the streams of Catete and Cabonda, *Welwitsch*, 5356! Huilla; by streams, *Welwitsch*, 5357! Malange, *Gossweiler*, 1024! 1025!

Mozamb. Dist. German East Africa: Karagwe, *Speke & Grant*, 418! Kilimanjaro, *Volkens*, 423! British Central Africa: Nyasaland; Namasi, Mandala, *Cameron*, 3! Blantyre, top of Wilandi, *Buchanan*, 22! Shire Highlands, *Buchanan*, 383! summit of Chiradzulu Mountain, *Cameron!* Masuku Plateau, *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Mount Mlanji, *Adamson*, 355! Mwata Manga stream, *Kirk!* and without precise locality, *Buchanan*, 790!

Var. *angustisectus*, Engl. Hochgebirgsfl. Trop. Afr. 203. Leaf-segments linear, acute, the central one 3–4 times as long as the lateral, 8 in. long, 1 in. wide.

Nile Land. Abyssinia: Begemeder; near Debra-Tabor, 9000 ft., *Schimper*, 1527!

Var. *Mannii*, Engl. l.c. Leaves triangular, acuminate, up to 4 in. long and 3½ in. wide, pilose beneath.

Upper Guinea. Cameroons, 4000–7000 ft., *Mann*, 1217! 1978!

2. **R. maderensis,** *Lowe, Nov. Fl. Mad.* 12. A shrub up to 10 ft. high. Branches striate, glabrous. Leaves often crowded on short lateral branchlets, distinctly petioled, ovate, acute, hastate or cordate or furnished with small deflexed auricles, moderately firm, 1½–2 in. long. Flowers hermaphrodite, in ample terminal panicles; branches and branchlets spreading; lower branches very compound, subtended at the base by reduced leaves; flowers several in a cluster; pedicels capillary, longer than the flowers. Inner segments of the fruiting perianth cordate-orbicular, bright red, entire, strongly reticulated.—Webb & Berth. Phytog. Canar. iii. iii. 287; Meisn. in DC. Prodr. xiv. 67; T. Thoms. in Speke, Nile, Append. 645; Oliv. in Trans. Linn. Soc. xxix. 142, t. 90. *R. tingitanus*, Webb & Berth. l.c., not of Linn.

Nile Land. Uganda: Ruwenzori; Yeria, 7000 ft., *Scott-Elliot*, 7759! British East Africa: valley near Lake Nakuro, 6000 ft., *Scott-Elliot*, 6792! Kilungu River, in Ukamba, *Scott-Elliot*, 2357

Mozamb. Dist. German East Africa: Mininga, *Speke & Grant*, 77! Kilimanjaro, *Smith!* Marangu, *Volkens*, 2104! higher plateau north of Lake Nyasa, *Thomson!* and without precise locality, *Busse*, 355! British Central Africa;

Nyasaland; Panda Peak, 6381 ft., *McClounie*, 150! Tanganyika Plateau, at Fwambo, *Carson!*

Also in the Canary Islands and Madeira.

3. **R. Ellenbeckii,** *Dammer in Engl. Jahrb.* xxxviii. 61. A shrub 1½–3 ft. high; branches striate, woody. Leaves hastate; terminal lobe linear, 1–1½ in. long, about 1 lin. wide; basal lobes not more than 1½ lin. long and ¼ lin. wide, usually curved towards the apex of the blade, sometimes nearly obsolete. Panicles at the apex of the young branches, 2 in. long; pedicels about 1 lin. long, filiform, articulated below the middle. Outer perianth-lobes acute; inner pale rose, roundish, ½ lin. long, becoming in fruit 2 lin. long and nearly as broad, cordate-orbicular, entire. Stamens 6; filaments short; anthers sagittate, ¾ lin. long. Ovary triangular; styles 3, small; stigmas wide, fimbriate at the margin.

Nile Land. Abyssinia: on the rocky island Tuluguto in Lake Zuai, *Ellenbeck*, 1686.

4. **R. hararensis,** *Dammer in Engl. Jahrb.* xxxviii. 61. A perennial. Stem slender, simple, about 3½ in. high. Leaves lanceolate-hastate, about 1 in. long and 1–6 lin. wide; ochreæ wide, membranous; petiole 9–14 lin. long. Flowers in leafy whorls from 4–9 lin. apart; pedicels articulate below the middle. Calyx-lobes very narrow, acute, ½ lin. long. Corolla white; lobes lanceolate, margin 3–4-toothed. Stamens 6; filaments very short; anthers sagittate. Ovary trigonous; styles 3, about ½ lin. apart; stigmas small, capitate. Fruit 1 lin. long.

Nile Land. Abyssinia: Harar, on mountains, *Ellenbeck.*

5. **R. nervosus,** *Vahl, Symb.* i. 27. A much-branched shrub, reaching a height of 6 ft. Leaves often crowded on short striate lateral branchlets, distinctly petioled, oblong, or the upper lanceolate, subacute, glabrous, 2–3 in. long, narrowed to the base, rather firm in texture, triplinerved; ochreæ truncate. Flowers dicœcious, forming ample lax or dense terminal panicles, the very compound lower branches only subtended at the base by reduced leaves; flowers 2–5 in a cluster; pedicels capillary, often longer than the flowers. Outer perianth-segments reflexed, inner in fruit cordate-orbicular, 3 lin. in diam., scarious, strongly reticulate.—Meisn. in DC. Prodr. xiv. 72; Aschers. in Schweinf. Beitr. Fl. Aethiop. 171; Engl. Hochgebirgsfl. Trop. Afr. 203; Britten & Rendle in Gregory, Great Rift Valley, 397; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 153. *R. persicarioides,* Forsk. Fl. Ægypt.-Arab. 76, not of Linn. *R. alismæfolius,* Fresen. in Flora, 1838, 602; Meisn. l.c.; A. Rich. Tent. Fl. Abyss. ii. 230.

Nile Land. Eritrea: various localities, *Schweinfurth,* 189, 1014, 591, 1035, 1818, *Schweinfurth & Riva,* 789! 1044! 1814! Abyssinia: near Adowa, *Schimper,* 152! Mettaro, *Schimper,* 891! and without precise locality, *Quartin-Dillon & Petit,*

77! *Schimper*, 1067! 1484! *Plowden!* *Parkyns!* British East Africa: Ndoli, *Gregory*.

Mozamb. Dist. German East Africa: Kilimanjaro, *Johnston!* *Meyer*, 146, 154.

Var. *usambarensis*, Engl. in Glied. Veg. Usambara, 61. Stem often 40 ft. long, winding in and out amongst the bush, with a tendency to root between the stones.

Mozamb. Dist. German East Africa: Usambara, Mlalo and Kwa Mshuza, ex *Engler*.

Also in Arabia.

6. **R. vesicarius,** *Linn. Sp. Pl. ed.* i. 336. Stem herbaceous, branching at the base. Leaves deltoid or ovate, usually cordate at the base, rather fleshy, minutely papillose when dry, about $1\frac{1}{4}$ in. long and 1 in. wide; petiole of lower leaves up to $1\frac{1}{2}$ in. long. Panicles terminal; peduncles slender, articulated about the middle, 1-flowered or with 2 terminal connate flowers; bracts about as long as the peduncles, lanceolate, scarious. Perianth-segments 4 lin. in diam. in fruit, suborbicular, cordate at both ends, reddish, woody in the centre, membranous and reticulated on the wings, not nerved at the margins. Achene triquetrous or almost winged, acute, cream-coloured, $1\frac{1}{2}$ lin. long.—Campd. Monogr. Rumex, 129, t. 3, fig. 1; Meisn. in DC. Prodr. xiv. 70; Boiss. Fl. Orient. iv. 1017; Engl. & Prantl, Pflanzenfam. iii. 1A, 17, fig. 8, D–E; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 154.

Nile Land. Nubia: coast region, *Bent!* Somaliland: Golis Range, *Drake-Brockman*, 234!

Also from Egypt and Greece to Afghanistan. Very closely allied to *R. roseus*, Linn., which has the fruiting-perianth nerved around its margin.

7. **R. nepalensis,** *Spreng. Syst.* ii. 159. Perennial. Stems moderately stout, 3–4 ft. high, divaricately branched. Basal leaves oblong, rounded or cordate at the base, 1 ft. or more long, long-petioled, cauline from ovate-oblong with a cordate base to lanceolate. Racemes forming long lax panicles, with reduced leaves in the lower part only; flowers many in a whorl; pedicels deflexed, longer than the flowering perianth, articulate below the middle. Inner perianth-segments $\frac{1}{8}$ in. long in fruit, ovate-cordate, margined with hooked teeth as long as the segment is broad, not tubercled, or with a tubercle on 1 or 3 segments. Nutlet $1\frac{1}{2}$ lin. long, ovoid-triquetrous.—Wight, Ic. Pl. t. 1810; Meisn. in DC. Prodr. xiv. 55; Hook. f. Fl. Brit. Ind. v. 60, and in Journ. Linn. Soc. vii. 214. *R. obtusifolius*, T. Thoms. in Speke, Nile, Append. 645, not of Linn.; var., Oliv. in Trans. Linn. Soc. xxix. 141; var. *Steudelii*, Hook. f. in Journ. Linn. Soc. vii. 214. *R. Steudelii*, Hochst. in Schimp. Fl. Abyss. Exsicc. 380, and ex A. Br. in Flora, i. 278, 1841; Engl. Hochgebirgsfl. Trop. Afr. 204; Britten & Rendle in Gregory, Great Rift Valley, 397; Walp. Ann. iii. 292; var. *cordifolius*, A. Rich. Tent. Fl. Abyss. ii. 229. *R. steudelianus*, Meisn. in DC. Prodr. xiv. 56; var. *cordifolius*, Meisn. l.c.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1235! 1990!

Nile Land. Eritrea: near Saganeiti, *Schweinfurth & Riva*, 836! 1815! Abyssinia: near Gennia, in the region of Memsach, *Schimper*, 380! without precise locality, *Schimper*, 883! Uganda: Ruwenzori, 7000–9800 ft., *Scott-Elliot*, 7699! *Dawe*, 557! British East Africa: Aberdare Mountains, *James!* between Kibwezi and Machakos, *Scott-Elliot*, 6692!

Mozamb. Dist. German East Africa: Kilimanjaro, *Johnston*, 130! *Thomson! Volkens*, 676! Usagara; Robeho Mountains, *Speke & Grant!* British Central Africa: Nyasaland; Nyika Mountains, 4000–6000 ft., *Whyte!* Shire Highlands, *Buchanan*, 77! and without precise locality, *Buchanan*, 513! 552!

Also in Tropical Asia.

R. Steudelii has been separated from *R. nepalensis* by the absence of tubercles on the back of the fruiting perianth-segments, but the tubercles may be absent and present in the same panicle.

A specimen of the European and North Asian *R. crispus*, Linn. (*Sp. Pl.* ed. i. 335), has been collected by Sir Evan James on the Aberdare Mountains, where it has probably been introduced.

4. **SYMMERIA**, Benth.; Benth. et Hook. f. Gen. Pl. iii. 105.

Flowers diœcious. Male: Perianth 6-partite; segments orbicular, the 3 outer smaller. Stamens 20–30, inserted on a central disk; filaments very short. Rudiment of ovary none. Female: Perianth with 3 free ovate deciduous outer segments, the 3 inner coherent into a fleshy mass and much enlarged after flowering, pyramidal, trigonous. Ovary acutely trigonous; style free at the apex; stigmas 3, fimbriate. Nut acutely trigonous, its faces plane or convex. Seed similar in shape to the nut; endosperm ruminate; embryo nearly straight; cotyledons broad.

Monotypic.

1. **S. paniculata,** *Benth. in Hook. Lond. Journ. Bot.* iv. 630. A shrub, glabrous in all its parts. Branchlets terete, woody. Leaves oblong, coriaceous, obtuse, cordate or cuneate at the base, 6–9 in. long; main veins arcuate, raised nearly to the edge; petiole short, clasping the branch at the base. Male flowers in an ample terminal panicle; branches many, long, spreading, slender; flowers small, in few-flowered sessile clusters spaced out on the branches. Female flowers shortly pedicelled. Female perianth coriaceous, trigonous, 6–7 lin. long.—Meisn. in Linnæa, xxi. 266, in DC. Prodr. xiv. 186, and in Mart. Fl. Bras. v. i. 46, t. 23; Scott-Elliot in Journ. Linn. Soc. xxx. 95.

Upper Guinea. Senegambia, *Heudelot*, 334! Sierra Leone: near Kambia, *Scott-Elliot*, 4467! near Mandira, Limba Country and Kahrini (Karena), *Scott-Elliot*, 5562! 5573!

Also in Guiana and North Brazil. Called "*mongmoi*" by the Mendis near Kambia.

5. **BRUNNICHIA**, Banks; Benth. et Hook. f. Gen. Pl. iii. 103.

Flowers hermaphrodite. Perianth-tube short; lobes 5, equal, ovate. Stamens usually 8, inserted on the thick disk; filaments filiform; anthers subglobose. Ovary ampulliform, immersed in the thick disk; ovule 1, pendulous from a long funicle; styles 3, stigmatose at the apex. Nut enclosed in the persistent perianth, trigonous; pericarp coriaceous, intruded into the grooves of the seed. Seed with 6 deep grooves; endosperm slightly ruminate; cotyledons oblong, rather longer than the radicle.—Climbing shrubs, with forked tendrils at the end of the branches. Leaves alternate, entire, petioled. Flowers small, fascicled, arranged in long lax racemes; pedicels elongated in fruit and furnished with a coriaceous wing on one or both sides.

A fourth species occurs in the Southern United States.

Branches angular.
- Branches glandular-pubescent . . . 1. *B. africana.*
- Branches glabrous . . . . . 1. *B. africana*, var. *glabra.*

Branches terete, glabrous . . . . . 2. *B. erecta.*

1. **B. africana,** *Welw. in Trans. Linn. Soc.* xxvii. 61. A widely scandent shrub; branches patent, angular, multisulcate between the angles, glandular-pubescent; tendrils (modified peduncles?) supra-axillary, forked, 2–4 in. long. Leaves oblong-ovate or ovate-elliptic, acuminate or cuspidate, usually cuneate at the base, quite entire, membranous, glabrous, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 in. wide, drying black; petiole 3–6 lin. long, channelled above, pubescent. Racemes 3–6 in. long, increasing to 1 ft. in fruit, bearing fascicles of about 3 flowers about 6 lin. apart; bracts ovate, acuminate, fleshy, membranous at the margins. Perianth-tube short; lobes oblong, acuminate, 2 lin. long, the three outer wider than the two inner, rosy inside, suberect during flowering, becoming connivent, hard and dusky purple in fruit. Pedicel in fruit nearly 3 in. long and 4 lin. wide, crimson.—Oliv. in Hook. Ic. Pl. xiv. 21, t. 1328; Dammer in Engl. Jahrb. xxvi. 357; Hiern in Cat. Afr. Pl. Welw. i. 905.

Lower Guinea. Angola: Golungo Alto; in forests by streams among the mountains in Sobato de Bumba, and at the Capopa cataract near Sange, *Welwitsch*, 1754!

Var. *glabra*, Dammer in Engl. Jahrb. xxvi. 357. A climber. Branches quite glabrous.

Upper Guinea. Liberia: within 20 miles of Kakatown, *Whyte!* Gold Coast, *Burton!* Cameroons: Bipinde, *Zenker*, 1125! 2031! 2272! 2272A! 2823!

2. **B. erecta,** *Aschers. in Jahrb. Königl. Bot. Gart. Berlin*, i. 334. An erect shrub, about 10 ft. high. Branches terete, many-sulcate, quite glabrous. Leaves oblong-elliptic, about 2 in. long, nearly 1 in. wide, acuminate or nearly cuspidate, subcuneate at the base; petiole slender, 4 lin. long. Panicle lax; cymes 3–6-flowered, without tendrils.

Perianth-lobes during flowering patent, in fruit erect and conniving, lanceolate, acuminate. Stamens 5, inserted on the base of the perianth-lobes. Styles connate at the base. Fruit subglobose, about 3 lin. in diam.; pedicel 2 in. long, 5 lin. wide across the wing.—Dammer in Engl. Jahrb. xxvi. 357.

Upper Guinea. Lagos: Ejan, *Millen*, 140!

Lower Guinea. Gaboon: Sibange Farm, *Soyaux*, 152! 382!

Imperfectly known species.

3. **B. congoensis,** *Dammer in Engl. Jahrb.* xxvi. 357. Branches terete, glabrous. Leaves broadly oval, shortly acuminate, thick, recurved at the margin, glabrous, about 2 in. long, $1\frac{1}{2}$ in. wide; petiole 4 lin. long, glabrous. Racemes about 5 in. long; tendrils glabrous; bracts lanceolate or oval, fleshy, scarious at the margin; pedicels 1 lin. long. Perianth-segments $2\frac{1}{2}$ lin. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. wide.

Lower Guinea. Congo Free State: between Lukolela and the equator, *Büttner*, 312.

Dammer founds this on Büttner, 312, and quotes as a synonym *B. africana*, var. *erecta* (Aschers.) Büttner, in *Mitteil. Afrikan. Gesellsch.* 1888, 257, a publication which I have not seen. This latter name is also included in Durand and Schinz's *Études Fl. Congo*, i. 236. *B. congoensis* does not appear to differ by any valid character from *B. erecta*.

ORDER CX. **PODOSTEMACEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers regular, hermaphrodite or dicœcious. Perianth inferior, membranous, 3–5-partite or represented by minute scales or entirely absent. Stamens hypogynous, 1 to many; filaments free or united; anthers oblong, 2-celled, dehiscing longitudinally; pollen 1–2-celled. Ovary sessile or stipitate, 1–3-celled; styles 2–3; stigmas capitate or decurrent; placentas axile or parietal; ovules many, anatropous. Capsule 1–3-celled, dehiscing by valves, often septifragal. Seeds many, minute, sessile, exalbuminous; cotyledons flat; radicle very short.—Submerged herbs of various habit, often resembling mosses, foliaceous and frondose hepaticæ and algæ. Flowers minute, variously arranged.

Species about 130, chiefly in the tropics and subtropics of the Southern Hemisphere.

Flowers hermaphrodite.
- Perianth equally 3-partite . . . . 1. TRISTICHA.
- Perianth of 2 small linear segments.
  - Stamens 3; filaments free or nearly so . . 2. ANGOLÆA.
  - Stamens 2; filaments united in the lower half.
    - Capsule compressed, almost winged . . . 3. WINKLERELLA.
    - Capsule not compressed, smooth . . . 4. LEIOTHYLAX.

Capsule not compressed, ribbed.
Valves of capsule equal.
Ovary sessile . . . . . 5. DICRÆA.
Ovary stipitate . . . . . 6. DICRÆANTHUS.
Valves of capsule unequal . . . . 7. SPHÆROTHYLAX.
Flowers diœcious; perianth none . . . . 8. HYDROSTACHYS.

1. **TRISTICHA,** Thouars; Benth. et Hook. f. Gen. Pl. iii. 108.

Flowers hermaphrodite. Perianth membranous, 3-partite; segments oblong, obtuse, slightly imbricate. Stamen 1, hypogynous; filament long; anthers oblong. Ovary oblong, 3-celled; styles 3, short, linear; stigmas decurrent on the inner side of the styles; placentas axile; ovules numerous. Capsule oblong, crustaceous, septicidally and septifragally 3-valved.—Herbs with a moss-like habit, growing under water and attached to rocks by a flat lobed thallus. Stem slender, much-branched. Leaves small, sessile, entire, pellucid, 1-nerved. Flowers terminal or axillary; pedicels stiffly erect, each with 3 bracts at the base.

Species 3, variable and difficult of limitation. Also in South Africa, the Mascarene Islands and Tropical America.

Leaves ovate-rotundate to ovate-oblong.
Flowers axillary . . . . . 1. *T. trifaria.*
Flowers terminating short branches . . . 2. *T. hypnoides.*
Leaves oblong-linear . . . . . 3. *T. alternifolia.*

1. **T. trifaria,** *Tulasne in Ann. Sci. Nat.* 3^{me} *sér.* xi. 111. A much-branched herb. Stems up to 9 in. long, at first erect, at length floating; leafy branches 6–9 lin. long. Leaves tristichous, ovate-rotundate to ovate-oblong, very obtuse, imbricate, about 1 lin. long. Flowers solitary, axillary, or terminal on short branches; pedicel about 1 lin. long, increasing to 5 lin. in fruit, slender, terete, rigid, glabrous. Perianth marcescent; lobes 3, slightly united at the base, ovate, acute, equal, glabrous, patent, imbricate in bud. Filament flat; anthers ovoid. Ovary obovoid-trigonous; stigmas 3, equal, short, linear, at first erect, finally recurved. Capsule 1 lin. long, obovoid-ellipsoid, obtuse, crowned by the withered styles, faintly 9-ribbed.—Tulasne in Arch. Mus. Hist. Nat. Par. vi. (1852), 180; Wedd. in DC. Prodr. xvii. 45; Warming in Kgl. Danske Vidensk. Selsk. Skrifter, ser. 6, xi. i. 28, fig. 24; Hiern in Cat. Afr. Pl. Welw. i. 907. *Dufourea trifaria,* Bory ex Willd. Sp. Pl. v. 55. *D. Boryi,* A. Rich. in Dict. Class. Hist. Nat. v. 637. *Cryptocarpa tristicha,* Tayl. ex Tulasne in Arch. Mus. Hist. Nat. Par. vi. 180.

Lower Guinea. Angola: Pungo Andongo; in the Præsidium, attached to submerged rocks in the Casalale stream, *Welwitsch,* 528!

Also in the Mascarene Islands.

2. **T. hypnoides,** *Spreng. Syst.* iv. *Cur. Post.* 10. Stems cæspitose, often very short, branched, more or less compressed. Leaves

broadly ovate to elliptic, usually trifarious, about $\frac{1}{3}$ lin. long, the upper sometimes longer and narrower. Flowers solitary, terminal on short branches near the apex of the stem; peduncle up to 9 lin. long in fruit, terete, rigid, erect. Perianth-segments 3, equal, oblong-elliptic, cymbiform, pellucid. Filament compressed; anthers ovoid, obtuse. Ovary shortly stalked, ellipsoid, trigonous. Capsule ellipsoid, 1 lin. long; valves 3-nerved.—Weddell in DC. Prodr. xvii. 44; Tulasne in Ann. Sci. Nat. 3me sér. xi. 112, in Arch. Mus. Hist. Nat. Par. vi. (1852), 186, and in Mart. Fl. Bras. iv. i. 272; Engl. Hochgebirgsfl. Trop. Afr. 228; Warming in Kgl. Danske Selsk. Skrifter, ser. 6, ix. ii. 107, figs. 1–6, and xi. i. 28, 61, figs. 20–23, excl. syn. *T. trifaria*. *T. bryoides*, Gardn. in Calc. Journ. Nat. Hist. vii. (1847), 178, and Wight, Ic. t. 1920. *T. Philocrena*, Steud. Nomencl. Bot. ed. 2, ii. 715. *T. alternifolia*, var. *pulchella*, Warm. l.c. xi. i. 36. *Dufourea hypnoides*, A. St. Hil. in Mém. Mus. Paris, x. (1823), 472. *Philocrena pusilla*, Bong. in Mém. Acad. Pétersb. 6me sér. i. (1832), 80, t. 6.

Upper Guinea. Northern Nigeria: Nupe; on rocks near Ketsa, *Barter*, 1093! rocks of the River Awou, an affluent from the Yoruba country about 5 miles from the River Kworra (Niger), *Barter*, 1530! Chutes de Billy, *Chevalier*, 65! Fernando Po: in a rivulet near Clarence, *Barter*, 2073! *Mann!*

Nile Land. Sudan: creeping on stones in the River Biri at Meshra Yoro Shamo, *Broun*, 1632! Abyssinia: Begemeder; Silen Uha, *Schimper*, 1381! Mittu: Woko River near Koro, *Schweinfurth*, 2859!

Lower Guinea. Angola: between Huilla and Humpata, *Johnston!*

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; near "Mungozi," Shupanga, *Kirk!*

3. **T. alternifolia,** *Thouars ex Spreng. Syst.* i. 22. Plant much branched from the base, fixed to rocks by a dull rosy or purple thallus. Stems terete or only slightly compressed, at first erect, afterwards floating with the current, up to 10 in. long, reddish-purple, semipellucid; branches filiform. Leaves trifarious, at first densely packed, at length distant, oblong-linear, 1 lin. long, $\frac{1}{5}$ lin. wide, the lower slightly spreading, the upper erect and imbricate. Flowers solitary in the axils of branches near the top of the plant or terminating short branches. Perianth-segments green, ovate-oblong, concave. Anther red, ovate-oblong, emarginate at the base. Capsule reddish-brown, oblong-ovoid, 1 lin. long; valves 3, 3-ribbed; peduncle 6 lin. long, slender.—Tulasne in Ann. Sc. Nat. 3me sér. xi. 111, and in Arch. Mus. Hist. Nat. Par. vi. (1852), 182; Wedd. in DC. Prodr. xvii. 45; Warming in Kgl. Danske Vidensk. Selsk. Skrifter, ser. 6, xi. i. 31, 61, 62, figs. 25–30. *T. hypnoides*, var. *fontinaloides*, Wedd. in DC. Prodr. xvii. 45; Hiern in Cat. Afr. Pl. Welw. i. 907. *T. fontinaloides*, Welw. ex Wedd. l.c. *Dufourea alternifolia*, Willd. in Ges. Naturf. Fr. Berl. Mag. vi. (1812), 64; Roem. & Sch. Syst. i. 50.

Lower Guinea. Congo, without precise locality, *Deweni*, 902, 997 (ex *Warming*). Angola: in the Præsidium, on submerged stones in the clear mountain streams of Pedra de Cabondo, *Welwitsch*, 527!

2. **ANGOLÆA**, Wedd.; Benth. et Hook. f. Gen. Pl. iii. 111.

Flowers hermaphrodite, each enclosed in an irregularly bursting spathella. Perianth-segments 2, minute (staminodia of *Weddell*). Stamens 3–4, unilateral; filaments slightly flattened, all free or two shortly connate at the base; anthers oblong; pollen-grains 2-celled. Ovary ovoid, shortly stipitate, 1-celled by the absorption of the septum; placentas 2, central, fusiform; stigma at first laterally compressed, then capitate, subsessile, papillose; ovules anatropous. Capsule ovoid, 8-ribbed, dehiscing by 2 equal valves.

Monotypic, endemic.

1. **A. fluitans,** *Wedd. in DC. Prodr.* xvii. 300. A herb attached to rocks under water, "in appearance like seaweed" (*Monteiro*). Stem and primary branches floating, "thick, transparent and watery" (*Monteiro*), 14 in. long, green. Leaves 1–1½ in. long, dichotomously divided into linear segments, the ultimate ones 3–4 lin. long. Flowers solitary near the sinus of the dichotomies, or 2–5 in umbellate cymes near the ends of branchlets; bracts similar to the leaves but shorter and with flattened segments; spathellæ calyx-like, on a pedicel 1–4 lin. long, bursting by 3–5 unequal lobes. Stamens 3; filaments 2–3 lin. long; anthers 1½ lin. long, equally 2-lobed; pollen pale yellow; staminodia 2, linear or linear-lanceolate, ½ lin. long, entire, rarely divided. Ovary narrowly obovoid, shorter than the stamens. Capsule 1 lin. long, ½ lin. wide, 8-ribbed; placentas before dehiscence of the capsule fixed to the base and apex of the cell, fusiform, marked at length with the scars of fallen seeds.—Wedd. in Journ. Linn. Soc. xiv. 210, t. 13; Oliv. in Hook. Ic. Pl. t. 2357; Warming in Kgl. Danske Vidensk. Selsk. Skrifter, ser. 6, ix. ii. 143, fig. 38.

Lower Guinea. Angola: Quanza River, on submerged rocks at the rapids of Cambambe, seen nowhere else, *Monteiro!*

3. **WINKLERELLA**, Engl. Jahrb. xxxviii. 97.

Flowers zygomorphic. Perianth-segments 2, minute, linear. Stamens 2–3; filaments connate at least to the middle. Pollen-grains 1-celled. Gynophore becoming nearly as long as the ovary. Ovary compressed, 2-toothed at the apex; stigmas 2, subulate.—Stems arising from a horizontal deeply lobed thallus, dichotomously branched; branches compressed. Leaves 2–4-fid, with filiform segments. Inflorescence lax, dichasial; ultimate branches 2–3-flowered; spathellæ 5–6 times shorter than the slender pedicels.

Monotypic, endemic.

1. **W. dichotoma,** *Engl. Jahrb.* xxxviii. 97, *fig.* 2. Thallus irregularly radiating. Stems slender, up to 4 in. long, 3–4 times dichotomous. Leaves up to 1 in. long, with usually 2 filiform segments.

Spathellæ about 3 lin. long; pedicels very slender, about 14 lin. long. Filaments 2 lin. long, united about half-way up; anthers rather longer than the filaments. Ovary compressed, ovate. Capsule about 1 lin. long; valves boat-shaped, very minutely verrucose. Seeds black, minute, ovoid.

Upper Guinea. Cameroons: on submerged rocks at the North Falls, near Edea, *Winkler*, 900.

4. **LEIOTHYLAX**, Warming in Danske Vidensk. Selsk. Skrifter, ser. 6, ix. ii. 145.

Flowers hermaphrodite. Perianth of 2 small scales. Stamens 2; filaments united in the lower part; anthers oblong. Ovary globose, 2-celled; styles 2. Capsule globose; valves 2, subequal, not ribbed.—Herbs with much-branched stems. Leaves divided in very narrow segments. Flowers lateral or terminal, enclosed when young in membranous spathellæ.

Species 3, endemic.

This genus differs from *Dicræa*, Thouars, in the capsule being without ribs and the pollen-grains 1-celled.

Ovary globose.
Ovary sessile . . . . . 1. *L. Warmingii.*
Ovary distinctly stalked . . . . . 2. *L. quangensis.*
Ovary oblong . . . . . 3. *L. violascens.*

1. **L. Warmingii,** *Warming in Danske Vidensk. Selsk. Skrifter, ser.* 6, ix. ii. 150, *fig.* 41. Stem divaricately branched. Leaf-segments very narrowly subulate. Spathellæ 2–3 approximate near the apex of the branchlets, sessile, obovoid, acute, bursting irregularly; pedicel ½–1 lin. long. Perianth-segments linear-subulate. Filaments united in the lower half; anther-cells oblong, unequal. Ovary sessile, globose; stigmas linear-spathulate. Capsule globose, quite smooth.—*Dicræa Warmingii,* Engl. Jahrb. xx. 135, t. 4, figs. L–P. *Leiocarpodicræa Warmingii,* Engl. Jahrb. xxxviii. 98.

South Central. Congo Free State: on stones in the Lulua River, *Pogge,* 1379.

2. **L. quangensis,** *Warming in Danske Vidensk. Selsk. Skrifter, ser.* 6, ix. ii. 147, *fig.* 40. Stems numerous, arising from a thallus horizontally fixed to rocks, much-branched, slightly compressed, 8–12 in. long; branches 2–6 in. long; internodes long. Leaves many times dichotomous; segments very narrowly linear. Flowering branches much divided above and 1–3-flowered near the apex; bracts 1–3, subtending the spathella, up to 9 lin. long, sheathing and shortly 2-auricled at the base, once or twice dichotomous, with very narrow acute segments; pedicel 4 lin. long; spathella ovoid, acute, about 1 lin. long, bursting

irregularly, about $\frac{1}{3}$ the length of the pedicel. Perianth-segments 2, small, linear, acute. Filaments 3 lin. long, united in the lower two-thirds; anthers oblong, cells slightly divergent above. Gynophore up to twice as long as the ovary. Ovary globose, smooth, many-ovuled; stigmas linear-spathulate, $\frac{1}{3}$ the length of the ovary. Capsule globose, brown, quite smooth, $\frac{3}{4}$ lin. in diam.—*Dicræa quangensis*, Engl. Jahrb. xx. 134, t. 4, figs. A–K. *Leiocarpodicræa quangensis*, Engl. Jahrb. xxxviii. 98.

Lower Guinea. Angola: Bismarck Falls on the Quango River, on stones in quickly running water, *Teuscz*, 506.

3. **L. violascens,** *C. H. Wright.* Whole plant violet. Stem short. Leaves about 1 in. long, dichotomously divided; segments very narrow. Bracts approximate near the apex of the stem, similar to the leaves, sheathing or shortly biauriculate at the base; spathellæ sessile, oblong when closed, cup-shaped and toothed when ruptured, about 1 lin. long; pedicel about 1 lin. long. Perianth-segments $\frac{1}{4}$ lin. long, linear-subulate, acute. Androphore variable in length, sometimes as long as the gynophore and ovary. Filaments as long as the oblong anthers. Ovary oblong, shortly stalked. Capsule oblong, brown, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. in diam.—*Dicræa violascens*, Engl. Jahrb. xxx. 312. *Leiocarpodicræa violascens*, Engl. Jahrb. xxxviii. 98.

Mozamb. Dist. German East Africa: Kinga (Livingstone) Mountains, on boulders in the bed of the River Diroro, 7000 ft., *Goetze*, 943.

5. DICRÆA, Thouars, Gen. Nov. Madag. 2 (DICRÆIA, by error)

Flowers hermaphrodite, at first enclosed in a spathella. Perianth-segments 2, minute, linear. Stamens 2; filaments united below; anthers ovate, 2-celled, dehiscing longitudinally; pollen-grain with two globose cells. Ovary ellipsoid, sessile or nearly so, ribbed, 2-celled, many-ovuled; stigmas 2, free, short, terete or compressed. Capsule ellipsoid, 8–12-ribbed, 2-celled; valves 2, equal.—Submerged herbs. Stems elongated, rarely frond-like, branched or subsimple. Radical leaves variable, cauline scale-like. Flowers terminal on short branchlets. —*Podostemon*, Benth. et Hook. f. Gen. Pl. iii. 112, partly.

Species about 10, the others in the Mascarene Islands and India.

Flowering branches with numerous short imbricate 3-lobed leaves	1. *D. tenax.*
Flowering branches with few long lacerate leaves . .	2. *D. Garrettii.*

1. **D. tenax,** *C. H. Wright.* Plant of a bronze colour and horny consistency (*Kolbe*). Stem much-branched, portion seen 2 in. long, $\frac{1}{2}$ lin. in diam., slightly compressed. Leaves numerous, scattered below, imbricate on the flowering branches, quadrate, deeply 3-lobed, $\frac{1}{3}$ lin. long and wide. Spathella tubular, irregularly toothed, green, 1 lin. long; pedicel inflexed in bud. Stamens 2; filaments united

about $\frac{1}{3}$ of the way up; anthers 2-celled. Stigmas linear, deflexed. Capsule equally 2-valved, 1 lin. long, $\frac{1}{3}$ lin. in diam.; valves 5-nerved, not toothed at the apex.

Mozamb. Dist. Rhodesia: Livingstone Island, Victoria Falls, growing in the very swirl of the rapids, *Kolbe*, 3149 !

This much resembles the Brazilian *Podostemon Chamissonis*, Tul., in habit.

2. **D. Garrettii,** *C. H. Wright.* Stems seen 4 in. long, branched, compressed, horny. Leaves distant, about 1 lin. long, irregularly lobed. Flowers in terminal fascicles, each one inflexed within its spathella in bud; bracts 3 lin. long, sheathing at the base, lacerate above; pedicel in fruit 6 lin. long; spathellæ tubular, split down one side, 2 lin. long. Perianth-segments small, linear. Filaments 2 lin. long, overtopping the ovary, united rather more than half-way. Ovary ellipsoid, ribbed; stigmas subulate; gynophore $\frac{1}{2}$ lin. long. Capsule $\frac{3}{4}$ by $\frac{1}{2}$ lin.; valves equal, 3-ribbed.

Upper Guinea. Sierra Leone: Sherboro, *Garrett !*

Imperfectly known species.

3. **Podostemon Tholloni,** *Baill. in Bull. Soc. Linn. Paris,* ii. 877. Spathella pyriform, unequally toothed. Perianth-segments linear. Stamens 2; filaments united below; anthers oblong, 2-celled. Style-branches 2, linear, recurved.

Lower Guinea. French Congo: rapids in the Lope River, *Thollon,* 825.

In the absence of a description of the capsule it is impossible to refer this with certainty to any genus, but all the above-mentioned characters agree with those of *Dicræa.*

6. DICRÆANTHUS, Engl. Jahrb. xxxviii. 94.

Flowers zygomorphic. Perianth-segments 2, minute. Stamens 2; filaments free or united only at the base; anthers shortly lobed at both ends, longer than the filaments; pollen-grains 2-celled. Gynophore $\frac{1}{2}$–$\frac{1}{4}$ the length of the elongate-clavate 2-celled ovary; placenta central, cylindrical, many-ovuled; stigmas small, subulate. Capsule pale brown; valves linear, 5-nerved, remaining after the fall of the placenta. —Stems arising from a horizontal thallus attached to rocks, floating, long and much-branched; branches angular. Leaves deeply 2–3-fid; segments narrowly linear, but not capillary. Cymes unilateral, the lower 6–20-, the upper 1–5-flowered; peduncles clustered; pedicels many times longer than the spathellæ.

Species 2, endemic.

Pedicel 2–3 in. long; spathella split down one side .	1. *D. africanus.*
Pedicel $\frac{1}{4}$ in. long; spathella splitting irregularly .	2. *D. pusillus.*

1. **D. africanus,** *Engl. in Engl. Jahrb.* xxxviii. 96, *fig.* 1. Thallus many-lobed. Stems sometimes over 3 ft. long, 3–4 lin. thick, terete below; branches angular. Leaves on one side of the branches, cuneate, deeply divided into narrowly linear acute segments. Cymes opposite the leaves, lower 6–20-flowered, upper 1–5-flowered; bracts small, very narrowly linear or sometimes the lowest ovate, acute. Spathellæ subcylindrical, slightly curved at the apex, splitting up one side, 3–4 lin. long, 1 lin. in diam.; pedicel inflexed in bud, at length 2–3 in. long. Perianth-segments linear, acute, 1 lin. long. Filaments free, 1 lin. long; anthers narrowly linear, emarginate at both ends, $1\frac{1}{2}$ lin. long. Gynophore $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Ovary long-clavate, 3 lin. long; stigmas small, subulate. Capsule 4 lin. long, pale brown.

Upper Guinea. Cameroons: on submerged rocks at the North Falls near Edea, *Winkler*, 901.

South Central. Congo Free State: Mopinga-Lulua Island, *Pogge*, 1431. Native name "*saule.*"

2. **D. pusillus,** *C. H. Wright.* Stem about 9 lin. high. Leaves petioled, about 7 lin. long, subdichotomously divided into 3–5 very narrowly linear obtuse segments, slightly sheathing and with a small tooth-like stipule on each side at the base. Spathellæ almost sessile, irregularly bursting at the apex; flowers involute in bud; pedicel about twice as long as the spathella. Filaments united about half-way; anthers broadly oblong, slightly separated at the obtuse or almost quadrate apex. Ovary ellipsoid; styles 2, obtuse. Fruit ellipsoid, 1-celled, about 1 lin. long.—*Sphærothylax pusilla*, Warming in Kgl. Danske Vidensk. Selsk. Skrifter, ser. 6, ix. ii. 146, fig. 39.

Upper Guinea. Cameroons: Bipinde, at the Lokundje rapids, on submerged stems in the centre of the stream, *Zenker*, 1050!

7. SPHÆROTHYLAX, Bischoff; Benth. et Hook. f. Gen. Pl. iii. 113.

Flowers hermaphrodite, subtended by 2 minute scales. Stamens 2; filaments united to the apex; anthers 2, sessile at the top of the column, 2-celled, or solitary and 4-celled according to *Weddell*, dehiscence longitudinal. Staminodia 2, small, linear. Ovary ovoid, 8-ribbed; valves 2, unequal, the larger persistent, the smaller deciduous. Seeds ellipsoid, compressed.—Stems slender and branched, arising from a Marchantia-like base. Leaves elongate, laciniate. Spathellæ produced both on the thallus and on the elongated stems.—*Anastrophea*, Wedd. in DC. Prodr. xvii. 78.

Species 4, one in South Africa.

Rhachis of inflorescence densely covered with fimbriate scales	1. *S. warmingiana.*
Rhachis of inflorescence not scale-bearing.	
Flowers clustered on the erect stems	2. *S. abyssinica.*
Flowers solitary on the erect stems	3. *S. heteromorpha.*

1. **S. warmingiana,** *Gilg ex Warming in Kgl. Danske Selsk. Skrifter, ser.* 6, xi. i. 17, *figs.* 13–19. Stem about 8 in. long, springing from a creeping root, slightly compressed, branched, young leaves and branches curved and resembling a helicoid cyme; lower branches rather long and bearing both leaves and flowers, upper short and flower-bearing. Leaves up to 9 in. long, many times pinnatisect or the ultimate divisions subdichotomous, exstipulate. Cymes scorpioid, many-flowered, densely clothed with imbricate digitately divided scales; spathellæ sessile, ovoid-ellipsoid; pedicels at length 3 lin. long. Perianth-scales 2, linear, $\frac{1}{6}$ lin. long. Filaments $\frac{3}{4}$ lin. long, united in the lower half; anther $\frac{1}{3}$ lin. long, oblong, obtuse; pollen-grains 1-celled. Ovary obovoid-oblong, strongly 6-ribbed; styles reflexed. Capsule pale brownish-grey (*Gilg*), 1 lin. long; valves 2, subequal, 3-ribbed, ribs produced into apical teeth.—Gilg in Baum, Kunene-Samb. Exped. 240.

Lower Guinea. Angola: Kubango River, at Menempremp, near Wolombo, 5200 ft., *Baum*, 904!

2. **S. abyssinica,** *Warming in Engl. & Prantl, Pflanzenfam.* iii. 2A, 22. Thallus irregularly lobed, up to 3 in. across. Stems up to 8 in. long, slender, much-branched. Leaves 2–4 in. long, divided into very narrow linear segments. Flowers either solitary on the thallus or in glomerules on the stem; bracteoles 2, minute; spathellæ about 1 in. long, irregularly bursting at the apex. Filaments about $\frac{1}{2}$ lin. long; anthers oblong, shorter than the filaments. Staminodes minute. Ovary ellipsoid; style bifid, stigmatose on the inner side. Capsule $\frac{3}{4}$ lin. long, on a pedicel 2 lin. long, brown, marked with 8 paler ribs.—Oliv. in Hook. Ic. Pl. t. 2356; Engl. Hochgebirgsfl. Trop. Afr. 229; Warming in Kgl. Danske Vidensk. Selsk. Skrifter, ser. 6, vii. iv. 146, figs. 16–17, and ix. ii. 145. *Anastrophea abyssinica*, Wedd. in DC. Prodr. xvii. 79.

Nile Land. Abyssinia: Begemeder; near Gafat, 7800 ft., *Schimper*, 1181!

3. **S. heteromorpha,** *Baill. in Bull. Soc. Linn. Paris*, ii. 876. Stems dimorphic, some about 20 in. long, slender, cylindrical or faintly channelled on one side, with leaves along one side and flowers on the other, others flattened or as if fasciated and bearing leaves and flowers round the margin. Leaves irregularly pinnatisect, with subulate segments. Flowers clustered on the flattened stems, usually solitary on the cylindrical. Spathellæ rupturing and irregularly 4–5-toothed at the apex; pedicel about 6 lin. long, inflexed in bud; bracteoles 1–2, filiform. Stamens 2–3; filaments united below; anther-cells 2, free and obtuse below, separated by a deep groove. Ovary stipitate, 2-celled; style with two short subulate branches. Capsule equally 2-valved.

South Central? Congo: without precise locality or collector's name (*Thollon?*).

8. **HYDROSTACHYS**, Thouars; Benth. et Hook. f. Gen. Pl. iii. 115

Flowers diœcious. Perianth none. Male: Stamen solitary; filament very short; anther oblong, 2-celled. Female: Ovary oblong, 1-celled; placentas 2, parietal. Styles 2, long, filiform, connate in the lower half. Capsule oblong, seated in the hollow of a concave accrescent bract, the apex of which is often reflexed, 2-valved. Seeds many to each placenta.—Stem short, tuberous. Leaves large, pinnately branched, usually bearing protuberances on the petiole and rhachis. Spikes simple, tufted, peduncled, much resembling the fruiting spikes of *Plantago major*, Linn., each flower seated in the axil of a persistent bract.

Species about 15, chiefly in the Mascarene Islands, one in South Africa.

Ultimate branches of the rhachis at least 3 lin. long, filiform. Leaf-segments setaceous	1. *H. triaxialis.*
Ultimate branches of the rhachis rarely 3 lin. long.	
Protuberances on rhachis narrowly linear . .	2. *H. angustisecta.*
Protuberances on rhachis lanceolate or palmately or pinnately lacerate	3. *H. polymorpha.*

1. **H. triaxialis,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 241. A submerged herb. Leaves about 14 in. long, 3 in. wide; rhachis tripinnate, the primary divisions alternate, the secondary subopposite, all bearing subulate or elliptic protuberances, ultimate divisions bearing 5–8 pairs of setaceous segments $\frac{1}{2}$–1 lin. long formed of 2–3 chains of cells; petiole 1–$2\frac{3}{4}$ in. long. Female spikes in fascicles of 6–10; peduncle 2–5 in. long, verrucose with black protuberances; flowering part 2–3 in. long; bracts obovate, concave, transversely rugose in the upper part, 1 lin. wide. Fruit obovoid, sessile, shorter than the bract, smooth. Flowers and male plant unknown.

Lower Guinea. Angola: in the Kubango River, above Massaca, 3900 ft. on boulders in running water, *Baum*, 263!

Native name "*waterkorn.*"

2. **H. angustisecta,** *Engl. Jahrb.* xxviii. 391. Rhizome tuberous. Leaves multipinnate, about 1 ft. long, 2–$2\frac{1}{2}$ in. wide; rhachis with short conical protuberances below, longer and narrowly linear ones above, ultimate divisions bearing lanceolate segments $\frac{1}{2}$ lin. long; petiole 4 in. long, 2–3 lin. in diam. Female spike 7 in. long; peduncle 8 in. long; bracts 2 lin. long, 1 lin. wide, oblong, concave. Capsule oblong-ovoid, slightly shorter than the bract.

Mozamb. Dist. German East Africa: Uhehe; on stones beneath a waterfall on the Lofio River, 1900 ft., *Goetze*, 433!

Either this is a polymorphic species or Goetze's specimen at Kew consists of two species. The smaller has leaves 4 by $1\frac{1}{2}$ in., with their ultimate segments very narrowly linear and compressed; the petioles, however, so strongly resemble those of the larger plant as to favour the opinion that the species is variable. The bracts when old lose their parenchyma, and then appear palmately divided.

3. **H. polymorpha,** *Klotzsch in Peters, Reise Mossamb. Bot.* 506, *tt.* 52–53. Stem short, tuberous, perennial. Leaves tufted, pinnate or slightly bipinnate, variable in outline but usually more or less oblong or ligulate, 1–3 ft. long, 1–3 in. broad, verrucose on the lower part of the petiole, the imbricate protuberances becoming larger upwards on the rhachis, those on the final divisions of the leaf lanceolate and 1½ by ½ lin., or palmately divided, or pinnately lacerated. Male spikes dense, with spreading orbicular bracts; female clustered, cylindrical, 1½–6 in. long; bracts elliptic, very concave, with the upper margin sharply reflexed, 1½ lin. long, minutely verrucose, longitudinally ribbed when dry; peduncle up to 6 in. long, black verrucose. Style-arms 1½ lin. long, curved. Capsule fitting into the concavity of the bract, pilose outside. Seeds ellipsoid, ⅙ lin. long, bright brown.—Wedd. in DC. Prodr. xvii. 89. *H. cristulata*, Wedd. l.c. *H. natalensis*, Wedd. l.c. 88. *H. multipinnata*, Engl. Jahrb. xx. 137.

Mozamb. Dist. Portuguese East Africa: Makua country; Namuli, *Last!* British Central Africa: Nyasaland; near Blantyre, *Last!* Shire Highlands, *Adamson*, 9! Mandala, *Scott-Elliot*, 8562! Zomba, *Purves*, 168! in a river flowing into the Shire north of Shibisa, *Kirk!* and without precise locality, *Buchanan*, 956!

Imperfectly known species.

4. **H. Bismarckii,** *Engl. Jahrb.* xx. 137. Leaves multipinnate, 12–16 in. long, 1½–2½ in. wide; protuberances on the rhachis spathulate in the lower part, linear and obtuse or acute above; ultimate divisions densely clothed with patent narrowly linear-subulate very acute protuberances; petiole 6–8 in. long. Male spike 1¼ in. long, 3 lin. in diam.; bracts broadly deltoid and unguiculate, twice as long as the stamens; peduncle ½ or ⅓ as long as the leaves.

Lower Guinea. Angola: on stones in a strong stream at the Bismarck Falls on the River Quango, *Teuscz*, 506.

ORDER CXI. **CYTINACEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers regular, hermaphrodite or unisexual. Perianth simple, sometimes fleshy; tube adnate to the ovary and often produced above it, solid in the male flowers; lobes 3–10, imbricate or valvate, 1–2-seriate. Stamens 8 to many, free or united; anthers surrounding a central column and dehiscing by apical slits, or forming a lobed ring inside the perianth-tube with long sinuous cells like those of some *Cucurbitaceæ*, dehiscing longitudinally but folded so that the slits are near together and across the ring. Ovary inferior, 1-celled; placentas parietal or numerous and pendulous from the top of the cell, entirely covered with ovules; stigma sessile, flat or cushion-like, lobed. Fruit a berry, globose or turbinate. Seeds minute, albuminous; embryo small.—Fleshy root or branch parasites, leafless or with the leaves reduced to scales.

Species about 40, in the warmer regions of both hemispheres.

Flowers unisexual. Anthers in several whorls around a central column	1. PILOSTYLES.
Flowers hermaphrodite. Anthers in a single whorl inside the perianth-tube	2. HYDNORA.

1. **PILOSTYLES**, Guillemin in Ann. Sc. Nat. 2me sér. ii. 19.

Flowers unisexual. Male: Bracts 2–3, linear-lanceolate. Calyx 4-partite. Petals 4–8, free, at length spreading at the apex, persistent, inserted by a broad base. Stamens united into a column bearing several series of anthers beneath a pileus-like papillose fringed apex, or the filaments connate into a tube around the rudimentary pistil; anthers 1–celled, bursting at the apex. Female: Calyx and corolla as in the male. Ovary inferior, surmounted by a lobed epigynous disk, 1-celled, ovuliferous over the whole of the interior; style short, conical; stigma capitate. Berry globose, surrounded by the persistent floral envelopes. —Small parasitic plants consisting of flowers surrounded by a few scales growing on the branches of trees, whose bark forms small cups at their base.—*Apodanthes*, Benth. et Hook. f. Gen. Pl. iii. 118, partly.

Species 8, chiefly in Tropical America, one in the Orient.

1. **P. æthiopica,** *Welw. in Trans. Linn. Soc.* xxvii. 67, *t.* 22. A small parasite growing in clusters on the smaller branches of trees, and sending slender threads into the bast, first appearing as hemispherical nodules. Bracts imbricate, shortly oblong or almost rotundate, about 1 lin. long, like the perianth bright blood-red. Male flowers: Perianth-segments 4–8, oblong, obtuse, slightly longer than the innermost bracts, concave, callous at the base inside. Disk fleshy, angular. Staminal column cylindrical, truncate; anthers numerous in a single series around the mouth of the column, 1-celled, dehiscing by a short transverse slit; pollen globose, smooth, white. Female flowers: Perianth-segments similar to those of the male. Ovary 1-celled; placentas parietal, usually confluent, rarely 4 distinct; ovules numerous; style shortly conical, thick; stigma hemispherical, entire, rarely 2–3-lobed.—Engl. Hochgebirgsfl. Trop. Afr. 201; Hiern in Cat. Afr. Pl. Welw. i. 908; Solms-Laub. in Engl. Pflanzenr. Rafflesiaceæ, 15.

Lower Guinea. Angola: Huilla; forests of Morro de Monino, 5500 ft., parasitic on branchlets of the panda tree (*Berlinia paniculata*, Benth.), *Welwitsch*, 529! 529B!

2. **HYDNORA**, Thunb.; Benth. et Hook. f. Gen. Pl. iii. 120.

Flowers hermaphrodite. Perianth superior; tube short or long; lobes 3–5, valvate, fleshy, triquetrous above, channelled or concave in the lower part inside. Anthers forming a flexuous 3–4-lobed ring in

the perianth-tube, transversely divided into numerous cells. Ovary inferior, 1-celled, with many placentas pendulous from the top of the cell and ovuliferous all over; stigmas cushion-shaped, 3–5-lobed and bearing numerous radiating lamellæ; ovules with a single integument. Fruit subglobose, filled with glutinous pulp. Seeds globose, free in the pulp; endosperm copious, horny; perisperm formed of a single layer of cells; embryo with a long suspensor dilated at the apex.—Parasitic fungus-like plants with a fleshy warted subterranean rhizome. Flowers large, arising singly from the rhizome, with an unpleasant odour.

Species 8, two of them in South Africa.

Flowers 3- (rarely 4-) merous. Rhizome 4–5-angled, warted on the angles.	
Perianth-lobes much longer than the short broad tube	1. *H. æthiopica.*
Perianth-lobes as long as the long narrow tube .	2. *H. longicollis.*
Flowers always 4-merous. Rhizome cylindrical, warted all over.	
Perianth-lobes narrowed towards the base . .	3. *H. Hanningtoni.*
Perianth-lobes lanceolate.	
Perianth-lobes bearded at the margins . . .	4. *H. abyssinica.*
Perianth-lobes naked at the margins . . .	5. *H. bogosensis.*
Flowers 5-merous	4. *H. abyssinica*, var. *quinquefida.*

1. **H. æthiopica,** *Decne in Bull. Soc. Bot. France*, xx. (1873), 77. Perianth about 2 in. long, tubular; tube 9 lin. long, verrucose outside, transversely rugose within; lobes 3, oblong, rather obtuse, inflexed, with linear acute scales on the margin only, inflexed part slender and smooth or obscurely papillose. Ovary nearly hemispherical, verrucose. Fruit as large as the fist, globose-turbinate, tessellate, not tuberculate, concave and surrounded by a slender ring at the apex.—Solms-Laub. in Engl. Pflanzenr. Hydnoraceæ, 6.

Nile Land. Ethiopia, *Sabatier.*

2. **H. longicollis,** *Welw. in Trans. Linn. Soc.* xxvii. *t.* 21. Parasitic on the roots of *Zygophyllum orbiculatum*, Welw., and on a succulent *Euphorbia.* Rhizome 5–7-angled, $\frac{2}{3}$ to 2 in. in diam. towards the base, bearing a row of tubercles along each angle, fleshy, rose-colour or purple outside, pale brick-red inside. Perianth tubular, 3–8 in. long, 1 in. in diam, dusky cinnamon outside, orange-red tending to brick-red inside; lobes 3, rarely 4, valvate, generally much shorter than the tube, thick, triquetrous above, shortly and obtusely acuminate, irregularly areolate outside, densely covered with inwardly directed scales on the thick sides, concave inside in the lower part. Andrœcium 3- (rarely 4-) lobed, inserted opposite to the lobes and $\frac{1}{2}$–1 in. up the tube; anthers yellow, spuriously 2-celled. Ovary oblong, $1\frac{1}{2}$ in. long, 9 lin. wide; stigma shortly 3- (rarely 4-) lobed. Fruit globose, about 2 in. in diam., irregularly areolate outside, 1-celled. Seeds numerous

on pendulous deliquescent placentas, brown.—Solms-Laub. in Engl. and Prantl, Pflanzenfam. iii. i. 285, and Pflanzenr. Hydnoraceæ, 6. *H. africana*, var. *longicollis*, Welw. l.c. 66; Hook. f. in DC. Prodr. xvii. 109; Ficalho, Pl. Uteis, 244. *H. sp.*, Monteiro, Angola, ii. 207.

Lower Guinea. Angola: Mossamedes; on mariti ne sandy hills near Mossamedes and as far as Cabo Negro, *Welwitsch*, 530!

This plant yields (especially from the rhizome) a dusky cinnamon colouring matter which contains tannin, and is used by fishermen for staining and preserving their nets.

3. **H. Hanningtoni,** *Rendle in Journ. Bot.* 1896, 55, *t.* 356, *fig. A.* Rhizome up to 1 in. in diam., coral-like, bearing numerous tubercles. Flowers smooth and brown outside, 6–7 in. long, subcylindrical in bud. Perianth-tube 4 in. long, 1 in. in diam.; lobes 4, $2\frac{1}{2}$–3 in. long, $1\frac{1}{4}$ in. broad in the upper third, narrower below, incurved at the tips, inflexed and covered with short fleshy setæ in the lower 2 in., pink. Androœcium 4-lobed, forming a sinuous ring about half-way up the perianth-tube and 1 in. in height, the numerous pollen-sacs indicated by transverse striations. Ovary $1\frac{1}{2}$ in. long; stigmas arranged in the form of a cross.

Nile Land. Abyssinia: Galla Highlands at Ginia, *Donaldson Smith.* Uganda: Victoria Nyanza, Jordan's Nullah, *Hannington!*

At Kew there is a tracing from Bishop Hannington's drawing lent by Mr. W. Mitten in July, 1883, to which is appended the following note: "The plant appeared to grow in large circles as fungi do, and in breaking up from the ground forced up lumps of earth as large as his head. He took great pains to get a good representation, but could not depict the ciliation of the margin of the clefts of the flower. He says the evil odour was so great that he could not keep it very near him."

4. **H. abyssinica,** *A. Br. in Schweinf. Beitr. Fl. Aethiop.* 217. Rhizome as thick as the thumb, simple or branched, furnished with tubercles, cylindrical or slightly angular, fleshy. Perianth widely tubular; lobes 4, inflexed, the lower third of the margin ciliate with scales, the upper part quite smooth, slightly cucullate. Androœcium 4-lobed, inserted at the middle of the perianth-tube; lobes ovate, obtuse, erect, confluent at the very base, free at the apex. Stigma 4-lobed, adpressed, with radial lamellæ. Ovary subglobose, verrucose, 1-celled; placentas pendulous.—De Bary in Abhandl. Nat. Gesellsch. Halle, x. (1868), 28; Becc. in Nuovo Giorn. Bot. Ital. iii. (1871), 7; Decne in Bull. Soc. Bot. France, xx. (1873), 76; Martelli, Fl. Bogos. 70; Engl. Jahrb. xxviii. 386; Engl. Pfl. Ost-Afr. C. 169; Solms-Laub. in Engl. Pflanzenr. Hydnoraceæ, 7. *H. Johannis*, Becc. l.c. 5; Solms-Laub. l.c.

Nile Land. Eritrea: Bogos; Zedamba, *Beccari*, 170. Abyssinia: near Dehli-Dikeno, 5000 ft., on *Acacia glaucophylla*, Steud., *Schimper.*

Mozamb. Dist. German East Africa: Pangani, ex *Engler*; Usagara; near Kidoti, on the Ruhenbe River, on roots of acacia, *Goetze*, 395.

Var. *quinquefida*, Engl. Jahrb. xxviii. 386. Perianth 5-lobed.—*H. Johannis*, var. *quinquefida*, Solms-Laub. in Engl. Pflanzenr. Hydnoraceæ, 7.

Mozamb. Dist. German East Africa: Uhehe; hilly places by the River Lukosse, on the roots of *Adansonia digitata*, Linn., *Goetze*, 487.

In Uhehe the type is called "*nyambo*," and the variety "*mulimbi*." A specimen at Kew collected by Messrs. James and Thrupp at Hahi, in Somaliland, probably belongs to this species, but as it is in a fragmentary state and destitute of the rhizome cannot be definitely named.

5. **H. bogosensis,** *Becc. in Nuovo Giorn. Bot. Ital.* iii. (1871), 6. Rhizome fleshy, terete, bearing tubercles. Perianth 4-lobed; lobes elongate-lanceolate, fleshy, "rosy-yellow inside" (*Beccari*), not hooked at the differently coloured apex; margins reflexed, sparingly bearded in the central part, elsewhere naked. Anthers 4, at first joined, afterwards scarcely contiguous, ochre-coloured.—Solms-Laub. in Engl. Pflanzenr. Hydnoraceæ, 7. *H. bogonensis*, Martelli, Fl. Bogos. 70.

Nile Land. Eritrea: Keren, on the roots of an *Acacia*, *Beccari*.

Imperfectly known species.

6. **H. angolensis,** *Decne in Bull. Soc. Bot. France*, xx. (1873), 76. Rhizome as thick as the wrist, simple or branched, covered with roundish tubercles, cylindrical or slightly compressed, fleshy, red inside. Perianth unknown. Fruit turbinate, slightly woody, densely verrucose outside, concave and surrounded by a quadrangular ring above, 1-celled; stigmas 4, adpressed, ovate, with radial lamellæ; placentas numerous, pendulous, filling the cavity of the ovary. Seeds subsessile, globose; testa fuscous, crustaceous; endosperm rather horny; embryo globose, central, white.—Solms-Laub. in Engl. Pflanzenr. Hydnoraceæ, 7.

Lower Guinea. On the shores of Angola, on roots, ex *Decaisne*.

ORDER CXII. **ARISTOLOCHIACEÆ.** (By J. G. Baker and C. H. Wright.)

Flowers hermaphrodite. Perianth superior, often produced into a tube above the ovary, equally or unequally 3-lobed, or unilateral and undivided. Stamens 6 to many, epigynous, gynandrous; anthers 2-celled, dehiscing longitudinally. Ovary inferior, rarely free at the apex, perfectly or imperfectly 3–6-celled; ovules numerous, anatropous, horizontal or pendulous; styles connate into a column (*gynostemium*), free above. Capsule indehiscent or septicidal. Seeds often immersed in the inner layer of the endocarp, triquetrous or flattened by pressure, albuminous; raphe sometimes thickened or winged; testa hard; embryo small.—Erect or climbing herbs or shrubs. Leaves alternate, entire or lobed, exstipulate. Flowers axillary, solitary or cymose, fœtid.

Species about 200, cosmopolitan.

1. **ARISTOLOCHIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 123.

Perianth superior; tube dilated below into an obliquely ovoid or subglobose utricle, upper part cylindrical or funnel-shaped, straight or curved, hairy inside; limb very variable, sometimes unilateral and entire or emarginate, sometimes with 3 equal or unequal, often caudate, lobes. Stamens 6 or more united with and around the style forming the gynostemium; anthers oblong, dehiscing longitudinally; connective variously produced. Ovary inferior, slender and pedicel-like, perfectly or imperfectly 6-celled; style-arms 6, 9, or 12; ovules numerous. Capsule clavate, septicidally 6-valved. Seeds numerous, horizontal, triangular or cordate; endosperm copious, fleshy; embryo minute.—Herbs or shrubs, erect or climbing. Leaves alternate, entire or lobed. Flowers axillary, solitary, fascicled or cymose, sometimes very large, fœtid.

Species about 200, cosmopolitan, but more numerous in warm climates.

*Stamens and styles 6.
  Perianth-limb unilateral, narrow.
    Flowers solitary . . . . . 1. *A. bracteata.*
    Flowers racemosely cymose; bracts large.
      Cymes 2–3-flowered . . . . . 2. *A. Dewevrei.*
      Cymes 5- to many-flowered.
        Leaves 7-nerved.
          Seeds 6 lin. long . . . . . 3. *A. densivenia.*
          Seeds 4 lin. long . . . . . 4. *A. petersiana.*
        Leaves 5-nerved; seeds 6 lin. long . . 5. *A. albida.*
  Perianth-limb unilateral, cordate.
    Perianth-limb $1\frac{1}{3}$ in. in diam.; capsule curved . 6. *A. gibbosa.*
    Perianth-limb $1\frac{1}{2}$–3 in. in diam.; capsule straight . 7. *A. elegans.*
    Perianth-limb 6 in. in diam.; capsule straight . 8. *A. fœtens.*
  Perianth-limb equilateral, entire, 9 lin. in diam. . 9. *A. rigida.*
**Stamens and styles 9–12.
  Perianth-limb unilateral, narrow . . . . 10. *A. Kirkii.*
  Perianth-limb 3-lobed; lobes not produced into long tails.
    Leaves more or less lobed and cordate at the base.
      Perianth-lobes short, much broader than long . 11. *A. Mannii.*
      Perianth-lobes 2 in. long . . . . . 12. *A. triactina.*
    Leaves entire, not cordate at the base.
      Perianth-lobes 1–$1\frac{1}{2}$ in. long.
        Leaves oblong, shortly cuneate at the base . 13. *A. Zenkeri.*
        Leaves ovate-oblong, obtuse at the base . . 14. *A. Staudtii.*
      Perianth-lobes 6 in. long . . . . . 15. *A. soyauxiana.*
  Perianth-limb 3-lobed; lobes long-tailed.
    Leaves produced at the same time as the flowers . 16. *A. flagellata.*
    Leaves and flowers produced at different times.
      Tails of perianth-lobes $1\frac{1}{2}$–2 ft. long . . 17. *A. promissa.*
      Tails of perianth-lobes $1\frac{1}{6}$ in. long . . 18. *A. Preussii.*
***Stamens about 24; styles about 12 . . 19. *A. goldieana.*

1. **A. bracteata,** *Retz. Obs.* v. 29. A perennial herb, glabrous in all its parts. Stems short, flexuous. Leaves cordate-ovate, entire, 1½–2 in. long, with a broad basal sinus; petiole up to 9 lin. long. Flowers solitary, axillary; pedicels 2 lin. long; bracts cordate, 2 lin. wide, persistent. Perianth dark brown; globose base 3 lin. in diam.; tube 7 lin. long, 1 lin. wide below, 3 lin. wide at the mouth; limb unilateral, lingulate, 1 in. long. Stamens and styles 6. Capsule shortly pyriform or subglobose, about 9 lin. long and 7 lin. wide. Seeds obcordate, flat, 3 lin. long, 3 lin. broad at the apex.—Duch. in DC. Prodr. xv. i. 478; Zarb in Cat. Spéc. Bot. Pfund, 34; Hook. f. Fl. Brit. Ind. v. 75; Solereder in Engl. Jahrb. x. 441. *A. Kotschyi*, A. Rich. Tent. Fl. Abyss. ii. 237; Zarb, l.c. *A. abyssinica*, Klotzsch in Monatsb. Akad. Berl. 1859, 598. *A. sempervirens*, Forsk. Fl. Ægypt.-Arab. 156.

Upper Guinea. Northern Nigeria: Bornu; Kuka, *Vogel*, 45!

North Central. Eastern Chari: Snoussi, between Kourde and Tili, *Chevalier* 8846!

Nile Land. Nubia: Mount Uaratab, near Suakin, *Schweinfurth*, 972! Singat, *Schweinfurth*, 215! Abyssinia: dry beds of mountain streams near Tadjoura, *Roth*, 545! White Nile at Wod Schellai, *Schweinfurth*, 922! Kordofan: various localities, *Kotschy*, 68! 121! *Pfund*, 138! 209! Jur: Jur Ghattas, *Schweinfurth*, 2073! Uganda: Nile Province, *Dawe*, 901! British East Africa: east shore of Lake Rudolf, *Wellby!*

2. **A. Dewevrei,** *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxviii. 46. A climber. Stem sulcate. Leaves cordate, acute, apiculate, about 4 in. long, 1½–3 in. wide, herbaceous, glabrous; basal lobes separated by a wide sinus, rounded and overlapping; lateral nerves one on each side, ascending, as thick as the midrib in the lower part, sending out branches towards the margin; veinlets densely reticulate, prominent beneath; petiole ¾–1½ in. long, decurrent. Cymes axillary, solitary or geminate, about half as long as the leaves, 2–3-flowered; flowers 6–9 lin. apart; bracts cordate, the lower 9 lin. long, 7 lin. wide. Perianth green below, dark brown above; utricle globose, 2 lin. in diam.; tube funnel-shaped, 7 lin. long, ¾ lin. in diam.; limb unilateral, oblong, 9 lin. long, 4 lin. wide, hairy inside, 5-nerved. Gynostemium short; anthers 6, cells oval, prolongations of the connective widely triangular, subacute, laterally cohering, about 1 lin. long. Ovary long-clavate, 5 lin. long, ¾ lin. wide; stigmas 6, not overtopping the stamens.—Ill. Fl. Congo, i. 107, t. 54.

Lower Guinea. Lower Congo: Zambi, *Dewèvre.*

3. **A. densivenia,** *Engl. Jahrb.* xxiv. 489, *t.* 10, *figs. A–G.* Stem twining, sulcate. Leaves cordate, rather obtuse, glaucous-green, densely and very minutely puberulous beneath, about 3 in. long and 2 in. wide, basal lobes separated by a wide sinus; 2 lateral nerves arising at the base of the lamina, as thick as the midrib and close to it for a short distance, then diverging and bearing 5 thinner secondary nerves towards the margin; veinlets rather thick, very densely

reticulate, prominent beneath; petiole about 1 in. long. Cymes rather more than half as long as the leaves, 6–8-flowered; bracts cordate, 6 lin. long, 5 lin. wide. Gynostemium about 1 lin. long; anthers 6, cells oval; connective above the cells widely produced and laterally connate. Ovary long-clavate, 6-celled; stigmas 6, slightly overtopping the anthers. Capsule clavate, up to 4 in. long and about $\frac{3}{4}$ in. in diam., brown. Seeds numerous, subtriangular, 6 lin. long, 4 lin. wide; raphe thickened and longitudinally winged, wings wider towards the base of the fruit.

Mozamb. Dist. German East Africa: Usambara; near Muafa, 4900 ft., *Buchwald*, 376. Uluguru; on foot hills by the Ngerengere River, 1100 ft., *Stuhlmann*, 8698.

Near *A. petersiana*, Klotzsch.

4. **A. petersiana,** *Klotzsch in Monatsb. Akad. Berl.* 1859, 599. A climbing shrub, 4–6 ft. high. Stem and branches angular, sulcate, glaucescent, slender. Leaves ovate, deeply cordate at the base, obtuse, acute or cuspidate, obscurely crenate, 2–2$\frac{1}{2}$ in. long, 1–2 in. wide across the base, dark green and slightly verrucose above, glaucous beneath; lateral nerves about 2 each side, arcuately ascending, like the remainder prominent beneath; petiole about 6 lin. long. Cymes racemose, axillary, 5- to many-flowered, shortly peduncled; pedicels 3 lin. long; bracts 6 lin. long, 3 lin. wide, elliptic from a cordate base, mucronulate. Perianth violet, glabrous outside, basal part equally ovoid and tomentose within; tube slender, oblique or recurved above; limb about 1 in. long, oblong-lanceolate, acute or rarely obtuse, mucronate, puberulous inside. Capsule pyriform, hexagonal.—Klotzsch in Peters, Reise Mossamb. Bot. 501; Duch. in DC. Prodr. xv. i. 483; Solereder in Engl. Jahrb. x. 457; Engl. Jahrb. xxiv. 490, t. 10, fig. H.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Tete, *Peters!* *Kirk!* between Sena and Lupata, *Kirk!* Shiramba, *Kirk!* Expedition Island, *Kirk!* British Central Africa: Nyasaland; Chiromo, *Scott-Elliot*, 2809! Tropical Transvaal: South African goldfields, *Baines!*

This may be a form of *A. albida*, Duchartre.

5. **A. albida,** *Duch. in Ann. Sc. Nat.* 4^{me} *sér.* ii. 75. A shrubby climber, glabrous in all its parts. Stem slender, branched, sulcate. Leaves cordate, with a broad sinus, obtuse, sometimes shortly mucronate, finely verrucose above, 5-nerved, 4 in. long, 2$\frac{1}{2}$ in. wide; nerves prominent beneath; petiole 9 lin. long. Flowers in axillary racemose cymes; bracts rotundate- or ovate-cordate, up to 8 lin. long, persistent; pedicels up to 6 lin. long. Perianth dusky purple (*Welwitsch*), black (*Barter*); globose base 2 lin. in diam.; tube 5 lin. long, cylindrical below, narrowly funnel-shaped at the oblique mouth; limb 1 in. long, unilateral, oblong, obtuse. Capsule pyriform, obtuse, 2$\frac{1}{2}$ in. long, 6-angled, 6-ribbed, septicidally 6-valved. Seeds flat, triangular, 6 lin. long, 5 lin. wide across the top including the broad wing.—

Duch. in DC. Prodr. xv. i. 483; Hiern in Cat. Afr. Pl. Welw. i. 911; Solereder in Engl. Jahrb. x. 437. *A. æthiopica*, Welw. Apont. Phyto-Geogr. 548.

Upper Guinea. Senegambia, *Heudelot*. Lagos, *Dawodu*, 206! Northern Nigeria: Nupe, *Barter*, 1531!

Lower Guinea. Angola: Mossamedes; in sandy maritime thickets between Mossamedes and Cavalheiros or Giraûl, *Welwitsch*, 512! Golungo Alto; by the Ambaca Road, 1000–2400 ft., *Welwitsch*, 511! Loanda, *Gossweiler*, 445!

6. **A. gibbosa,** *Duch. in Ann. Sc. Nat.* 4^{me} *sér.* ii. 53. A climber, glabrous in all its parts. Stem slender, sulcate; internodes about as long as the leaves. Leaves cordate, acute, 5–7-nerved from the base, 4 in. long, 3 in. broad, thinly membranous, exstipulate, basal sinus rounded; petiole 6–9 lin. long, slender. Flowers solitary, axillary; peduncles 2 in. long. Perianth purplish inside with a bright yellow throat, sulphur-yellow outside (*Johnson*); utricle gibbous on one side, 6 lin. long; tube funnel-shaped, slender below, 4 lin. long; limb cordate, acute, $1\frac{3}{4}$ in. long, $1\frac{1}{3}$ in. wide, basal auricles rounded. Column stalked; anthers 6, nearly $\frac{2}{3}$ the length of the column. Style-arms 6, broadly lanceolate, obtuse, incurved, channelled on the outer side. Fruit obovoid-fusiform, $2\frac{1}{2}$ in. long, 9 lin. wide, 6-ribbed. Seed cordate, 2 lin. long, smooth on the inner concave side, muricate on the convex outer, thickened at the margin; raphe not prominent.—DC. Prodr. xv. i. 459. *A. odoratissima*, Benth. Pl. Hartweg. 82, not of Linn. *Howardia Benthamii*, Klotzsch in Monatsb. Akad. Berl. 1859, 620.

Upper Guinea. Gold Coast: Aburi, *Johnson*, 241

Also in Mexico.

7. **A. elegans,** *Mast. in Gard. Chron.* 1885, xxiv. 301, fig. 64. A glabrous climber. Branches very slender. Leaves broadly cordate with a wide sinus, rounded or obtuse, glaucescent beneath; nerves 5–7 radiating from the top of the $2\frac{1}{2}$-in.-long slender petiole; stipules suborbicular. Flowers solitary on long pedicels. Perianth: utricle oblong, $1\frac{1}{4}$ in. long, $\frac{1}{2}$ in. in diam., yellowish; tube suddenly reflexed on the utricle, $\frac{3}{4}$ in. long, subcylindrical, yellowish; limb suddenly expanded, orbicular-cordate, 3 in. in diam., white with red-purple veins outside, purple-brown with white mottling inside; throat greenish-yellow. Anthers 6, linear. Ovary very slender; style-arms 6, oblong, obtuse, much overtopping the anthers.—Bot. Mag. t. 6909.

Upper Guinea. Gold Coast: Aburi Gardens, *Johnson*, 240! Southern Nigeria: abundant at Brass, *Billington!*

Probably introduced from Brazil.

8. **A. fœtens,** *Lindl. in Bot. Reg. t.* 1824. Stem climbing, branched, glabrous. Leaves cordate with a wide sinus, acute, up to 8 in.

long and 5 in. wide, glabrous above, very finely pubescent and glaucescent beneath; petiole 3–5 lin. long. Flowers solitary, axillary, with a single orbicular perfoliate bract near the centre of the peduncle. Perianth glabrous; utricle obovoid-oblong, 2 in. long, 9 lin. in diam., greenish with red ribs; tube $2\frac{1}{2}$ in. long, abruptly curved below, widened above, coloured like the utricle; limb suborbicular-cordate, 4–6 in. across, produced at one side into a slender tail 6–8 in. long, greenish yellow mottled with purple, dark purple in the throat. Gynostemium stalked. Anthers 6, oblong-linear.—Duch. in DC. Prodr. xv. i. 473.

Nile Land. Uganda: Mengo, *Tomkins!*

Also in the West Indies.

9. **A. rigida,** *Duch. in DC. Prodr.* xv. i. 495. Rootstock perennial. Stems slightly woody, much-branched, strongly sulcate, glabrous. Leaves linear-lanceolate, 1 in. long, 2–3 lin. wide, auricled at the base, mucronate, glabrous, margins thick, cartilaginous and scabrid. Flowers solitary, axillary; peduncle 6 lin. long; bracts ovate, obtuse, 9 lin. long, **5** lin. wide. Perianth yellow (*Kirk*); utricle obliquely ovoid; tube strongly curved, funnel-shaped, 8 lin. long; limb entire, 9 lin. in diam. Gynostemium 6-lobed. Ovary about 3 lin. long.—Franch. Sert. Somal. 63. *A. somaliensis*, Oliv. in Hook. Ic. Pl. xiii. 56, t. 1273; Benth. et Hook. f. Gen. Pl. iii. 124.

Nile Land. Somaliland: Carin Osse, *Revoil*, and without precise locality, *Boivin*. British East Africa: Kismayu, near the mouth of the River Juba, *Kirk!*

Mozamb. Dist. German East Africa: Magila, *Kirk!*

Var. *major*, C. H. Wright. Leaves 3 in. long, 3 lin. wide near the base. Bracts $1\frac{1}{2}$ in. long, 4 lin. wide, ovate-lanceolate, long-acuminate, mucronate, thickened and scabrid at the margins. Perianth $1\frac{1}{2}$ in. long; limb at least 1 in. in diam.

Nile Land. Somaliland: Lasgori and Ahl Mountains, about 1600 ft., *Hildebrandt*, 873!

This variety has a very different aspect from the type, which may be due to growing in a moister locality. The difference in the shape of the bracts is very striking.

Franchet (l.c.) gives "*ones*" as the native name.

10. **A. Kirkii,** *Baker.* Stems very slender, climbing, at first pubescent, finally glabrous. Leaves 3-lobed, subcoriaceous, slightly verrucose above, pubescent on the main nerves beneath, 3 in. long; terminal lobe oblong, obtuse, nearly 1 in. wide, with the three primary nerves subparallel; lateral lobes rotundate, each about 9 lin. in diam., separated by a wide rounded sinus, 3-nerved; petiole very slender, 6 lin. long, pubescent. Cymes axillary, few-flowered; bracts ovate, 1 lin. long, pubescent. Perianth: utricle subglobose, 2 lin. in diam.; tube 5 lin. long, 3 lin. in diam. at the mouth, cylindrical below, funnel-shaped in the upper third and emarginate on one side; limb unilateral, lanceolate, 3 lin. wide, over 6 lin. long (apex broken off all the specimens seen).

Gynostemium subsessile. Stamens 12; anther-cells linear, half as long as the gynostemium. Style-arms subulate.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shiramba, *Kirk!* Lower Shire River, Moramballa, 3000 ft., *Kirk!*

11. **A. Mannii,** *Hook. f. in Trans. Linn. Soc.* xxv. 186. Stems woody, 10–15 ft. long, twining, rather thick, terete, glabrous. Leaves 6 in. long, 4–6 in. wide, 5-lobed, cordate at the base, finely verrucose above, pubescent beneath especially on the prominent nerves; terminal lobe oblong or obovate-oblong, more or less abruptly acuminate; lateral lobes almost straight on the upper edge, curved below; basal lobes smaller than the others and more rounded; petiole stout, 1–2 in. long. Racemes short, few-flowered; bracts small, ovate, acuminate; pedicels $1\frac{1}{2}$ in. long, finely pubescent. Perianth membranous, glabrous; lower part obliquely ovoid-globose, 6 lin. long, hairy within; tube $2\frac{1}{2}$ in. long, $\frac{1}{3}$ in. in diam. at the base, $1\frac{1}{2}$ in. at the apex, slightly curved; limb obliquely truncate, obscurely 3-lobed, not ciliate, but with small fascicles of hairs inside. Anthers 10, linear, half as long as the gynostemium. Stigmatic lobes 10, subulate.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann,* 2323! *Swan! Thomson,* 69! Bonny, *Kalbreyer,* 62!

12. **A. triactina,** *Hook. f. in Trans. Linn. Soc.* xxv. 186. Stem woody, climbing, 25 ft. high (*Mann*), smooth, shining, glabrous. Leaves 3- (or obscurely 5-) lobed or subentire, cordate at the base with a deep sinus, glabrous, 8 lin. long, 7 lin. wide; terminal lobe oblong, acute or cuspidate; side lobes rounded, basal touching or overlapping; primary nerves 3–5; petiole 1–4 in. long. Flowers in short axillary racemes. Perianth: lower part obliquely ovoid, $1\frac{1}{2}$ in. long, 1 in. in diam.; tube curved, 2 in. long, 9 lin. in diam. when pressed, terete, slightly contracted and ciliate at the throat; lobes 3, subequal, patent, flat, triangular-caudate, acuminate, 2 in. long, $\frac{3}{4}$ in. wide across the base, quite glabrous or slightly ciliate on the margin. Gynostemium small, sessile; anthers 10. Stigmatic lobes 10, subulate. Capsule 10–12 in. long, 1–$1\frac{1}{2}$ in. in diam., with 6 conspicuous ribs, thickly coriaceous.—*A. Schweinfurthii,* Engl. Jahrb. xxiv. 492.

Upper Guinea. Southern Nigeria: Lagos, *Moloney,* 18! Itu, Cross River, *Holland,* 26!

Nile Land. Uganda: Entebbe, 4000 ft., *Mahon!*

Lower Guinea. Spanish Gaboon: Corisco Bay, *Mann,* 1851!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth,* 3507!

The degree of lobing of the leaves varies greatly in this species.

13. **A. Zenkeri,** *Engl. Jahrb.* xxiv. 490, *t.* 9. A woody climber. Stems up to 50 ft. long, compressed, tortuous. Leaves oblong, cuspidate, $3\frac{1}{2}$ in. long, $1\frac{3}{4}$ in. wide, coriaceous, more or less verrucose above,

otherwise glabrous; lateral nerves 3–4, arcuately ascending, remaining nerves reticulate, all prominent beneath; petiole about 1 in. long. Flowers in shortened cymes or almost fascicles on the old wood; pedicels $2\frac{1}{4}$ in. long; bracts ovate, obtuse. Perianth ochre-yellow and reddish-brown, sparingly hairy inside; utricle obliquely ovoid, about 1 in. long and $\frac{3}{4}$ in. across; tube subcylindrical below, slightly widened above, about $1\frac{1}{4}$ in. long and 5 lin. in diam.; lobes 3, triangular, acuminate, the largest 1 in. long, $\frac{3}{4}$ in. wide. Gynostemium long-turbinate, $3\frac{1}{2}$ lin. long; anthers about 9, cells linear, 2 lin. long. Ovary $1\frac{1}{4}$ in. long, 1 lin. wide, 6-celled, twisted; stigmas $\frac{1}{2}$ lin. long, obtuse.

Upper Guinea. Sierra Leone: near Kassa, 3600 ft., *Scott-Elliot*, 5062! near Berria, Falaba, *Scott-Elliot*, 5401! Cameroons: Bipinde, *Zenker*, 1226! 2056! 2261! 2792!

14. **A. Staudtii,** *Engl. Jahrb.* xxiv. 491. Stem woody, compressed, slender; internodes 5–6 in. long. Leaves ovate-oblong, acuminate, obtuse or almost truncate at the base, coriaceous, shining above, about 5 in. long and $2\frac{1}{4}$ in. wide; lateral nerves 4–5 each side, arcuately ascending, as well as the secondary loosely reticulate ones prominent beneath; petiole 9 lin. long. Cymes shortly pilose; bracts lanceolate, 2 lin. long. Perianth greenish-brown, pale yellow inside; utricle ovoid, 14–16 lin. long, 9 lin. in diam.; tube 18 lin. long, 4 lin. in diam. below, 7 lin. above, with long scattered hairs inside; lobes 3, unequal, lanceolate, one $1\frac{1}{2}$ in. long, 8 lin. wide, the two others 2 in. long, 9 lin. wide. Gynostemium rather long-stalked; anthers linear, nearly 2 lin. long. Stigmatic lobes as long as the anthers.

Upper Guinea. Cameroons: Lolodorf, 1400–1600 ft., *Staudt*, 186.

15. **A. soyauxiana,** *Oliv. in Hook. Ic. Pl.* xv. 8, *t.* 1410. A climber. Stem woody, stout, compressed. Leaves elliptic, entire, shortly and abruptly acuminate, rounded at the base, 7 in. long, $4\frac{1}{2}$ in. wide, coriaceous, glabrous; main nerves 3–4 pairs, prominent beneath; petiole about 2 in. long, sinuous, irregularly swollen. Flowers in very short racemes or almost fascicles on the old wood. Perianth: obliquely ovoid part 1 in. long, about 1 in. wide above; tube 2 in. long, 9 lin. wide when pressed, slightly curved, ciliate at the throat; lobes 3, patent, lanceolate-acuminate from a cordate base, glabrous, 6 in. long, $1\frac{1}{2}$ in. wide at the base, the dorsal slightly narrower.

Lower Guinea. Gaboon: Munda, Sibange Farm, *Soyaux*, 317! Loango: woods in the vicinity of Chinchocho, *Soyaux*, 182!

16. **A. flagellata,** *Stapf in Kew Bulletin*, 1906, 80. A glabrous evergreen climbing shrub; branches slightly compressed, with large lenticels, shining. Leaves produced at the same time as the flowers, oblong or elliptic, shortly acuminate, obtuse, shortly cuneate at the base, $3\frac{1}{2}$ in. long, 2 in. wide; secondary nerves 3–4 each side, arcuately joining near the margin; petiole about 1 in. long, sinuous. Flowers

3–4 in very short clusters, produced at the same time as the leaves. Perianth "outside whitish with purplish blotches, inside yellow with purple markings" (*Johnson*); utricle obliquely obovoid, $1\frac{1}{4}$ in. long; tube $2\frac{3}{4}$ in. long, about 8 lin. in diam. when pressed, subcylindrical, slightly curved, with long scattered downward-pointing hairs inside; limb widely cordate-ovate or cordate-suborbicular, about $1\frac{3}{4}$ in. in diam.; lobes 3, all from one side of the limb, 3 lin. wide at the triangular base, then attenuated into tails up to 18 in. long, filiform in the lower part, but dilated to 2 lin. in the upper 2–4 in. Gynostemium shortly stalked; anthers $1\frac{1}{2}$ lin. long. Stigmatic lobes 9, about as long as the anthers, triangular-lanceolate, cuspidate, undulate.

Upper Guinea. Gold Coast: Aburi Hills, *Johnson*, 487! Aburi Gardens, *Johnson*, 1060!

17. **A. promissa,** *Mast. in Gard. Chron.* 1879, xi. 494. Stems 20–25 ft. high, climbing, branched from the base, where they are 9 lin. in diam., glabrous. Leaves oblong, entire, cuspidate, 4–5 in. long, 2 in. broad, membranous, glabrous; petiole 1 in. long. Flowers produced freely from the old stems three months before the leaves unfold. Perianth 4–5 in. long, exclusive of the tails; utricle globose, 1 in. in diam.; tube short, broadly funnel-shaped; limb 2–3 in. in diam., "inside light yellow, brown-spotted and with white hair, outside dirty yellow" (*Kalbreyer*); lobes small, deltoid, with filiform pendulous tails, $1\frac{1}{2}$–2 ft. long. Anthers 9–12, linear-oblong, scarcely reaching to the base of the column. Style-branches 9–12, oblong, obtuse, abruptly acuminate.

Upper Guinea. Cameroons: Victoria, *Kalbreyer!*

18. **A. Preussii,** *Engl. Jahrb.* xxiv. 492. A climber. Leaves unknown. Cymes articulated, very shortly pilose; bracts linear-lanceolate, shortly pilose, as long as the internodes; flowers sessile. Perianth greenish-yellow, minutely spotted with carmine and edged with dark purple; utricle ovoid, 9 lin. long, 7 lin. in diam.; tube cyathiform, 17 lin. long; lobes 3, triangular, 6 lin. long and wide, produced into tails 14 lin. long and about $\frac{1}{2}$ lin. wide. Gynostemium turbinate; anther-cells linear, about 1 lin. long. Ovary clavate; stigmatic lobes broadly linear, $1\frac{1}{2}$ lin. long.

Upper Guinea. Cameroons: between Barombi and Kumba, 1046 ft., *Preuss*, 108.

19. **A. goldieana,** *Hook. f. in Trans. Linn. Soc.* xxv. 185, *t.* 14. A climber, glabrous in all its parts. Stem 20 ft. long; branchlets slender, terete. Leaves ovate- or triangular-cordate, shortly and abruptly acuminate, with a wide rounded basal sinus, 6–8 in. long, 5–6 in. wide, entire, membranous, paler below; primary nerves 5–11, arising from the base of the leaf, arcuate; petiole 6 in. long. Flowers solitary, greenish with red-purple ribs outside, brownish and yellow mottled inside, very large; utricle 8 in. long, $2\frac{1}{2}$–3 in. wide, subcylindrical,

sharply curved near and gibbous at one side of the top, 6-ribbed, furnished inside with soft hairs; tube 4–6 in. long, broadly funnel-shaped, many-ribbed; limb 9 in. in diam., 5–6 in. long, shortly campanulate, strongly ribbed, with a membranous curtain 6 lin. wide from its throat; lobes 3, equal, broadly and shortly triangular, suddenly contracted into tails 1–2 in. long. Gynostemium subsessile, $1\frac{1}{2}$ in. long, hollow. Anthers about 24 narrowly linear, 1 in. long. Style-arms about 12, bifid, stigmatic at the apex.—Bot. Mag. t. 5672; Fl. Serres, t. 1729; Mast. in Gard. Chron. 1867, 1143, with fig., 1890, vii. 525, fig. 83, and 1897, xxi. 337, fig. 116; Hackett in Gard. Chron. 1906, xl. 177, fig. 72.

Upper Guinea. Sierra Leone: in forests near Elugu, *Barter*, 3427! Bedembu, *Scott-Elliot*, 5682! near Port Lokko, *Scott-Elliot*, 5747! Lagos, *Carter!* Fernando Po, *Mann*, 391

Imperfectly known species.

20. **A. bongoensis,** *Engl. Jahrb.* xxiv. 488. A glaucescent twining herb. Stem slender; internodes $3\frac{1}{2}$ in. long. Leaves cordate, obtuse, subcoriaceous, $1\frac{3}{4}$ in. long, $1\frac{1}{2}$ in. wide; lateral nerves about 4 each side, springing from the base, prominent beneath; petiole about 1 in. long. Inflorescence elongated; bracts deeply cordate-ovate, amplexicaul with overlapping lobes. Flowers unknown. Capsule obovoid, about 2 in. long and 1 in. in diam., the seed-bearing part about as long as the stalk. Seeds triangular, much compressed, surrounded by a wing; wing on the raphe narrow below, dilated above.

Nile Land. Bongo: in woods near Sabbi, *Schweinfurth*, 2617.

21. **A. Stuhlmannii,** *Engl. Pfl. Ost-Afr. C.* 169. Stem woody. Leaves unknown. Flowers many, fascicled; pedicels shorter than the flowers, puberulous. Perianth about $3\frac{1}{2}$ in. long; utricle obliquely obovoid; tube slightly narrower than the utricle, long-pilose inside; lobes triangular, acuminate, "$2\frac{1}{2}$ times shorter than the tube," long-fimbriate.

Nile Land. Uganda, ex *Engler.*

ORDER CXIII. **PIPERACEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers hermaphrodite or unisexual. Perianth absent in the Tropical African genera. Stamens 2–6, rarely more, hypogynous; filaments usually free; anthers erect, often articulated on the filament, cells 2, distinct or confluent, dehiscing longitudinally. Ovary sessile, 1-celled and 1-ovuled in the Tropical African genera; stigmas 1–5; ovule orthotropous. Fruit in the Tropical African genera indehiscent, baccate. Seed globose, ovoid or oblong; testa usually membranous or rather fleshy; endosperm small; perisperm copious, farinaceous;

embryo minute.—Herbs or shrubs, erect or climbing. Leaves usually alternate and entire, rarely opposite or verticillate; stipules none or adnate to the petiole. Flowers minute, usually forming dense spikes, each subtended by a peltate bract.

Species about 1000, spread through the warmer regions of both hemispheres; most numerous in Tropical America.

Shrubs. Stamens 2–6; anther-cells usually distinct.
  Stigmas 2–3 . . . . . 1. PIPER.
Herbs. Stamens 2; anther-cells usually confluent.
  Stigma 1 . . . . . 2. PEPEROMIA.

1. **PIPER**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 129.

Flowers hermaphrodite or unisexual, usually forming dense cylindrical spikes, rarely racemes. Perianth none. Stamens 2–4, rarely more; filaments short; anther-cells usually distinct. Ovary sessile, 1-celled, 1-ovuled, obtuse or rostrate; stigmas 2–4, distinct, erect or recurved. Berry small, usually globose, often immersed in the succulent rhachis, more rarely stalked. Seed similar in shape to the berry; testa thin; endosperm and perisperm usually hard.—Erect or scandent shrubs. Branches jointed at the nodes. Leaves alternate, entire, equal or unequal at the base, penninerved; stipules adnate to the petiole or connate into a leaf-opposed sheath. Flowers usually sessile spikes terminal or leaf-opposed.

Species about 600, spread through the warmer regions of both hemispheres.

Stigmas 3.
  Spikes 2–7, umbellately arranged . . . 1. *P. umbellatum.*
  Spikes solitary . . . . . 2. *P. guineense.*
Stigmas 2.
  Branches glabrous.
    Leaves villous on the nerves beneath . . 3. *P. capense.*
    Leaves glabrous.
      Leaves cordate or rounded at the base.
        Peduncle twice as long as the petiole . 4. *P. Molleri.*
        Peduncle as long as the petiole . . 5. *P. pseudosylvaticum.*
      Leaves acute at the base . . . . 6. *P. sclerocladum.*
  Branches pubescent . . . . . 7. *P. brachyrhachis.*

1. **P. umbellatum,** *Linn. Sp. Pl. ed.* i. 30. A shrub, 4–5 ft. high; branches stout, flexuous, glabrous. Leaves roundish reniform, 3–12 in. across, cuspidate, deeply cordate at the base, membranous, glabrous on both surfaces or pubescent on the nerves beneath; nerves 11–13, radiating from the apex of the petiole; petiole dilated and sheathing at the base. Spikes 2–7, umbellately arranged on short axillary peduncles, 2–3 in. long, 2 lin. in diam. Flowers minute, hermaphrodite; bracts shortly stalked, suborbicular, distinctly ciliate. Stigmas 3. Fruit turbinate, trigonous.—Jacq. Ic. t. 216; C. DC. in DC. Prodr. xvi. i. 332; Hiern in Cat. Afr. Pl. Welw. i. 911. *P. subpeltatum*, Willd. Sp. Pl. i. 166; C. DC. l.c. 333; Baker, Fl. Maurit.

295; Hook. f. Fl. Brit. Ind. v. 95. *Heckeria umbellata*, *H. subpeltata* and *H. sidæfolia*, Kunth in Linnæa, xiii. 569–571. *Pothomorphe subpeltata*, Miq. Syst. Piper. 213; and in Nov. Act. Acad. Nat. Cur. xxi. Suppl. 29, t. 26, fig. B; Wight, Ic. t. 1925.

Upper Guinea. Sierra Leone: near Regent, *Scott-Elliot*, 4077! Mount Yamba, Scarcies Valley, *Scott-Elliot*, 4287! Liberia: Sinoe Basin, *Whyte!* Ashanti: Assin-yan-Kumassi, *Cummins*, 149! Lagos, *Millen*, 113! Cameroons: Cameroon Mountain, 3000 ft., *Mann*, 1272! Fernando Po, *Vogel*, 53! *Mann*, 70!

North Central. Ubangi Territory: Krebedje, *Chevalier*, 6006!

Nile Land. Niamniam: at Nakofoh River, *Schweinfurth*, 3076! 3222!

Lower Guinea. Gaboon: Sibange Farm, *Soyaux*, 206! Angola: Golungo Alto; forests by the Cuango and Delamboa Rivers, *Welwitsch*, 501! 6707! Pungo Andongo; in forests of Mata de Pungo in the Præsidium, *Welwitsch*, 502!

South Central. Congo Free State; Bangala, on the Congo, 1000 ft., *Hens*, 355!

Mozamb. Dist. German East Africa: Usambara, *Holst*, 2267! 3310! *Buchwald*, 67A. Karagwe; Bukoba, ex *Engler*; East Uluguru, *Stuhlmann*, 9048.

Also in the Mascarene Islands, Tropical Asia and Tropical America.

2. **P. guineense,** *Schum. & Thonn. Beskr. Guin. Pl.* 19. A glabrous shrub, climbing to a height of 30–40 ft. by means of densely hairy adventitious rootlets. Leaves ovate, acuminate, equally or unequally cordate to obtusely cuneate at the base, 4–5 in. long, 2½–3 in. wide, sometimes pubescent on the under-side of the nerves, otherwise glabrous; lateral nerves about 2 on each side of the lower half of the midrib; petiole 2–9 lin. long. Spikes solitary, leaf-opposed, 1–2 (in fruit up to 4) in. long, shortly peduncled; bracts rotundate, peltate, glabrous or slightly hairy beneath. Stigmas 3. Fruit globose, shortly mucronate, about 1½ lin. in diam. when dry, on a pedicel 3 lin. long.—C. DC. in DC. Prodr. xvi. i. 343; Hiern in Cat. Afr. Pl. Welw. i. 912; var. *thomeanum*, C. DC. in Bol. Soc. Brot. x. 152. *P. Clusii*, C. DC. in DC. Prodr. xvi. i. 340; Ficalho, Pl. Uteis, 245. *P. leonense*, C. DC. in DC. Prodr. xvi. i. 342. *Cubeba Clusii*, Miq. Syst. Piper. 304; Hook. Lond. Journ. Bot. iv. 434.

Upper Guinea. Sierra Leone: various localities, *Scott-Elliot*, 4003! 4688! 4875! *Don!* Gold Coast: Eastern Akin, *Johnson*, 720! 745! Aquapim, *Rumsey*, 11! and without precise locality, *Johnson*, 175! Southern Nigeria: Lagos, *Millen*, 65! Iyere, *Dawodu*, 195! Brass, *Barter*, 2076! Northern Nigeria: Nupe, *Barter!* Cameroons: Bipinde, *Zenker*, 938! 1912! 2414! Barombi, *Preuss*, 417! Fernando Po, *Roscher*, 917! *Barter! Mann*, 162!

North Central. Ubangi Territory: Bangui, *Chevalier*, 5229!

Nile Land. Dar Fertit: Dem Gudyu, *Schweinfurth*, iii. 120! Niamniam: Boddo River, *Schweinfurth*, 3842! near Kulenjo, *Schweinfurth*, 2949! Uganda: Entebbe, 3900–4000 ft., *Mahon!* West Ankole, 5000 ft., *Dawe*, 359! Kampala, *Scott-Elliot*, 7246! 7284! Mabira Forest, Chagwe, *Ussher*, 56!

Lower Guinea. Island of St. Thomas, *Welwitsch*, 509! *Moller*, *Quintas*. Gaboon: Munda, Sibange Farm, *Soyaux*, 46! Angola: Golungo Alto; various localities, *Welwitsch*, 508! 510!

3. **P. capense,** *Linn. f. Suppl.* 90. A shrub, erect or more or less climbing. Branches terete, swollen at the nodes, glabrous. Leaves ovate or more rarely elliptic-ovate, equilateral or nearly so, shortly acuminate, rounded or shortly cordate at the base, 5–7-nerved, membranous, pellucid-dotted, about 4 in. long, 2½–3 in. wide, glabrous above, usually villous on the under-surface of the nerves especially towards their base; petiole channelled above, about 1 in. long, glabrous; stipules lanceolate, membranous, deciduous. Catkins terminating short lateral branches which falsely appear to spring from the middle of the petiole, 1½–2 in. long in flower, cylindrical; peduncles about 9 lin. long; bracts peltate, glabrous except at the base of the very short stalk. Stamens 3 or 2; anther-cells separated by a wide connective. Ovary ovoid; stigmas 2, recurved. Fruit obtuse, compressed, sessile.—Thunb. Fl. Cap. ed. Schultes, 443; C. DC. in DC. Prodr. xvi. i. 339, and in Engl. Jahrb. xix. 224; Engl. Pfl. Ost-Afr. C. 159. *P. Volkensii,* C. DC. in Engl. Jahrb. xix. 225. *Coccobryon capense,* Miq. Syst. Piper. 343; and in Nov. Act. Acad. Nat. Cur. xxi. Suppl. 59, t. 61. *Cubeba capensis,* Miq. Syst. Piper. 303. *Peperomia capensis,* Loudon, Hort. Brit. ed. i. 13; Steud. Nomencl. Bot. ed. 2, ii. 301.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann,* 2015! *Johnston,* 59! Buea, *Preuss,* 615! *Dusen,* 409, *Zenker,* 265. Fernando Po, 1300 ft., *Mann,* 299!

Nile Land. Uganda: Mawokoto, 3900 ft., *Brown,* 195! Wimi Valley, Ruwenzori, 7000–8000 ft., *Scott-Elliot,* 7909!

Lower Guinea. Island of St. Thomas, 4000–7000 ft., *Mann!*

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Holst,* 3281! Derema, *Volkens,* 130! 139! *Scheffler,* 89! *Holst,* 2269! and without precise locality, *Buchwald,* 62! British Central Africa: Nyasaland; various localities, *Kirk! Whyte! Buchanan,* 762!

Var. *magnifolium,* C. DC. in Engl. Jahrb. xix. 224. Blade of the lower leaves 5½ in. long, 4¾ in. wide, of upper 3¾ in. long and wide.

Upper Guinea. Cameroons: near Buea, *Preuss,* 615.

Also in South Africa. This species requires further investigation in the field; the habit being so differently described by various collectors would suggest that several species are included here.

4. **P. Molleri,** *C. DC. in Bol. Soc. Brot.* x. 153. Glabrous. Branches terete. Lower leaves rotundate-ovate, up to 11-nerved and equally cordate at the base, 4¾ in. long; upper leaves ovate, 7–9-nerved, equally cordate or rounded at the base, 4 in. long, all acutely cuspidate, when dry dull green, membranous, pellucid-dotted; petiole rather long, sheathing beyond the middle. Peduncle about twice as long as the petiole; catkins shorter than the leaf-blade; rhachis slightly pilose; bracts orbicular, peltate, subsessile. Stamens 2; anthers longer than the filaments. Berry subglobose, with the apex of the rhachis intruded; stigmas 2, short.

Lower Guinea. Island of St. Thomas: Monte Caffé, Nova Moka, 2780–4250 ft., *Moller & Quintas.*

Said to resemble *P. sylvestre,* Lam., from Mauritius and Tropical Asia, but to differ in the shape of the bracts and the number of stamens.

5. **P. pseudosilvaticum,** *C. DC. in Bol. Soc. Brot.* x. 153. Glabrous. Leaves ovate, equally cordate at the base, acutely acuminate, 7-nerved, when dry subopaque and pellucid-dotted, up to $2\frac{1}{2}$ in. long and 7 lin. wide; petiole up to 7 lin. long, sheathing beyond the middle. Peduncle about as long as the petiole; male catkins shorter than the leaves, 1 in. long, about 1 lin. in diam.; bracts orbicular, very shortly stalked; rhachis and pedicels slightly pilose; female inflorescence unknown. Stamens 2.

Lower Guinea. Island of St. Thomas: Macambrara, 4250 ft., *Moller.*

This is said to be allied to the Indian *P. sylvaticum,* Roxb., which differs in generally having 4 stamens. Although the female flowers are unknown, the other characters show such an affinity with *P. Molleri,* C. DC., that we place them in the same section.

6. **P. sclerocladum,** *C. DC. in Engl. Jahrb.* xix. 224. Branches smooth, glabrous. Leaves ovate-elliptic, $3\frac{1}{2}$ in. long by half as broad, acutely acuminate, symmetrical and acute at the base, subcoriaceous, opaque when dry, glabrous on both sides, 5-nerved, the two lower arising from the midrib a little above the base, the two upper near the middle of the blade; petiole about 4 lin. long, sheathing at the very base. Peduncle leaf-opposed; spikes dense, much shorter than the leaf; rhachis puberulous; bracts orbicular, glabrous, peltate. Berry stalked, ovoid.

Upper Guinea. Cameroons: Yaunde, *Zenker,* 327.

7. **P. brachyrhachis,** *C. H. Wright.* A shrub 6–7 ft. high. Branches pubescent. Leaves ovate, acuminate, rounded at the base, 5–7-nerved, densely villous beneath, glabrous above, $5\frac{1}{2}$ in. long, $3\frac{1}{2}$ in. wide, one or two pairs of lateral nerves springing from the base, the other slightly above; petiole about 1 in. long, channelled above, villous. Peduncle slender, 9 lin. long, villous; spike 5 lin. long; bracts peltate, glabrous, white; flowers polygamous. Stamens 3; filaments complanate; anther-cells distinct. Ovary ovoid, compressed; stigmas 2.

Mozamb. Dist. British Central Africa: Nyasaland; between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., *Whyte!* Nyika Plateau, 4000–7000 ft., *Whyte,* 199!

2. **PEPEROMIA**, Ruiz & Pav.; Benth. et Hook. f. Gen. Pl. iii. 132.

Flowers hermaphrodite, spicate. Perianth 0. Stamens 2; filaments short; anthers transversely oblong or subglobose; cells 2, usually confluent. Ovary sessile or subsessile, obtuse or acute; ovule solitary, erect; stigma undivided, often penicillate. Fruit minute; pericarp thin. Seed similar in shape to the fruit; testa membranous or coriaceous; endosperm farinaceous.—Herbs, annual or perennial, sometimes

climbing. Leaves exstipulate, alternate, opposite or verticillate, entire, penniveined or triplinerved. Spikes terminal or leaf-opposed, solitary or several together; bracts sessile, usually peltate.

Species about 400, spread through the warmer regions of both hemispheres, concentrated in America.

Leaves alternate.
- Stems erect from the base.
  - Leaves cuneate at the base . . . . 1. *P. thomeana.*
  - Leaves shortly cordate at the base.
    - Leaves 5–7-nerved from the base . . 2. *P. pellucida.*
    - Leaves penninerved . . . . . 3. *P. knoblecheriana.*
- Stems creeping and rooting at the base, then ascending.
  - Leaves ovate . . . . . 4. *P. Baumannii.*
  - Leaves oblong-lanceolate.
    - Leaves subpellucid . . . . . 5. *P. Molleri.*
    - Leaves moderately thick, opaque.
      - Leaves pubescent . . . . . 6. *P. ruwenzoriensis.*
      - Leaves glabrous . . . . . 7. *P. magilensis.*
  - Leaves ovate-lanceolate . . . . . 8. *P. Preussii.*
  - Leaves oblong or ovate.
    - Leaves 3-nerved . . . . . 9. *P. vulcanica.*
    - Leaves 5-nerved . . . . . 10. *P. Holstii.*
  - Leaves oblong, ciliate at the apex . . . 11. *P. ulugurensis.*
  - Leaves lanceolate . . . . . 12. *P. fernandopoiana*
  - Leaves obovate.
    - Leaves narrowed from the middle to the base . . . . . 13. *P. vaccinifolia.*
    - Leaves slightly narrowed at the base . . 14. *P. goetzeana.*
- Stems trailing and rooting nearly to the tip.
  - Leaves oblong-lanceolate . . . . 15. *P. Stuhlmannii.*
  - Leaves oblong . . . . . 16. *P. abyssinica.*
  - Leaves ovate-oblong . . . . . 17. *P. bueana.*
  - Leaves orbicular.
    - Leaves thin, membranous . . . . 18. *P. Mannii.*
    - Leaves thick, opaque.
      - Midrib distinct . . . . . 19. *P. crassifolia.*
      - Veins all hidden.
        - Bracts subsessile . . . . 20. *P. mascharena.*
        - Bracts shortly stalked . . . . 21. *P. bangroana.*

Leaves opposite.
- Leaves oblong or suborbicular . . . . 22. *P. kamerunana.*
- Leaves rhomboid . . . . . 23. *P. arabica*, var. *parvifolia.*

Leaves whorled.
- Leaves 3-nate . . . . . 24. *P. Dusenii.*
- Leaves 4-nate . . . . . 25. *P. reflexa.*

1. **P. thomeana,** *C. DC. in Bol. Soc. Brot.* x. 154. Stem erect, glabrous, sparingly branched; branches very slender. Leaves alternate, obovate-oblong, 2 in. long, 1 in. broad, cuneate at the base, rounded and often emarginate at the apex, firm, subpellucid, 3-nerved; petiole 4 lin. long. Spikes terminal, dense, 8 lin. long; peduncle as long as

the spike; rhachis glabrous; bracts orbicular. Ovary obovoid, obtuse, impressed in the rhachis; stigma terminal, minute.

Lower Guinea. Island of St. Thomas; Angolares, *Quintas*.

2. **P. pellucida,** *H. B. & K. Nov. Gen. et Sp.* i. 64. Annual. Stems weak, branched, erect from the base, very slender; branches sometimes slightly pubescent. Leaves alternate, distinctly petioled, broadly ovate, $\frac{3}{4}$–1 in. long, acute, slightly cordate at the base, membranous, very thin, 5–7-nerved from the base. Spikes leaf-opposed, shortly peduncled, very slender, lax, 1–2 in. long; rhachis glabrous, strongly angled, not distinctly pitted; bracts round-peltate, nearly sessile. Berry very small, subglobose, sessile; stigma terminal.—C. DC. in DC. Prodr. xvi. i. 402, and in Bol. Soc. Brot. x. 154; Hiern in Cat. Afr. Pl. Welw. i. 912. *P. Vogelii*, Miq. in Hook. Lond. Journ. Bot. iv. (1845), 413; C. DC. l.c. 403. *P. exigua*, Miq. Syst. Piper. 77; C. DC. l.c. 403; Hiern, l.c.; var. *freireifolia*, C. DC. l.c. *P. freireæfolia*, A. Rich. Tent. Fl. Abyss. ii. 274. *Piper freireæfolium*, Hochst. ex A. Rich. l.c.

Upper Guinea. Sierra Leone: forest on the way to Lester Peak, *Scott-Elliot*, 3885! Lagos, *Dawodu*, 4! Northern Nigeria: Mount Patteh, *Vogel*, 192! Cameroons: Bipinde, *Zenker*, 2719!

Nile Land. Abyssinia: shaded rocks in the Tacazze Valley, *Schimper*, 1942!

Lower Guinea. Princes Island, *Barter*, 1978! St. Thomas Island, *Don! Moller*. Angola: forest between Ambriz and Quizembo, 100–150 ft., *Welwitsch*, 506! Cazengo, by streams in forest on the Serra de Muxaulo, *Welwitsch*, 504! Pungo Andongo; damp rocks by the Casalale stream, *Welwitsch*, 503! and without precise locality, *Gossweiler*, 451!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, opposite Sena, *Kirk!*

Cosmopolitan in the tropics; very common in America.

3. **P. knoblecheriana,** *Schott in Bot. Zeit.* 1851, 225, *t.* 5. A small succulent glabrous annual herb. Stem 1–2 in. high, simple or nearly so, terete below. Leaves (except the two lowest) alternate, patent, rotundate-ovate, slightly cordate, acute, about 4 lin. long and nearly as much broad, with 3 opposite pairs of lateral nerves, sparingly punctate; petiole 1 lin. long, channelled above, margins finely crenulate, convex below. Spikes solitary, axillary and terminal, shorter than the leaves, 2–3 lin. long; flowers hermaphrodite, 8–12, distant. Bracts ovate, acute, concave. Stamens 2, lateral; anthers globose. Ovary long-ovoid, crowned by the minute penicillate stigma. Berry sessile, subglobose, rugulose, blackish, very shortly rostrate.—*Verhuellia knoblecheriana*, C. DC. in DC. Prodr. xvi. i. 391.

Nile Land. Sudan: on the shores of the White Nile, 5°–7° N., *Knoblecher*.

4. **P. Baumannii,** *C. DC. in Engl. Jahrb.* xxvi. 360. A herb nearly 5 in. high from a decumbent base. Leaves alternate, ovate, rather obtusely acuminate, $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide, glabrous on both

surfaces, ciliolate on the margins, 5-nerved, thinly membranous when dry, pellucid-punctate; petiole 5 lin. long. Spikes terminal, about twice as long as the leaf-blade, filiform, not very densely flowered; peduncle 1 in. long; bracts orbicular, peltate, subsessile. Ovary ovoid, not immersed in the rhachis; stigma terminal. Berry sessile, globose, roughly glandular when dry.

Upper Guinea. Togo: in damp shady places at Misahöhe, *Baumann*, 205.

This is very closely allied to *P. Molleri*, from which it differs in having ciliolate leaves and a terminal stigma.

5. **P. Molleri,** *C. DC. in Bol. Soc. Brot.* x. 154. Stem creeping at the base, glabrous; branches narrowly winged, ½ lin. in diam. Leaves alternate, oblong-lanceolate, 1½ in. long, 1 in. wide, acute, narrowed to the base, membranous and subpellucid when dry, 5-nerved, glabrous on both surfaces; petiole 7 in. long. Spikes terminal and lateral, dense, 2½ in. long; peduncle twice as long as the petiole; rhachis glabrous; bracts orbicular. Ovary ovoid; stigma terminal, minute, oblique.

Lower Guinea. Island of St. Thomas; Macambrara, 3000–4000 ft., *Moller.*

6. **P. ruwenzoriensis,** *Rendle in Journ. Linn. Soc.* xxxviii. 278. A climbing herb. Stems when young and petioles slightly pilose. Leaves alternate, lanceolate or ovate, acute, thin when dry, sparingly pilose on the under-surface, up to nearly 2 in. long and 1¼ in. wide, usually smaller; petiole about 4 lin. long. Spikes 2 in. long, much longer than the leaves, in the axils of the upper leaves and terminal; peduncle moderately long; bracts orbicular. Flowers greenish-white. Ovary impressed in the rhachis, broadly obovate, obtuse. Berry ½ lin. long, broadly ovate, brown, glandular.

Nile Land. Uganda: Ruwenzori, 7000 ft., *Wollaston*, 7000–8000 ft., on tree-trunks, *Scott-Elliot*, 7862, partly !

7. **P. magilensis,** *Baker.* Stem stout, glabrous, decumbent at the base, then shortly ascending. Leaves alternate, shortly petioled, oblong-lanceolate, 1–1½ in. long by half as broad, acute, cuneate at the base, moderately thick, opaque, glabrous on both surfaces, distinctly triplinerved from the base. Spikes terminal and lateral, slender, 2–3 in. long; peduncle glabrous, 1 in. long; rhachis pitted, glabrous; bracts orbicular; flowers distant, minute. Stamens 2, lateral; filaments slender, much longer than the globose anthers. Ovary ovoid, sessile; stigma terminal.

Mozamb. Dist. German East Africa: Usambara; Magila, *Kirk !*

8. **P. Preussii,** *C. DC. in Engl. Jahrb.* xix. 226. Stems rooting at the base, then ascending, 1 lin. in diam. when dry, densely clothed with long hairs in the lower part, subglabrous upwards. Leaves alternate, ovate-lanceolate, nearly 2 in. long by half as broad, acuminate, obtuse or rounded at the base, firm when dried, subopaque, 5-nerved, pilose especially on the under-surface; petiole 2½ lin. long. Spikes

shortly peduncled, lateral and terminal; bracts orbicular, peltate, glandular. Anthers elliptic, about as long as the filaments. Ovary turbinate, obtuse, obliquely flattened; stigma oblique.

Upper Guinea. Cameroons: Buena, in woods, 4000 ft., *Preuss*, 863.

Var. *tenuispicata*, Engl. Spikes very slender.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3097!

9. **P. vulcanica,** *Baker & C. H. Wright.* Stems creeping and rooting at the base, then ascending to a height of 6 in., stout, fleshy, glabrous. Leaves distinctly petioled, alternate, oblong or ovate, 1–2 in. long by half as broad, obtuse, cuneate at the base, thick, opaque, glabrous on both surfaces, distinctly triplinerved from the base. Spikes lateral and terminal, shortly peduncled, 1½–2 in. long; rhachis pitted, glabrous; bracts round-peltate, glabrous. Ovary sessile, globose; stigma minute, terminal, oblique.—*P. monticola*, Hook. f. in Journ. Linn. Soc. vii. 217; C. DC. in DC. Prodr. xvi. i. 422; Engl. Hochgebirgsfl. Trop. Afr. 188, not of Miq.

Upper Guinea. Cameroons: lava fields on Cameroon Mountain, 8000 ft., *Mann*, 1305!

10. **P. Holstii,** *C. DC. in Engl. Jahrb.* xix. 226. Perennial, growing on old tree-trunks. Stems rooting at the base, then ascending, 1–2 ft. long, slender, glabrous. Leaves alternate, distinctly petioled, ovate, 1–2 in. long, subacute or obtuse, rounded or cuneate at the base, moderately firm, indistinctly 5-nerved from the base, opaque, obscurely pellucid-punctate, glabrous on both surfaces. Spikes leaf-opposed or terminal, shortly peduncled, very slender, 2–3 in. long; rhachis pitted; bracts orbicular, peltate, subsessile. Berry globose, ¼ lin. long, sessile; stigma terminal.—Hiern in Cat. Afr. Pl. Welw. i. 913. *P. fernando-poana*, var. *subopacifolia*, C. DC. in DC. Prodr. xvi. i. 397, and in Engl. Jahrb. xix. 227; var. *acutifolia*, C. DC. in Engl. l.c. *P. Zenkeri*, C. DC. in Engl. l.c. 226.

Upper Guinea. Gold Coast, *Johnson*, 176! Cameroons: Yaunde, 2500 ft., *Zenker & Staudt*, 59! *Zenker*, 619, 1401! Buea, 3000 ft., *Preuss*, 886, 1060! Bipinde, *Zenker*, 1783B!

Lower Guinea. Island of St. Thomas: in forests at Fazenda de Monte Caffé, 1800 ft., *Welwitsch*, 507! Angola: Pungo Andongo; on rocks in Mata de Pungo in the Præsidium, *Welwitsch*, 505!

Mozamb. Dist. German East Africa: Usambara, *Holst*, 8832!

11. **P. ulugurensis,** *Engl. Jahrb.* xxviii. 374. A small herb. Stems glabrous, decumbent at the base, then ascending, slightly branched, 4 in. long. Leaves few, alternate, petioled, oblong, about 6 lin. long, 3–4 lin. wide, rather thick, ciliate at the apex, glabrous elsewhere; midrib and main veins indistinct; petiole 4 lin. long. Spike terminal, 10 lin. long, ¾ lin. in diam.; peduncle 4–7 lin. long; bracts orbicular, peltate, subsessile. Ovary depressed subovoid; stigma terminal. Berry ½ lin. in diam.

Mozamb. Dist. German East Africa: South Uluguru, amongst moss on tree-stems, 3500–5500 ft., *Goetze*, 183.

Native name "*dinjidangago.*"

12. **P. fernandopoiana,** *C. DC. in Journ. Bot.* 1866, 134, *excl. var. a.* Perennial. Stems trailing at the base, branching and rooting, slender, glabrous, ½–2 ft. long. Leaves alternate, distinctly petioled, lanceolate, 1–2 in. long, acuminate, rounded towards but acute at the base, moderately firm, obscurely 5-nerved from the base, glabrous. Spikes axillary and terminal, shortly peduncled, very slender, 1–2 in. long; peduncle glabrous; rhachis slightly pitted; bracts round, peltate, glabrous. Berry ovoid, ⅓ lin. long, shortly stipitate; stigma terminal. —*P. fernandopoana,* C. DC. in DC. Prodr. xvi. i. 397. *P. Staudtii,* Engl. Jahrb. xxvi. 361.

Upper Guinea. Cameroons: Lolodorf, *Staudt,* 175! Fernando Po, 1300 ft., *Mann,* 394!

13. **P. vaccinifolia,** *C. DC. in Engl. Jahrb.* xix. 226. Stems trailing and rooting in the lower part, then ascending, glabrous. Leaves alternate, shortly petioled, oblong-obovate, 1–1½ in. long, obtuse, sometimes emarginate at the apex, narrowed gradually from the middle to the base, membranous when dry, subpellucid, finely punctate, glabrous on both surfaces, 5-nerved from near the base; midrib distinct nearly to the apex; lateral veins fine, obscure. Spikes distinctly peduncled, lateral and terminal, 1 in. or more long, dense; bracts orbicular, peltate, subsessile; rhachis glabrous, distinctly pitted. Berry globose, obscurely stipitate, ⅓ lin. long; stigma terminal, oblique.

Upper Guinea. Sierra Leone: Sugarloaf Mountain, *Barter! Scott-Elliot,* 5755! Cameroons: Buena, 5000–6000 ft., *Preuss,* 875A!

14. **P. goetzeana,** *Engl. Jahrb.* xxviii. 375. A large herb. Stems decumbent; lower internodes 10 lin. long, 3 lin. in diam.; branches erect, thick, rather densely leafy. Leaves thick, coriaceous, alternate, subspathulate-oblong or obovate-oblong, 1–1½ in. long, 7–9 lin. wide, quite glabrous, slightly narrowed to the base; midrib prominent; petiole about 3 lin. long. Spikes terminal on the primary and secondary branches; peduncles longer than the leaves, but shorter than the spikes; bracts suborbicular, peltate, subsessile. Ovary subglobose; stigma terminal.

Mozamb. Dist. German East Africa: Central Uluguru; on the Lukwangula Plateau, 8000 ft., *Goetze,* 296.

Native name, "*mkarasch.*"

15. **P. Stuhlmannii,** *C. DC. in Engl. Jahrb.* xix. 225. Stems rooting from the nodes, glabrous, 1 lin. in diam. Leaves alternate, shortly petioled, oblong-lanceolate, above 2 in. long, narrowed from the middle to both ends, subpellucid, triplinerved, glabrous. Spikes peduncled, dense, 2 in. long; rhachis pitted; bracts orbicular. Ovary

ovoid, obtuse, dotted with yellowish glands; stigma minute, fleshy, oblique.

Nile Land. Uganda: Ruwenzori, at the edge of woods, 6000–7000 ft., *Stuhlmann*, 2485.

16. **P. abyssinica,** *Miq. in Hook. Lond. Journ. Bot.* iv. (1845), 419. Stems trailing widely, rooting and leafless at the base, succulent, glabrous; lowest internodes 1–2½ in. long; nodes thickened. Leaves shortly petioled, alternate, oblong, 1–2 in. long by half as broad, narrowed to an obtuse point, cuneate at the base, firm, opaque, glabrous on both surfaces, triplinerved; midrib distinct; side nerves obscure. Spikes terminal and lateral, shortly peduncled, 1–1½ in. long; rhachis glabrous, not pitted; bracts orbicular, peltate, glabrous. Stamens 2; filaments very short; anthers globose. Ovary ellipsoid, sessile; style terminal.—A. Rich. Tent. Fl. Abyss. ii. 274; C. DC. in DC. Prodr. xvi. i. 405; Engl. Hochgebirgsfl. Trop. Afr. 188; Schweinf. in Bull. Herb. Boiss. iv. Append. ii. 115.

Nile Land. Eritrea: Mount Bizen, 6200 ft., *Schweinfurth & Riva*, 2074! 2075! Abyssinia: Dschan (Jan) Meda, 8000–9000 ft., *Schimper*, 1189! Maschila Valley, between Debra Dschoa and Abu Mekanna, *Schimper*, 1319!

17. **P. bueana,** *C. DC. in Engl. Jahrb.* xix. 227. Stems trailing, rooting from the nodes; branches slightly hairy, ½ lin. in diam. Leaves alternate, distinctly petioled, the upper ovate-oblong, under 1 in. long and ½ in. wide, lower smaller, suborbicular, obtuse and cuspidate at the apex, cuneate at the base, glabrous on both surfaces, triplinerved; lateral nerves faint. Spikes terminal, apparently monœcious, as long as the leaves; bracts orbicular, peltate. Ovary ovoid-oblong, very shortly stalked; stigma terminal, pilose.

Upper Guinea. Cameroons: woods between Buena and Mamis fountain, *Preuss*, 663.

18. **P. Mannii,** *Hook. f. ex C. DC. in DC. Prodr.* xvi. i. 422. Annual. Stems creeping and rooting at the base, then ascending to a height of 3–4 in., very slender, glabrous. Leaves alternate, distinctly petioled, orbicular or oblong, ½–¾ in. long, obtuse, acute at the base, thin, membranous, glabrous, triplinerved from the base; midrib distinct; side nerves obscure; petiole glabrous. Spikes terminal and lateral, shortly peduncled, very slender, 1–2 in. long; rhachis pitted, glabrous; bracts orbicular, peltate, glabrous. Ovary sessile, globose; stigma punctiform, oblique.

Upper Guinea. Cameroons: Cameroon Mountain, on trees, 7000 ft., *Mann*, 2016!

Mozamb. Dist. British Central Africa: Nyasaland, Masuka Plateau, 6500–7000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

Var. *fernandopoana*, C. DC. l.c. Upper leaves elliptic-orbicular.

Upper Guinea. Fernando Po, 1600 ft., *Mann*, 291!

19. **P. crassifolia,** *Baker*. Stem decumbent, moderately stout, glabrous, about a foot long. Leaves alternate, shortly petioled, orbicular, 6 lin. long and broad, obtuse, broadly rounded at the base, thick, opaque, glabrous on the upper surface, slightly pubescent beneath; midrib distinct from base to apex; side nerves invisible. Spikes terminal and lateral; peduncle glabrous, less than 1 in. long; spikes slender, 2–3 in. long; rhachis glabrous. Ovary sessile, globose; stigma terminal.

Nile Land. Uganda: Wimi Valley, Ruwenzori, 7000 ft., *Scott-Elliot*, 7928!

20. **P. mascharena,** *C. DC. in Journ. Bot.* 1866, 135. A small annual herb. Stem wide-creeping, very slender. Leaves alternate, distant, petioled, suborbicular, 3–4 lin. long, obtuse, deltoid at the base, fleshy, without visible venation, ciliate on the margins, pubescent on both surfaces. Spikes terminal and lateral, very short, dense, peduncled; rhachis pitted; bracts round, peltate, subsessile. Ovary obtuse; stigma terminal, minute. Fruit globose, sessile, immersed at the base in the rhachis.—*P. mascarena*, C. DC. in DC. Prodr. xvi. i. 404.

Mozamb. Dist. German East Africa: Usambara, Derema, *Volkens*, 60!

Also in extra-tropical South Africa and Madagascar.

This species is very closely allied to *P. bangroana*, C. DC.

21. **P. bangroana,** *C. DC. in Journ. Bot.* 1866, 134. Annual. Stem creeping, filiform, finely pubescent. Leaves alternate, petioled, orbicular, 4 lin. wide, pilose on both surfaces, ciliate on the margin, rather rigid, without visible venation. Spikes terminal, peduncled; bracts round, peltate, shortly stalked. Ovary deeply immersed in the pitted rhachis. Fruit subglobose, sessile; stigma terminal, fleshy.—*P. bangrooana*, C. DC. in DC. Prodr. xvi. i. 404. *P. bagroana*, Dawe in Rep. Bot. Uganda Protect. 1906, 55.

Upper Guinea. Sierra Leone: River Bagru, *Mann*, 905! Gold Coast: Kibbi Hills, on trunks of trees, *Johnson*, 273!

Nile Land. Uganda: Mawokota, 3900 ft., *Brown*, 194! Loro, 5000 ft., *Dawe*, 529!

22. **P. kamerunana,** *C. DC. in Engl. Jahrb.* xix. 228. Stems decumbent, with short ascending branches, moderately stout, densely hairy. Leaves opposite, shortly petioled, oblong or suborbicular, 6–9 lin. long, obtuse, cuneate at the base, moderately thick, opaque, hairy on both surfaces, obscurely triplinerved from the base. Spikes short, dense, terminal; peduncle densely hairy; rhachis pitted, glabrous; bracts orbicular, peltate. Ovary oblong, sessile; stigma minute, terminal.

Upper Guinea. Cameroons, *Preuss*, 918!

23. **P. arabica,** var. **parvifolia,** *C. DC. in Engl. Jahrb.* xix. 230. Stems decumbent at the base, then ascending, moderately stout, finely

pubescent. Leaves opposite, shortly petioled, rhomboid, 1 in. long, 6 lin. wide, moderately stout, opaque, pubescent on both surfaces, obscurely 3–5-nerved from the base. Spikes terminal and lateral, peduncled, long, slender; bracts rotundate, peltate; rhachis pitted. Ovary globose, sessile; stigma terminal, minute.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 3810.

The type occurs in South Africa, Madagascar, Socotra and Arabia.

Johnson 181 from Melsetter, Rhodesia, probably belongs to this species.

24. **P. Dusenii,** *C. DC. in Engl. Jahrb.* xix. 229. Stem branched, rooting at the base; branches densely pubescent. Leaves ternate, shortly petioled, obovate-cuneate, less than 6 lin. long, 3 lin. wide, densely pubescent on both surfaces, obscurely triplinerved. Spikes terminal and axillary, peduncled, three times as long as the leaves; peduncle pubescent; rhachis glabrous; bracts orbicular, peltate, shortly stalked. Ovary obovoid, obtuse, shortly stalked; stigma oblique. Fruit cylindrical, distinctly stalked, glabrous.

Upper Guinea. Cameroons, *Dusen*, 436.

25. **P. reflexa,** *A. Dietr. Sp. Pl.* i. 180. Stems creeping, tufted, 3–6 in. long, once or twice dichotomously forked, tetragonal, deeply sulcate when dried. Leaves usually 4 in a whorl, obovate, obtuse, 3–4 lin. long, bright green, rigidly coriaceous, obscurely triplinerved. Spikes terminal, solitary, 6–18 lin. long, distinctly peduncled; rhachis pilose, deeply pitted; bracts round, subsessile. Ovary ovoid; stigma terminal, penicillate. Fruit oblong, narrowed to a point, deeply immersed in the pits of the rhachis.—Miq. Syst. Piper. 169, and in Hook. Lond. Journ. Bot. iv. (1845), 426; Wight, Ic. t. 1923, fig. 1; Baker, Fl. Maurit. 298; C. DC. in DC. Prodr. xvi. i. 451; Hook. f. Fl. Brit. Ind. v. 99; Engl. Pfl. Ost-Afr. 159; Dawe in Rep. Bot. Uganda Protect. 1906, 55. *Piper reflexum*, Linn. f. Suppl. 91. *Micropiper pusillum*, Miq. Comm. Phyt. 62, t. 5, fig. B.

Nile Land. Uganda: Molo Forest, *Dawe*, 4! Mawokota, 3900 ft., *Brown*, 157! Mau, on old tree-trunks, 7000 ft., *Scott-Elliot*, 6861!

Lower Guinea. Island of St. Thomas, *Henriques*.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 7200 ft., *Volkens*, 1286! British Central Africa: Nyasaland; Mount Malosa, 4000 ft., *Whyte!* Palombe, Mount Milanji, *McClounie*, 2! Zomba Plateau, 5000 ft., *Whyte!*

Also in Natal and Mauritius, and throughout the warmer regions of both hemispheres.

Imperfectly known species.

26. **P. martiana,** *Miq.?; C. DC. in Bol. Soc. Brot.* x. 154. Sterile specimens of a plant resembling this in leaf and habit have been collected by Quintas in the island of St. Thomas. It has a glabrous stem, rooting at the base, and alternate obovate-cuneate rigid obtuse glabrous

leaves, about an inch long, with a distinct midrib and two faint lateral main nerves.

27. **P. læteviridis,** *Engl. Jahrb.* xxvi. 361. Stem ascending, simple or slightly branched, 1–14 ft. high, rather thick, glabrous. Lower leaves alternate, upper opposite, ovate or oblong, about 1½ in. long, about 1 in. broad, herbaceous, glabrous, bright green, 3-nerved; lateral nerves reaching from the base nearly to the apex; petiole up to 5 lin. long. Spike solitary, terminal, 2¼ lin. long; peduncle 9 lin. long; bracts peltate. Stamens short, as long as the bracts. Ovary ovoid; stigma minute.

Upper Guinea. Cameroons: in damp shady places in woods at Lolodorf, *Staudt*, 338.

ORDER CXIV. MYRISTICACEÆ. (By O. Stapf.)

Flowers diœcious, apetalous. Perianth 3- (rarely 2–5-) lobed or partite, infundibuliform to globose or patelliform; lobes valvate. Male flower: Stamens 2–30; filaments united into a central, sometimes very short column; anthers arranged in a ring and adnate to the column or free or fused into a globular mass, 2-celled, dehiscing longitudinally; rudimentary ovary 0. Female flower: Staminodes 0. Ovary superior, sessile, 1-celled; stigma sessile or subsessile, usually more or less minutely 2-lobed; ovule 1, subbasal, anatropous. Fruit fleshy, nearly always dehiscing by 2 valves. Seed erect, with a thin or fleshy, entire, lobed or laciniate, frequently vividly coloured aril; testa of 3 layers, the outer membranous or fleshy, the middle crustaceous or woody, the inner membranous, usually intruding into the folds of the often ruminate endosperm; endosperm replete with fat and often also starch. Embryo small or very small, near the base; cotyledons ascending and divergent or divaricate or connate into a disk or cup.—Trees, frequently aromatic. Leaves alternate, entire, penninerved, often with pellucid dots (oil-glands). Flowers small or very small, particularly the male, fascicled, racemose, umbellate or capitate; the partial inflorescences often gathered in panicles, racemes, or compound heads, frequently bracteate, but generally without bracteoles; female inflorescences usually less compound than the male and fewer. Inflorescences axillary (sometimes from the axils of fallen or arrested leaves).

Species about 235, in the tropics of both hemispheres.

In adopting the genera as proposed by Professor Warburg in his exhaustive monograph of the *Myristicaceæ*, rather than reducing them to subdivisions of one large genus, *Myristica*, I was mainly led by two considerations: first, the appreciation of the great progress, marked by that monograph, in our knowledge of the family; and, secondly, the conviction that no good could be done by breaking away, in a work like this and in dealing with so small a number of species, from a conception of the family which has all the merit of thoroughness and consistency.

Moreover, very little has since been added to our collections of African *Myristicaceæ*, and they are still one of the most imperfectly known families of the African floras. Their often considerable height, their diœcism and their inconspicuous flowers account probably for their neglect by the collectors; but as the seeds of some of them are enormously rich in vegetable fat, and others yield serviceable timber, more attention might be paid to them even from a purely economic point of view.

Endosperm ruminate; lateral nerves always conspicuous.	
Leaves with 15–60 parallel, usually very marked lateral nerves on each side; male flower-heads or umbels not supported by a disk-like base of an early deciduous involucre of bracts; seeds solid in the centre.	
Male flowers sessile, $\frac{1}{2}$ lin. long, in small heads, loosely clustered or congested on the secondary branches of more or less divaricate panicles; anthers 2–4; fruit oblong; aril laciniate; rumination-folds intruding radially . . .	1. PYCNANTHUS.
Male flowers distinctly pedicelled, $1\frac{1}{2}$–2 lin. long, in small capituliform umbels, which are solitary or crowded into globose heads on the primary branches of very reduced panicles; anthers 6–10; fruit much depressed; aril entire; rumination-folds starting from near the chalaza (that is, descending from near the top) . .	2. SCYPHOCEPHALIUM.
Leaves with 7–10 very slender curved lateral nerves on each side; male umbels supported by the disk-like base of the early deciduous involucre of bracts; seed with a longitudinal cavity in the centre	3. CŒLOCARYON.
Endosperm not ruminate; lateral nerves faint.	
Leaves *concolorous*; *flower-heads almost sessile, in* the leaf-axils, solitary, or in small clusters; aril entire	4. STAUDTIA.
Leaves dark green above, pale to silvery grey below; flower-heads distant on the branches of a panicle; aril laciniate	5. CEPHALOSPHÆRA.

1. PYCNANTHUS, Warb. in Ber. Deutsch. Bot. Ges. xiii. Generalvers.-Heft, 94.

Male flowers: Perianth obovoid or shortly clavate, 3–4-partite. Filaments united into a slender column; anthers small, 2–4, adnate to the apex of the column, exserted from the perianth. Female flower: Perianth as in the male. Stigma sessile, indistinct. Fruit medium-sized; pericarp thick, fleshy, dehiscent; aril laciniate. Seed oblong, testa thin; endosperm ruminate, replete with fat, but destitute of starch (or almost so); rumination-folds intruding radially. Cotyledons free almost to the base, suberect.—Leaves more or less chartaceous, cordate at the base, glaucous beneath, with numerous subhorizontal lateral nerves and faint subparallel transverse veins. Inflorescences panicled, divaricate with clustered or more or less scattered heads of minute sessile flowers.

Species 2 to 5, endemic.

Leaves with 20–35 lateral nerves on each side; tomentum of leaves ferruginous, of brown candelabriform hairs	1. *P. Kombo.*
Leaves with 40–60 lateral nerves on each side; tomentum of leaves very scanty (except when quite young), of minute whitish stellate hairs	2. *P. microcephalus.*

1. **P. Kombo,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 252 (*partly, i.e., vars. angolensis and microcephalus*). A tree, 30–120 ft. high; trunk up to 5 ft. in diam.; branches horizontal or somewhat drooping; branchlets like all the young parts of the plant densely covered with a brownish-red velvety tomentum, formed of candelabriform hairs, at length more or less glabrescent. Leaves oblong, shortly cordate at the base, rather suddenly contracted into a fine and often long acumen, up to over 8 in. long, up to 3 in. wide; tomentum long-persistent on the midrib and nerves; midrib stout and prominent below; lateral nerves 20–35 on each side, much-spreading, slightly curved or almost straight, joined by short loops near the margin, slender, prominent below, distinctly showing up from the densely and very minutely papillose glaucous ground; transverse veins few, delicate; petioles stout, 3–4 lin. long, reddish tomentose. Male panicles axillary (often from the axils of fallen leaves), 3–6 in. long, 1–3 in. wide, brownish-red, velvety; peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long; rhachis and branches somewhat stout, flexuous; heads in compact lobed ovoid clusters on the short secondary branchlets, globose, 1 lin. in diam. Perianth shortly clavate-turbinate, 3- (sometimes 4–5-) fid, $\frac{1}{2}$ lin. long, brownish-red, minutely papillose; lobes obovate. Andrœcium exserted; stipes slender, as long as or slightly longer than the perianth; anthers 3–5, not quite $\frac{1}{8}$ lin. long. Female panicle unknown. Fruiting panicle rather robust, 4–5 in. long, with a flexuous rhachis and primary branches up to 2 in. long; pedicels 1–2 lin. long. Fruit oblong- or subobovoid-ellipsoid, 1–1$\frac{1}{2}$ in. long, 8–10 lin. in diam.; pericarp green, at length glabrous, up to 2 lin. thick, sutural ridges prominent and acute in the young fruit, often obscure in the mature; aril fleshy, coloured, laciniate almost to the base. Seed dusky, 8–12 lin. long, 5–7 lin. in diam.; testa faintly longitudinally grooved; cotyledons thick.—Warb. Muskatnuss, 374, 385, t. 4, fig. 9. *P. microcephala*, Warb. in Ber. Pharm. Gesellsch. Berlin, 1892, 222 (excl. syn.). *P. Niohue*, Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 259 (the fruit only). *Myristica Kombo*, Baill. in Adans. ix. (1868), 79. *M. Niohue*, Baill. l.c. (the fruit only). *M. angolensis*, Welw. in Syn. Expl. 51, No. 137 (name only); Ficalho, Pl. Uteis, p. 246; Hiern in Cat. Afr. Pl. Welw. i. 913.

Upper Guinea. Sierra Leone: Sherbro, *Garrett! Afzelius!* French Guinea: Longuery, *Chevalier*, 14779! Ivory Coast: Bingerville, *Chevalier*, 16058! Boursukron, *Chevalier*, 16101 *bis!* Gold Coast: between Amfoi and Alafanjo, *Krause!* and without precise locality, *Evans!* Togo: Lobots Mountain, near Alakgama, 1600 ft., *Dohring*, 901! Sodo, near Alakgama, *Dohring*, 148! *Busse*, 3536! Southern Nigeria: Ibadan forest reserve, *Punch*, 126! Asaba, *Leslie*, 43! Akomu, *Dodd*, 402! Northern Nigeria: without precise locality, *Elliott!*

North Central. Ubangi Territory: Krebedje, *Chevalier*, 6009!

Lower Guinea. Island of St. Thomas, *Don!* Boa Entrada, *Chevalier*, 13755! 13719! *Samuelson* (seeds in the Kew Museum)! Mount Caffé, 2000 ft., *Welwitsch*, Carp. Coll. 883! Gaboon, *Griffon de Bellay and Duparquet*, 120. Spanish Gaboon: Fang Country, 1500 ft., *Tessmann*, B. 65! Angola: Golungo Alto; frequent in forests in various localities, *Welwitsch*, 781! 782! 782B! 782C! 782D! and Carp. Coll. 881! 882! Casengo, 1000–2300 ft., *Gossweiler*, 679.

Var. *sphærocarpa*, Stapf. Fruit subglobose, $\frac{2}{3}$–$\frac{3}{4}$ in. in diam., on one side with a slightly prominent sutural ridge, on the other with a shallow groove, hence subcordate in transverse section.

Nile Land. German East Africa: Bukoba, *Stuhlmann*, 1167!

This may in the future prove to be a distinct species.

The seeds of the type are remarkable on account of their containing great quantities of a fat (up to 72 per cent.), and according to Welwitsch they are used by the natives for illumination purposes, burning like tapers even when fresh.

2. **P. microcephala,** *Stapf* (*not of Warb.*). A tree 60–80 ft. high; branchlets like all the young parts of the plant very finely tomentellous; tomentum reddish or ochreous, consisting of minute (often stellate) papillæ, soon rubbing off. Leaves oblong to lanceolate-oblong, shortly cordate at the base, contracted into a fine acumen, up to 1 ft. long and 2–3 in. (or more) wide; tomentum in the mature state reduced to a few scattered minute whitish stellate hairs; midrib, lateral nerves and veins as in *P. Kombo*, but the nerves 40–60 on each side; petiole stout, up to 6 lin. long, very soon glabrous. Male panicles 3–8 in. long, up to 6 in. wide, finely rusty-tomentellous, at length glabrescent; peduncle $\frac{3}{4}$–$1\frac{1}{2}$ in. long, like the rhachis and branches more slender than in *P. Kombo;* heads loosely clustered on the short secondary branchlets, globose, up to 1 lin. in diam. Perianth and andrœcium as in *P. Kombo.* Female panicle unknown. Fruiting panicle somewhat contracted, up to 8 in. long; primary branches obliquely erect, up to 3 in. long; pedicels extremely short. Fruit obovoid (not quite mature), up to 1 in. long and 8 lin. in diam., with distinct sharp but slender sutural ridges; pericarp very finely fulvous-tomentellous.—*Myristica microcephala*, Benth. in Hook. Ic. Pl. xiii. 48, t. 1261.

Upper Guinea. Fernando Po, *Mann*, 572!

Imperfectly known species.

3. **P. Dinklagei,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 258. A tree about 30 ft. high, with pendulous branches; branchlets glabrous, dark brown, lenticillate. Leaves elliptic-oblong, rounded at the base, subacute, 4–5 in. long, $1\frac{1}{2}$–2 in. broad, coriaceous, pale chocolate-brown beneath when dry, glabrous; midrib prominent below; lateral nerves about 15 on each side, dark, hardly raised, thinning out towards the margin and joined by faint arches; veins delicate, anastomosing; petiole terete, finely channelled, up to $\frac{1}{2}$ in. long. Male panicles axillary, ferruginous-pubescent, $2\frac{1}{2}$–3 in. long, with 4–5 branches on each side, ultimate branchlets short; bracts broad-ovate, densely hairy,

deciduous; heads globose or ovoid, densely congested, 1–1½ lin. long. Androecium shortly exserted; anthers 3–4. Female plant unknown.

Upper Guinea. Liberia: Fishtown, near Grand Bassa, *Dinklage*, 1624!

The facies of the leaves and branches of this plant are so different from the other species of *Pycnanthus* that I suspect it does not belong to that genus.

4. **P. Schweinfurthii,** *Warb. in Ber. Pharm. Gesellsch. Berlin*, (1892), 223 (*name*), *and in Engl. Pfl. Ost-Afr. B.* 271, *C.* 180. A tall tree. Leaves and inflorescences unknown. Fruits clustered, sessile, ellipsoid, 1–1½ in. long, 1–1¼ in. in diam.; pericarp 2½–3 lin. thick, almost glabrous; aril laciniate down to the middle or to ⅘. Seed obovoid-ellipsoid, up to 1 in. long, 6–8 lin. in diam.; testa shining, grooved, reddish-brown; endosperm sparingly ruminate; starch very scanty; cotyledons suberect with undulate margins.—Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 260, t. 10, figs. 1–3.

South Central. Congo Free State: by the Assika stream, in Niamniam Country, *Schweinfurth!*

Similar seeds covered with their arils were sent by the late Mr. Mahon from Uganda, but they are smaller, mostly 9–10 lin. by 6 lin., and even the largest always less than 1 in. in length. The tree from which these seeds were collected is of fine appearance, but the timber is not much valued.

5. **P. Mechowii,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 261, *t.* x. *figs.* 1–2. Seed ovoid, brown, faintly grooved, 11 lin. long, 6½ lin. in diam.; testa black, ⅓ lin. thick; rumination-folds rather thick.

Lower Guinea. Congo Free State (or Angola?): without precise locality, *Mechow.*

2. SCYPHOCEPHALIUM, Warb. in Ber. Deutsch. Bot. Ges. xiii. Generalvers.-Heft, 84.

Male flower: Perianth funnel-shaped, 3–5-partite. Filaments united into a column; anthers 6–10, adnate to the column and as long as the stipes or slightly shorter. Female flower: Perianth as in the male, but with minute triangular bracteoles at the base. Ovary tomentose; stigma 2-lobed. Fruit very large, depressed; pericarp very thick, fleshy, indehiscent; aril completely covering the seed, entire. Seed depressed; testa woody, not very thick; endosperm ruminate, replete with fat, but destitute of starch; rumination-folds intruding from the chalaza downwards. Cotyledons divaricate.—Leaves chartaceous, with spicular cells, which in the dry state appear as slight prominences, particularly below; lateral nerves joined by distinct arches close to the margin. Flowers pedicelled, in pseudo-capitate umbels, sometimes several of them crowded into larger heads; heads in short sparingly branched panicles or, by the reduction of the lateral branches, solitary. Bracts and, in the female, bracteoles present.

Species 3, endemic.

Leaves distinctly cordate at the base; lateral nerves 20–26 on each side	1. *S. Ochocoa.*
Leaves not cordate at the base; lateral nerves 15–18 on each side.	
Leaves rather obtuse at the base	2. *S. Mannii.*
Leaves attenuated and acute at the base . . .	3. *S. chrysothrix.*

1. **S. Ochocoa,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 244, *tt.* 2 *and* 9. A tree, about 120 ft. high, of palm-like habit, with subhorizontal or slightly pendulous branches; branchlets densely ferruginous-tomentellous when young, at length glabrous and reddish brown, rather stout. Leaves oblong or obovate-oblong, shortly and often unequally cordate at the base, suddenly contracted into a narrow acute acumen, 7–11 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ in. broad, glabrous and slightly rough above, ferruginous-tomentellous underneath when young, soon glabrescent; midrib stout and prominent underneath; lateral nerves rather spreading, almost straight, prominent below, 20–26 on each side; transverse veins obscure; petiole stout, 3–5 lin. long. Male inflorescences 1–$1\frac{3}{4}$ in. long, ferruginous-tomentellous; common peduncle up to $\frac{2}{3}$ in. long, stout; bracts ovate, obtuse, caducous; umbels capituliform, 6–8 lin. in diam., very many-flowered; pedicels $1\frac{1}{2}$ lin. long. Perianth about 2 lin. long, ferruginous-tomentellous without, glabrous within, 3–5- (usually 4-) partite; lobes obtuse. Staminal column glabrous, stout; anthers 6–10, $\frac{1}{4}$ lin. long. Female inflorescences cymose or umbel-shaped panicles, $1\frac{1}{2}$–3 in. long. Perianth tomentose without. Fruit depressed-globose, $1\frac{3}{4}$–2 in. in diam., $1\frac{1}{2}$–$1\frac{3}{4}$ in. high, ferruginous-hispid; pericarp fleshy, $1\frac{1}{2}$ lin. thick when dry. Seed much depressed.—Warb. in Ber. Deutsch. Bot. Ges. xiii. Gen.-Versamml.-Heft, 81, t. 29, fig. 3*a*; Muskatnuss, 628, t. 4, fig. 12. *S. Kombo,* Warb. in Notizbl. Königl. Bot. Gart. Berlin, i. 98, partly. *Ochocoa Gabonii,* Pierre in Bull. Soc. Linn. Paris, ii. 1257. *Dryobalanops sp.*, Möller in Dingler's Polytechn. Journ. ccxxxviii. (1888), 432.

Lower Guinea. Gaboon: Sibange Farm, common and characteristic of the forests, *Soyaux,* 301! Libreville, *Klaine,* 72.

2. **S. Mannii,** *Warb. in Notizbl. Königl. Bot. Gart. Berlin,* i. 98. A tree, 40–100 ft. high; branchlets finely fulvous-tomentellous when quite young, very soon glabrous and reddish brown, rather stout. Leaves oblong to oblanceolate, obtuse and often unequal at the base, abruptly contracted into a narrow acute acumen, 7–10 in. long, $1\frac{3}{4}$–3 in. broad, pale fulvous-tomentellous beneath in bud, very soon glabrescent; midrib moderately stout and prominent beneath; lateral nerves suboblique, almost straight, slender, prominent beneath, 15–18 on each side; petiole $3\frac{1}{2}$–5 lin. long, somewhat slender. Male inflorescences 1–2 in. long, fulvous-tomentellous; common peduncle very short; special peduncles up to 1 in. long, slender; bracts ovate, caducous; umbels capituliform, up to 10 lin. in diam., very many-flowered; pedicels up to 2 lin. long. Perianth $1\frac{1}{2}$ lin. long, fulvous-tomentellous without, glabrous within, 3-fid; lobes broad-ovate, obtuse. Staminal column slender;

anthers $\frac{1}{8}$ lin. long. Fruit (quite young) subglobose, $1\frac{1}{2}$ in. in diam., densely fulvo-tomentose.—Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 249. *Myristica Mannii*, Benth. in Hook. Ic. Pl. xiii. 49, t. 1262.

Upper Guinea. Southern Nigeria: Old Calabar, *Mann*, 2290! Cameroons: Cameroon River, *Mann*, 752! near Victoria, *Winkler*, 360! Duala, near Ndokoti, *Winkler*, 741! and without precise locality, *Braun*, 3!

3. **S. chrysothrix,** *Warb. in Notizbl. Königl. Bot. Gart. Berlin*, i. 98. A tree; young branches ferruginous-tomentellous, at length glabrous, greyish and with scattered prominent lenticels. Leaves oblong-obovate, narrow and acute at the base, abruptly and obliquely cuspidate, 5–7 in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, soon glabrous on both sides; midrib very prominent; lateral nerves spreading, parallel, about 16 on each side; veins obscure; petiole 3–6 lin. long, rather slender. Inflorescences unknown. Fruiting peduncle stout, short, bearing at the apex one or few fruits on pedicels about 1 in. long and 4 lin. thick. Fruit depressed-globose, almost 4 in. in diam., about 3 in. high, covered with a dense woolly yellowish-red tomentum which rubs off easily; sutural ridges faint; pericarp almost 1 in. thick when fresh; aril red. Seed $1\frac{1}{2}$ in. in diam., not quite 1 in. high; testa 5–7 lin. thick.

Upper Guinea. Cameroons: in forests, *Braun*, 162.

3. CŒLOCARYON, Warb. in Notizbl. Königl. Bot. Gart. Berlin, i. 99.

Male flower: Perianth cupuliform, 3- (rarely 4-) partite. Filaments united into a column; anthers 3–5, adnate to the upper half of the column. Female flower: Perianth as in the male, slightly larger. Ovary ovoid-globose, glabrous; stigma sessile, 2-lobed. Fruit medium-sized, oblong; pericarp dehiscent, fleshy, usually thick; aril covering the seed, deeply laciniate and fenestrate. Seed oblong; testa crustaceous; endosperm more or less deeply ruminate, with a (sometimes narrow) cavity in the centre, full of fat, destitute of starch; rumination-folds radial. Cotyledons free, suberect.—Leaves chartaceous or coriaceous; lateral nerves oblique, curved towards the margins, faintly looping. Flowers in dense small loosely panicled umbels, when quite young surrounded by an involucre of caducous bracts, the bases of which are joined into a disk and persist.

Species 3, endemic.

Fruits obtuse.
- Leaves oblong to lanceolate-oblong . . . . 1. *C. Klainei.*
- Leaves obovate-oblong and more or less panduriform . 2. *C. Preussii.*

Fruits acute . . . . . 3. *C. oxycarpum.*

1. **C. Klainei,** *Pierre apud Heckel in Rev. Cult. Colon.* xii. (1903), 130. A tree 30–50 ft. high; branchlets slightly pubescent when quite young, soon glabrous. Leaves oblong to lanceolate-oblong, more or less acute or subobtuse at the base, more or less acuminate, 5–12 in. long, 2 4 in. broad, coriaceous, adpressedly rufo-pubescent in bud, very

soon quite glabrous; midrib prominent below, channelled above; lateral nerves 8–13 on each side; petiole ½–1 in. long, subflexuous, stout, channelled. Male panicles axillary or extra-axillary near the ends of the branches, 2–3½ in. long and wide, very lax, sparingly pubescent or almost glabrous; peduncle ½–1 in. long; primary branches slender, spreading; ultimate divisions up to more than ½ in. long; involucral disk 1–2 lin. in diam., bearing about 15–20 chrome-yellow flowers; pedicels clavate, very short. Perianth 3-partite, about 1 lin. long, sparsely and finely reddish-pubescent, particularly along the margins of the broad-ovate lobes. Andrœcium ½ lin. long; stipes slender; anthers 3, rarely 4, distinct, ¼ lin. long. Female panicle similar to the male, but less divided; branches shorter and stouter, at length divaricate; umbels usually recurved when young; involucral disk reduced to a rim; pedicels stout, 1–1½ lin. long in flower, up to 10 lin. in fruit, ferruginous-pubescent. Perianth as in the male, but persistent and slightly enlarged in the fruit. Fruit obovoid-oblong, 1–1¼ in. long, ¾ in. in diam.; pericarp glabrous. Seed 12 lin. long, 7 lin. in diam.; testa reddish brown, shining; endosperm deeply ruminate.—*C. cuneatum*, Warb. apud Heckel in Rev. Cult. Colon. xii. (1903), 132, figs. 1–6; in Engl. Jahrb. xxxiii. 385.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2109! 2492! 2665! 2735! 3281! 3637! and without precise locality, *Rudatis*, 14!

South Central. Congo Free State: Kondui, on the Sankuru River, in sandy soil in woods, 1400 ft., *Ledermann*, 8! 12!

Lower Guinea. Gaboon: Libreville, *Klaine*, 960! 1156! 1186! and without precise locality, *Klaine*, 693! Spanish Gaboon: Alén Akolentangan, 1500 ft., *Tessmann*, B. 108!

2. **C. Preussii,** *Warb. in Notizbl. Königl. Bot. Gart. Berlin*, i. 99. A tall tree with drooping branches and stout terete branchlets, which are finely and fugaciously rufous-puberulous near the tips. Leaves obovate-oblong and more or less panduriform, obtuse or shortly acute near the base, acuminate or subcuspidate, 7–9 in. long, 3–4 in. broad, chartaceous, rufous-tomentellous in bud, soon glabrous, bright green; midrib prominent below, rather stout towards the base; lateral nerves 7–11 on each side; veins very indistinct; petioles ½ to almost 1 in. long, stout, channelled. Male panicles usually extra-axillary, up to 2 in. long, finely rufo-pubescent, glabrous below; peduncle slender, ½–1 in. long; first internode up to ¾ in. long, the following (2–5) very much shorter; ultimate divisions 10–2 lin. long; involucral disk 1–2 lin. in diam., supporting an umbel of 20 or more yellowish-green flowers; pedicels slender, up to 1½ lin. long, clavate. Perianth ferruginous, finely and sparsely pubescent, 3- (rarely 4- or 5-) partite, 1 lin. long. Andrœcium ½ lin. long; anthers 3–5, ¼ lin. long. Female inflorescences unknown. Fruiting branches panicled, about 5 in. long; peduncle 1½–2½ in. long; pedicels 7–10 lin. long, 1½ lin. thick, glabrous. Fruits oblong-ellipsoid, almost 2 in. long, 1½ in. in diam., yellow; pericarp 3 lin. thick, glabrous; aril carmine. Seed 1¼ in. long, ¾ in. in diam.; testa dark reddish brown, deeply grooved; rumination-folds about 2 lin. deep. Embryo

3½ lin. long; cotyledons lanceolate, parallel, 2½ lin. long, not quite 1 lin. wide.—Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 250, t. 10. *C. multiflorum*, Warb. in Engl. Jahrb. xxxiii. (1904), 386.

Upper Guinea. Cameroons: Victoria, *Preuss!* collector's name unknown, Aug. 1904, 331! banks of the Limbe River, *Winkler*, 624! Yaunde, forest, 2600 ft., *Zenker & Staudt*, 649! Bipinde, *Zenker*, 2561!

The leaves of the original of *C. Preussii* differ from those of the type of *C. multiflorum* only in the more gradually attenuate apex and the number of the lateral nerves, there being 10–11 of them on each side instead of 7–9; but specimens collected later on by Preuss at Victoria agree so completely with those of *C. multiflorum* that I have no doubt about the identity of those plants.

3. **C. oxycarpum,** *Stapf.* A tree with terete glabrous branchlets. Leaves obovate-oblong to oblong, acuminate, obtuse at the base, 4–7 in. long, 2–2½ in. broad, thinly coriaceous, adpressedly rufo-pubescent in bud, very soon quite glabrous; midrib prominent below; lateral nerves 6–8 on each side; petiole ½–¾ in. long, channelled, flexuous. Male raceme of umbels slender, 1½ in. long; lowest branches 2–3 lin. long; involucral disk 1–2 lin. in diam., supporting an umbel of 10–25 flowers; pedicels slender, up to 2 lin. long. Perianth 3-fid, ¾ lin. long. Anthers 3, ⅙ lin. long, equalling the stipes. Female inflorescence unknown. Fruit-bearing branches axillary, towards the tips of the branches, 2–3½ in. long (including the fruits), glabrous; umbels solitary, or 2 or more racemosely arranged, each with 2–3 mature fruits; pedicels rather slender, about ½ in. long. Perianth persistent, 3-partite, nearly 1 lin. long. Fruit ovoid-oblong or ellipsoid-oblong from a somewhat narrower base, acute or subacute, 1–1¼ in. long; pericarp thin, glabrous. Seed ellipsoid-oblong; testa brown, not grooved; endosperm ruminate almost to the central cavity.

Upper Guinea. French Guinea: Farana, in gallery woods, *Chevalier*, 13178! 13425! Ivory Coast: Dobou, *Chevalier*, 16213!

4. **STAUDTIA**, Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 128.

Male flower: Perianth more or less turbinate-funnel-shaped, 3–4-lobed. Filaments united into a column; anthers 3–4, adnate to the column and longer than the short stipes. Female flower: Perianth globose-turbinate. Ovary more or less globose; stigma sessile, indistinct. Fruit large; pericarp dehiscent, thick, fleshy; aril as long as the seed, subentire. Seed ovoid or oblong-ellipsoid; testa woody, thick; endosperm hard, not ruminate, full of fat and starch. Cotyledons suberect, united at the base only.—Leaves more or less coriaceous, glabrous; lateral nerves very faint. Inflorescences subglobose, almost sessile, capitate, very dense; bracts present; bracteoles 0.

Species 3 or 4, endemic.

Petioles with a shallow wide channel in the upper part.
- Fruit stipitate, 1½ by ¾ in. . . . . 1. *S. stipitata.*
- Fruit not stipitate, 2 by 1½ in. . . . . 2. *S. kamerunensis.*

Petioles with a deep narrow channel all along; fruit not stipitate . . . . . 3. *S. gabonensis.*

1. **S. stipitata,** *Warb. in Engl. Jahrb.* xxxiii. 384. A tree, 100–120 ft. high, with a slender stem and roundish crown; old bark rough, brown; wood reddish, very hard; branchlets glabrous, dark brown when dry. Leaves oblong to oblong-lanceolate, more or less acuminate, shortly attenuated or rounded at the base, 4–7 in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, coriaceous, pubescent in bud, very soon quite glabrous; lateral nerves 6–8, slightly impressed above, venation obscure; petioles about 10 lin. long, with a wide shallow channel in the upper part. Flower-heads usually from the axils of fallen leaves, about $3\frac{1}{2}$ lin. in diam., surrounded by broad hairy deciduous bracts; pedicels scarcely $\frac{1}{2}$ lin. long. Perianth under $\frac{1}{2}$ lin. long, 4- (rarely 3-) lobed, tomentellous without; lobes ovate, obtuse. Anthers 3. Ovary densely tomentose. Axis of fruit-bearing branch thickened, on a short peduncle, up to 8 lin. long. Fruit oblong, $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. in diam., shortly stipitate, rufous-tomentellous; suture of valves acute at the base; aril minutely lobed at the apex.—*S. kamerunensis*, Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 241, partly.

Upper Guinea. Cameroons: forest near Johann Albrechtshöhe, *Staudt*, 484! 751! and without precise locality, *Rudatis*, 16.

2. **S. kamerunensis,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 241, *t.* 8 (*sub Brochoneura kamerunensi, Warb.*), *partly.* Branchlets glabrous, brownish when dry. Leaves lanceolate or oblong-lanceolate, long-acuminate, acute, shortly attenuate at the base, $3\frac{1}{2}$–6 in. long, 1–2 in. broad, subcoriaceous, bright green when fresh; lateral nerves 7–10 on each side, like the faint reticulation impressed above; petiole slender, 3–4 lin. long, with a shallow wide channel in the upper part. Inflorescences and flowers as in the preceding species. Fruit shortly pedicelled, supported by the persistent and slightly enlarged perianth, ovoid, red, 2 in. long, $1\frac{1}{2}$ in. in diam., at length glabrous; suture of valves rather prominent; pericarp 4 lin. thick when fresh; aril up to $3\frac{1}{2}$ lin. thick when fresh, red. Seed ovoid or oblong-ellipsoid, $1\frac{1}{2}$ in. long, 7–8 lin. in diam. Embryo $\frac{3}{8}$ lin. long.—Warb. Muskatnuss, 386, and in Engl. Jahrb. xxxiii. 384.

Upper Guinea. Cameroons: forest near Lolodorf, *Staudt*, 353! Victoria Botanic Garden, *Winkler*, 1090! 1335!

3. **S. gabonensis,** *Warb. in Engl. Jahrb.* xxxiii. 384. A tree 30-60 ft. high; branches glabrous, with a greyish bark. Leaves ovate-lanceolate to oblong, subacute to long-acuminate, subacute to rounded at the base, subcoriaceous, glabrous; lateral nerves 5–8 on each side, faintly impressed above; petiole slender, 2–5 lin. long, deeply and narrowly channelled. Male inflorescence sessile or subsessile, solitary, rarely in clusters of 2 or 3, fulvo- or rufo-pubescent, up to 3 lin. in diam.; pedicels very short. Perianth usually 3-fid, tomentellous without, up to $\frac{3}{4}$ lin. long; lobes ovate, subacute. Anthers 3, $\frac{1}{3}$ lin. long, much longer than the stipes. Female inflorescence like the male; pedicels $\frac{1}{2}$ lin. long, in fruit stout and up to $2\frac{1}{2}$ lin. long. Perianth 3–4-fid, $\frac{1}{2}$ lin. long. Ovary ovoid-globose, densely and finely tomentose. Fruit ellipsoid, not stipitate, ferruginous-tomentellous when young, at length glabrous and somewhat shining, 12–14 lin. long, 8–9 lin. in diam., suture of the

valves slightly raised. Seed 10 lin. long, 6 lin. in diam.; aril dentate at the apex.—*Myristica Niohue*, Baill. Adansonia, ix. 79, partly. *Pycnanthus Niohue*, Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 259, partly.

Lower Guinea. Gaboon: Libreville, *Klaine*, 565! and without precise locality, *Klaine*, 565B!

Myristica Niohue, Baill., and *Pycnanthus Niohue*, Warb., were, according to Warburg, based on mixtures of *Staudtia gabonensis* (leaf-branches) and *Pycnanthus Kombo* (fruit), collected by Griffon du Bellay (No. 5) and Duparquet (No. 74).

Imperfectly known species.

4. **S. pterocarpa,** *Warb. in Nov. Act. Acad. Nat. Cur.* lxviii. 243, *t.* 8 (*sub Brochoneura pterocarpa*). Fruit ovoid or obovoid, $2\frac{1}{2}$–3 in. long, $1\frac{2}{3}$–2 in. in diam., with or without sharply raised sutural ridges; pericarp 2 lin. thick; aril "capsuliform" (*Welwitsch*), entire, covering the whole seed, truncate, fleshy or subcoriaceous, scarlet, at length deliquescent. Seed ovoid or obovoid, 2–$2\frac{1}{6}$ in. long, $1\frac{1}{2}$ in. in diam.; testa yellowish, streaked with brown, $\frac{1}{4}$–$\frac{3}{10}$ lin. thick. Cotyledons thick, large.—Warb. Muskatnuss, 386, t. 4, fig. 11. *Myristica macrocarpa*, Welw. ex Christy, New. Comm. Drugs, No. 8 (1885), 27; Hiern in Cat. Afr. Pl. Welw. i. 914.

Lower Guinea. Island of St. Thomas, in forest, *Welwitsch!*

5. **CEPHALOSPHÆRA**, Warb. in Engl. Jahrb. xxxiii. 383.

Male flower: Perianth subglobose, 3–4-fid. Filaments united into a long exserted column; anthers 3–4, adnate to the column and shorter than its stipes. Female flower: Perianth unknown. Fruit large; pericarp thick, fleshy; aril laciniate. Seed ovoid; testa thick, woody; endosperm not ruminate, replete with fat and starch; cotyledons connate at the base, suberect, not diverging.—Leaves chartaceous, glaucous below, glabrous; lateral nerves interarching; arches distant from the margin; veins forming a faint network. Inflorescences panicled with large mostly distant flower-heads; bracts present; bracteoles none.

Species 1, in East Africa.

1. **C. usambarensis,** *Warb. in Engl. Jahrb.* xxxiii. 383. A tree 160 ft. high, with dark branchlets, fulvo-pubescent at their tips when young. Leaves oblong-lanceolate or oblong, gradually attenuate and acute at both ends, 4–5 in. long, 2 in. broad, dark green above, glaucous or almost silver-grey below; midrib prominent below; lateral nerves 15–20 on each side, slender, but distinct. Male panicles axillary (sometimes from the axils of fallen leaves), $2\frac{1}{2}$–3 in. long, 1–2 in. wide, ferruginous-puberulous; peduncle under 1 in. long; lower branches about 1 in. long, ultimate divisions very short; heads globose, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. in diam. Perianth 1 lin. in diam., ferruginous-tomentellous without; lobes broad-ovate, obtuse. Fruit with fleshy greyish-green pericarp; aril reddish yellow, thick. Seed almost 2 in. long and 1 in. in diam.; testa yellowish brown, shining; chalaza subterminal; raphe very much im-

pressed.—*Brochoneura* (?) *usambarensis*, Warb. in Engl. Pfl. Ost-Afr. C. 180; Warb. in Nov. Act. Acad. Nat. Cur. lxviii. 240; Muskatnuss, 386, t. 4, fig. 10.

Mozamb. Dist. German East Africa: Usambara; Derema, *Scheffler*, 122! 152!

ORDER CXV. **MONIMIACEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers hermaphrodite or unisexual. Perianth inferior, regular or irregular; tube globose; limb 4- or more lobed or oblique. Disk adnate to the perianth-tube. Stamens indefinite, in two or more rows; filaments short, usually flat, often with a gland on each side of the base; anthers erect; cells 2, distinct or confluent at the apex, dehiscing longitudinally or by valves. Carpels distinct, usually many, more or less immersed in the disk; style long or short; stigma terminal; ovule solitary, erect or pendulous, usually anatropous. Fruit indehiscent, included in the accrescent perianth-tube. Seed solitary; testa membranous; endosperm fleshy or oily.—Trees or shrubs. Leaves opposite or alternate, entire or toothed, penninerved, exstipulate. Flowers axillary, fascicled, cymose or racemose; bracts small or absent.

Species about 150, widely dispersed in the warmer regions of both hemispheres.

Perianth oblique . . . . . 1. GLOSSOCALYX.
Perianth symmetrical.
  Male perianth protruding beyond the stamens . . 2. CHLOROPATANE.
  Male perianth concealed by the stamens.
    Leaves subopposite . . . . . 3. XYMALOS.
    Leaves alternate . . . . . 4. PLAGIOSTYLES.

1. **GLOSSOCALYX**, Benth. in Benth. et Hook. f. Gen. Pl. iii. 144.

Flowers dicœcious. Perianth-tube campanulate; limb oblique, one lobe protruded into a long tongue-like process, the others small and deltoid. Disk represented by a ring in the male flowers, in the female fleshy and divided into cells, in which the carpels are sunk. Stamens indefinite, inside the disk, 2–3-seriate; filaments short, flat, united at the base; anthers 2-celled, dehiscing longitudinally. Carpels many, distinct, sunk in the disk; style short; stigma capitate. Ovule solitary, erect. Fruits included in the accrescent perianth-tube, which is crowned by the withered limb.—Trees or shrubs. Young shoots clothed with rigid, often fascicled, hairs. Leaves alternate, entire, penninerved. Flowers in axillary fascicles.

Species 3, endemic.

Perianth-lip narrow, 12 lin. long . . . . . 1. *G. longicuspis.*
Perianth-lip narrow, 4 lin. long . . . . . 2. *G. Staudtii.*
Perianth-lip broader, 2 lin. long . . . . . 3. *G. brevipes.*

1. **G. longicuspis,** *Benth. in Hook. Ic. Pl.* xiv. 1, *t.* 1301. A tree 30–40 ft. high; young branches furnished with very short hairs.

Leaves alternate, oblong, long-acuminate, symmetrical at the base, 6–8 in. long, 2–2½ in. wide, entire or with remote small teeth, membranous, penninerved; petiole 3–5 lin. long. Flowers in axillary fascicles of 4–5; pedicels very slender, up to 8 lin. long, hairy. Perianth obliquely campanulate, 1–1½ lin. wide, unequally toothed, produced on one side into a narrow lip nearly 1 in. long. Disk adnate to the perianth-tube, and in the male almost closing it at the throat, in the female fleshy and protruded between the carpels. Stamens included; filaments short, broad, slightly connate; anthers ovate, introrse, 2-celled, opening upwards by valves. Carpels many, each one enclosed in a hollow of the disk; style subulate; ovule solitary, erect. Fruit (immature) subglobose, angled, fleshy, crowned by the withered perianth.—Perkins & Gilg in Engl. Pflanzenr. Monim. 116.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1784! 2482! 2992A! 3083! Fernando Po, *Mann*, 1428!

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1723!

2. **G. Staudtii,** *Engl. Jahrb.* xxvi. 384. A shrub, up to 13 ft. high, strigose on all the young parts with fascicles of hairs. Branches slightly flexuous. Leaves oblong (lanceolate, *Engler*), often unequal at the base, long-acuminate, remotely denticulate, up to 8 in. long and 2¾ in. wide, strigose beneath especially on the nerves; lateral nerves about 10 each side arcuately ascending. Male flowers unknown; female solitary or several axillary; pedicels 4 lin. long. Perianth-tube campanulate; limb narrow, produced on one side into a linear lip about 4 lin. long and 1 lin. wide. Disk forming a fleshy ring at the throat of the perianth. Carpels about 6; ovary ovoid, densely pilose; style filiform.—Perkins & Gilg in Engl. Pflanzenr. Monim. 117.

Upper Guinea. Cameroons: Lolodorf, on the Lokunje River, at 1600 ft. in damp shady places, *Staudt*, 28; Johann Albrechtshöhe, *Staudt*, 808; in woods near Kribi, *Dinklage*, 1483; Bipinde, *Zenker*, 1887!

3. **G. brevipes,** *Benth. in Hook. Ic. Pl.* xiv. 2, *t.* 1302. A shrub, 10 ft. high. Young branches with fascicles of short stiff hairs. Leaves oblong, long-acuminate, 8 in. long, 2½ in. wide, obliquely cordate at the base, quite entire, glabrous above, hairy beneath especially on the nerves; petiole 1 lin. long. Flowers in axillary fascicles; pedicels villous, 2 lin. long. Perianth 1½ lin. in diam., oblique, green, pubescent outside; lip about 2 in. long, 2 lin. wide at the base, triangular. Carpels about 5, fusiform, hairy.—Perkins & Gilg in Engl. Pflanzenr. Monim. 116.

Upper Guinea. Cameroons: Cameroon River, *Mann*, 722! 2196

2. CHLOROPATANE, Engl. Jahrb. xxvi. 383.

Flowers diœcious. Perianth 4-partite, when closed depressed-conical with valvate segments, when open patelliform; segments ovate-lanceolate. Stamens numerous, subsessile; anthers ovoid, conniving at the apex, bursting by longitudinal slits. Female flowers unknown.

Shrubs; branches slender. Leaves alternate, penninerved. Flowers fascicled.

Species 2, endemic.

Leaves obtuse at the base; lateral nerves about 10 each side	1. *C. africana.*
Leaves cuneate at the base; lateral nerves 6–8 each side	2. *C. Batesii.*

1. **C. africana,** *Engl. Jahrb.* xxvi. 383. Branches slender, green. Leaves broadly oblong, penninerved, acute or acuminate, obtuse at the base, slightly undulate at the margin, up to 5 in. long and $2\frac{3}{4}$ in. wide; lateral nerves about 10 each side; petiole $2\frac{1}{2}$ lin. long, semiterete, channelled above, biglandular at the apex. Flowers in axillary fascicles on lateral branches $1\frac{1}{2}$ in. long; outer bracts concave, scarious, inner lanceolate; pedicels 3 lin. long. Perianth green; segments ovate-lanceolate.—Perkins & Gilg in Engl. Pflanzenr. Monim. 24, fig. 4, M–R.

Upper Guinea. Cameroons: in a wood near Yaunde, *Zenker*, 494, 798; Batanga, *Dinklage*, 1057.

2. **C. Batesii,** *C. H. Wright.* A shrub 4–8 ft. high. Branches slender, terete. Leaves elliptic, 5 in. long, 2 in. wide, cuspidate, cuneate at the base, thinly membranous, pale green, minutely verrucose below, puberulous on the main nerves, otherwise glabrous; lateral nerves 4–6 each side, slender, looping within the margin; petiole 4 lin. long, puberulous. Racemes axillary near the end of the branches; peduncle slender, 10 lin. long; pedicels filiform, 8 lin. long. Male flower $2\frac{1}{2}$ lin. in diam. Perianth shortly 4-lobed, green, glabrous, spherical in bud. Anthers obovoid. Female flower unknown.

Lower Guinea. Cameroons: Efulen, *Bates*, 409!

3. **XYMALOS,** Baill. in Bull. Soc. Linn. Paris, i 650.

Flowers diœcious. Male flower: Perianth 4–6-partite; lobes ovate or lanceolate. Stamens 10–15; anthers subsessile, 2-celled, dehiscence longitudinal. Rudiment of ovary none. Female flower: Perianth 3–5-lobed. Staminodes absent, or represented by a ring of hairs around the base of the ovary. Ovary obovoid or turbinate, glabrous, 1-celled; ovule solitary, pendulous, anatropous; stigma sessile, discoid or subhemispherical, wider than the top of the ovary. Fruit fleshy, smooth, crowned by the persistent stigma. Seed compressed-ellipsoid, albuminous; embryo small; cotyledons roundish, flat.—Shrubs or small trees, glabrous except the inflorescence. Leaves nearly opposite, coriaceous, shortly petioled, minutely pellucid-punctate. Racemes solitary or geminate in the axils of the leaves; bracts ovate or oblong.

Species 2, one of which extends into South Africa.

Leaves obovate to elliptic	1. *X. monospora.*
Leaves oblong	2. *X. ulugurensis.*

1. **X. monospora,** *Baill. in Bull. Soc. Linn. Paris,* i. 650. A shrub or small tree. Branches glabrous. Leaves alternate or almost opposite, up to 6 in. long and $2\frac{1}{2}$ in. wide, varying from obovate to

elliptic, cuneate at the base, usually irregularly serrate, more rarely entire, glabrous; main lateral nerves forming loops about 3 lin. within the margin; petiole about 6 lin. long. Inflorescence dicecious. Male flowers subtended by an ovate pubescent bract shorter than the perianth. Perianth nearly 1 lin. long, deeply 4-lobed, pubescent. Stamens about 10; anthers shortly elliptic, subsessile. Female flowers: Perianth 3–5-lobed, less than 1 lin. long, pubescent outside, and with a ring of hairs inside near the base. Ovary oblong, slightly longer than the perianth; stigma sessile, wider than the ovary.—Warb. in Engl. & Prantl, Pflanzenfam. iii. 6A, 53, fig. 21, A, B; Oliv. in Hook. Ic. Pl. t. 2444; Perkins in Engl. Pflanzenr. Monimiaceæ, 23; Sim, For. Fl. Cape Col. 288, t. 121; Burtt-Davy in Transv. Agric. Journ. v. 416, t. 171. *X. usambarensis*, Engl. Jahrb. xxx. 310. *Xylosma monospora*, Harv. Thes. Cap. ii. 52, t. 181. *Toxicodendron acutifolium*, Benth. in Journ. Linn. Soc. xvii. 214. *Paxiodendron usambarense*, Engl. Pfl. Ost-Afr. C. 182, incl. var. *serratifolia*.

Nile Land. British East Africa: Mount Kenia, 7000–8000 ft., *Battiscombe*, 17! *Hutchins!* and without precise locality, *Elliott*, 43! Uganda: Kalungu woods, *Scott-Elliot*, 7367! lower slopes of Ruwenzori, *Dawe*, 597!

Mozamb. Dist. German East Africa: Usambara; Iruja, *Holst*, 4249! Marangu, 6200–8500 ft., *Volkens*, 1876, 1908, 2264. British Central Africa: North Nyasaland, *Whyte!*

Also in South Africa, where it is known as "wild lemon" or "lemon-wood."

2. **X. ulugurensis,** *Engl. Jahrb.* xxx. 310, *in obs.* A tree up to 26 ft. high. Branches glabrous, purplish. Leaves dense, oblong, obtuse, bullate, rather thickly coriaceous, up to $3\frac{1}{2}$ in. long and $1\frac{1}{2}$ in. wide, glabrous; midrib purplish; lateral nerves about 7 each side, patent, prominent beneath; petiole semiterete, $2\frac{1}{2}$ lin. long. Racemes many, solitary or in pairs in the leaf-axils, shortly ashy-pilose; bracts $\frac{1}{2}$ lin. long, ovate. Perianth cupular, shortly 4-lobed. Berry ovoid, smooth, about 7 lin. long and 4 lin. in diam. Seed of the same shape as the berry.—*Paxiodendron ulugurense*, Engl. Jahrb. xxviii. 389.

Mozamb. Dist. German East Africa: Central Uluguru, on the Lukwangula Plateau, 7800 ft., *Goetze*, 274!

I have only seen a fragment of this, and am doubtful whether it is distinct from *monospora*, Baill.

4. **PLAGIOSTYLES,** Baill. in Bull. Soc. Linn. Paris, ii. 1326.

Male flowers: Perianth small, 6–8-lobed. Stamens numerous; anthers subsessile, 2-celled, dehiscence longitudinal. Female flowers: Perianth 5-lobed. Ovary 1-celled; stigma sessile, hemispheric, slightly excentric, becoming lateral in fruit; ovule solitary, pendulous. Fruit fleshy. Seed closely applied to the pericarp; raphe branched; embryo small; endosperm oily.—Leaves alternate. Flowers racemose.

Monotypic, endemic.

In a note with one of the specimens at Kew, Pierre says that the ovules are solitary, and not in pairs, as stated in his original description. This genus is closely allied to *Xymalos*, from which it differs chiefly in the curious structure of its seeds.

1. **P. klaineana,** *Pierre in Bull. Soc. Linn. Paris*, ii. 1327. A tree up to 32 ft. high. Branches terete, glabrous. Leaves alternate, oblong, acuminate, 6 in. long, $2\frac{1}{4}$ in. wide, subcoriaceous, glabrous; lateral nerves about 5 on each side, uniting by loops within the margin; reticulation fine; petiole about 6 lin. long, slender, glabrous. Racemes axillary, much shorter than the leaves. Male flower: Perianth about $1\frac{1}{2}$ lin. in diam., glabrous; lobes short, rounded. Stamens about 30. Female flower: Perianth cupular, 1 lin. long, glabrous; lobes rounded. Ovary oblong, slightly oblique. Fruit transversely oblong, with the stigma lateral through unequal growth, 4 lin. high, 9 lin. across the longer and 6 lin. across the shorter diameter. Seed of the same shape as the fruit, minutely black verrucose, with a very large central cavity containing on the side against the base of the fruit a pale-brown thin saucer-shaped body as long and wide as the seed, attached by a small point, and enclosing the small embryo; "endosperm oily" (*Pierre*).—Pax in Engl. & Prantl, Planzenfam. Nachtr. ii.–iii. 38.

Lower Guinea. Cameroons: Bipinde, *Zenker*, 1730! Gaboon: Issoula, *Klaine*, 1010! 1096!

ORDER CXVI. **LAURINEÆ.** (By O. Stapf.)

Flowers hermaphrodite, polygamous or diœcious, regular. Perianth inferior, very rarely superior (*Hypodaphnis*); tube (receptacle) ovoid, turbinate, campanulate or rarely oblong, sometimes growing out and persisting after flowering; lobes usually 6, equal or more or less unequal, in 2 whorls, or the perianth divided almost to the very base into 6 equal or subequal segments; æstivation imbricate. Stamens typically in 4 whorls at the base of and opposite to the perianth-lobes or in the upper part of the receptacle, often one or the other (usually the fourth) reduced to staminodes or entirely suppressed; filaments usually present, more or less flattened, varying from very short to several times the length of the anther, those of the third whorl mostly with a pair of large globose glands at the sides or the base or behind them (*i.e.*, between the second and third whorl), very rarely the glands fused with the receptacle into a disk, or also the outer stamens with glands at the base; anthers continuous with the filaments, 2- or 4-valved, valves superposed or more or less collateral, dehiscing from the base upwards, introrse, or those of the third whorl more often extrorse. Ovary superior, often more or less surrounded by the receptacle or ultimately quite enclosed in it, very rarely inferior (*Hypodaphnis*), 1-celled; style terminal, short or long, simple; stigma small, obtuse or unilaterally widened or discoid. Ovule solitary, anatropous, pendulous from near the apex of the ovary. Fruit baccate, fleshy or more or less drupaceous, indehiscent, more or less surrounded by or entirely free or enclosed in the persistent and accrescent perianth or its receptacular portion, often borne on an enlarged pedicel. Seed pendulous, exalbuminous; testa membranous, often adnate to the pericarp and indistinct in the mature state.

Embryo straight; cotyledons thick, fleshy, sometimes very tightly adpressed to each other and not separable; radicle superior; plumule distinct.—Trees or shrubs, very rarely (*Cassytha*) twining parasitic herbs, all parts with aromatic oil glands. Leaves alternate, rarely opposite or subopposite, coriaceous and evergreen, rarely membranous and annual, penniveined or 3–5-nerved, usually with a distinct network of veins, very rarely (*Cassytha*) reduced to small scales; stipules 0; leaf-buds often scaly. Flowers small, greenish or yellowish, in axillary or subterminal, rarely terminal, cymose or racemose inflorescences, rarely solitary; bracts caducous or subpersistent, sometimes forming involucres below the partial inflorescences; bracteoles 0, except in *Cassytha*.

Species about 1000, in the tropics and subtropical regions; few in Africa.

Cinnamomum zeylanicum, Linn., is often cultivated for the sake of its aromatic bark, and *Persea gratissima*, Gaertn., the Avocado pear, for its edible fruit.

Leaf-bearing trees and shrubs.
- Anthers 2-valved.
  - Fruit completely enclosed in the persistent and accrescent receptacle . . . . . 1. CRYPTOCARYA.
  - Fruit free; perianth deciduous . . . . 2. TYLOSTEMON.
- Anthers 4-valved.
  - Valves collateral; ovary inferior . . . . 3. HYPODAPHNIS.
  - Valves superposed; ovary superior . . . . 4. OCOTEA.

Leafless slender climbers . . . . . 5. CASSYTHA.

1. **CRYPTOCARYA**, R. Br.; Benth. et Hook. f.

Gen. Pl. iii. 150.

Flowers hermaphrodite. Perianth herbaceous; receptacle ovoid to turbinate or subcylindric, after flowering constricted above, persistent; lobes 6, in 2 whorls, subequal, deciduous. Stamens in 4 whorls, the outer 2 whorls fertile and inserted at the base of the perianth-lobes, the third fertile, and like the fourth, which is staminodial, inserted in the upper part of the receptacle; anthers 2-valved, of the two outer whorls introrse, of the third extrorse; filaments short, those of the third whorl with a pair of sessile or stipitate glands at the base or in front of it; staminodes ovoid and shortly stipitate or attenuated at the base. Ovary sessile, enclosed in the receptacle; style shortly exserted. Fruit globose or oblong, enclosed in the enlarged indurated or somewhat fleshy receptacle, smooth or longitudinally ribbed; pericarp membranous or indurated, more or less free from the receptacle. Testa membranous, not or imperfectly separable from the pericarp.—Trees or shrubs. Leaves alternate, rarely subopposite, penninerved or 3-nerved, coriaceous. Flowers small, in subterminal or axillary panicles.

About 40 species in the tropics, mostly in the Indo-Malayan region, and in extra-tropical South Africa.

1. **C. liebertiana,** *Engl. Jahrb.* xxvi. 390, *t.* 10, *fig. B.* A tree of medium size; branches and leaves (particularly the petiole and

midrib) fulvo-pubescent when young, soon glabrous. Leaves ovate to elliptic, subacute to subacuminate, acute at the base, 2½–4 in. long, 1¼–2 in. broad, coriaceous, green above, glaucescent beneath; lateral nerves 4–5 on each side, the lowest pair more oblique than the others and somewhat distant from them, reticulation very close and fine below; petioles 4–8 lin. long. Inflorescences up to 10 lin. long, greyish or fulvo-pubescent, 7–9-flowered; peduncle slender, 5–7 lin. long; pedicels up to ¾ lin. long or hardly any. Perianth not quite 1½ lin. long, sparingly pubescent without; receptacle oblong, ¾–1 lin. long; segments elliptic, the inner slightly narrower than the outer, all finely pubescent within. Filaments pubescent; anthers ovate, acuminate, outer 6 about ⅜ lin. long, inner smaller, narrowly acute; staminal glands stipitate, their stalks inserted between the stamens of the second and third whorl, but converging in pairs towards the latter; staminodes substipitate. Fruit globose, 6–8 lin. in diam.

Mozamb. Dist. German East Africa: Usambara, on mountain slopes near Muafa, 3600 ft., *Buchwald*, 167 ! 492 !

Buchwald's specimen 492 in the British Museum collections has globose fruits, black with a bluish bloom, and crowned with the short persistent cylindric neck of the receptacle. Engler, on the other hand, describes the fruit as reddish-hairy.

2. **TYLOSTEMON**, Engl. Jahrb. xxvi. 389.

Flowers hermaphrodite. Perianth herbaceous, campanulate, turbinate or hemispheric, 6- (rarely 8-) lobed; receptacle cupular or turbinate, usually occupying half of the perianth; lobes equal or subequal, small. Stamens in 4 whorls, the outer 2 whorls fertile, inserted at or just above the base of the perianth-lobes, the third fertile or like the fourth staminodial and inserted in the upper part of the receptacle; anthers 2-valved, of the 2 outer whorls introrse, of the third (if fertile) extrorse or subextrorse; filaments of the 2 outer whorls broad, much shorter to somewhat longer than the anthers, more or less papillose to villous, of the third whorl similarly hairy, much more slender, with a large gland at each side; glands either adnate to the very base or up to or beyond the middle of the filament, very rarely (*T. ugandensis*) fused with the receptacle and lining it as a fleshy disk; staminodes (of the third whorl if barren) usually reduced to the filaments and glands, of the fourth whorl usually representing reduced anthers, sessile or subsessile, triangular, subcordate or subhastate, rarely reduced to rudimentary filaments. Ovary sessile, more or less immersed in the receptacle, attenuated into the slender style; stigma small. Fruit oblong, borne on the slightly thickened or sometimes obconical pedicels; pericarp crustaceous. Seed with a delicate testa, adnate to the pericarp; cotyledons large, plano-convex.—Trees or shrubs, glabrous with the exception of the leaf-buds, and usually also the inflorescences. Leaves alternate, rarely subopposite, penninerved. Flowers small, greenish, in sometimes large and many-flowered axillary or subterminal panicles, with small boat-shaped early deciduous bracts.

About 21 species, mostly in West Africa.

*ENNEARRHENA.—Stamens of the third whorl perfect, with extrose anthers.
†Staminal glands not fused with the receptacle.
‡Leaves 6–15 in. by 2–5 in.
Leaves sessile, cordate at base . . . . 1. *T. sessilifolius.*
Leaves petioled.
Flowers very small, $\frac{3}{4}$–1 lin. long; inflorescences pubescent all over.
Leaves elliptic-oblong, 2–3 times as long as broad; perianth finely pubescent . . 2. *T. fruticosus.*
Leaves lanceolate to oblong, 3–4 times as long as broad.
Perianth densely pubescent without and within; ovary hairy . . . . 3. *T. Preussii.*
Perianth glabrous or nearly so; ovary glabrous . . . . . 4. *T. minutiflorus.*
Flowers 1 to over $1\frac{1}{2}$ lin. long.
Inflorescences and flowers fulvo-tomentellous; perianth up to more than $1\frac{1}{2}$ lin. long; receptacle rather narrow . . . . 5. *T. grandifolius.*
Inflorescences sparingly and very finely pubescent or glabrous; perianth hemispheric to wide-campanulate or turbinate.
Perianth sparingly but evenly pubescent all over; segments oblong, $\frac{2}{3}$ the length of the perianth . . . . . 6. *T. Staudtii.*
Perianth glabrous or nearly so; segments broad-ovate or rotundate, $\frac{1}{2}$–$\frac{1}{3}$ the length of the perianth . . . . . 7. *T. Mannii.*
‡‡Leaves 2–6 in. by 1–$2\frac{1}{2}$ in.
Pedicels 1–$3\frac{1}{2}$ lin. long; inflorescences and flowers glabrous, or the latter nearly so . . . 8. *T. longipes*
Pedicels $\frac{1}{2}$–1 lin. long; inflorescences finely pubescent all over.
Leaves 4–6 in. by $1\frac{1}{2}$–2 in.; panicles up to 1 in. long, dense, many-flowered . . . 9. *T. cinnamomeus.*
Leaves 2–4 in. by 1–$1\frac{3}{4}$ in.; panicles not dense and many-flowered.
Leaves drying copper-red, particularly below 10. *T. batangensis.*
Leaves drying brown.
Leaves lanceolate, coriaceous, drying chestnut-brown; staminodes triangular . 11. *T. nitidus.*
Leaves elliptic to lanceolate-oblong, thinly coriaceous, drying dark brown; staminodes filiform . . . . . 12. *T. Dinklagei.*
††Staminal glands fused with the perianth, drying deep black . . . . . 13. *T. ugandensis.*

**HEXARRHENA.—Stamens of the third whorl barren, usually conical or cylindric (see 19, *T. papyraceus*).
Panicles 4 to over 8 in. long, more or less drooping, very many-flowered.
Perianth densely greyish or fulvous-tomentellous.
Perianth up to 2 lin. long; style enclosed . . 14. *T. caudatus.*
Perianth up to 1 lin. long; style early exserted . 15. *T. euryneurus.*

Perianth sparingly and minutely pubescent, drying black, not quite 1 lin. long . . . . 16. *T. Zenkeri.*
Panicles 1–2 in. long, on short peduncles.
Leaves distinctly coriaceous.
Leaves 5–9 in. by 1½–4 in., drying brown . . 17. *T. gaboonensis.*
Leaves 3–5 in. by 1½–2½ in., drying dark and dull brown (fuscous) . . . . . 18. *T. obscurus.*
Leaves papery or almost membranous.
Leaves papery, elliptic-oblong, rounded at the base; ovary pubescent . . . . . 19. *T. papyraceus.*
Leaves almost membranous, gradually attenuate at the base; ovary glabrous . . . . 20. *T. membranaceus.*

1. **T. sessilifolius,** *Stapf.* Branches stout, drying grey, glabrous. Leaves sessile, oblanceolate-oblong, acuminate (acumen slender and up to 1 in. long), narrowed from above the middle towards the base, cordate with rounded auricles, up to 15 in. long and 4½ in. broad, papery, glabrous, drying fuscous-brown, slightly shining; midrib flat or nearly so and moderately broad above, raised and rather narrow below; lateral nerves about 12 on each side, ascending, the lower much more oblique than the upper, not or indistinctly looping, like the loose elegant reticulation raised on both sides. Panicle over 3 in. by 2 in., rather slender, finely pubescent in the upper part; peduncle short; lower branches distant, up to 2 in. long, undivided up to half-way, much divided and many-flowered higher up; ultimate branchlets and pedicels very short, the latter filiform, under 1 lin. long. Perianth (not quite open) subglobose-turbinate, ¾ lin. long, very finely pubescent without; receptacle about half the length of the perianth; segments rotundate. Introrse stamens with filaments as long and broad as the short anthers, minutely and sparingly hairy at the base of the anthers and along the middle line of the filament; extrorse stamens with a hairy tip to the connective and a roundish large gland at each side of the base of the filament; staminodes triangular. Ovary glabrous.—*Afrodaphne sessilifolia*, Stapf in Journ. Linn. Soc. xxxvii. 111. *Beilschmiedia sessilifolia*, Engl. ex Stapf, l.c.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2256!

2. **T. fruticosus,** *Stapf.* A shrub, 5 ft. high, with greyish or green branches; leaf-buds minutely fulvo-tomentose. Leaves elliptic-oblong, acuminate (acumen up to 1 in. long), obtuse at the base, 8–12 in. long, 3–5 in. broad, thinly coriaceous, glabrous, drying brown, slightly shining; midrib rather broad, flat or slightly convex above, prominent and rounded underneath; lateral nerves 7–9 on each side, curved, intermediate 1–2 in. apart, the lower more oblique than the upper spreading, sunk above, raised below, loose reticulation raised on both sides; petiole stout, 3 lin. long, narrowly channelled above. Panicles 3–4 in. long, up to 2½ in. wide, slender, finely fulvo-pubescent all over; peduncle ½–1½ in. long; lowest branches up to more than 1 in. long, distant, undivided in the lower third or half, then copiously divided and many-flowered; ultimate branchlets and pedicels filiform, short, the

latter ½ lin. long; bracts boat-shaped, subacute, 2 lin. long. Perianth (not quite open) globose-turbinate, up to ¾ lin. long, very finely puberulous without; receptacle not quite half the length of the perianth; segments rotundate. Introrse stamens with very short filaments, almost as broad as the anthers, bearded laterally below the anthers; extrorse stamens with very sparingly and minutely hairy filaments, with a large gland on each side of the base; staminodes subcordate-lanceolate. Ovary glabrous, gradually passing into a style of equal length.—*Beilschmiedia fruticosa*, Engl. Jahrb. xxvi. 386, t. ix. fig. B. *Afrodaphne fruticosa*, Stapf in Journ. Linn. Soc. xxxvii. 111.

Upper Guinea. Cameroons: Lolodorf, in the underwood of the primæval forest, 150–1600 ft., *Staudt*, 403! Bipinde, Morisei waterfall, at 250–350 ft., *Zenker*, 1063!

Engler distinguishes Zenker 1063 as a variety *tetramera*, characterised by tetramerous flowers. The flowers of Zenker 1063 which I examined were all trimerous. As the number of parts varies also in other species from 3 to 4, even in the same inflorescence, I have neglected Engler's distinction.

3. **T. Preussii,** *Stapf.* A shrub with glabrous green branchlets. Leaves lanceolate, long-acuminate (acumen up to 10 lin. long), acute at the base, up to 10 in. by not quite 3 in., thin; lateral nerves 7–8 on each side, ascending; petiole terete, deeply channelled, about 5 lin. long. Panicles as long as the leaves, very shortly rusty-pubescent, lax, with long slender branches; pedicels as long as the flowers or slightly longer. Perianth ¾ lin. in diam., wide-turbinate, hairy within and without; segments ovate, under ½ lin. long, with long hairs at the base of the filaments. Extrorse stamens with a suborbicular 2-lobed gland on each side of the base; staminodes reduced to ovate glands. Ovary long-hairy, passing into a short conoid style.—*Beilschmiedia Preussii*, Engl. Jahrb. xxvi. 387, t. ix. fig. C. *Afrodaphne Preussii*, Stapf in Journ. Linn. Soc. xxxviii. 111.

Upper Guinea. Cameroons: in open forest between Victoria and Bimbia, *Preuss*, 1272.

4. **T. minutiflorus,** *Stapf.* Branches glabrous, drying greenish brown; leaf-buds finely acuminate, fulvous-velvety. Leaves oblong, acuminate (acumen linear, to over ½ in. long), shortly acute or rounded at the base, 6 to almost 12 in. long, 2–3 in. broad, coriaceous, glabrous, drying greenish brown, concolourous; midrib slightly convex (rarely flat) above, moderately raised below; lateral nerves 8–10 on each side, very obliquely ascending, distinctly looping (at least towards the tips), with an additional submarginal nerve, like the loose reticulation raised on both sides; petioles 3–5 lin. long, stout, channelled above. Panicles terminal and axillary, up to more than 6 in. long and wide, very finely pubescent all over, with the exception of the flowers; peduncle short or up to 2 in. long, slender; lower branches obliquely spreading, up to 4 in. long, undivided almost to the middle, then much divided and many-flowered; bracts ovate, cymbiform, up to 3 lin. long, tomentose dorsally, deciduous; pedicels ½–1 lin. long during flowering, at length

up to $1\frac{1}{2}$ lin. long, filiform. Perianth hemispheric, up to 1 lin. long, glabrous except the ciliolate margins; receptacle about $\frac{1}{2}$ the length of the perianth, rather thick-walled, glabrous within; segments rotundate. Introrse stamens with very short obovate-quadrate filaments, slightly hairy on the back and bearded laterally at the base of the anthers, extrorse narrower, glabrous except for a tuft of hairs on the front of the filament, with a large roundish gland at each side of the base; staminodes ovate-lanceolate, villous on the back. Ovary glabrous. Young fruits oblong, apiculate.—*Oreodaphne? minutiflora*, Meisn. in DC. Prodr. xv. i. 130. *Afrodaphne minutiflora*, Stapf in Journ. Linn. Soc. xxxvii. 111. *Beilschmiedia*, Benth. et Hook. f. Gen. Pl. iii. 158.

Lower Guinea. Gaboon River, *Mann!*

5. **T. grandifolius,** *Stapf.* Branches stout, drying dull brown; leaf-buds rather large, acuminate, very finely velvety. Leaves oblanceolate-oblong, very shortly and acutely acuminate, gradually attenuated at the base, 6–10 in. long, 3–$3\frac{1}{2}$ in. broad, coriaceous, glabrous; midrib acutely and shallowly channelled above, very prominent below; lateral nerves 6–7 on each side, very oblique, running out along the margin, slightly sunk above, prominent below, reticulation very loose, raised on both sides, particularly below; petiole very stout, rugose, slightly channelled above. Panicles subterminal, very many-flowered, up to 5 in. by 3 in., very minutely fulvous-tomentellous all over; peduncle short, like the rhachis more or less compressed; lower branches 2 in. long, sometimes spreading, undivided up to $\frac{3}{4}$–1 in.; ultimate branchlets and pedicels short, the latter rarely over 1 lin. long; bracts boat-shaped, apiculate, up to 3 lin. long, deciduous. Perianth campanulate, up to over $1\frac{1}{2}$ lin. long, very finely downy without; receptacle $\frac{1}{2}$ to $\frac{2}{3}$ the length of the perianth, thick-walled; segments ovate, the inner broader, almost rotundate. Introrse stamens with papillose filaments about as long as the short anthers, slightly narrower towards the base; extrorse stamens with densely tomentellous sublinear filaments and a large gland at each side of the base; staminodes subcordate-triangular, pubescent on the outer side. Ovary gradually tapering into a style of equal length.—*Afrodaphne grandifolia*, Stapf in Journ. Linn. Soc. xxxvii. 111. *Cryptocarya? grandifolia*, Engl. ex Stapf, l.c.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2250! 2250A!

6. **T. Staudtii,** *Stapf.* A shrub. Branchlets very minutely rusty-pubescent when quite young. Leaves oblong to oblong-lanceolate, acute or shortly acuminate, acute at the base, 6–9 in. long, $2\frac{1}{2}$–3 in. broad, thinly coriaceous, glabrous, drying dull greenish-brown; midrib flat above, moderately raised below; lateral nerves 7–8 on each side, ascending, running into a submarginal nerve, like the loose reticulation more raised below than above; petiole about 4 lin. long. Panicle many-flowered, up to 3 in. long, not much over 1 in. wide, rather contracted, sparingly and very finely pubescent; peduncle short; lower branches about 1 in. long, divided from low down; bracts fulvous

tomentellous dorsally, 2–3 lin. long, early deciduous; pedicels filiform, not much over ½ lin. long. Perianth wide-campanulate, 1½ lin. long, loosely and minutely pubescent; receptacle ⅓ the length of the perianth, but well defined; segments oblong, very obtuse, ciliolate. Introrse stamens with broad-linear filaments, very sparingly hairy, almost twice the length of the anthers, extrorse narrower, rather more hairy, with a large gland at each side of the base; staminodes subhastate, acuminate, hairy without. Ovary glabrous, almost as long as the slender style.—*Beilschmiedia Staudtii*, Engl. Jahrb. xxvi. 387, t. 9, fig. D. *Afrodaphne Staudtii*, Stapf in Journ. Linn. Soc. xxxvii. 111.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, *Staudt*, 857!

7. **T. Mannii,** *Stapf.* A tree, about 20 ft. high; branches moderately stout, the old grey, the young drying greenish-brown, striate, somewhat compressed upwards; leaf-buds adpressedly greyish to fulvous-pubescent. Leaves lanceolate, oblanceolate or oblong, acute or acuminate (acumen over ½ in. long, attenuated from a broader base), acute (rarely subobtuse) at the base, 4–9 in. long, 1½–4 in. broad, thinly coriaceous, drying greenish-brown; midrib flat or nearly so above, sometimes rather broad, prominent and rounded below; lateral nerves 7–10 on each side, ascending, running out along the margin, fine above, stouter beneath, like the loose reticulation raised on both sides; petiole ¼–½ in. long, more or less channelled above. Panicles subterminal and on short sparingly leafy lateral branches, 2–6 in. long, 1½–4 in. broad, very sparingly pubescent or glabrous; peduncle short, like the rhachis more or less compressed; lower branches spreading, 1–4 in. long, loosely but copiously divided above the lower ⅓ or ½; ultimate branchlets and pedicels filiform, the latter usually not exceeding 1 lin. (rarely 2 lin.) long; bracts small and very early deciduous. Perianth broad-turbinate to hemispheric, up to almost 1½ lin. long, glabrous except for the ciliolate margins or sparingly and minutely pubescent outside; receptacle ½–⅖ the length of the perianth or nearly so; lobes broad-ovate or rotundate. Introrse stamens with the filaments somewhat longer than the short anthers and hairy along the edges and the middle line and on their back; extrorse anthers with linear, more or less hairy filaments and a large roundish gland on each side of their base; staminodes ovate to subhastate, acuminate or apiculate, hairy on the outer side. Ovary glabrous, gradually passing into a style of about equal length. Fruit oblong, stipitate, over 1½ in. long, about ⅔ in. in diam., obtuse, brown, somewhat shining; stipes solid, 3 lin. long. Seed over 1 in. long.—*Oreodaphne? Mannii*, Meisn. in DC. Prodr. xv. i. 130. *Beilschmiedia sp.*, Benth. et Hook. f. Gen. Pl. iii. 152, 158. *B. elata*, Scott-Elliot in Journ. Linn. Soc. xxx. 96 (excl. Mann, 2255*a*). *Afrodaphne Mannii* and *A. elata*, Stapf in Journ. Linn. Soc. xxxvii. 111.

Upper Guinea. Sierra Leone: near Musaia, Falaba, *Scott-Elliot*, 5125! Mofari, Scarcies River, *Scott-Elliot*, 4400! Cameroons: Bipinde, *Zenker*, 1695! 2609! 3167!

Lower Guinea. Gaboon: by the Gaboon River, *Mann!*

8. **T. longipes,** *Stapf.* A tree, 20 ft. high, glabrous with the exception of the fulvous-velvety leaf-buds; branches drying greenish-brown. Leaves oblong to elliptic-oblong, abruptly and shortly acuminate, obtuse or shortly acute at the base, 4–6 in. long, 2–2½ in. broad, coriaceous, glabrous, drying brownish-green; midrib flat or slightly concave above, prominent below; lateral nerves 6–7 on each side, obliquely ascending, indistinctly looping, like the loose reticulation slightly raised on both sides; petioles 4–5 lin. long, channelled above. Panicles subterminal and also from last year's wood, very lax, subdivaricate, about 4 in. long and wide, glabrous; peduncles short; branches subopposite (particularly the lower) or alternate, very slender; bracts very early deciduous (not seen); pedicels finely filiform, 1–3½ lin. long. Perianth depressed hemispheric when quite open, up to 1½ lin. high, quite glabrous except for the inner segments, which are more or less minutely pubescent towards the tip and ciliolate; receptacle less than ½ the length of the perianth; segments rotundate. Introrse stamens with villous filaments, distinctly longer than the anthers and at least as broad, extrorse with narrower villous filaments, more than twice the length of the anther, and large sessile glands at each side of the base; staminodes subhastate, acuminate, villous without, glabrous within. Ovary glabrous, as long as the slender style.—*Beilschmiedia elata*, Scott-Elliot in Journ. Linn. Soc. xxx. 96, partly.

Upper Guinea. Old Calabar, *Mann*, 2255 (partly)! 2255A!

9. **T. cinnamomeus,** *Stapf.* Branches slender; the young drying cinnamon-colour, the old dark greyish-brown; leaf-buds finely fulvous-tomentellous. Leaves oblong to oblanceolate-oblong, acuminate, acute or rarely obtuse at the base, 4–6 in. long, 1½–2 in. broad, thinly coriaceous, drying brown to cinnamon-colour, glabrous; midrib slender, rather flat above; lateral nerves 8–10 on each side, the lower running out along the margin, the upper looping, like the loose reticulation faintly raised; petiole up to 2 lin. long, channelled above. Panicles subterminal, ¾–1 in. long and wide, dense; branches up to more than ½ in. long, like the branchlets and pedicels filiform, very finely fulvo-pubescent all over; bracts boat-shaped, 1 lin. long, early deciduous; pedicels up to almost 1 lin. long, mostly much shorter. Perianth broad-turbinate, 3- or 4-merous, not quite 1 lin. long, finely greyish-brown pubescent without; receptacle ½ the length of the perianth or nearly so; segments broad-ovate, ciliolate. Introrse stamens with the filaments longer and narrower below than the very short anthers and densely villous on the back, glabrous in front except at the edges; extrorse anthers with linear more or less papillose-villous filaments and a large gland on each side of the base; staminodes rather thin, lanceolate-triangular, acuminate, villous on the outer side. Ovary glabrous, as long as the slender style.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2855!

10. **T. batangensis,** *Engl. Jahrb.* xxvi. 390. A tree with pale greyish bark, young branches drying greenish; leaf-buds fulvous-

velvety. Leaves oblong to oblong-elliptic, acuminate, acute at the base, $2\frac{1}{2}$–4 in. long, 1–$1\frac{3}{4}$ in. broad, thinly coriaceous, glabrous, drying almost copper-red, particularly below; midrib slender, flat above, prominent and rather acute below; lateral nerves 6–8 on each side, ascending, looping, very slender, like the lax reticulation slightly prominent below; petiole slender, 4–5 lin. long. Inflorescences and flowers unknown. Fruiting panicles lateral and subterminal, spreading, up to $2\frac{1}{2}$ in. long; pedicels up to 3 lin. long, thickened upwards. Fruit obliquely oblong, mostly slightly curved, sometimes obscurely and obtusely acuminate, up to 1 in. long, $\frac{1}{2}$ in. in diam.

Upper Guinea. Cameroons: Batanga, in dry forests, *Dinklage*, 1375!

11. **T. nitidus,** *Stapf.* An arborescent shrub, 15–25 ft. high, with slender densely leafy branchlets, drying brown; leaf-buds adpressedly fulvous-pubescent. Leaves lanceolate to oblong-lanceolate, shortly acuminate, rarely subobtuse, subacute at the base, up to 4 in. long and $1\frac{1}{4}$ in. broad, coriaceous, glabrous, more or less shining above; midrib very slender and rather flat above, somewhat raised below; lateral nerves 8–10 on each side, looping some distance from the margin, like the loose reticulation faintly raised, particularly below; petiole finely channelled above, 3–4 lin. long. Panicles axillary, numerous, 1–$1\frac{3}{4}$ in. long (including the short peduncle), up to over 1 in. broad, finely and densely rufo-pubescent all over; branches ascending, 4–5 lin. long; branchlets and pedicels very short, the latter not quite $\frac{1}{2}$ lin. long. Perianth broad-turbinate, $\frac{3}{4}$ lin. high, up to $1\frac{1}{4}$ lin. in diam., finely pubescent without; receptacle $\frac{1}{2}$ the length of the perianth, glabrous within; segments rotundate, ciliolate. Introrse stamens with more or less hairy filaments, about as long as the very short anthers, but narrower; extrorse anthers with linear loosely hairy filaments and a large roundish gland on each side of the base; staminodes subhastate, acute, glabrous within. Ovary glabrous, suddenly contracted into a slender, slightly longer style.—*Beilschmiedia nitida*, Engl. Jahrb. xxvi. 387, t. 9, fig. E. *Afrodaphne nitida*, Stapf in Journ. Linn. Soc. xxxvii. 111.

Upper Guinea. Cameroons: Lolodorf, in shady, moist places, 1600 ft., *Staudt*, 104! 106!

12. **T. Dinklagei,** *Engl. Jahrb.* xxvi. 389. A tree or shrub with slender branches, young ones drying greenish-brown, old covered with pale bark; leaf-buds finely and adpressedly pubescent. Leaves elliptic- to lanceolate-oblong, gradually contracted into an acute rather long acumen, obtuse at the base, $1\frac{3}{4}$–3 in. long, 1–$1\frac{1}{2}$ in. broad, thinly coriaceous, drying brown, glabrous; midrib very slender, rather flat above, slightly raised below; lateral nerves 6–8 on each side, obliquely spreading, looping, fine, raised on both sides, reticulation loose, faintly raised below, obscure above; petiole 3–5 lin. long, slender, channelled above. Panicles axillary, 2–$2\frac{1}{2}$ in. long, finely pubescent; peduncle more than $\frac{1}{2}$ in. long, more or less compressed; lower branches

spreading, up to 1 in. long, loosely flowered; ultimate branchlets and pedicels filiform, the latter up to 1 lin. long, clavate in fruit. Perianth broad-turbinate, scarcely 1½ lin. long, very minutely pubescent without, greenish; receptacle ½ the length of the perianth or almost so, sparingly and minutely hairy within; segments ovate to broad ovate-oblong, very sparingly and minutely hairy upwards. Introrse stamens with filaments as long as and narrower than the anthers and papillose along the edges and middle front line; extrorse anthers with slender papillose filaments and a large gland on each side; staminodes filiform, hairy. Ovary glabrous, very gradually passing into the slender style. Fruit oblong, about 1 in. long, not quite ½ in. in diam.

Upper Guinea. Cameroons: Batanga, in dry, open forests, *Dinklage*, 1140!

13. **T. ugandensis,** *Stapf.* A shrub; old branches with a rough greyish bark, young ones smooth, drying blackish; leaf-buds fulvous, silky-velvety. Leaves elliptic, obtuse to obscurely acuminate, obtuse to rounded at the base, 4–6 in. long, 2 to over 3 in. broad, coriaceous, glabrous, drying brown, very dark above; midrib flat above, rounded and moderately prominent below; lateral nerves 9–11 on each side, rather spreadingly oblique, indistinctly looping, like the reticulation faintly raised above, more so below; petiole 3–4 in. long, stout, shallowly channelled above. Panicles axillary, 1–3 in. long, 1½–2 in. wide, finely rufo-puberulous all over; peduncle ½–1 in. long; lowest branches more or less spreading, undivided to ⅓ or ½ way up, then copiously branched, many-flowered; ultimate branchlets and pedicels subfiliform, the latter up to over 2 lin. long. Perianth greenish, very shallowly turbinate, 3- or 4-merous, very minutely fulvo- or rufo-puberulous, 1½ to over 2 lin. in diam.; receptacle about ⅔ the length of the perianth, rather fleshy from the large adnate staminal glands, which dry a deep black, hairy at the base within; segments rotundate-ovate, minutely hairy inside. Introrse stamens subsessile, hairy on both sides; extrorse stamens with a villous filament about as long as the anther and a large gland on each side; staminodes very small, ovate, villous on the outer side. Ovary glabrous, as long as the style.—*Beilschmiedia ugandensis*, Rendle in Journ. Linn. Soc. xxxvii. 203.

Nile Land. Uganda: shore of Victoria Nyanza, to the north of Bakova River, *Bagshawe*, 142!

14. **T. caudatus,** *Stapf.* Branchlets drying blackish. Leaves oblong, caudate-acuminate (tips slender, to over 1 in. long), obtuse at the base, about 9 in. long, up to 3½ in. broad, coriaceous, quite glabrous, concolorous, somewhat shining below, drying greenish-brown; lateral nerves about 8 on each side, curved, looping within an additional submarginal nerve, reticulation of veins distinct on both sides; petioles 3 lin. long, stout. Panicle lax, up to 8 in. long, finely fulvo-puberulous; peduncle up to 3 in. long; bracts few, ovate, concave, deciduous, up to 2 lin. long, fulvo-tomentellous; pedicels 1–2 lin. long. Perianth turbinate, 1½–2 lin. long, fulvo-tomentellous without; receptacle ¾ lin. high,

not constricted at the base; lobes ovate, subacute. Stamens of the first and second series inserted at the base of the lobes, with very short puberulous filaments and apiculate anthers; of the third series reduced to staminodes, inserted low down in the receptacle, conical, densely papillose with a large roundish gland on each side; of the fourth series reduced to papillose eglandular filaments. Pistil shorter than the perianth.—*Afrodaphne caudata*, Stapf in Journ. Linn. Soc. xxxvii. 112, and in Johnston, Liberia, ii. 645, fig. 263.

Upper Guinea. Liberia: Sinoe Basin, *Whyte*.

15. **T. euryneurus,** *Stapf.* Branchlets drying blackish. Leaves oblong, shortly acuminate or almost mucronate (tip very narrow), rounded at the base, up to 8 in. long and $3\frac{1}{4}$ in. wide, coriaceous, glabrous; lateral nerves about 8 on each side, looping, with an additional submarginal nerve, rather prominent below, reticulation of veins loose, distinct on both sides; petioles stout, up to 6 lin. long. Panicle lax, 4–8 in. long, fulvous or greyish puberulous; peduncle 1–3 in. long; bracts few, ovate, acute, concave, up to 2 lin. long, fulvous or greyish tomentellous; pedicels slender, 1 lin. long. Perianth shortly turbinate-globose, not quite 1 lin. long, fulvous or greyish tomentellous without; receptacle $\frac{2}{3}$–$\frac{3}{4}$ the length of the perianth; lobes broad-ovate, subacute. Stamens of the first and second whorl inserted at the base of the lobes with very short broad puberulous filaments and exapiculate papillose anther-tips; of the third order reduced to conical, densely papillose staminodes with a stout roundish gland on each side; of the fourth order reduced to a pair of fleshy glands held together by a papillose filament. Style shortly exserted from the perianth already before the opening of the flower.—*Afrodaphne euryneura*, Stapf in Journ. Linn. Soc. xxxvii. 112, and in Johnston, Liberia, ii. 645.

Upper Guinea. Liberia: Sinoe Basin, *Whyte*.

16. **T. Zenkeri,** *Stapf.* A shrub about 12 ft. high with slender branches which dry dark brown; the youngest parts very finely rusty-pubescent. Leaves elliptic to oblong, obtuse or obtusely acuminate, obtuse at the base, 5–8 in. long, 2–$3\frac{1}{2}$ in. wide, coriaceous, glabrous, drying light greenish-brown, somewhat shining; midrib flat above, convex and rather prominent below; lateral nerves about 6–8 on each side, oblique, looping, with a fine additional submarginal nerve, prominent below, less so above, reticulation raised and conspicuous below, faint above; petiole 3–4 lin. long. Panicle up to 6 in. long and wide, loose, sparingly and finely pubescent; branches spreading, undivided for 1–$1\frac{1}{2}$ in.; bracts boat-shaped, apiculate, fulvo-tomentellous on the back or (the lower) only along the edges, up to 3 lin. long; pedicels very slender, 1–$1\frac{1}{2}$ (rarely $2\frac{1}{2}$) lin. long. Perianth globose-turbinate, up to 1 lin. long, very minutely and sparingly pubescent; receptacle $\frac{2}{3}$ the length of the perianth; lobes broad, rotundate-ovate. Stamens of the first and second whorl with broad and very short

filaments, loosely hairy on the back, the sides and the middle line on the front; staminodes of the third whorl subcylindric, hairy on the outer side, with a roundish gland on each side, of the fourth order short, oblong, hairy. Ovary glabrous.—*Beilschmiedia Zenkeri*, Engl. Jahrb. xxvi. 388. *Afrodaphne Zenkeri*, Stapf in Journ. Linn. Soc. xxxvii. 111.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 698B! forming underwood in primeval forest, Yaunde, *Staudt*, 109.

17. **T. gaboonensis,** *Stapf.* A shrub. Branches glabrous, drying brown or blackish; leaf-buds acuminate, finely greyish or fulvo-pubescent. Leaves oblong, acute or obscurely acuminate, subobtuse or acute at the base, 5–9 in. long, 1½–4 in. wide, coriaceous, glabrous, drying brown; midrib flat above and ½ to almost 1 lin. wide near the base, raised below; lateral nerves about 9 on each side, obliquely ascending, indistinctly looping, like the loose reticulation raised on both sides; petiole ½–¾ in. long, stout, slightly grooved above. Panicles terminal or subterminal from the axils of the uppermost leaves, 1–2½ in. long, all over very finely greyish or fulvous-pubescent, many-flowered; peduncles from a few lines to over 1 in. long; bracts ovate, fulvo-tomentellous, up to 2 lin. long, caducous; branchlets and pedicels filiform, the later ¼ to almost 1 lin. long. Perianth turbinate, up to 1 lin. long, finely fulvous-pubescent; receptacle ⅔ the length of the perianth; segments broad-ovate, obtuse. Stamens with very broad and short obovate, more or less villous filaments; outer staminodes oblong to cylindric, villous with a pair of comparatively small glands at the base, inner ovoid to oblong, minutely villous with the exception of the tips. Ovary glabrous, gradually tapering into the short style.—*Oreodaphne gaboonensis*, Meisn. in DC. Prodr. xv. i. 130. *Beilschmiedia sp.*, Hook. f. in Benth. et Hook. f. Gen. Pl. iii. 158. *Afrodaphne gaboonensis*, Stapf in Journ. Linn. Soc. xxxvii. 112.

Upper Guinea. Southern Nigeria: Old Calabar, *Mann*, 2255 (partly)!

Lower Guinea. Gaboon River, *Mann*, 979!

The panicles of the Old Calabar plant are much laxer than those from the Gaboon River; but the flowers (very young in both specimens) dissect alike, and the foliage seems to be indistinguishable.

18. **T. obscurus,** *Stapf.* Branchlets drying blackish. Leaf-buds lanceolate-ovoid, acuminate, fulvous-velvety, somewhat silky. Leaves oblong to obovate- or elliptic-oblong, obtuse to obtusely subacuminate, acute or subacute at the base, 3–5 in. long and 1½–2½ in. wide, coriaceous, glabrous, drying dull and dark greenish-brown; lateral nerves 7–11 on each side, looping, with a frequently indistinct additional marginal nerve, equally prominent on both sides; midrib narrow and flat above, convex and very prominent below, reticulation loose and raised on both sides; petioles rather stout, 3–5 lin. long. Panicles axillary, rather remote from the branch-tips or subterminal and terminal

and then sometimes gathered into a leafy compound panicle, 1½–2 in. long, all parts like the flowers greyish-fulvous puberulous; peduncle very short; bracts boat-shaped, ovate, 3–4 lin. long; pedicels ¼–½ lin. long. Perianth globose-turbinate, ½ lin. to 1 lin. long; receptacle ⅔ the length of the perianth; lobes rotundate-ovate. Stamens of the first and second whorl with very short and broad obovate hairy filaments; staminodes of the third whorl conical, hairy except at the tip, with a stout roundish gland on each side, of the fourth order ovate, acute, hairy without, rather thin. Ovary glabrous; style not exceeding the perianth.—*Beilschmiedia obscura*, Engl. ex Stapf in Journ. Linn. Soc. xxvii. 112. *Afrodaphne obscura*, Stapf, l.c. (name only).

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2117! 2612! Gaboon (?) Como, by streams, *Bates*, 845!

19. **T. papyraceus,** *Stapf.* Branches pubescent when young, soon glabrescent, drying dark brown; leaf-buds reddish tomentose, acuminate. Leaves elliptic-oblong, subobtuse or subacuminate, rounded at the base, 4–8 in. long, 2–3 in. broad, papery, drying dull greenish-brown above, reddish-brown below, glabrous; midrib flat or shallowly channelled above, much raised below; lateral nerves 9–11 on each side, rather straight, then curved towards the margin, and looping close to it, faintly sunk above, raised below, reticulation loose, slightly raised on both sides; petiole rather stout, faintly channelled above, 3–4 lin. long. Panicle slender, up to 2 in. long, including the peduncle (over 1 in. long), fulvo-pubescent all over; bracts ovate, acute, up to 2 lin. long, densely fulvo-tomentose; branchlets and pedicels filiform, the latter ½–¾ lin. long. Perianth turbinate, not quite 1 lin. long, finely and minutely fulvo-puberulous; receptacle ⅔ the length of the perianth; segments broad-ovate, obtuse, more or less pubescent within. Stamens sparingly and minutely papillose-pubescent on the back and below the anthers in front; filaments shorter than the anthers, those of the third whorl with rudimentary anthers forming a subrhomboid head and a stout gland on each side; staminodes of the fourth whorl minute, cylindric, hairy. Ovary papillose-pubescent with a short style.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2065!

20. **T. membranaceus,** *Stapf.* Branches slender, glabrous, drying brown or greenish; terminal bud slender, very finely fulvous-pubescent. Leaves oblong or oblanceolate, acuminate (acumen often very narrow, gradually attenuate at the base), about 4 in. long and up to 1½ in. broad, membranous to subcoriaceous, glabrous, concolorous, drying a light greenish-brown; midrib slender, flat or faintly concave above, slender, raised below; lateral nerves about 7 on each side, obliquely ascending, more or less looping or running out into an indistinct submarginal nerve, like the loose reticulation slightly raised on both sides; petiole 2–3 lin. long, channelled. Panicles from the axils of the upper (sometimes arrested and early deciduous) leaves, very slender, 1–1½ in. long, finely fulvo-pubescent; branchlets and pedicels

filiform, the latter ½ lin. long. Perianth broad campanulate-turbinate, slightly over 1 lin. long, finely pubescent without, glabrous within; receptacle less than ½ the length of the perianth; segments obtuse, outer rotundate-ovate, inner narrower, more or less oblong-ovate. Stamens villous on the back with the exception of the broad tip of the connective, glabrous in front; outer staminodes clavate, villous except at the thickened tip with a stout gland on each side of the base, inner lanceolate to ovate-quadrate, thin, more or less hairy on the back, ⅓ lin. long. Ovary glabrous, narrowed upwards with a very short style. Fruit oblong, shortly and obliquely apiculate, not quite 1 in. long and less than ½ in. in diam.; pericarp faintly striate, thin. Testa delicately membranous, almost entirely adnate to the pericarp.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2855! 3562!

Imperfectly known species.

21. **T. crassifolius,** *Engl. Jahrb.* xxvi. 390. A tree 60–120 ft. high, with a long smooth trunk and hard yellowish-brown wood; branchlets short, drying blackish; leaf-buds fulvo-pubescent. Leaves oblong, at both ends shortly acute to subobtuse, 4–6 in. long, 1½–2 in. broad, coriaceous, drying dark greyish-brown, dull, glabrous; midrib flat above, raised and rounded below, moderately slender; lateral nerves 7–9 on each side, indistinctly looping, like the loose reticulation slightly raised on both sides; petiole up to 5 lin. long, shallowly channelled. Inflorescences and flowers unknown. Fruiting panicles axillary, shorter than the leaves; branches spreading; pedicels 2 lin. long, thickened upwards. Fruit oblong, attenuated below, up to 1 in. long, ½ lin. in diam.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, 1000 ft., *Staudt*, 505!

3. HYPODAPHNIS, Stapf.

Flowers diœcious. Perianth herbaceous, 6-partite to the base; segments subequal, deciduous (?). Male: Perfect stamens 6 in 3 whorls, staminodes 0; anthers 4-valved, valves collateral, of the 2 outer whorls introrse, of the third extrorse; filaments slender, linear; staminal glands 3, large, inserted below the filaments of the second whorl and embracing the bases of their filaments. Ovary inferior, turbinate; style cylindric, rudimentary; ovule present, but small, not developing. Female: Stamens as in the male, but smaller, barren with imperfect anther-cells. Ovary inferior as in the male, but style nearly as long as the stamens with a subdiscoid stigma; ovule large, developing. Fruit unknown.—Tree. Leaves alternate, penninerved, coriaceous. Flowers small in subterminal, many-flowered panicles.

Species 1, in West Africa.

1. **H. Zenkeri,** *Stapf.* A shrub or tree, 20–30 ft. high, with densely leafy branches; all the young parts densely and finely fulvo-

pubescent. Leaves ovate- to obovate-elliptic, acutely acuminate, or almost caudate, very shortly acute or almost obtuse at the base, 5–10 in. long, 2½–3 in. broad, thinly coriaceous, densely fulvo-pubescent on the nerves below when unfolding, soon quite glabrous, drying brown, paler below; midrib narrow, channelled above, very prominent below; lateral nerves 4–5 on each side, distant, very obliquely ascending, indistinctly looping, slightly prominent below; veins transverse, parallel, faintly raised above, very fine; petiole terete, with a faint groove above, ¾–1¼ in. long. Panicle subcorymbose, sometimes made up of several panicles springing from the axils of the uppermost leaves, 1½–3 in. long, 2–2½ in. wide, many-flowered, finely rusty-pubescent all over; lowest branches undivided for 1 in. or more, then like the others frequently divided with short branchlets and pedicels, ½–1 lin. long. Perianth finely rusty or fulvous-pubescent to velvety on both sides; segments slightly unequal, the outer oblong, 2 lin. long, the inner ovate-oblong and slightly shorter, all spreading in the open flower. Stamens of the male 1 lin. long; filaments finely and minutely pubescent along the sides, slightly longer than the anthers. Style ¾ to almost 1 lin. long, and like the flat top of the ovary fulvo-pubescent.—*Ocotea Zenkeri*, Engl. Jahrb. xxvi. 385, t. 9, fig. A.

Upper Guinea. Cameroons: in primeval forests, Bipinde, *Zenker*, 851! 3033! 3033A! Kiango, *Zenker*, 1630! Johann-Albrechtshöhe, *Staudt*, 961.

4. **OCOTEA**, Aubl.; Benth. et Hook. f. Gen. Pl. iii. 157.

Flowers usually diœcious, or hermaphrodite. Perianth herbaceous, with or without a receptacle or tube, 6- or 8-lobed or partite; lobes or segments equal, usually deciduous. Hermaphrodite: stamens in 3 or 4 whorls, the outer 3 fertile, the fourth (if present) staminodial; anthers 4-valved; valves in superposed pairs, of the 2 outer whorls introrse, of the third extrorse or subextrorse, very rarely introrse; filaments very short or 0, or longer than the anthers, of the third whorl with a sessile, very rarely stipitate, gland at each side of the base; staminodes, if present, slender. Ovary ovoid, ellipsoid or subglobose, usually glabrous, longer or shorter than the style. Male: as in the hermaphrodite flowers, but ovary sterile, stalk-like or quite suppressed. Female: as in the hermaphrodite flowers, but stamens rudimentary, barren. Fruit baccate, ellipsoid or globose, seated on or in an enlarged cupular receptacle, which is either truncate or 6-toothed or 6-lobed from the persistent perianth-lobes.—Trees or shrubs. Leaves alternate, membranous or coriaceous, glabrous or hairy. Flowers small, in cymes, arranged in axillary or subterminal panicles.

Species about 200, mostly in Tropical America, a few in South Africa and the Mascarenes.

The genus has been defined here in the sense of Mez's monograph of the American *Laurineæ* (*Jahrb. Königl. Bot. Gart. Berlin*, v. 219), and probably includes several types which might well be taken as generically distinct.

1. **O. usambarensis,** *Engl. in Abh. Preuss. Akad. Wiss.* (1894), 51, 54; *Pfl. Ost-Afr. C.* 182. A tree up to 130 ft. high; trunk up to 11½ ft. in diam.; branchlets softly and spreadingly pubescent to tomentose or with the exception of the youngest parts glabrous and then drying blackish. Leaves rather crowded, alternate, subopposite or opposite, broad-elliptic, obtuse at both ends, margins of the young leaves more or less revolute, 2–2½ in. long, 1½–1¾ in. broad, thinly coriaceous, somewhat bullate, whitish or glaucous below, softly hairy on both sides when young, glabrescent above and sometimes also below, but less completely so; midrib narrow above, broader and raised below; lateral nerves 5–7, spreading or oblique, often forking, sunk above, raised below, venation irregular, fine, quite obscure above; petiole 2–5 lin. long, terete, finely channelled above, more or less tomentose or pubescent. Panicles from the axils of the uppermost leaves, subcorymbose, fulvous- or greyish-hairy all over, ½–1 in. long, 1 in. wide, on slender peduncles 1–2 in. long; bracts ovate, obtuse, densely pubescent, up to over 1 lin. long, very early deciduous; pedicels very short to 1 lin. long. Perianth densely pubescent to tomentellous without, 2½–3 lin. across when quite open; receptacle turbinate, about ¾ lin. high, hairy within; segments spreading, about 1½ lin. long, the outer elliptic-oblong, inner broad-ovate, all obtuse, pubescent within, particularly the outer. Stamens of the hermaphrodite flowers with linear filaments, as long as the anthers and very finely pubescent or the inner glabrous on the back; glands shortly but distinctly stalked, subglobose, inserted on each side of the base of the stamens of the third whorl; staminodes about ½ lin. long, filiform, with a dark gland-like tip; stamens and staminodes of the female very much reduced. Ovary immersed, but free, in the receptacle, ovoid, like the slender style glabrous; stigma discoid. Fruit globose or ellipsoid-globose, 4–5 lin. long, borne on the upward-thickened pedicel and seated in the enlarged cupular receptacle, 2 lin. across and almost 1 lin. deep. Testa crustaceous.

Nile Land. British East Africa: forests on Mount Kenia and the Aberdare Range, *Hutchins! Battiscombe,* 16!

Mozamb. Dist. German East Africa: Usambara; Silai, *Holst,* 1301!

An account of this very valuable timber tree was given by Mr. D. E. Hutchins in *Colonial Reports—Miscellaneous,* No. 41, 1907, 18, under the name of Ibean camphor or *mozaiti* (Kikuyu). Seedlings and root-suckers referred to the "*mozaiti*" were communicated by Mr. Hutchinson and Mr. Battiscombe. The seedlings and the root-suckers are, apart from the terminal buds, almost entirely glabrous, but the tomentum of the buds is of the same kind as in the adult plant. The leaves of the suckers and the youngest seedlings are papery, 3–5 in. long and 1½–2 in. wide, oblong to oblong-lanceolate, and more or less acutely acuminate. Those of the older seedlings are broad-elliptic, and 3–6 in. by 2–3½ in., and their reticulation is very marked on the upper side. An older branch, collected at Karoris, in the Aberdare Forest, is also glabrous, but has the coriaceous irregularly veined leaves of the flowering specimens described above. According to a communication by Professor Engler, similar variations occur in the Usambara Mountains.

5. **CASSYTHA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 164.

Flowers hermaphrodite, sometimes dimorphic (diœcious?). Perianth with a turbinate or ovoid receptacle (very small during flowering) and a 6-partite limb, after flowering tightly constricted at the junction of limb and tube; segments unequal, outer 3 much smaller. Stamens in 4 whorls of 3, of the 3 outer fertile, of the fourth staminodial, rarely also those of the second whorl reduced to staminodes; anthers 2-celled, of the 2 outer whorls introrse, of the third extrorse; filaments of the third whorl with subsessile glands at each side of the base; staminodes subsessile or stipitate. Ovary during flowering hardly immersed in the receptacle, which afterwards grows out and envelops it. Fruit completely enclosed in the succulent receptacle, often crowned by the persistent limb. Seed with a coriaceous testa. Cotyledons tightly adpressed to each other, distinct only when young.—Twining, parasitic herbs, adhering to their hosts by means of uniseriate haustoria. Leaves reduced to minute scales. Flowers small, racemose, spicate or capitate, sessile or pedicelled from the axils of scale-like bracts, supported by a pair of bracteoles.

Species about 15, mostly Australian, the following widely spread throughout the tropics.

1. **C. filiformis,** *Linn. Sp. Pl. ed.* i. 35. Stems filiform, bright yellow, glabrous or more or less pubescent to tomentose. Leaf-scales ovate to lanceolate-subulate, acute. Inflorescences loosely spicate, usually solitary, spreading, 1–2 in. long, few- to 10-flowered. Flowers hermaphrodite, white, up to about 1 lin. long; bracteoles ciliolate. Outer perianth-segments very similar to the bracteoles, inner broadly ovate-oblong, obtuse, 3 times longer. Filaments of the first whorl broader than the anther, thinly membranous, of the second narrower than the anther. Staminodes triangular, fleshy. Fruit crowned with the persistent limb, 2–3 lin. in diam.—Meisn. in DC. Prodr. xv. i. 255; Engl. Pfl. Ost-Afr. C. 182; Hiern in Cat. Afr. Pl. Welw. i. 915; Engl. ex Gilg in Baum, Kunene-Samb. Exped. 238; De Wild. in Ann. Mus. Congo, sér. v. i. 244. *C. guineensis*, Meisn. l.c. (including var. *Livingstonii*). *C. americana*, Meisn. l.c. 256. *Cassyta guineensis*, Schum. & Thonn. Beskr. Guin. Pl. 199; Benth. in Hook. Niger Fl. 497. *C. americana*, Nees, Syst. Laur. 644.

Upper Guinea. Senegambia: without precise locality, *Roger!* Sierra Leone, *Scott-Elliot*, 4177! 5875! Freetown, *Johnston*, 71! Gold Coast: Aburi, *Johnson*, 970! Togoland: Lome, *Warnecke*, 53! Lagos, *Dawodu*, 33! 154! Southern Nigeria: mouth of the Niger, *Mann*, 464! Northern Nigeria: Nupe, *Barter*, 412! Addasuduh, *Vogel!*

Nile Land. Somaliland, *Lort Phillips!* Uganda: Buddu, 3900 ft., *Dawe*, 302!

Lower Guinea. Loango, *Soyaux*, 32! Angola: Pungo Andongo, *Welwitsch*, 6427! 6428! Benguela, *Welwitsch*, 6424! *Monteiro!* Mossamedes, *Welwitsch*, 6425! *Gossweiler*, 30! Chijija, by the Longa River, *Baum*, 626!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1030! German East Africa: Tanga, *Volkens*, 170! Tanganyika shore, *Scott-Elliot*, 8235! Mozambique: Island of Chingune, *Johnson*, 65! Mouth of Zambesi, *Kirk!* Nyasaland: banks of Luabo river, *Kirk*, 24! 51! Muata Manja, *Kirk!* Shire Highlands, *Buchanan*, 367! Namasi, *Cameron!* Nyika Plateau, *McClounie*, 112! Island of Likoma, *Johnson*, 33! west shore of Lake Nyasa, *Kirk!*

ORDER CXVIA. **HERNANDIACEÆ.** (By T. A. Sprague.)

Flowers hermaphrodite or by abortion monœcious or polygamous, regular. Perianth superior; segments free or shortly united below, in two valvate 3–5-merous whorls, or more rarely in one imbricate 4–8-merous whorl. Stamens 3–5 in a single whorl, opposite the outer perianth-segments when the perianth is double, or generally 4 (2–7) when the perianth is single; anthers 2-celled, dehiscing introrsely or laterally by 2 valves. Staminodes more or less glandular, in 1 or 2 whorls usually outside the stamens, or absent; those of the outer whorl in pairs at the base of the stamens, those of the inner whorl alternate with the stamens. Ovary inferior, 1-celled; ovule solitary, pendulous, anatropous. Fruit dry, often longitudinally ribbed, sometimes with 2–4 longitudinal wings (*Illigera*), or with 2 terminal wings formed by accrescent perianth-segments (*Gyrocarpus*), or wingless and enclosed in an inflated cupule (*Hernandia*). Seed solitary, exalbuminous. Embryo straight; cotyledons large, plano-convex, more or less lobed, or flattened and spirally twisted.—Unarmed trees or shrubs, sometimes scandent. Leaves alternate, exstipulate, simple or digitate, 3–7-nerved at or a little above the base. Cymes axillary, peduncled, corymbose or panicled, bracteate or ebracteate. Flowers usually small, greenish-yellow, cream-coloured or white.

Genera 4, tropical; species about 35.

The genera *Gyrocarpus* and *Illigera*, together with the Tropical American *Sparattanthelium*, were regarded by Bentham and Hooker as a sub-order of *Combretaceæ;* it has been considered better, however, to follow Pax (in Engl. & Prantl, *Pflanzenfam.* iii. 2, 129) in regarding them and *Hernandia* as forming a distinct order allied to *Laurineæ.*

Cymes ebracteate; perianth ½–1 lin. long; fruit with two terminal wings	1. GYROCARPUS.
Cymes bracteate; perianth 2–4 lin. long; fruit without terminal wings.	
Leaves simple; flowers monœcious; fruit not winged, surrounded by an inflated cupule	2. HERNANDIA.
Leaves digitate; flowers hermaphrodite; fruit with 2–4 lateral wings	3. ILLIGERA.

1. **GYROCARPUS,** Jacq.; Benth. et Hook. f.
Gen. Pl. i. 689.

Flowers polygamous, mostly male. Perianth 4–8-partite; lobes in a single whorl, imbricate, equal or unequal, 2 larger than the rest and accrescent in hermaphrodite flowers. Stamens much exserted, usually 4 (2–7), inserted at the base of the perianth; anthers dehiscing laterally, valves opening upwards. Staminodes more or less clavate, as many as and alternate with the stamens, or more numerous. Style straight; stigma obliquely expanded. Fruit with 2 terminal wings formed by

accrescent perianth-segments. Cotyledons spirally twisted.—Trees with simple, long-petioled, undivided or 3–5-lobed leaves. Cymes corymbose, ebracteate, borne chiefly in the axils of the upper leaves. Flowers very small and numerous.

Species 5 or more, in the tropical parts of both hemispheres, some undescribed.

1. **G. asiaticus,** *Willd. Sp. Pl.* iv. 982. A tree, 30–80 ft. high. Branchlets stout, pubescent in a young state. Leaves crowded towards the ends of the branchlets, broadly ovate or suborbicular, those on young trees deeply 3-lobed, often 8–10 in. in diam., those on old trees usually undivided, 4–5 in. long, 3–3½ in. broad, all more or less acuminate, simply cuneate at the base or cuneate from a cordate or truncate base, 3-nerved with the lateral nerves soon forked, or more rarely 5-nerved from the base, glabrous or slightly puberulous above, more or less puberulous or pubescent below, sometimes only on the nerves; petiole 2–5½ in. long. Cymes 2–4 in. long, densely pubescent. Flowers greenish-yellow or cream-coloured, either all male in a cyme, or the terminal ones hermaphrodite. Perianth ½ lin. long in male, ¾–1 lin. long in hermaphrodite flowers, densely pubescent outside; the two larger lobes of the hermaphrodite flower 2–3-lobed. Filaments ¾–1 lin. long, puberulous. Staminodes stalked, villous above. Style densely pubescent, ½ lin. long. Fruits ovoid, about ⅔ in. long, velvety, ribbed above, rugose below; wings elongate-spathulate, 2–3¼ in. long, puberulous.—Jacq. Fragm. 63, t. 93, f. 2; Roem. & Schult. Syst. Veg. iii. 292; Mant. 218; Spreng. Syst. Veg. i. 489; Nees in Wall. Pl. As. Rar. ii. 68; Blume in Ann. Sci. Nat. 2me sér. ii. 97; Nees, Syst. Laur. 701; Miq. Fl. Ned. Ind. i. i. 978; Meisn. in DC. Prodr. xv. i. 248; Baker f. in Andrews, Monogr. Christm. Island, 178. *G. Jacquini*, Roxb. Pl. Corom. i. 1, t. 1 (excl. syn.); Roxb. Fl. Ind. ed. Carey & Wall. i. 465 (ed. Carey, i. 445); Seem. Fl. Vitien. 95 (excl. syn.); Laws. in Oliv. Fl. Trop. Afr. ii. 435; Beddome, Fl. Sylv. t. 196; Kurz, For. Fl. Brit. Burma, i. 470; C. B. Clarke in Hook. f. Fl. Brit. Ind. ii. 461; Trimen, Handbk. Fl. Ceylon, ii. 165. *G. americanus*, Engl. Pfl. Ost-Afr. A. 75, C. 182; Prain, Bengal Pl. i. 484; Cooke, Fl. Bombay, i. 486; not of Jacq.

Nile Land. Abyssinia, ex *Engler*. British East Africa: Takaungu, 80 ft., *Thomas!*

Lower Guinea. Angola: Huilla; on the river-bank at Tschahut, *Fritsche*, 189!

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst* 8899!

Also in Asia and Polynesia; the Australian specimens which have been referred here may represent one or more distinct species. A small branchlet bearing young fruits, from the Victoria Falls, Rhodesia, *Allen*, 401, may possibly belong to *G. asiaticus*. The fruits, however, differ in being glabrous. *Gyrocarpus* was formerly referred to the *Combretaceæ*, and *G. asiaticus* was included under that order in *Fl. Trop. Afr.* ii. 435, as *G. Jacquini*, on the strength of a statement by Welwitsch that he had it in his Angola collection. Hiern (*Cat. Afr. Pl. Welw.* i. 356) states that Welwitsch's specimen was *Illigera pentaphylla*, Welw.

2. **HERNANDIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 164

Flowers monœcious. Perianth-segments in two valvate whorls, free, spreading. Male flower: Perianth-segments 6 (in both the African species) or 8. Stamens 3 or 4, opposite the outer segments; anthers dehiscing introrsely, valves opening outwards. Staminodes either as many as the stamens and alternate with them, or (in both the African species) twice as many and attached one on either side at the base of each filament, or absent. Female flower surrounded at the base by a cupular truncate or bilobed involucel. Perianth-segments 8 (in both the African species) or 10. Staminodes 4 or 5, opposite the outer segments. Style geniculate at or a little above the middle; stigma obliquely peltate. Fruit more or less distinctly 8-ribbed, surrounded by an inflated fleshy cupule. Cotyledons lobed like the human brain.—Trees. Leaves simple, long-petioled, undivided, sometimes peltate. Cymes long-peduncled, corymbose, bracteate, borne in the axils of the upper leaves; cymules surrounded by an involucre of 4–5 foliaceous bracts, usually 3-flowered, the central flower female, the two lateral male.

Species 12, in the tropical parts of both the Old and New World.

Branchlets glabrous; leaves distinctly peltate, 7-nerved at the insertion of the petiole	1. *H. peltata.*
Branchlets puberulous; leaves not peltate or slightly peltate, 5-nerved at the insertion of the petiole . .	2. *H. beninensis.*

1. **H. peltata,** *Meisn. in DC. Prodr.* xv. i. 263. A tree, 40–50 ft. high with a clear trunk of 20–25 ft., 5–12 ft. in circumference; head wide-spreading; wood soft, light, grey. Branchlets stout, glabrous. Leaves broadly ovate, peltate, rounded-truncate, retuse or cordate at the base, shortly acuminate and subobtuse at the apex, more rarely obtuse or rounded, 4½–12 in. long, 3–9 in. broad, subcoriaceous, glabrous, digitately 7-nerved at the insertion of the petiole, remaining nerves 3–4 on each side of the midrib; petiole 2½–8 in. long. Corymbs 4–12 long including the peduncle, which is 2½–7 in. long. Flowers whitish. Perianth-segments of male flower about 2 lin. long. Stamens monadelphous for ½ lin. below; anthers ¾ lin. long; free part of filament ¾ lin. long, pubescent. Fruit ellipsoid, with a broad rounded umbo, 8-ribbed, 1¼ in. long; cupule subglobose, about 1½ in. in diam. —Seem. Fl. Vitien. 204, t. 52; Benth. Fl. Austr. v. 314; Beddome, Fl. Sylv. t. 300; Baker, Fl. Maurit. 293; Kurz, For. Fl. Brit. Burma, ii. 309; Hook. f. Fl. Brit. Ind. v. 188; Trimen, Handb. Fl. Ceylon, iii. 456; Engl. Pfl. Ost-Afr. C. 183; Greshoff, Nutt. Ind. Pl. t. 21; Brandis, Indian Trees, 542; Hattori in Journ. Coll. Sci. Tokyo, xxiii. x. 13. *H. sonora,* Linn. Sp. Pl. ed. i. 981 (as to the Ceylon plant only); Wight, Ic. t. 1855.

Mozamb. Dist. Zanzibar: on the eastern, stony part of the island, *Stuhlmann,* ser. i. 783.

A sea-coast tree, found also in the Mascarene Islands, Ceylon, Malay Peninsula and Archipelago, N. Australia, Polynesia, and the Luchu and Bonin Islands. The fruits are distributed by ocean currents. In certain parts of its area it also occurs inland.

2. **H. beninensis,** *Welw. ex Ficalho, Pl. Uteis,* 247 (*name only*); *Henriques in Bol. Soc. Brot.* x. 155. A tree, 40 ft. high. Branchlets stout, minutely puberulous. Leaves ovate, sometimes subpeltate, subtruncate or rounded at the base, rounded at the apex, 3–6 in. long, 2–3½ in. broad, coriaceous, glabrous, digitately 5-nerved at the insertion of the petiole, remaining nerves 4–6 on each side of the midrib; petiole 1¼–3½ in. long. Corymbs 3½–10 in. long including the peduncle, which is 2–6 in. long. Perianth-segments of male flower about 3 lin. long. Stamens monadelphous for ½ lin. below; anthers 1 lin. long; free part of filament 1 lin. long, sparingly pilose.—Hiern in Cat. Afr. Pl. Welw. i. 915.

Upper Guinea. Island of St. Thomas: Monte Caffé, at 1800 ft., *Welwitsch,* 1240! Roça (plantation) Rio do Ouro, at 1000 ft., *Moller;* and without precise locality, *Mann,* 1084!

A specimen from Fernando Po, *Mann,* 1418, may possibly belong to *H. beninensis,* though the venation of the leaves is a little different. Comparison is difficult, however, as only the lower leaves and fruits are represented on the Fernando Po specimen, whilst the St. Thomas specimens have upper leaves and flowers only. The Fernando Po tree has a cupule twice as long as the fruit, and in this and other respects is very like *H. sonora,* Linn., a species hitherto known only from the West Indies. As the male flowers of the St. Thomas specimens agree with those of *H. sonora,* I suspect that the whole of the West African material is referable to that species. Precise information is desirable as to the conditions under which the West African plants occur, and as to whether there is any possibility of their having been introduced.

3. **ILLIGERA,** Blume; Benth. et Hook. f. Gen. Pl. i. 689.

Flowers hermaphrodite. Perianth 10-partite; tube very short; lobes in two valvate whorls, spreading. Stamens 5, opposite the outer perianth-lobes; anthers dehiscing introrsely, valves opening outwards. Staminodes in two whorls, the outer consisting of 5 pairs of glands opposite the stamens, the inner of 5 solitary glands alternate with the stamens. Ovary quadrangular; style straight or slightly curved; stigma much dilated, reniform, undulate, sometimes curved into the shape of a funnel. Fruit with 2–4 longitudinal wings. Cotyledons plano-convex, shortly petioled, bilobed.—Shrubs, climbing by means of twisting petioles. Leaves digitate, long-petioled; leaflets 3 or 5, stalked. Cymes axillary or forming a terminal panicle, bracteate.

Species 14, 13 Asiatic and 1 African.

1. **I. pentaphylla,** *Welw. in Trans. Linn. Soc.* xxvii. 26. A shrub, climbing to a great height. Branches pendulous, sometimes 15–20 ft. long; stems green or black-purplish or reddish, striate, glabrescent. Leaves of 5 or 3 leaflets; petioles 1½–4½ in. long,

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swollen at the base; leaflets ovate, elliptic or elliptic-oblong, 2–5 in. long, 1–2½ in. broad, rounded or obtuse at the base, shortly obtusely acuminate at the apex, coriaceous, glabrous above, slightly puberulous below; lateral nerves about 3 on each side of the midrib; partial petioles ¼–¾ in. long. Cymes axillary, and panicled at the ends of the branches; peduncle and pedicels tomentose or pubescent. Perianth-tube about ⅓ lin. long, villous inside; outer lobes lanceolate-oblong, 4 lin. long, 1 lin. broad, green; inner lobes linear-subulate, 3½ lin. long, ⅜ lin. broad, slightly villous at the base, greenish-yellow or pink. Filaments 1¼–1½ lin. long, puberulous, villous near the base. Paired staminodes solid, horn-shaped, ½ lin. long, whitish; solitary staminodes subsessile, peltate, ¼–⅓ lin. in diam., concave above. Ovary 1 lin. long, densely pubescent; style 2 lin. long, puberulous. Fruit about 1¼ in. long; spread of wings 2½–3 in.—Hiern in Cat. Afr. Pl. Welw. i. 355; Baker f. in Journ. Linn. Soc. Bot. xxxvii. 152; Dunn, ibid. xxxviii. 295.

Upper Guinea. Gold Coast: on mountains at Aburi, *Brown*, 317! Cameroons: Yaunde, *Zenker*, 1426! Bipinde, *Zenker*, 3573!

Nile Land. Uganda: Victoria Nyanza; Buvuma Island, *Bagshawe*, 601! 619!

Lower Guinea. Angola: Golungo Alto; among the mountains of Serra de Alto Queta and of Quilombo, *Welwitsch*, 1753!

ORDER CXVII. **PROTEACEÆ**. (By J. G. Baker and C. H. Wright.)

Flowers hermaphrodite or by abortion polygamous or diœcious, but a style always present in the male flowers and staminodes in the female, regular or slightly irregular. Perianth inferior; tube cylindric or inflated at the base; limb globose, ovoid, or cylindric and scarcely wider than the tube, formed of 4 lobes valvately cohering at first, at length more or less separating and recurving. Stamens 4, opposite the perianth-lobes and inserted near their base, always shorter than the perianth; filaments short, rarely as long as the anthers. Hypogynous glands 4, alternate with the stamens, free or connate, in some genera absent. Ovary superior, sessile or stalked, 1-celled, often oblique; style short or long, often variously thickened at the apex; stigma small, terminal or sublateral; ovules solitary or geminate and collateral (rarely superposed) or numerous and in two series, amphitropous or nearly anatropous, micropyle always inferior and usually conspicuous. Fruit a nut or drupe, or a capsule or follicle with thick coriaceous valves. Seeds compressed or thick, exalbuminous; testa membranous or coriaceous, sometimes produced into a wing; cotyledons flat and equal, or thick fleshy and unequal; radicle short or retracted into a sinus at the base of the cotyledons.—Shrubs or trees, rarely perennial herbs. Leaves alternate, rarely opposite or verticillate, quite entire, toothed or much divided, sometimes even on the same plant, usually coriaceous, exstipulate. Flowers capitate, racemose

or rarely solitary; bracts small and caducous, or large, imbricate, persistent and hardened in fruit.

Genera 50, species nearly 1000, chiefly in South Africa and Australia; a few in South America, Tropical Asia, and the South Pacific Isles.

Flowers in heads surrounded by an involucre of large imbricate bracts . . . . . 1. PROTEA.
Flowers in spikes or racemes, without any involucre . . . 2. FAUREA.

1. **PROTEA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 169.

Flowers hermaphrodite, irregular. Perianth-tube more or less inflated at the base, then linear and more or less dorsally compressed, often incurved; limb cylindric and slightly wider than the tube in bud, the posticous segment deeply separating from the others, which form an entire or shortly 2–3-fid lip. Anthers subsessile on the perianth-limb, free, linear; connective produced beyond the cells. Hypogynous scales 4, linear, slender or obsolete. Ovary densely clothed with long hairs; ovule solitary, amphitropous, laterally fixed; style rigid, often persistent and woody, subulate, compressed, angular or narrowly winged; stigma small, terminal or oblique. Nut densely bearded, terminated by the persistent style.—Shrubs or small trees. Leaves alternate, coriaceous, rigid, quite entire. Flowers in dense globose or turbinate (rarely oblong) heads; receptacle thick, flat or convex; involucral bracts numerous, imbricate, coriaceous or woody, the innermost often long and coloured.

Species about 100, the majority in South Africa.

Leaves linear, not more than 4 lin. wide.
  Bracts hairy outside.
    Branches glabrous . . . . . 1. *P. Baumii.*
    Branches hairy at first.
      Innermost bracts very acute . . . . 2. *P. hæmantha.*
      Innermost bracts obtuse.
        Leaves lanceolate . . . . . 3. *P. Lemairei.*
        Leaves linear or oblong . . . . 4. *P. trichophylla.*
  Bracts glabrous outside.
    Perianth as long as the innermost bracts . . 5. *P. linearifolia.*
    Perianth shorter than the innermost bracts . 6. *P. paludosa.*
Leaves oblong, more than 4 lin. wide, not more than 2 in. long . . . . . 7. *P. heckmanniana.*
Leaves oblong or broadly oblanceolate, more than 4 lin. wide and 2 in. long.
  Leaves distinctly petioled . . . . . 8. *P. petiolaris.*
  Leaves very shortly petioled . . . . 9. *P. praticola.*
  Leaves sessile.
    Bracts glabrous, except at the margin.
      Perianth glabrous or nearly so . . . 10. *P. kilimandscharica.*
      Perianth densely silky above . . . 11. *P. Nyasæ.*
    Bracts hairy.
      Leaves glabrous.
        Lateral nerves spreading . . . . 12. *P. Kirkii.*

Lateral nerves ascending.
Heads turbinate . . . . . 13. *P. abyssinica.*
Heads globose . . . . . 14. *P. busseana.*
Leaves hairy, at least when young.
Leaves conspicuously broader above the middle.
Innermost bracts shorter than the perianth.
Leaves amplexicaul . . . . 15. *P. gætzeana.*
Leaves not amplexicaul.
Leaves usually acute . . . 16. *P. chrysolepis.*
Leaves obtuse . . . . 17. *P. Welwitschii.*
Leaves subacute . . . . 18. *P. congensis.*
Innermost bracts at least as long as the perianth.
Perianth $2\frac{1}{2}$ in. long, shaggy outside . . . . . 19. *P. micans.*
Perianth $1\frac{1}{4}$ in. long, silky outside . 20. *P. melliodora.*
Leaves not conspicuously broader above the middle.
Leaves white-arachnoid . . . 21. *P. uhehensis.*
Leaves not arachnoid.
Marginal nerve distinct.
A shrub 20 in. high . . . 22. *P. rubrobracteata.*
A tree 12–15 ft. high . . . 23. *P. leucoblepharis.*
Marginal nerve absent . . . 24. *P. myrsinifolia.*
Leaves ovate or oblong, more than 2 in. wide.
Lateral nerves patent. Leaves densely hairy beneath 25. *P. trichanthera.*
Lateral nerves ascending.
Perianth glabrous or nearly so above . . . 26. *P. madiensis.*
Perianth hairy above.
Leaves obovate . . . . . 27. *P. chionantha.*
Leaves ovate or elliptic.
Perianth-tube glabrous or nearly so . . 28. *P. angolensis.*
Perianth-tube shaggy . . . . . 29. *P. Elliottii.*

1. **P. Baumii,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 221, *fig.* 94. A shrub nearly 4 ft. high. Branches glabrous, brown. Leaves rather dense, linear or linear-lanceolate, acute, long cuneate at the base, 3–4 in. long, 4 lin. wide, quite glabrous, coriaceous, opaque; nerves very slightly raised on both surfaces, marginal inconspicuous. Heads terminal on the branches, 4 in. in diam.; bracts many, much imbricate, loosely and very shortly silky outside, glabrous or nearly so inside, white edged with brownish yellow, lower ovate, acute, 5 lin. long, upper lanceolate or obovate-lanceolate, rounded at the apex, 2 in. long, all about 5 lin. wide. Perianth rosy and silvery, very densely long white-silky, up to nearly 2 in. long. Style very slightly elongating after flowering, 2 in. long.—Engl. Jahrb. xxxiii. 129.

Lower Guinea. Angola: in or by swamps on the right bank of the Kubango River, opposite the mouth of the Kueio, 3600 ft., *Baum*, 375 !

2. **P. hæmantha,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 220, *fig.* 93. A prostrate shrub. Branches rising here and there to a height

of 16 in., densely pilose when young, soon glabrescent. Leaves dense, sessile, linear-lanceolate to linear, very acute or even pungent, long cuneate at the base, 2–4½ in. long, 3–5 lin. wide, silky-pilose when young, at length quite glabrous, subcoriaceous or coriaceous, shining on both sides; nerves prominent on both surfaces, 2 marginal. Heads terminal, 4½ in. in diam.; bracts numerous, shortly white-silky outside, glabrous and red inside, lower ovate-lanceolate, 6–12 lin. long, upper becoming gradually linear-lanceolate and up to 2 in. long, very acute. Perianth rosy, densely long white-silky, 1½ in. long. Style up to 2 in. long after flowering, almost woody, pungent.—Engl. Jahrb. xxxiii. 129.

Lower Guinea. Angola: by the Longa and upper part of the Quiriri Rivers, 4170 ft., *Baum*, 709!

Allied to *P. paludosa*, Engl.

3. **P. Lemairei,** *De Wild. Études Fl. Katanga*, 30, *t.* 8, *fig.* 1–12. A woody plant. Branches up to 1 ft. long, straight, clothed with long hairs when young, glabrescent. Leaves scattered, lanceolate, straight, acute, 1½–3½ in. long, 1–3 lin. wide, sessile, with long silky hairs adpressed on both surfaces, margins scabrous. Heads terminal, sessile, up to 2½ in. long; bracts few, strongly imbricate, outer 2 lin. long, inner 2 in. long, 4 lin. wide, obtuse, velvety outside, ciliate, glabrous and rose-coloured inside, more or less spreading during flowering; receptacle conical. Perianth densely velvety with yellow hairs outside, especially towards the apex, inflated at the base, about 2¼ in. long; upper lip shortly 3-toothed. Anthers linear, 2½ lin. long. Ovary covered with brownish hairs; style filiform, 1¾ in. long.

South Central. Belgian Congo; Lukafu, *Verdick.*

Mozamb. Distr. Nyasaland: plateau between Lakes Nyasa and Tanganyika, *Lemaire.*

4. **P. trichophylla,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 226. A small shrub. Branches many, 12–15 in. high, arising from a thick rootstock, very densely grey silky above, glabrescent below. Leaves dense, linear or linear-lanceolate, 2½–3 in. long, 3–4 lin. wide, acute, narrowly cuneate at the base, long and densely adpressed grey silky, scarcely glabrescent, subcoriaceous, opaque; veins loosely reticulate, equally prominent on both surfaces, the marginal almost at the very edge. Heads about 2¼ in. in diam., solitary at the ends of the branches; bracts few imbricate, very densely grey silky outside; outer broadly ovate, acute, 3 lin. long and wide; innermost oblong-lanceolate, rounded at the apex, about 1 in. long, 5 lin. wide. Perianth 1¼ in. long, very long and densely grey silky. Style after flowering 1½ in. long.—Engl. Jahrb. xxxiii. 131.

Lower Guinea. Angola: between the Kubango River and Mandongo and on to Kassinga, 4740 ft., *Baum*, 918!

Mozamb. Distr. Rhodesia: by the Mohlungushi River, *Allen*, 477!

5. **P. linearifolia,** *Engl. Jahrb.* xxx. 296. An undershrub with a very short rootstock. Branches erect, 1–1¼ ft. high. Leaves rather

dense, linear, acute, long cuneate at the base, $2\frac{1}{4}$ in. long, $2\frac{1}{2}$ lin. wide, coriaceous, the uppermost sheathing the heads. Bracts brown, glabrous, outer 1–4 lin. long and broad, ovate, middle oblong, innermost linear-oblong, 9 lin. long, pale green tinged with red. Perianth as long as the innermost bracts, white, oblong-tubular in the lower third, slender in the central part, narrowly linear, concave and very shortly hairy inside in the upper part. Anthers very narrowly linear, 3 lin. long. Ovary clothed with long purple hairs; style as long as the perianth, tapering upwards.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Mountains, near Lake Nyasa, 8800 ft., *Goetze*, 1244.

Native name "*sihaenge*."

6. **P. paludosa,** *Engl. Hochgebirgsfl. Trop. Afr.* 196. An undershrub $\frac{1}{2}$–$1\frac{1}{2}$ ft. high. Stems decumbent, densely leafy throughout, slender, rather wiry, densely pilose. Leaves linear-oblong, obtuse or subapiculate, up to $2\frac{1}{2}$ in. long and 4 lin. wide, coriaceous, rigid, at first thinly pilose on both surfaces; nerves not very prominent, the two lateral distinctly within the margin. Heads turbinate, terminal, turned at right angles to the axis of the stem, $2\frac{1}{2}$ in. in diam.; bracts pale rose to rosy purple, glabrous, white-ciliate; outer 2 lin. long, $1\frac{1}{2}$ lin. wide, ovate, becoming dusky red; innermost linear or lanceolate, 2 in. long, $2\frac{1}{2}$ lin. wide. Perianth about $1\frac{1}{2}$ in. long, snow-white, shaggy with spreading hairs. Anthers linear, 3 lin. long. Ovary densely clothed with rusty hairs 4 lin. long; style $2\frac{1}{4}$ in. long after flowering.—*Leucadendron paludosum*, Hiern in Cat. Afr. Pl. Welw. i. 919.

Lower Guinea. Angola: Huilla; on the wooded, spongy slopes of pastures in Morro de Lopollo, 5200–5500 ft., *Welwitsch*, 1596!

7. **P. heckmanniana,** *Engl. Jahrb.* xxx. 300, *t.* 11. A much-branched shrub, about 3 ft. high, with long ash-coloured hairs on the young branches, leaves and bracts. Leaves oblong or oblong-lanceolate, rather obtuse, up to 2 in. long and 6 lin. wide, coriaceous; lateral nerves obscure above, obvious beneath; membranous margins narrow. Heads about $1\frac{1}{2}$ in. in diam.; bracts in 4–5 series, brownish, outer ovate and 2 lin. long, inner linear-oblong and 14 lin. long. Perianth white, slightly longer than the inner bracts, densely rusty hairy outside. Anthers linear, $1\frac{1}{4}$ lin. long. Ovary densely clothed with rusty hairs; style slightly longer than the perianth.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Range, on sunny slopes and meadows of the Yanimbi Mountains, 7540 ft., *Goetze*, 827. British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 174! 135!

8. **P. petiolaris,** *Welw. ex Engl. Hochgebirgsfl. Trop. Afr.* 197. A tree up to 20 ft. high; trunk $\frac{1}{2}$–$1\frac{1}{2}$ ft. in diam. at the base; branches spreading, glabrate; branchlets shaggy, densely leafy. Leaves oblanceolate or narrowly oblong, obtuse, tapering to the base, 3 in. long, 6 lin. wide, rigidly coriaceous, glabrous, margin membranous;

nerves numerous and slender, finely reticulated, equally conspicuous on both surfaces, none truly marginal; petiole about $1\frac{1}{2}$ in. long. Heads numerous, more or less oblique at the ends of branchlets, globose, almost hidden by the leaves; bracts glabrous or silky, ciliate, outer ovate or semicircular, 2 lin. long, inner up to $2\frac{1}{4}$ in. long, oblong. Perianth up to $2\frac{1}{4}$ in. long, pilose or sometimes glabrous above. Ovary densely clothed with rusty hairs; style nearly 2 in. long.—*Leucadendron petiolare*, Hiern in Cat. Afr. Pl. Welw. i. 920.

Lower Guinea. Angola: Huilla; in open forests in Morro de Lopollo, above 5600 ft., *Welwitsch*, 1597! slopes leading down to Lubango, 6200 ft., *Pearson*, 2648!

9. **P. praticola,** *Engl. Jahrb.* xxx. 297. An undershrub 1 ft. high. Stems 2 lin. in diam., densely leafy, pilose when young. Leaves linear-oblong or oblong-subspathulate, obtuse, 3 in. long, 9 lin. wide, pilose when young, scarcely petioled, shining above; nerves somewhat prominent below, dichotomously branching a short distance above the base. Bracts densely ciliate, outer in about 8 rows, ovate, 5 lin. long, innermost oblong, $1\frac{1}{2}$ in. long, 5 lin. wide. Perianth about as long as the innermost bracts, white, glabrous at the base, densely and shortly white-pilose above. Anthers $3\frac{1}{2}$ lin. long, linear; connective produced into a short subtriangular appendage. Ovary clothed with rusty hairs 4 lin. long; style thickened at the base, 9 lin. long, geniculate below, attenuate above.

Mozamb. Distr. German East Africa: Unyika, Uwurungu Mountain, near Umalila, 7200 ft., *Goetze*, 1460.

10. **P. kilimandscharica,** *Engl. Hochgebirgsfl. Trop. Afr.* 195. A shrub. Branches glabrous, terete. Leaves oblanceolate, subacute, 4 in. long, 1 in. wide, coriaceous, glabrous, with a distinct cartilaginous sometimes undulate border; veins loosely reticulate, obvious on both surfaces. Heads about 2 in. in diam.; outer bracts ovate, 3 lin. long, ciliate on the margin, otherwise glabrous, uppermost linear-oblong, $2\frac{1}{2}$ in. long, 4 lin. wide, rusty pilose at the apex. Perianth about as long as the innermost bracts, densely silky above. Anthers linear. Style about as long as the perianth, angular below, subulate above.—Engl. Jahrb. xxx. 299; Engl. Pfl. Ost-Afr. A. 135, 138, C. 165.

Mozamb. Distr. German East Africa: Kilimanjaro, Kifinika Volcano, 9000 ft., *Volkens*, 929! 9000 to 13,000 ft., *Johnston*, 156! last zone of vegetation below perpetual snow, *New! Meyer*, 121, 264, *Höhnel*, 170; Rungwe Stock, 9480 ft., *Goetze*, 1152.

Native name "*segera*" (*Goetze*).

11. **P. Nyasæ,** *Rendle in Trans. Linn. Soc. ser.* 2, *Bot.* iv. 39. Caulescent. Leaves oblong, rounded and emarginate at the apex, narrowed at the base, 2–$2\frac{3}{4}$ in. long, 6–7 lin. wide, sessile, 1-nerved, glabrous, coriaceous. Head terminal, turbinate, $3\frac{1}{2}$ in. in diam.; bracts in many rows, smooth, outer broadly ovate, ciliolate, innermost spathulate oblong, glabrous. Perianth $1\frac{3}{4}$ in. long, glabrous or very slightly

pubescent; tube 1 lin. in diam. in the lower 5 lin., ½ lin. in diam. in the upper 9 lin.; limb 7 lin. long; lobes linear, subulate, ⅓ lin. wide. Anthers linear, 4½ lin. long. Ovary with rusty hairs 5 lin. long at its base; style 1¾ in. long, subulate, channelled above.—Engl. Pfl. Ost-Afr. A. 131.

Mozamb. Distr. British Central Africa: Nyasaland; Mount Milanji, *Whyte*, 30!

12. **P. Kirkii,** *C. H. Wright in Kew Bulletin*, 1909, 328. Branches woody, terete, densely rusty-pubescent when young, glabrous in age. Leaves sessile by a broad base, oblong, rounded at the apex, 4 in. long, 1 in. wide, glabrous; lateral nerves conspicuous, spreading, prominent on both surfaces; marginal nerves obvious. Heads sessile at the end of the branches, 2½ in. in diam.; bracts tomentose outside, densely ciliate, outer 3 lin. long, ovate, innermost oblanceolate, 1½ in. long, 2 lin. wide. Perianth 1½ in. long, densely rusty hairy all over, in the lower part with hairs 4 lin. long. Anthers linear, 3 lin. long; connective produced into a short subulate mucro. Style 1¾ in. long, triangular.

Mozamb. Distr. Portuguese East Africa; Moramballa Mountain, 3000 ft., *Kirk!*

13. **P. abyssinica,** *Willd. Sp. Pl.* i. 522. A shrub or tree up to 9 ft. high. Branches pilose when young. Leaves lanceolate or oblong-lanceolate, obtuse, tapering to the base, coriaceous, glabrous, about 6 in. long and 9 lin. wide; veins loosely reticulate, obvious on both surfaces; marginal veins much thickened. Head terminal, turbinate; bracts densely imbricate, silvery and silky outside, glabrous inside, the outermost less than 1 lin. long, gradually increasing inwards, innermost oblong, 1½ in. long, 5 lin. wide, all obtuse. Perianth 10 lin. long, densely fulvous hairy on the upper 6 lin., sparingly so in the lower part. Anthers linear, 4 lin. long. Style about 1½ in. long, reddish, triangular below, cylindric and much more slender in the upper 5 lin.—Meisn. in DC. Prodr. xiv. 237; A. Rich. Tent. Fl. Abyss. ii. 232; Engl. Hochgebirgsfl. Trop. Afr. 195; Engl. Pfl. Ost-Afr. A. 104, 138, B. 294, C. 165; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 148. *P. Gaguedi*, Gmel. Syst. 225.—*Gaguedi*, Bruce, Trav. Source Nile, v. 52, with two plates.

Nile Land. Eritrea: Mount Oualid, 6800 ft., *Schweinfurth & Riva*, 2210! Gallabat: on the left bank of the Gendua River, *Schweinfurth*, 2396! Abyssinia: Mount Lamalnon, *Bruce;* Dabus River district and Baro-Sobat, *Blundell!* and without precise locality, *Schimper*, 900! Uganda: Sibu, Nandi Country, *James!* British East Africa: Eldama Ravine, 7200 ft., *Hutchins!*

Lower Guinea. Angola: hills between Limekiln and Humpata, 6500 ft., *Pearson*, 2647!

Mozamb. Distr. German East Africa: Usambara; Mlalo, *Holst*, 2454! British Central Africa: Nyasaland; Blantyre, *Scott!* Rhodesia: Bulawayo and Matopos, *Kolbe*, 3165! Matopo Hills, *Rogers*, 153! Chimanimapi Mountains, 4000 ft., *Johnson*, 131! Mashonaland: Salisbury, *Hon. Mrs. Evelyn Cecil*, 260! near Umghoosi River, *Baines!* Valley of the Umzingwaini River, *Baines!*

Var. *brevifolia*, Engl. Pfl. Ost-Afr. C. 165. Leaves shorter than in the type, slightly narrowed towards the base, softly pilose.

Nile Land. Uganda: Butumbi, 6200 ft., *ex Engler*.

The type also in South Africa.

14. **P. busseana**, *Engl. Jahrb.* xxxiii. 131. A tall shrub or a tree. Branches pale rusty-pilose when young. Leaves erect, approximate, coriaceous, glabrous, sessile, narrowly lanceolate, obtuse, 6 in. long, $1\frac{1}{4}$ in. wide; lateral nerves many, ascending at a very acute angle, prominent on both surfaces. Heads turbinate below, dilated and globose above; bracts coriaceous, shortly white-tomentose, outer ovate, 2 lin. long and wide, innermost linear-oblong, obtuse, $1\frac{1}{2}$ in. long, 5 lin. wide. Flowers $1\frac{3}{4}$ in. long, much longer than the bracts, rusty-pilose below, white-pilose above; upper perianth-limb boat-shaped, 3-toothed. Anthers 6 lin. long, $\frac{1}{2}$ lin. wide; connective produced into a short cone. Style thickened below, tapering above, much exserted from the perianth.

Mozamb. Distr. German East Africa: Makorro Mountains, near Lake Nyasa, *Busse*, 788.

Very closely allied to *P. abyssinica*, Willd.

15. **P. gœtzeana**, *Engl. Jahrb.* xxx. 298, *t.* 9. A shrub up to $6\frac{1}{2}$ ft. high. Branches rather densely adpressed pilose. Leaves approximate, narrowly oblong from a rather broad sessile or half amplexicaul base, about 4 in. long and 14 lin. wide, adpressed pilose, coriaceous. Heads broadly turbinate, 2 in. in diam.; bracts densely fulvo-pilose, outer 5–6-seriate, semiovate or ovate, innermost oblong, $1\frac{1}{2}$ in. long, 5 lin. wide. Perianth white, long pilose, $3\frac{1}{3}$ in. long; tube elongate; limb slightly curved at the apex. Anthers narrowly linear, $3\frac{1}{2}$ lin. long; connective produced into a triangular appendage. Ovary elongate-oblong, clothed with yellowish-brown hairs 4 lin. long; style thickened at the base, tapering upwards; stigma filiform.

Mozamb. Distr. German East Africa: Upper Kondeland; Umalila, on the Usanga Mountain, 7500 ft., *Goetze*, 1367.

16. **P. chrysolepis**, *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 222, *fig.* 95. A shrub or tree up to 13 ft. high; branches very densely grey tomentose when young, glabrescent. Leaves rather dense, lanceolate or oblong-lanceolate, acute, rarely slightly rounded, tapering to the base, $2\frac{1}{4}$–$4\frac{1}{4}$ in. long, 9–13 lin. wide, subcoriaceous, sessile by a broad base; nerves scarcely conspicuous in young leaves, loosely and irregularly reticulate, equally prominent on both surfaces, marginal percurrent. Heads terminal on the branches, up to 3 in. in diam.; bracts very numerous, densely imbricate, lower 2 lin. long, ovate, acute, uppermost nearly 1 in. long and 5 lin. wide, densely and shortly silvery silky outside, glabrous within, ovate, rounded at the apex. Perianth silvery, very densely long yellowish silky, $1\frac{1}{2}$ in. long. Style much elongated after flowering, 2 in. long, thick and coriaceous.—Engl. Jahrb. xxxiii. 129.

Lower Guinea. Angola: by the River Kubango above Chirumbu, 3900 ft., *Baum*, 272!

Native name "*zuikerbosch.*"

17. **P. Welwitschii,** *Engl. Hochgebirgsfl. Trop. Afr.* 196. A tree 12–25 ft. high. Trunk nearly 1 ft. in diam. at the base; branches spreading, naked below, leafy towards the apex, pilose when young. Leaves dense, linear-oblong, tapering downwards, obtuse, 5 in. long, 1 in. wide, pilose, slightly glabrescent. Heads solitary, terminal, 2–3 in. in diam.; bracts with rusty silky hairs outside, becoming glabrous at the margins; outer ovate, 1 lin. long, 2 lin. wide; inner oblong, 1–1½ in. long, 6 lin. wide. Perianth 1¾ in. long, pilose with white hairs throughout, rusty when dried. Anthers linear, 4 lin. long, apiculate. Style about 2 in. long, glabrous, slightly furrowed; stigma slender, clavate at the apex.—*Leucadendron Welwitschii*, Hiern in Cat. Afr. Pl. Welw. i. 918.

Lower Guinea. Angola: Huilla; in the more open mixed forests at No Monino, near Lopollo, and at Quilengues, *Welwitsch*, 1600! 1602! between Lopollo and Monino, *Welwitsch*, 1604! Benguella; Bailundo District, 5000 ft., *Wellman!*

18. **P. congensis,** *Engl. Jahrb.* xxxiii. 129. Branchlets and leaves densely ashy-pilose. Leaves close together, erect, sessile, coriaceous, linear-oblong, tapering towards both ends, subacute, 2¾ in. long, 9 lin. wide. Heads subglobose, about 3 in. in diam.; bracts densely brownish silky, outer ovate, in about 4 series, 4–12 lin. long, innermost in 2 series, linear-oblong, 1½ in. long, 4 lin. wide. Perianth rather longer than the bracts, densely clothed with rusty hairs; tube compressed, oblong; upper lobe of limb boat-shaped, 3-toothed, lower lobe narrow. Filament narrowly cuneate; anther narrowly linear, 2½ lin. long, ½ lin. wide; connective produced into a small cone. Ovary oblong, densely clothed with long rusty hairs; style longer than the perianth, thickened below, tapering upwards.

South Central. Belgian Congo: Upper Congo, Marungu, *Descamps.*

19. **P. micans,** *Welw. Apont.* 586. A cæspitose undershrub 1–2 ft. high; rootstock hard and woody. Stems simple, rarely forked at the apex, villous when young. Leaves lanceolate or oblong, up to 4 in. long and 1 in. wide, rounded at the apex, tapering towards the base, coriaceous, villous, "silky-hoary in the living state with long adpressed whitish remarkably glistening hairs" (*Welwitsch*); lateral nerves ascending at an acute angle. Heads terminal. Perianth 2½ in. long, shaggy outside, "apparently white-rosy" (*Welwitsch*). Ovary densely covered with rusty hairs 4 lin. long. Style after flowering 2¼ in. long.—*Leucadendron micans*, Hiern in Cat. Afr. Pl. Welw. i. 918.

Lower Guinea. Angola: Pungo Andongo; in hilly places among low bushes near Bumba, between Quisonde and Condo, *Welwitsch*, 1589!

20. **P. melliodora,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 224, *fig.* 96. A shrub up to about 2½ ft. high. Younger branches very

densely silky tomentose, at length glabrous. Leaves lanceolate or oblong-lanceolate, acute, tapering towards the base, 4 in. long, 1 in. wide, densely dark yellowish silky when young, less densely so in age, coriaceous, opaque; nerves equally prominent on both surfaces, none truly marginal. Heads up to 3 in. in diam., solitary or as many as 8 near the ends of the branches; bracts numerous, densely and shortly white silky outside, glabrous and silvery inside (*Baum*), outer 2 lin. long, innermost lanceolate or oblong-lanceolate, rounded at the apex, $1\frac{1}{2}$ in. long, 4 lin. wide; flowers honey-scented. Perianth $1\frac{1}{4}$ in. long, densely silky or villous with long dark yellow hairs. Style after flowering $1\frac{1}{2}$ in. long.—Engl. Jahrb. xxxiii. 130.

Lower Guinea. Angola: by the Longa River near Minnesera, 4000 ft., *Baum*, 653!

21. **P. uhehensis,** *Engl. Jahrb.* xxviii. 380. A shrub about 3 ft. high, or sometimes a tree nearly 7 ft. high. Branches densely leafy, softly pilose. Leaves coriaceous, sessile, oblong-lanceolate, obtuse, white-arachnoid on both surfaces, 4–6 in. long, up to 2 in. wide; lateral nerves ascending, prominent on both surfaces. Bracts in 5 series, white-pilose outside and on the margins, outer ovate, 4 lin. long, innermost oblong, nearly $1\frac{1}{2}$ in. long. Perianth about $1\frac{1}{2}$ in. long, very densely clothed with hairs, brownish in the lower part, rosy above; lobes as long as the tube. Anthers narrowly linear, about 7 lin. long.

Mozamb. Distr. German East Africa: Uhehe; northern Uchungwe Mountains, on the undulating Higulu Plateau, 5880 ft., *Goetze*, 720. Higher plateau north of Lake Nyasa, *Thomson!* British Central Africa: Rhodesia; Chimanimani Mountains, 4000 ft., *Johnson*, 131!

22. **P. rubrobracteata,** *Engl. Jahrb.* xxx. 299, *t.* 10. A shrub about 20 in. high, with numerous branches up to 8 in. long, densely ashy-tomentose when young. Leaves closely packed, sessile, lanceolate, obtuse, $3\frac{1}{2}$ in. long, 9 lin. wide at the middle, uppermost narrower, thickly coriaceous, bluish-green, very shortly hairy; lateral nerves 6–7 on each side, ascending at an acute angle, slightly prominent when dry. Heads broadly turbinate, $2\frac{3}{4}$ in. in diam.; bracts coriaceous, pale red, long white-pilose outside, densely ciliate, innermost about $1\frac{1}{2}$ in. long, 5 lin. wide. Perianth $1\frac{1}{3}$ in. long, pale red with long white hairs; tube 7 lin. long; upper lip of limb narrowly boat-shaped, 3-toothed, lower narrow. Anthers narrowly linear, 2 lin. long; connective prolonged into an obtuse ovate appendage. Ovary oblong, clothed with long rusty hairs; style $1\frac{1}{2}$ in. long, tapering from a thick base.

Nile Land. British East Africa: Londiani, 7500–8000 ft., *Battiscombe*, 4!

Mozamb. Distr. German East Africa: Kinga (Livingstone) Range, Kingobo Mountain, 4900 ft., *Goetze*, 1182.

Native name "*iuhanye.*" Extremely close to *P. leucoblepharum*, Baker.

23. **P. leucoblepharis,** *Baker*. A tree 12–15 ft. high. Branches ascending, dusky, glabrate, at first pubescent and leafy at the tip. Leaves oblanceolate or oblong-lanceolate, 5 in. long, 1 in. wide, obtuse,

slightly tapering towards the base, straight or slightly curved, hairy on both surfaces, sometimes glabrescent, parchment-like; nerves obvious on both surfaces, marginal ones distinct; midrib whitish-rosy or yellowish (*Welwitsch*). Heads terminal with one or two lateral, about 2 in. in diam.; outer bracts broadly ovate, gradually becoming larger inwards, densely white-silky on the back, shaggy on the margins; inner bracts spathulate-oblong, 1½ in. long, 4 lin. wide, at first silky on the back, at length glabrescent except at the apex. Perianth about 1½ in. long, rosy, densely shaggy throughout; lobes linear, about ½ in. long. Anthers about ½ in. long. Style 1½–1¾ in. long, white, sulcate along one side, slightly curved below the stigma; stigma 4 lin. long, subclavate at the apex, sometimes gibbous at the base.—*Leucadendron leucoblepharum*, Hiern in Cat. Afr. Pl. Welw. i. 919.

Lower Guinea. Angola: Huilla; in the more open of the Monino forests, *Welwitsch*, 1599! in open mixed forests between Lopollo and the Monino, in company with other forms of this or allied species, *Welwitsch*, 1601!

24. **P. myrsinifolia,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 223. A shrub 6–10 ft. high. Branches greyish pilose when young, at length quite glabrous. Leaves rather far apart, lanceolate, rounded at the apex, 5–7 in. long, about 1 in. wide, loosely silky pilose near the base (especially on the under surface) when young, almost glabrous when mature, coriaceous, shining on both surfaces; nerves numerous, equally prominent and reticulated on both surfaces, marginal none. Heads terminal on the branches, 3 in. in diam.; bracts very numerous, outside very densely long yellow or golden silky tomentose, inside glabrous; outer ovate, acute, 4 lin. long, 2 lin. wide; innermost oblong, rounded at the apex, 1½ in. long, 9 lin. wide. Perianth 1⅓ in. long, whitish, long and densely yellowish tomentose. Style after flowering about 1¾ in. long.—Engl. Jahrb. xxxiii. 129.

Lower Guinea. Angola; on hills not far from the River Kubango, near Menemprenp, 4740 ft., *Baum*, 903!

Native name "*mujunge wandonga.*"

25. **P. trichanthera,** *Baker in Kew Bulletin*, 1909, 329. A shrub, with finely hairy branches. Leaves shortly but distinctly petioled, oblong, 5–6 in. long, 2½–3 in. broad, very obtuse, deltoid or rather rounded at the base, rigidly coriaceous, dark green and glabrous on the upper surface, paler and densely pubescent beneath; lateral nerves fine, raised, uniting in distinct intramarginal arches. Heads globose, 3 in. in diam.; inner and central bracts oblong, 6 lin. wide, matted with drab tomentum on the back in the lower part, naked towards the tip. Perianth 2 in. long, glabrous from the base above the middle, densely clothed with soft spreading drab hairs in the upper swollen part. Anthers linear, hairy, 9 lin. long. Ovary densely hairy; style not exserted.

Mozamb. Distr. British Central Africa: Nyasaland; Tanganyika Plateau at Fort Hill, 3500–4000 ft., *Whyte*.

26. **P. madiensis,** *Oliv. in Trans. Linn. Soc.* xxix. 143, *t.* 92. A small tree. Branches terete, smooth, with a reddish-brown deciduous epidermis. Leaves lanceolate-elliptic, obtuse, tapering downwards, 6–8 in. long, 2–3 in. wide, finely short adpressed-hairy on both surfaces, coriaceous; nerves finely reticulate, equally prominent on both surfaces, marginal faint. Heads up to 4 in. in diam., turbinate; bracts glabrescent, outer broadly ovate, obtuse, 3 lin. long, 5 lin. wide, innermost pink, linear, 3 in. long, 6 lin. wide. Perianth nearly 2 in. long, yellow, "like a silvery sunflower" (*Grant*), or reddish, densely villous below, glabrous or sparingly pilose above. Anthers linear, $3\frac{1}{2}$ lin. long; connective produced into a short triangular appendage. Ovary densely clothed with rusty hairs.—Engl. Pfl. Ost-Afr. A. 103, 115, B. 150, C. 165; var. *latifolia*, Engl. Jahrb. xxxiii. 130. *P. sp.*, T. Thoms. in Speke, Nile, Append. 645.

Nile Land. Sudan: on high ground above the river Biri near Dem Zubeit, Bahr-el-Ghazel, *Broun!* Bongo: Sabbi, *Schweinfurth*, 2669! Niamniam: Tuhami's Seriba, *Schweinfurth*, 3803! Nganje, *Schweinfurth*, 3940! Uganda: Madi woods, *Speke & Grant*, 673! Ankole and Koki, *Dawe*, 420! British East Africa, *Powell*, 28!

Mozamb. Distr. German East Africa: Karagwe, 4000–5000 ft., *Scott-Elliot*, 8114! British Central Africa: Nyasaland; Zomba, *Kerr Cross*, 15! Manganja Hills, *Meller!* Nyika Plateau, 6000–7000 ft., *Whyte!* Namasi, *Cameron*, 44! South-west slope of hills opposite Shibisa, *Kirk!* Portuguese East Africa: between Unangu and Lake Shire, 3000–4500 ft., *Johnson!*

Forma *pilosa*, Engl. Jahrb. xxxiii. 130. A tree about 8 ft. high. Branches and leaves rather densely ashy-pilose.

Mozamb. Distr. German East Africa: Ugoni, on the Makorro Mountains, between Njuga and the Likonde River, *Busse*, 741.

The variety *latifolia* is stated by Engler to differ from the type in having broader leaves and the perianth almost glabrous above. The specimen of the type at Kew has the perianth very sparingly pilose above, not densely so as shown in the figure of it (l.c.).

Native names "*m'zaza*" and "*king-geezee*."

27. **P. chionantha,** var. **typica,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 225. A small shrub. Branches glabrous. Leaves obovate to oblong, rounded (very rarely subacute) at the apex, long cuneate at the base, 5 in. long, 2 in. wide, coriaceous, glabrous, shining on both surfaces; nerves very numerous, closely reticulate, equally prominent on both surfaces; marginal nerves 2, thick. Heads 5 in. in diam., solitary at the ends of branches; bracts numerous, strongly imbricate, outer ovate, subacute, 7 lin. long and wide, densely white silky but becoming glabrous near the apex outside, glabrous and white within, innermost oblong-lanceolate, rounded at the apex, $2\frac{1}{2}$ in. long, about 9 lin. wide. Perianth $2\frac{1}{4}$ in. long, very densely white-tomentose. Style after flowering almost woody, pungent.—Engl. Jahrb. xxxiii. 130.

Lower Guinea. Angola: between the Chimpungu and Kulei Rivers, 4580 ft., *Baum*, 863!

Var. *divaricata*, Engl. & Gilg in Baum, Kunene-Samb. Exped. 226. A divaricate

shrub up to 8 ft. high. Heads terminating thick old leafless (never leafy) branches. Leafy branches lateral, slender.—*Leucadendron angolense*, Hiern in Cat. Afr. Pl. Welw. i. 917, partly.

Lower Guinea. Angola: between the River Kubango and Mundongo and on to Kassinga, 4580 ft., *Baum*, 920! Angola: Pungo Andongo, near the Condo Cataract, 3400 ft., *Welwitsch*, 1590B !

Mozamb. Distr. British Central Africa: Nyasaland; Shire Highlands, Blantyre (only one tree seen), *Buchanan !* Rhodesia: Broken Hill, *Rogers*, 8031!

28. **P. angolensis**, *Welw. Apont.* 586. A shrub or rarely small tree up to 10 ft. high. Stem erect, up to 4 in. in diam. Leaves elliptic or ovate, up to 5 in. long and $2\frac{1}{4}$ in. wide, usually obtuse, cuneate at the base, glabrous, coriaceous; main veins pinnate, smaller ones reticulate and obvious on both surfaces; marginal veins thickened. Head terminal, 5 in. in diam.; bracts rigid except at the membranous margin, obtuse, outermost 3 lin. long, innermost oblanceolate, $2\frac{1}{2}$ in. long, 7 lin. wide, silky pubescent outside at first, soon glabrous and reddish. Perianth $2\frac{1}{2}$ lin. long, white to rosy, angular below, filiform and almost glabrous in the central part, larger and densely hairy in the upper 5 lin. Anthers linear, 5 lin. long. Ovary subtended by brownish silky hairs 8 lin. long; style only slightly longer than the perianth.—Engl. Hochgebirgsfl. Trop. Afr. 196; Engl. Pfl. Ost-Afr. C. 165. *Leucodendron angolense*, Hiern in Cat. Afr. Pl. Welw. i. 917, partly.

Lower Guinea. Angola: Pungo Andongo; in wooded places near Banza de Bumba and Condo, 3500 ft., *Welwitsch*, 1590! Huilla; at the outskirts of rather open forests near the River Monino, *Welwitsch*, 1598! open forest above Huilla, 5600 ft., *Pearson*, 2652 ! Malange district, *Gossweiler*, 1018! Feira, *Buchner*, 54.

Mozamb. Distr. British Central Africa: Nyasaland: Fwambo, south of Lake Tanganyika, 5250 ft., *Nutt !*

Var. *albiflora*, Engl. Jahrb. xxviii. 380, and xxx. 296. Bracts densely white-pilose except at the glabrous apex.

Mozamb. Distr. German East Africa: Uhehe, in pastures on plateaus near Funda, 5200 ft., *Goetze*, 720.

Welwitsch's 1590 has numerous stems from the rootstock, probably owing to the plant having been broken down and dormant buds afterwards stimulated to growth.

29. **P. Elliottii,** *C. H. Wright in Kew Bulletin*, 1909, 328. A shrub. Branches white-pilose when young, glabrescent. Leaves broadly ovate, $5\frac{1}{2}$ in. long, $2\frac{3}{4}$ in. wide, obtuse, cuneate and almost petioled at the base, pilose when young, coriaceous, light green; secondary nerves ascending, prominent on both surfaces; marginal veins thick. Heads terminal, globose, $4\frac{1}{2}$ in. in diam.; bracts adpressed-silky outside, outer broadly ovate, inner oblanceolate, obtuse, 2 in. long, 5 lin. wide. Perianth $1\frac{3}{4}$ in. long, densely shaggy, and with a tuft of hairs 4 lin. long at the base; upper lip boat-shaped, lower narrow. Anthers linear, $3\frac{1}{2}$ lin. long; connective subulate above. Style a little longer than the perianth; stigma small.

Upper Guinea. Northern Nigeria: Gungeru, *Elliott*, 9! *Dalziel*, 69 !

Imperfectly known species.

30. **P. Dekindtii,** *Engl. Jahrb.* xxxii. 128. Stem very dwarf; branches short, hairy. Leaves dense, sessile, obovate-lanceolate or lanceolate, acute, 6–10 in. long, 1½–2 in. wide, tapering to the base, almost glabrous on the upper surface except towards the apex, densely silky on the lower surface. Heads on short leafless branches; upper bracts 1½ in. long, 3–4 lin. wide. Perianth whitish, 2 in. long, with long white silky hairs on the upper part.

Lower Guinea. Angola: Huilla, 5000–6000 ft., *Dekindt*, 76.

31. **P. Eickii,** *Engl. Jahrb.* xxxiii. 130. A shrub. Branches 4 lin. in diam., densely long rusty tomentose. Leaves closely packed, oblong-lanceolate, rather obtuse, up to 4½ in. long and 1¼ in. wide, coriaceous, the upper close around the inflorescence; midrib at first densely long rusty hairy. Heads about 2¾ in. in diam.; outer bracts in 3–4 series, ovate, densely adpressed rusty hairy; inner in 2 series, linear-oblong, obtuse, 2 in. long, 5 lin. wide. Perianth a little longer than the inner bracts; tube 5 lin. long, compressed; upper lobe of limb narrowly boat-shaped, lower lobe narrow. Anthers narrowly linear, 4½ lin. long; connective produced above into a triangular acute appendage. Ovary oblong, clothed with long rusty hairs; style tapering from a thick base.

Mozamb. Distr. German East Africa: Usambara; Kwai, 2600–4580 ft., *Eick*, 39.

Probably near *P. leucoblepharis*.

32. **P. kingaensis,** *Engl. Jahrb.* xxx. 297 (*by error hingaënsis*). An undershrub 8–12 in. high. Branches 4–8 in. long, densely ashy-pilose. Leaves close together, sessile by a broad base, 3½ in. long, 1¼ in. wide, acute, densely ashy-pilose when young, bluish-green, very coriaceous; lateral nerves 5–7 each side, ascending at an acute angle, prominent beneath. Heads turbinate, about 2 in. in diam.; bracts coriaceous, ashy-pilose when young, outer in about 6 rows, ovate or ovate-oblong, acute, innermost oblong. Perianth pale purple, 1 in. long, glabrous below, with long white hairs above; limb subcoriaceous. Anthers narrowly linear, 5 lin. long; connective produced into an ovate appendgae. Ovary oblong, clothed with long brownish hairs; style thick at the base, tapering upwards, curved below the apex, pale purple with white stripes near the middle, 1¾ in. long.

Mozamb. Distr. German East Africa: Ussangu; Kinga (Livingstone) Mountains, 8100 ft., *Goetze*, 991.

33. **P. wentzeliana,** *Engl. Jahrb.* xxx. 298. A shrub, with branches 3¼ ft. high rising from the ground, ashy-pilose when young. Leaves sessile, approximate, oblong, obtuse, 2½ in. long, 1 in. wide, coriaceous; lateral nerves about 8 on each side, slightly prominent beneath. Bracts coriaceous, ashy-pilose outside, at length glabrous, outer in about 6 series, ovate, 1½ lin. long, 2½ lin. wide, innermost

linear-oblong, 2 in. long, 5 lin. wide. Flowers up to 1½ in. long, white, glabrous above except at the densely white pilose apex, rusty-pilose at the middle and lower part. Anthers narrowly linear, about 5 lin. long; connective produced into a small ovate appendage. Ovary oblong, 1½ lin. long, clothed at the base with brownish hairs 5 lin. long; style tapering from a thickened base, purple at the apex.

Mozamb. Distr. German East Africa: Unyika; Uwurunga Mountains, 7200 ft., *Goetze*, 1455.

34. **P. Bismarckii,** *Engl. Hochgebirgsfl. Trop. Afr.* 196, *name only.*

Upper Guinea. Togo: near Bismarckburg, *Kling.*

35. **P. ferruginea,** *Engl. Hochgebirgsfl. Trop. Afr.* 197, *name only.*

South Central. Lunda: Mukenge, in Bashilange district, *Pogge*, 1415.

36. **P. Paulina,** *Endl. Gen. Suppl.* iv. ii. 77, *name only.*

Nile Land. Nubia.

37. **P. Poggei,** *Engl. Hochgebirgsfl. Trop. Afr.* 197. A dwarf shrub Leaves smooth, oblong, acute. Heads oblong; bracts lanceolate.

South Central. Lunda: Mukenge, in Bashilange district, *Pogge*, 1413.

2. FAUREA, Harv.; Benth. et Hook. f. Gen. Pl. iii. 170.

Flowers hermaphrodite. Perianth clavate, incurved; tube cylindric, obliquely dilated at the base, finally slit down one side nearly to the base; lobes 4, 3 united higher than the fourth. Anthers subsessile, linear; connective obtuse, often shortly apiculate. Hypogynous scales 4, usually triangular, acute or obtuse, persistent and spreading at the base of the fruit. Ovary clothed with hairs twice to thrice its length; ovule solitary, attached to the side of the cell about halfway up; style long, subulate; stigma small, terminal. Nut compressed, very hairy. Seed orbicular.—Small or medium-sized trees. Leaves alternate, entire, rigidly coriaceous, shortly petioled. Flowers in dense spikes or racemes, each in the axil of a small bract; involucre none.

Species about 10, extending to Madagascar and the Cape.

Flowers racemose . . . . . 1. *F. racemosa.*
Flowers spicate.
  Leaves lanceolate or oblong-lanceolate.
    Leaves permanently pubescent beneath . . 2. *F. discolor.*
    Leaves pilose beneath near the base only . . 3. *F. intermedia.*
    Leaves glabrous beneath (at least when mature).
      Leaves up to 5 in. long.
        Branchlets rusty-pilose when young . . 4. *F. wentzeliana.*
        Branchlets minutely pubescent when young . 5. *F. saligna.*

Leaves not more than $3\frac{1}{2}$ in. long.
Leaves 9 lin. wide. . . . . 6. *F. usambarensis.*
Leaves 12–15 lin. wide . . . . 7. *F. arborea.*
Leaves ovate-elliptic to elliptic.
Perianth pubescent outside . . . . 8. *F. decipiens.*
Perianth densely tomentose outside . . . 9. *F. speciosa.*

1. **F. racemosa,** *Farmar in Kew Bulletin*, 1908, 58. Branches greyish, rough. Leaves rather closely placed, broadly lanceolate, acute, tapering towards the base, $3\frac{1}{4}$ in. long, $1\frac{1}{4}$ in. wide, quite glabrous on both surfaces, shining above; lateral nerves slender but prominent on both surfaces, connected by intramarginal loops; petiole 2–3 lin. long, compressed. Raceme dense, about 5 in. long; rhachis rusty pubescent; pedicels patulous, rusty pubescent, 1–2 lin. long; bracts minute, deltoid, apiculate, rusty pubescent. Perianth 6 lin. long, glabrous; tube 1 lin. in diam. at the base; lobes $1\frac{1}{2}$ lin. long, 1 lin. wide, navicular, acute. Anthers slightly shorter than the perianth-lobes, apiculate; filaments 1 lin. long, complanate. Hypogynous scales $\frac{1}{2}$ lin. long, triangular, shortly and acutely bifid. Ovary ovoid, clothed with hairs thrice its length; style slightly shorter than the perianth, sulcate.

Mozamb. Distr. Nyasaland: Mount Mlanje, 7000 ft., *Adamson,* 338!

2. **F. discolor,** *Welw. in Trans. Linn. Soc.* xxvii. 64. A shrub usually about 6 ft. high, rarely a tree 8 ft. high. Branches terete, densely pubescent and pilose when young, glabrous in age. Leaves lanceolate or oblong-lanceolate, $3\frac{1}{2}$ in. long, 1 in. wide, acute or obtuse, upper surface at first finely adpressed pubescent, at length glabrous and shining, under surface permanently grey pubescent; lateral nerves numerous, slightly ascending, looping just within the slightly revolute margin. Spikes terminal on the branches, about 4 in. long, dense; peduncle short, pubescent, with or without a few distant scales; bracteoles small, spreading, shortly acuminate from a broad base. Perianth 4–5 lin. long, slightly curved, pubescent; lobes $1\frac{1}{2}$ lin. long. Anthers shortly apiculate. Hypogynous scales $\frac{1}{2}$ lin. long, deltoid, acute. Ovary conical, bearded with hairs two to three times as long as itself; style about as long as the perianth; stigma narrowly clavate, obtuse, obscurely angled.—Hiern in Cat. Afr. Pl. Welw. i. 921; Engl. Jahrb. xxviii. 380, and xxx. 300; Engl. Hochgebirgsfl. Trop. Afr. 195.

Lower Guinea. Angola: Huilla, in mixed sandy woods between Lopollo and Nene, *Welwitsch,* 1594!

Mozamb. Distr. German East Africa: Uhehe, Matanana Plateau, 5000–6000 ft., *Goetze,* 738.

Var. *cyclolepra,* Hiern in Cat. Afr. Pl. Welw. i. 922. Hypogynous scales rounded, obtuse, semicircular.

Lower Guinea. Huilla: in rocky places near Nene, *Welwitsch,* 1595!

The connection between the shape of the leaf-apex and the hypogynous scales is not constant, the Kew specimen of Welwitsch's 1595 having both obtuse and acute leaves on the same branch.

3. **F. intermedia,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 227. A tree 10–26 ft. high, with a rounded or pyramidal crown; bark with longitudinal clefts; young branches rather densely but shortly grey-silky. Leaves lanceolate, acute, up to 4 in. long and 1 in. wide, tapering downwards, coriaceous, glabrous and shining above, greyish and glabrous beneath except near the densely pilose base; lateral nerves many, subparallel, connected by intramarginal loops, prominent on both surfaces; petiole 3 lin. long, grey-pilose. Spikes terminal on the branches, about 3 in. long, very dense; rhachis densely grey-tomentose; peduncle 1 in. long. Perianth pubescent outside; tube 3 lin. long; lobes 1 lin. long, acute, cucullate. Anthers apiculate. Ovary clothed with "snow-white" hairs thrice as long as itself; style as long as the perianth, faintly ribbed, narrowly clavate at the apex.

Lower Guinea. Angola: on the Kubango above Kohi, 3400 ft., *Baum*, 912!

Dutch name "*waterbogenhout.*"

4. **F. wentzeliana,** *Engl. Jahrb.* xxx. 300. A tree 50–65 ft. high; ultimate branchlets up to 8 in. long with internodes 5 lin. long, rusty-pilose when young, at length brown and glabrous. Leaves lanceolate, cuneate at the base, nearly 5 in. long and $1\frac{1}{4}$ in. wide, coriaceous, shining, the same colour on both surfaces; lateral nerves many, slender, slightly prominent; petiole 5 lin. long, semiterete. Spikes $3\frac{1}{2}$ in. long, dense-flowered, in the axils of the upper leaves and at the apex of the branches; rhachis and bracts densely and shortly pilose, the latter ovate, concave, very small. Perianth about 6 lin. long, yellowish-green, clavate below, tapering upwards and then expanding into a clavate ashy-pilose limb, at first curved upwards, the upper part at length reflexed. Anthers linear, 1 lin. long. Ovary small, with white hairs $2\frac{1}{2}$ lin. long; style slender, curved, 6 lin. long.

Mozamb. Distr. German East Africa: Kinga Mountains, Ussangu, in woody ravines of Pikurugwe Mountain, 8175 ft., *Goetze*, 992.

5. **F. saligna,** *Harv. in Hook. Lond. Journ. Bot.* vi. (1847). 373, *t.* 15. A shrub or a tree up to 60 ft. high; wood mottled (*Dawe*); branches minutely adpressed-pubescent when young, glabrous in age. Leaves lanceolate, sometimes slightly falcate, acute, up to 5 in. long and 1 in. wide, tapering towards the base, glabrous, shining; lateral nerves many, subparallel, uniting by loops just within the margin, equally prominent on both surfaces; petiole 6–9 lin. long, usually glabrous, flat above. Spikes terminal on the branches, 3 in. long; bracteoles $\frac{1}{2}$ lin. long, concave, acute. Perianth pubescent outside; tube 3 lin. long; lobes 1 lin. long, acute, concave. Filaments compressed, channelled down the inner face; anthers mucronate. Hypogynous scales nearly 1 lin. long, acuminate from a broad deltoid base. Ovary ovoid, clothed with hairs nearly four times its length; style about as long as the perianth, ribbed.—Meisn. in DC. Prodr. xiv. 344; Welw. in Trans. Linn. Soc. xxvii. 65; Engl. Hochgebirgsfl. Trop. Afr. 195, and Pfl. Ost-Afr. C. 164; Hiern in Cat. Afr. Pl. Welw. i. 921,

incl. var. *platyphylla*, Welw.; Engl. & Gilg in Baum, Kunene-Samb. Exped. 226.

Upper Guinea. Northern Nigeria, *Dalziel*, 393!

Nile Land. Uganda: Ankole Hills, 4500 ft., *Dawe*, 411! Ruwenzori, 6000–8000 ft., *Dawe*, 564! Eldama Ravine, 8000 ft., *Hutchins!* British East Africa: Mount Kenia, 9000–10,000 ft., *Battiscombe*, 79!

Lower Guinea. Angola: Huilla, in the mixed Monino forests, frequent by clear streams and at cataracts about Lopollo, *Welwitsch*, 1592! damp forests at the base of Morro de Monino, near Lopollo, *Welwitsch*, 1593! on the Longa near Minnesera, 3900 ft., *Baum*, 647!

Mozamb. Distr. British Central Africa: Zomba, 3000 ft., *Whyte & McClounie!* Shire Highlands, *Buchanan*, 13! 244! 422! Mount Malosa, 4000–6000 ft., *Whyte!* Stevenson Road, 4000–4500 ft., *Scott-Elliot*, 8224! Ntondwe, *Cameron*, 148! Namasi, *Cameron*, 55! Moramballa, 3000 ft., *Kirk!*

Also in South Africa.

6. **F. usambarensis,** *Engl. Jahrb.* xix. *Beibl.* 47, 29. A much-branched tree about 60 ft. high; branchlets short, densely leafy, thinly adpressed-pilose. Leaves 2–3 in. long, about 9 lin. wide; lateral nerves 8–9 on each side, patent; petiole $2\frac{1}{2}$ lin. long. Spike densely flowered, very shortly pilose, nearly 5 in. long; bracts deltoid. Perianth 6 lin. long, dirty pale yellow. Ovary ovoid, 2 lin. long, $1\frac{1}{2}$ lin. thick, clothed with long dirty white hairs.—Engl. Glied. Veg. Usambara, 69, and Pfl. Ost-Afr. C. 164.

Mozamb. Distr. German East Africa: Usambara; Mbaluland, between Heboma and Mbalu in clearings, *Holst*, 2602.

Distinguished from *F. saligna*, Harv., by the shorter and somewhat thicker leaves, as well as by larger and denser inflorescence.

7. **F. arborea,** *Engl. Jahrb.* xix. *Beibl.* 47, 29. A tree 30–60 ft. high; branchlets densely clothed with short hairs, grey when young, brown in age. Leaves oblong-lanceolate, 2–$3\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. wide, acute, cuneately narrowed to the base, subcoriaceous, slightly grey-silky when young, glabrous on both surfaces when mature; lateral veins erecto-patent, 10–12 on each side of the midrib, prominent on both surfaces, connected by loops near the margin. Spikes 5–6 in. long; rhachis and perianth coated with adpressed drab tomentum; bracts minute, ovate, acute, from a very wide base. Perianth 6 lin. long; lobes of the lower lip oblong, $1\frac{1}{2}$ lin. long. Hypogynous scales $\frac{1}{2}$ lin. long, deltoid, acute. Anthers bluntly mucronate, cells thickened at the base on the inner side. Ovary densely clothed with long erect hairs; style finally 6 lin. long.—Engl. Pfl. Ost-Afr. C. 164.

Mozamb. Distr. German East Africa: Mount Kilimanjaro, on the eastern slope of the Mue ravine, behind the mission station of Kilema, 4930 ft., *Volkens*, 1690! Usambara, *Buchwald!*

8. **F. decipiens,** *C. H. Wright in Kew Bulletin*, 1909, 328. A small tree. Branches pubescent when young, rimose in age. Leaves from ovate-lanceolate to elliptic, 7 in. long, 2–$2\frac{3}{4}$ in. wide, glabrous and

shining above, laxly pubescent beneath; margins recurved; lateral nerves numerous, slender but conspicuous on both surfaces, connected by intramarginal loops and many slender veinlets; petiole 6 lin. long, plano-convex, pubescent. Spikes solitary or clustered at the end of the branches, up to 9 in. long, dense-flowered; bracts minute, deltoid, acute, tomentose. Perianth slender, 8 lin. long, pubescent outside; tube ½ lin. in diam. in bud; lobes oblong, acute. Hypogynous scales shortly tri angular, acute, sometimes bifid. Anthers linear, bluntly mucronate Ovary ovoid, clothed with hairs thrice as long as itself; style rather shorter than the perianth.

Mozamb. Distr. British Central Africa: Nyasaland; Shire Highlands, *Adamson*, 75! *Buchanan*, 1! Tshinmuzo, 3500 ft., *Kirk!*

9. **F. speciosa,** *Welw. in Trans. Linn. Soc.* xxvii. 63, *t.* 20. A shrub 6–8 ft. high or a tree up to 15 ft. high with a trunk 8 in. in diam. at the base; bark deeply furrowed; branchlets rather stout, at first densely villous, finally more or less pubescent through the falling off of the longer hairs. Leaves oblong or ovate-oblong, obtuse, shortly cuneate at the base, up to 6 in. long and 3 in. wide, densely villous or woolly on both surfaces or at length subglabrous above; midrib prominent beneath; lateral nerves spreading, sometimes forking, main branches connected by slender intramarginal loops. Spikes in the axils of the uppermost leaves of the branches; rhachis villous; bracts ovate-lanceolate, acute, villous. Perianth 1 in. long, slightly curved, densely tomentose outside, yellow or orange; tube subcylindrical; lobes 2½ lin. long, navicular, acute, rather thick. Anthers oblong, sessile or subsessile, thickly apiculate. Hypogynous scales shortly oval or semi-orbicular. Ovary ovoid, clothed with white silky hairs at least twice as long as itself; style filiform, rather shorter than the perianth; stigma obscurely 4-sulcate. Nut subglobose, the size of a small pea.—Engl. Hochgebirgsfl. Trop. Afr. 195, Glied. Veg. Usambara, 60, 63, Pfl. Ost-Afr. C. 164, and Jahrb. xxx. 301; Hiern in Cat. Afr. Pl. Welw. i. 922, incl. vars. *lanuginosa*, Hiern, *acutifolia*, Welw., and *lucidula*, Welw.; Engl. & Gilg in Baum, Kunene-Samb. Exped. 227. *Trichostachys speciosa*, Welw. Syn. Explic. 19.

Lower Guinea. Angola: Huilla; in the more elevated woody rocky places between Lopollo and Humpata, *Welwitsch*, 1622! between Limekiln and Humpata, 6200 ft., *Pearson*, 2622! near Nene, *Welwitsch*, 1622B! in the drier mixed forests between Eme and Lake Ivantala, *Welwitsch*, 1623! between Mumpulla and Cume de Xella, *Welwitsch*, 1624! Malange, *Gossweiler*, 1016! on the Kutsi and Kubango Rivers, *Baum*, 897!

Mozamb. Distr. German East Africa: Usambara; Kwa Mshusa, *Holst*, 9116! Kinga (Livingstone) Mountains, *Goetze*, 996. British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 180! Fort Hill, Tanganyika Plateau, *Whyte!*

Also in South Africa.

Baum states that this is called "*bogenhout*" by the Boers and "*mujunge*" by the Kaffirs.

ORDER CXVIII. **THYMELÆACEÆ.** (By H. H. W. Pearson.)

Flowers perigynous, regular, dichlamydeous or with the petals aborted, hermaphrodite or, by abortion, polygamous or dicœcious. Calyx tubular, cylindric or square in section, usually somewhat swollen around the ovary; lobes 4 or 5, imbricate, spreading during flowering, equal or rarely with the 2 interior rather smaller. Petals equal to and alternating with the calyx-lobes, inserted on the throat of the tube or below the stamens, usually much smaller than the calyx-lobes, frequently 0. Stamens as many or twice as many as the calyx-lobes, inserted on the calyx-tube—if in two whorls those of the upper usually opposite to the calyx-lobes; filaments usually very short; anthers 2-celled, introrse, dehiscing by parallel longitudinal slits. Disc hypogynous, annular, cup-shaped, lobed or 0. Ovary superior, 1- or 2-celled (4-celled in *Octolepis*), sessile or shortly stalked, entire. Style slender, short or long, excentric (1-celled ovary) or central (2-celled ovary); stigma terminal, capitate or subdiscoid. Ovule 1 in each cell, affixed laterally near the apex, anatropous, pendulous, with a ventral raphe. Fruit a nut, drupe, or pyrene (capsule in *Octolepis*), usually enclosed in the base of the calyx-tube. Albumen of the seed fleshy, copious, scanty or 0. Embryo straight; cotyledons fleshy, usually thick.—Trees or shrubs, very rarely slender annual herbs, with tough fibrous bark. Leaves opposite, alternate or scattered, entire, small ericoid or large, flat. Stipules 0. Flowers in involucrate heads, or in short racemes, spikes or fascicles, rarely solitary; the heads or spikes at the apices of the branches or sessile (rarely pedunculate) in the leaf-axils. Bracts various, frequently few or absent.

About 400 species: many in South Africa, the Mediterranean region and Australia; a few in Asia and North and South America. About 90 species in Tropical Africa.

I have not followed Gilg in the reduction of the genera *Arthrosolen* and *Lasiosiphon* to *Gnidia*. *Lasiosiphon* is distinguished not only by its 5-merous flower, but also by other characters readily recognised in the field. *Arthrosolen* presents some difficulty. The only constant character which separates it from *Gnidia* is the absence of petals. These are very minute in some species of *Gnidia*, and, on this account as well as for other reasons, these genera must be regarded as closely allied. But several of the genera of the *Thymelæaceæ*, as of many other families, are necessarily separated by small and apparently artificial characters, and it is doubtful whether any useful purpose is served by attempting to raise the standard of generic differences at the cost of a further complication of synonymy.

The material of *Octolepis* at Kew is too incomplete to allow of independent investigation, and I have therefore followed Oliver and Gilg in retaining it within this family, with which it undoubtedly possesses some degree of affinity.

TRIBE I. **Euthymelææ.** *Ovary* 1-*celled. Ovule solitary. Fruit a nut.*

Stamens as many as the calyx-lobes . . . 1. STRUTHIOLA.
Stamens twice as many as the calyx-lobes, inserted above the middle of the calyx-tube.
Flowers in bracteate heads or spikes, rarely axillary.
Petals 0 or shorter than the calyx-lobes.

Petals present.
Flowers 4-merous . . . . . 2. GNIDIA.
Flowers 5-merous . . . . . 3. LASIOSIPHON.
Petals 0.
Flowers 4-merous . . . . . 4. ARTHROSOLEN.
Flowers 5-merous . . . . . 3. LASIOSIPHON.
Flowers in ebracteate terminal fascicles. Petals ½ as long as the calyx-lobes . . . . 5. ENGLERODAPHNE.
Flowers axillary. Petals equalling or exceeding the calyx-lobes. Disc cup-shaped . . . 6. DICRANOLEPIS.
Flowers axillary. Petals fused to form a short continuous ring in the mouth of the calyx-tube. Disc small . . . . . 7. SYNAPTOLEPIS.
Stamens twice as many as the calyx-lobes, inserted below the middle of the calyx-tube. Flowers in axillary clusters . . . . . 8. CRATEROSIPHON.

TRIBE II. **Phalerieæ.** *Ovary 2-celled; ovule solitary. Drupe of 2 or, by abortion, 1 pyrene.*

Flowers pedicelled; petals 0 . . . . 9. PEDDIEA.

TRIBE III. **Octolepidoideæ.** *Ovary 4-celled. Fruit a capsule.* 10. OCTOLEPIS.

1. **STRUTHIOLA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 196.

Flowers hermaphrodite, 4-merous. Calyx-tube slender, cylindric, dilated at the top, articulated below the top of the ovary and breaking at the articulation at the end of flowering. Petals entire or divided to the base into 2 or 3 narrow segments, erect, fleshy, each segment surrounded by a crown of stiff erect hairs arising from the base. Stamens 4, inserted in 1 whorl in the upper part of the calyx-tube, almost sessile and not exserted, alternating with the calyx-lobes; anthers linear. Ovary sessile; disc absent or very inconspicuous; style very slender, arising laterally; stigma capitate. Fruit small, dry, surrounded by the persistent base of the calyx-tube. Seed somewhat compressed, with hard smooth testa; endosperm scanty; embryo with thick cotyledons. —Shrubs or undershrubs of ericoid habit with, usually, long virgate branches. Leaves alternate, opposite or whorled, small, leathery, narrow. Flowers white, red or yellow, solitary or rarely two together in the leaf-axils, sessile, with 2 linear bracteoles at the base.

Species numerous, all African, mostly south of the tropic. The 8 Tropical African species all belong to Gilg's section ii., BILOBÆ (*Gilg in Engl. & Prantl, Pflanzenfam.* iii. 6A, 229), the character of which is that the petals are divided to the base.

Adult leaves lanceolate, linear- or ovate-lanceolate, not less than ⅓ in. long.
Calyx-tube shorter than the leaves.
Leaves pinoid . . . . . 1. *S. ericina.*
Leaves flat.
Calyx-tube puberulous or glabrescent . . 2. *S. Stuhlmannii.*
Calyx-tube perfectly glabrous.
Adult leaves quite glabrous . . . 3. *S. usambarensis.*

Adult leaves pilose on the margins . .	4. *S. gilgiana.*
Calyx-tube as long as or longer than the leaves.	
Adult leaves 2–2½ lin. broad.	
Leaves erect and closely imbricate . .	5. *S. Thomsoni.*
Leaves not imbricate, more or less spreading	6. *S. Albersii.*
Adult leaves not exceeding 1½ lin. broad . .	7. *S. kilimandscharica.*
Adult leaves ovate, ⅙–¼ in. long	8. *S. amabilis.*

1. **S. ericina,** *Gilg in Engl. Jahrb.* xix. 270. A shrub about 6 ft. high. Branches erect, pubescent, densely leafy in the upper part. Leaves whorled, sessile, pinoid, with a hard acute apex, glabrous, with inflexed margins, ⅓ in. long, ¾ lin. broad. Flowers "snowy-white," glabrous, rather shorter than the leaves. Bracteoles 2, oblong, obtuse, conduplicate, with a few scattered hairs on the margins and at the apex, 1½ lin. long. Calyx-tube slender; lobes ovate-lanceolate, acute, ⅖–½ as long as the calyx-tube. Petals 8, divided to the base; segments fleshy, terete, about ⅓ lin. long. Style 2–2½ lin. long. Fruit ovoid, obtuse, glabrous, about 1 lin. long.—Gilg in Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Usambara; on the dry slopes of Mtai, *Holst,* 2476 partly! Uluguru, 6000 ft., *Goetze,* 332!

2. **S. Stuhlmannii,** *Gilg in Engl. Pfl. Ost-Afr. C.* 283. A low shrub, scarcely 1 ft. high. Stem not much branched; branches glabrous and leafless below, densely clothed with yellow pubescence. Leaves crowded in the upper part of the stem, sessile, ovate-lanceolate, obscurely 3-nerved, subcoriaceous, subacute, with ciliate margins, later entirely glabrous, ⅓ in. long, 2 lin. broad. Flowers white, a little shorter than the leaves. Bracteoles 2, linear, about 1 lin. long. Calyx-tube very slender, puberulous or glabrescent; lobes ovate-lanceolate, acute, puberulous or glabrescent without, about ⅖ as long as the tube. Petals very small; segments thick.

Mozamb. Distr. German East Africa: Uluguru Mountains at Lukwangula, 7500–8000 ft., *Stuhlmann,* 9219.

3. **S. usambarensis,** *Engl in Engl. Jahrb.* xix. 269. Branches hispid, few-flowered. Leaves crowded, linear, flat, quite glabrous, subcoriaceous, with the margins more or less recurved, rigid and acute at the colourless apex, ½–⅔ in. long, 1 lin. broad. Flowers glabrous, ⅗ as long as the leaves. Calyx-tube slender, cylindric, 2–3 lin. long; lobes about 1 lin. long. Petals divided to the base; segments fleshy, about ⅓ lin. long.—Gilg in Engl. Pfl. Ost-Afr. C 284.

Mozamb. Distr. German East Africa: Usambara; Mlalo, Ngambo, at high elevations, *Holst,* 41.

4. **S. gilgiana,** *H. H. W. Pearson.* Branches erect, pubescent, densely leafy in the upper part. Leaves whorled, sessile, linear-lanceolate, acute, sparsely pilose on the margins, otherwise glabrous, ½ in. long, 1 lin. broad. Flowers rather shorter than the leaves. Bracteoles 2, linear-oblong, obtuse, conduplicate, pubescent on the margins and at the apex, 2 lin. long. Calyx-tube slender, glabrous, about ⅓ in. long;

lobes lanceolate, acute, glabrous, $1\frac{1}{2}$ lin. long. Petals divided to the base; segments fleshy, terete, about $\frac{1}{3}$ lin. long. Style 2–$2\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Usambara, slopes of Mtai, *Holst*, 2476 partly!

The locality of this species is doubtful. The only specimen I have seen was mixed with *S. ericina*, Gilg.

5. **S. Thomsoni,** *Oliv. in Hook. Ic. Pl. t.* 1493. A shrub. Branches erect, pubescent, densely leafy in the upper part. Leaves whorled, imbricate, sessile, lanceolate or ovate-lanceolate, subacute, concave, pilose on the margins, otherwise glabrous, $4\frac{1}{2}$ lin. long, 2–$2\frac{1}{2}$ lin. broad. Flowers solitary, axillary, subsessile, about as long as the leaves. Bracteoles 2, linear-oblong, conduplicate, pubescent on the margins, with a tuft of hairs at the apex, about 2 lin. long. Calyx-tube cylindric, dilated at the top, glabrous; lobes ovate-lanceolate, acute, the two outer with tufts of short stiff hairs at the apex, the two inner with a few hairs at the apex or entirely glabrous. Petals divided to the base; segments fleshy, terete, about $\frac{1}{3}$ lin. long. Style $1\frac{1}{2}$–2 lin. long.—Engl. Hochgebirgsfl. Trop. Afr. 309; Gilg in Engl. Pfl. Ost-Afr. C. 284.

Mozamb. Distr. British East Africa: Lykipia, 6000–8000 ft., *Thomson!*

6. **S. Albersii,** *H. H. W. Pearson.* Branches erect, villous, densely leafy in the upper part. Leaves whorled, sessile, lanceolate or ovate-lanceolate, acute or subacute, villous on the reflexed margins and at the apex, otherwise glabrous, $\frac{1}{3}$–$\frac{5}{8}$ in. long, 2–$2\frac{1}{2}$ lin. broad. Flowers glabrous, about as long as the leaves. Bracteoles 2, oblong, obtuse, conduplicate, villous along the margins and at the apex, $1\frac{1}{2}$ lin. long. Calyx-tube slender, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes ovate-lanceolate, acute, the two outer with short stiff hairs at the apex, $\frac{1}{3}$ as long as the tube. Petals divided at the base; segments fleshy, terete, about $\frac{1}{3}$ lin long. Style 2–$2\frac{1}{2}$ lin. long. Fruit ovoid, acuminate, glabrous, about 1 lin. long.

Mozamb. Distr. German East Africa: Usambara; Kwai, *Albers*, 191!

7. **S. kilimandscharica,** *Gilg in Engl. Pfl. Ost-Afr. C.* 284. A shrub with erect branches densely clothed with black (or the young twigs with tawny) pubescence. Leaves crowded, sessile, lanceolate or linear-lanceolate, coriaceous, with a stiff subacute apex, villous with tawny hair on the margin and apex, otherwise glabrous, $\frac{2}{3}$–$\frac{3}{4}$ in. long, 1 lin. broad. Flowers longer than the leaves. Bracteoles 2, linear-oblong, obtuse, conduplicate, villous on the margins and apex, $2\frac{1}{2}$ lin. long. Calyx-tube slender, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes lanceolate, acute, the two outer with tufts of stiff hairs at the apices, otherwise glabrous, $1\frac{1}{2}$–2 lin. long. Petals divided to the base; lobes terete, $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Style $2\frac{1}{2}$–3 lin. long.—Gilg in Engl. Jahrb. xxiii. 203.

Mozamb. Distr. German East Africa: Kilimanjaro; by the River Useri, on the north side of Mawenzi Peak, 9800 ft., *Volkens*, 2008!

8. **S. amabilis,** *Gilg in Engl. Pfl. Ost-Afr. C.* 284. A small shrub 8–12 in. high. Branches glabrous and leafless below, in the younger parts

very densely clothed with silvery hairs. Leaves crowded in the upper part of the stem, sessile, ovate, coriaceous, with a hard very acute apex, silvery-ciliate on the margin, otherwise glabrous, 2–3 lin. long, 1 lin. broad. Flowers white, much longer than the leaves. Bracteoles 2, ovate, 1 lin. long. Calyx-tube very slender; lobes ovate-lanceolate, very acute, quite glabrous, about $\frac{1}{3}$ as long as the tube. Petals very small, divided to the base; segments thick.—Gilg in Engl. Jahrb. xxiii. 203.

Mozamb. Distr. German East Africa: Uluguru Mountains at Lukwangula, *Stuhlmann*, 9157.

2. **GNIDIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 197.

Flowers hermaphrodite. Perianth-tube cylindric, sometimes square in section, articulated, and at length breaking across above the level of the ovary; lobes 4. Petals alternating with the calyx-lobes, entire or more or less deeply divided, or obscure. Stamens 8, in two whorls in the throat of the calyx-tube, the upper, or all, shortly exserted; filaments very short; anthers oblong or linear. Hypogynous disc 0 or in the form of a minute ring. Ovary sessile, 1-celled; style filiform; stigma capitate. Fruit small, dry, enclosed in the persistent base of the calyx-tube; pericarp membranous. Testa of the seed brittle; endosperm usually scanty or 0, rarely abundant and fleshy; cotyledons stout.—Branched virgate or ericoid shrubs. Leaves usually small and narrow, opposite or scattered. Flowers white, yellow, crimson or violet, usually in terminal (rarely axillary) involucrate or naked heads, rarely solitary in the leaf-axils.

Species about 90, all in Tropical and South Africa.

*Calyx-tube entirely glabrous.	
Involucral bracts acute; calyx-tube 5 lin. long .	1. *G. leiantha.*
Involucral bracts rounded; calyx-tube not more than 4 lin. long	2. *G. macrorrhiza.*
**Calyx-tube glabrous below the articulation.	
Calyx-tube glabrescent or puberulous above the articulation.	
Unbranched or little branched shrubs 6–12 in. high.	
Stems simple	3. *G. Mittuorum.*
Stems branched.	
Leaves and bracts obtuse or subacute .	4. *G. huillensis.*
Leaves and bracts strongly acute. . .	5. *G. Thomsoni.*
Little-branched shrub, 1–3 ft.; flowers vermilion or scarlet	6. *G. Welwitschii.*
Tall, much-branched shrubs; flowers orange or pink.	
Flowering branches long, weak, and nodding .	7. *G. Schweinfurthii.*
Flowering branches erect or suberect . .	8. *G. Buchananii.*
Calyx-tube pubescent or villous above the articulation.	
Bracts green, herbaceous	9. *G. mollis.*

Bracts coloured or scarious.
Lateral heads sessile . . . . . 10. *G. apiculata.*
Lateral heads peduncled.
Terminal peduncle leafless below the head.
Peduncle erect or suberect.
Leaves 2 lin. broad . . . . 8. *G. Buchananii.*
Leaves $\frac{1}{3}$ lin. broad . . . . 11. *G. montana.*
Peduncle weak; head nodding.
Calyx-tube $\frac{1}{2}$ in. long, silky pubescent . . . . . 12. *G. nutans.*
Calyx-tube $\frac{1}{3}$ in. long, shortly pubescent . . . . . 7. *G. Schweinfurthii.*
Terminal peduncle leafy to the top.
Head 6–12-flowered . . . . 13. *G. involucrata.*
Head many-flowered . . . . 14. *G. Usafuæ.*
***Calyx-tube not glabrous below the articulation.
Heads 1–3-flowered . . . . . 15. *G. fastigiata.*
Heads more than 10-flowered.
Bracts caducous . . . . . 16. *G. caduca.*
Bracts persistent.
Bracts recurved during flowering . . 17. *G. rubrocincta.*
Bracts erect or spreading during flowering.
Plant about 3 in. high, with prostrate or ascending stems . . . . 18. *G. fruticulosa.*
Plant more than 6 in. high, with erect stems.
Bracts obtuse or rounded.
Leaves all alike . . . . 19. *G. oliveriana.*
Stem and branches heterophyllous . 20. *G. heterophylla.*
Bracts acuminate or acute.
Bracts densely pilose . . . 21. *G. stenophylloides.*
Bracts ciliate on the margins . . 22. *G. microcephala.*
Bracts quite glabrous.
Leaves flat, obtuse . . . 23. *G. ramosa.*
Leaves flat, acute.
Flowers at least $\frac{1}{2}$ in. long . 19. *G. oliveriana.*
Flowers $\frac{1}{4}$ in. long . . . 24. *G. gœtzeana.*
Leaves pinoid, acute . . . 25. *G. stenophylla.*

1. **G. leiantha,** *Gilg in Engl. Jahrb.* xix. 261. Flowering stems erect, frequently branched at the base, stout, glabrous, 6–12 in. high, apparently arising from a stout rhizome. Leaves crowded, linear-lanceolate, glabrous, somewhat acute at the apex, narrowed at the base, $\frac{1}{3}$–$\frac{2}{3}$ in. long, 1–1$\frac{1}{2}$ lin. broad. Heads 8-12-flowered, pedunculate; peduncle leafless, $\frac{1}{3}$–1 in. long; involucral bracts 4–5, broadly ovate, rounded at the apex, membranous, coloured, equal in length to the flowers. Flowers 4-merous. Calyx-tube cylindric, slender, short, glabrous, smooth, $\frac{1}{4}$–$\frac{1}{3}$ in. long; lobes ovate, glabrous, 1–1$\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad. Petals oblong, glabrous, somewhat thickened, rather more than half as long as the calyx-lobes.—Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Unyamwezi; Lake Shai, *Stuhlmann!*

2. **G. macrorrhiza,** *Gilg in Engl. Jahrb.* xix. 260. Flowering stems very numerous, slender, erect, unbranched, glabrous, 4–7 in. high, arising from a stout woody rhizome. Leaves remote, oblong, acute, somewhat narrowed towards the base, glabrous, about $\frac{1}{2}$ in. long, 2–3 lin. broad. Heads 15–20-flowered; leafless peduncle $\frac{1}{2}$–$1\frac{3}{4}$ in. long; involucral bracts 4–5, broadly ovate, acute, green, erect during flowering, about $\frac{3}{5}$ as long as the flowers, 2–3 lin. broad. Flowers 4-merous, pedicelled; pedicels bearing a brush of long erect hairs at the apex. Calyx-tube cylindric, slender, glabrous, 5 lin. long; lobes ovate, glabrous, 2 lin. long, 1 lin. broad. Petals obovate, thickened and concave towards the apex, rotund, about $\frac{1}{2}$ as long as the calyx-lobes. Ovary glabrous.

Lower Guinea. Angola; Malange, *Mechow*, 202! Huilla, 5500 ft., *Antunes*, 149!

3. **G. Mittuorum,** *Gilg in Engl. Jahrb.* xix. 260. Flowering stems erect, unbranched, slender, 4-angled, glabrous, 4–12 in. high, arising from a very stout woody ascending or erect rootstock. Leaves oblong, frequently oblong-obovate, obtuse, rarely subacute, narrowed towards the base, glabrous, $\frac{1}{2}$–$\frac{4}{5}$ in. long, 2–4 lin. broad. Heads terminal, 7–10-flowered; involucral bracts 3–4, broadly ovate, more or less rounded at the apex, erect during flowering, 3 lin. long, 2 lin. broad. Flowers 4-merous, brownish-yellow (*Schweinfurth*); pedicel about $\frac{1}{2}$ lin. long, bearing a brush of erect white hairs at the summit. Calyx-tube slender, puberulous or almost glabrous, 4–5 lin. long; lobes oblong, glabrous, 1–$1\frac{1}{2}$ lin. long. Petals more or less broadly oblong or suborbicular, narrowed to the insertion, thickened, usually somewhat marginate, $\frac{1}{4}$–$\frac{1}{2}$ as long as the calyx-lobes. Ovary glabrous.

Nile Land. Dar Fertit: Dem Adlan, *Schweinfurth*, iii. 114! Mittu: Deragoh, *Schweinfurth*, 2826! 2856! 2850 (ex *Gilg*). Reggo, *Schweinfurth*, 2790! Uganda: Nandi, in dry, bare places, *Scott-Elliot*, 6997!

4. **G. huillensis,** *Gilg in Engl. Jahrb.* xxiii. 206. Flowering stems numerous, erect, unbranched, slender, 4–8 in. high, arising from a stout woody rhizome. Leaves distant, linear or linear-lanceolate, narrowed towards the base, more or less rounded at the apex, sessile, glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{2}$–1 lin. broad. Heads terminal, few-flowered (12–17), pedunculate; peduncle leafless, $\frac{1}{2}$–1 in. long; involucral bracts about 5, broadly ovate or orbicular-ovate, acute or subacute at the apex, apparently greenish-red in colour, erect during flowering, less than $\frac{1}{2}$ the length of the flowers. Flowers 4-merous; pedicels minute, bearing a brush of long erect silky hairs. Calyx-tube glabrous below the articulation, puberulous above, about $\frac{1}{3}$ in. long; lobes ovate, subacute, glabrous or pilose on the outside, $1\frac{1}{2}$–2 lin. long, 1 lin. broad. Petals oblong, fleshy, about $\frac{1}{2}$ as long as the calyx-lobes. Ovary glabrous.

Lower Guinea. Angola: Huilla, *Antunes*, 107; Amboella; by the Nambali (Kubango) River, 4000 ft., *Baum*, 253! Malange, *Gossweiler*, 1013! 1015! 1023!

Baum's specimen, received from Berlin as *G. huillensis*, differs from Dr. Gilg's description of *Antunes* 107 in possessing glabrous calyx-lobes.

5. **G. Thomsoni,** *H. H. W. Pearson.* Flowering stems slender, erect, glabrous, branched, 6–9 in. high. Leaves linear, acuminate, acute, glabrous, $\frac{1}{3}$–$\frac{3}{4}$ in. long. Heads many-flowered, peduncled; involucral bracts 6–8, elliptic, acuminate, acute, with distinct midrib, thin, coloured, erect during flowering, $\frac{1}{3}$ in. long. Flowers 4-merous, minutely pedicellate; pedicel silky-villous at the summit. Calyx-tube quite glabrous below the articulation, glandular and puberulous above, about $\frac{1}{2}$ in. long; lobes elliptic, concave, obtuse, slightly incurved at the apex. Petals reduced to slender capitate papillæ $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Anthers of the lower whorl imperfect. Ovary glabrous.

Mozamb. Distr. German East Africa: lower plateau north of Lake Nyasa, *Thomson!*

6. **G. Welwitschii,** *Hiern in Cat. Afr. Pl. Welw.* i. 923. Stems erect, simple or little branched, glabrous, 1–3 ft. high, arising from a thick woody rootstock. Leaves alternate or crowded, linear, acute, rigid, glabrous, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad. Heads terminal, many-flowered (about 24); peduncle leafless, short; involucral bracts about 8, oval-obovate, obtuse or mucronate at the apex, coloured orange or reddish, glabrous or minutely gland-dotted, $\frac{1}{3}$ in. long. Flowers 4-merous, vermilion or scarlet, scarcely $\frac{1}{2}$ in. long; pedicel rather thick, villous at the apex. Calyx-tube slender, glabrous below the articulation, puberulous above; lobes broadly ovate, obtuse, pilose on the back, 1 lin. long. Petals small. Fruit $\frac{1}{10}$ in. long.

Lower Guinea. Angola: in bushy pastures between Lopollo and Humpata, and in the dry open Monino forests, *Welwitsch*, 6482!

7. **G. Schweinfurthii,** *Gilg in Engl. Jahrb.* xix. 261. Flowering stems erect, laxly branched, stout, glabrous, 1–2 ft. high, apparently arising from a stout rhizome. Leaves scattered, lanceolate or oblong, obtuse or subacute, narrowed at the base, glabrous, shortly petioled, $\frac{1}{2}$–1 in. long, 2–3 lin. broad. Heads 15–25-flowered, terminal or in loose, axillary, 1–3-headed, long-peduncled, more or less leafy racemes; involucral bracts 4–5, broadly ovate or subrotund, rounded at the apex, papery, coloured, about $\frac{1}{2}$ as long as the flowers. Flowers 4-merous, brownish-yellow (*Schweinfurth*), pedicellate; pedicels about $\frac{1}{3}$ lin. long, bearing a brush of long erect white hairs. Calyx-tube glabrous below the articulation, pubescent above, about $\frac{1}{3}$ in. long; lobes oblong, rounded at the apex, pubescent below, about 1 lin. long. Petals linear or subulate, thinly membranous, about $\frac{1}{4}$ lin. long. Ovary glabrous. Fruit ovoid, acuminate, obtuse, smooth, 1–1$\frac{1}{2}$ lin. long.

North Central. Eastern Chari: near Vou, *Chevalier*, 7391! between Vou and Ndelli, *Chevalier*, 7407!

Nile Land. Bongo: Sabbi, *Schweinfurth*, 2851!

8. **G. Buchananii,** *Gilg in Engl. Jahrb.* xix. 261. Flowering stems numerous, erect, much-branched, stout, 1–2 ft. high, arising from

a stout woody rhizome. Leaves linear-oblong or -elliptic, subacute or rounded at the apex, cuneate at the base, glabrous, very shortly petiolate, $\frac{1}{2}$–1 in. long, 2 lin. broad. Heads many-flowered, terminal or axillary, long-peduncled; involucral bracts 5–6, broadly oblong or subrotund, rounded at the apex, thinly membranous, coloured, erect during flowering, about $\frac{2}{3}$ as long as the flowers. Flowers bright pink or orange (*Meller*), 4-merous, pedicellate; pedicel about $\frac{1}{3}$ lin. long, bearing a brush of long erect white hairs. Calyx-tube glabrous below the articulation, pubescent above, about $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes narrowly ovate or oblong, rounded at the apex, pubescent without, 1–1$\frac{1}{2}$ lin. long. Petals ovate, rounded at the apex, fleshy, about $\frac{3}{4}$ lin. long. Ovary glabrous.—Gilg in Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Mountains, 7500 ft., *Goetze*, 1231. Portuguese East Africa: near Lake Nyasa, *Johnson*, 468! British Central Africa: Nyasaland; Stevenson Road, 5000–6000 ft., *Scott-Elliot*, 8291! Shire Highlands, *Adamson*, 29! Blantyre, *Buchanan*, 29! *Scott!* Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Manganja Hills, 3000 ft., *Meller!* Mount Chiradzulu, *Meller! Kirk!* Ndurandi, *Scott-Elliot*, 8473! and without precise locality, *Buchanan*, 125! 179! Rhodesia: Lukanda Valley, *Allen*, 472!

9. **G. mollis,** *C. H. Wright in Kew Bulletin*, 1906, 23. Stem stout, branched above the middle, shaggy-pubescent, 2 ft. high. Leaves crowded, linear-elliptic or oblong, acute or obtuse, narrowed at the base, densely shaggy-pubescent when young, later glabrescent above, puberulous on the margin and beneath, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. Heads $\frac{3}{4}$–1 in. in diam., many-flowered, compact, terminal on the main or axillary leafy branches; involucral bracts 15–20, broadly lanceolate, densely pilose, about $\frac{1}{2}$ as long as the flowers. Flowers 4-merous, minutely pedicelled; pedicel bearing a brush of erect soft white hair. Calyx-tube very slender, glabrous below the articulation, densely shaggy-pubescent above, about $\frac{1}{2}$ in. long; lobes oblong, obtuse, shaggy-pubescent without, about $\frac{1}{2}$ lin. long. Petals minute, cylindric, about $\frac{1}{8}$ lin. long. Ovary glabrous. Fruit ovoid, about 1$\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: lower plateau and higher plateau north of Lake Nyasa, *Thomson!* Portuguese East Africa: between Ununga and Lake Shire, 3000–4000 ft., *Johnson*, 12! British Central Africa: Nyasaland; Masisi, *McClounie*, 169!

10. **G. apiculata**, *Gilg in Engl. Jahrb.* xix. 263, *partly*. A low shrub 1$\frac{1}{2}$–3 ft. high; stems erect, much-branched, glabrous. Leaves alternate, crowded, linear or narrowly elliptic, narrowed at base and apex, acute, glabrous, indistinctly 3-nerved, $\frac{1}{2}$–$\frac{2}{3}$ in. long, $\frac{1}{2}$–2$\frac{1}{2}$ lin. broad. Heads numerous, terminal and axillary, sessile or shortly peduncled, 10–15-flowered; involucral bracts in two series; outer 3–6 narrowly linear-lanceolate, acute, glabrous, leaf-like in texture or brown and papery; inner 4–8 broadly ovate, caudate-acuminate, glabrous or puberulous, brown, papery in texture, about $\frac{1}{2}$ as long as the flowers.

Flowers 4-merous, pedicelled; pedicel very short, bearing a brush of erect white hairs. Calyx-tube cylindric, glabrous below the articulation, densely pubescent above, $\frac{1}{4}$–$\frac{1}{3}$ in. long; lobes shortly oblong, rounded at the apex, pubescent on the outside, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Petals minute, cylindric, glabrous, about $\frac{1}{4}$ as long as the calyx-lobes. Ovary glabrous.—Gilg in Engl. Pfl. Ost-Afr. C. 283. *G. involucrata*, Steud., var. *apiculata*, Oliv. in Trans. Linn. Soc. xxix. 143.

Nile Land. High bare grounds of Madi, *Speke & Grant!* Niamniam: Gumango Hill, *Schweinfurth*, 3901! British East Africa: Ukamba; Kitui, *Hildebrandt*, 2807!

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, *Holst*, 9112! and without precise locality, *Buchwald*, 189! 533! Kilimanjaro, 3200–5000 ft., *Smith! Volkens*, 371! 535, *Meyer*, 55.

11. **G. montana,** *H. H. W. Pearson.* Flowering stems numerous, erect, little-branched, slender, glabrous, $\frac{3}{4}$–1 ft. high. Leaves linear, subacute, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Heads many-flowered, terminal, peduncled; involucral bracts about 8, oblong or elliptic, subacute or acute, with a strongly marked midrib, thin, coloured, erect during flowering, 3–4 lin. long, 2–3 lin. broad. Flowers 4- (rarely 5-) merous, pedicellate; pedicel very short silky-villous at the summit. Calyx-tube quite glabrous below the articulation, densely silky-pubescent above, less than $\frac{1}{2}$ in. long; lobes oblong, rounded at the apex, silky-pubescent on the outside, about 1 lin. long. Petals thick, yellow, obcordate, about $\frac{1}{4}$ lin. long. Ovary glabrous.

Nile Land. Abyssinia; Kambata, nearly 6000 ft. *Wellby!*

12. **G. nutans,** *H. H. W. Pearson.* Flowering stems erect, glabrous, with numerous long loose branches. Leaves numerous, crowded, shortly petioled, linear-elliptic or linear-lanceolate, obtuse, glabrous, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{1}{6}$–$\frac{1}{3}$ in. broad. Heads many-flowered, pedunculate; involucral bracts 4–6, broadly ovate or subrotund, scarious, brown (when dry), glabrous, about $\frac{1}{2}$ as long as the flowers. Flowers 4-merous, shortly pedicelled; pedicels bearing a brush of erect white hairs at the apex. Calyx-tube glabrous below the articulation, densely pubescent above, $\frac{1}{2}$ in. long; lobes oblong, obtuse or emarginate, pubescent beneath, about 1 lin. long. Petals ovate, obtuse, thick, fleshy, about $\frac{1}{3}$ as long as the calyx-lobes. Ovary glabrescent.

Mozamb. Distr. Portuguese East Africa: Mountains east of Lake Nyasa, *Johnson!* British Central Africa: Nyasaland; between Kondowe and Karonga, 2000–6000 ft., *Whyte*, 330! Nyika Plateau, 6000–7000 ft., *Whyte!* South Nyika Mountains, 4000–7000 ft., *Whyte!*

13. **G. involucrata,** *Steudel ex A. Rich. Tent. Fl. Abyss.* ii. 234. Stem erect, racemosely branched, glabrous, 2 ft. and more in height, arising from a stout woody rootstock. Leaves numerous, alternate, linear or linear-oblong, 1-nerved, glabrous, minutely petioled, $\frac{1}{2}$–1 in. long, $\frac{1}{2}$–2 lin. broad. Heads 6–12-flowered, solitary, terminal on

short axillary branches; involucral bracts 5, scarious, brown (when dry), oblong, obtuse or rounded at the apex, glabrous, $\frac{1}{2}$–$\frac{2}{3}$ as long as the flowers. Flowers 4-merous, pedicelled; pedicel $\frac{1}{3}$–$\frac{3}{4}$ lin. long, bearing a brush of long erect white hairs. Calyx-tube glabrous below the articulation, pubescent above, $\frac{1}{4}$–$\frac{1}{2}$ in. long; lobes oblong, rounded at the apex, puberulous or pubescent without, about 1 lin. long. Petals subspathulate, fleshy, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Ovary glabrous.—Meisn. in DC. Prodr. xiv. 589; Engl. Hochgebirgsfl. Trop. Afr. 309; Hiern in Cat. Afr. Pl. Welw. i. 922.

Nile Land. Abyssinia: on the descent from Sana to Terrfera, *Schimper*, 770! Shireh, *Quartin-Dillon!* 6800 ft. above Lake Amogai, *Schimper*, 950! and without precise locality, *Plowden!*

Lower Guinea. Angola: Huilla, *Welwitsch*, 6481!

14. **G. Usafuæ,** *Gilg in Engl. Jahrb.* xxx. 363. A much-branched shrub with erect glabrous branches. Leaves very numerous, scattered, linear-lanceolate, glabrous, very shortly but distinctly petioled, $\frac{1}{2}$–1 in. long, 1 lin. broad. Heads numerous, in a more or less corymbose inflorescence, many-flowered; involucral bracts about 6, in 2 series, broadly elliptic, scarious, glabrous, about $\frac{1}{2}$ as long as the flowers. Flowers 4-merous, pedicelled; pedicel villous with erect silky hairs, 1–2 lin. long. Calyx-tube slender, glabrous below the articulation, pubescent above, with 8 projecting white longitudinal ridges within, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes short, oblong. Petals oblong, thickened, truncate and minutely toothed at the apex, $\frac{1}{6}$–$\frac{1}{4}$ as long as the calyx-lobes. Ovary glabrous; style lateral.

Mozamb. Distr. German East Africa; Usafua, *Goetze*, 1042!

15. **G. fastigiata,** *Rendle in Trans. Linn. Soc. ser.* 2, *Bot.* iv. 41. A low shrub about 1 ft. high. Branches numerous, erect, arising from a woody rootstock, pubescent with long erect hairs when young, later glabrescent. Leaves crowded, suberect, stiff, linear-lanceolate, acute, 1-nerved, hirsute when young, later glabrous or bearing a few long adpressed hairs, about $\frac{1}{2}$ in. long, $\frac{1}{2}$–1 lin. broad. Heads 1–3-flowered, sessile or very shortly stalked in the axils of the leaves of the uppermost 1–3 in. of the stem; involucral bracts 2–4, similar to or smaller than the leaves, pubescent. Flowers 4-merous, minutely pedicelled; pedicel bearing a dense brush of short erect white hairs. Calyx-tube dilated below, contracted above the ovary, funnel-shaped above, densely villous with erect hairs, 2–3 lin. long; lobes oblong or ovate, rounded at the apex, about $\frac{3}{4}$ lin. long. Petals split to the base; segments very thinly membranous, unequal in size, glabrous, oblong, entire or more or less emarginate, about $\frac{1}{8}$–$\frac{1}{4}$ lin. long. Ovary pubescent; style arising laterally. Mature fruit ovoid, 1–1$\frac{1}{2}$ lin. long; pericarp thin, membranous, loosely enclosing the seed; testa hard, brittle.—*G. Holstii*, Gilg in Engl. Bot. Jahrb. xix. 257 partly; var. *kilimandscharica*, Gilg in Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Kilimanjaro; above the River Useri,

9000 ft., *Volkens*, 1904! Usambara; Mlalo, *Holst*, 252. British Central Africa: Nyasaland, Mount Mlanji, *Whyte!*

Var. *hirsuta*, H. H. W. Pearson. Leaves and stems more or less densely hirsute.—*G. Holstii*, Gilg in Engl. and Gilg in Engl. Jahrb. xix. 257 partly; Engl. in Pfl. Ost-Afr. C. 283. *Struthiola Holstii*, Engl. in Engl. Jahrb. xvii. 165.

Nile Land. Uganda: Nandi, 7000–8000 ft., *Scott-Elliot*, 6966! Upper Mau Plateau, *Whyte!*

Mozamb. Distr. German East Africa: Usangu, *Goetze*, 1258! British Central Africa: Nyasaland; between Mpata and the Tanganyika Plateau, 2000–3000 ft., *Whyte!* Nyika Plateau, 6000–7000 ft., *Whyte!* Tuchila Plateau, *Purves*, 112!

Also in South Africa.

16. **G. caduca,** *H. H. W. Pearson.* Flowering stems erect, simple or little-branched, 15–18 in. high, glabrous. Leaves somewhat crowded, linear, sessile, acute, stiffly papery, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Heads 20–25-flowered; involucral bracts 5, scarious, ovate, acute, glabrous, caducous. Flowers 4-merous, very shortly pedicelled. Calyx-tube terete, very densely clothed with short depressed silky hairs, especially below the articulation, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes ovate-subrotund, densely silky-pilose on the under side. Petals linear, membranous, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Ovary glabrous.—*G. denudata*, Gilg in Ann. Istit. Bot. Roma, vi. 97, not of Lindl.

Nile Land. Somaliland: between Dadacci Utoca and Bidduma, *Ruspoli & Riva*, 1305!

17. **G. rubrocincta,** *Gilg in Engl. Jahrb.* xix. 259. Flowering stems numerous, erect, slender, unbranched, 4–7 in. high, arising from a thick woody rhizome. Leaves distant, linear, flat, more or less rounded at the apex, with red margins, glabrous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, 1–1$\frac{1}{2}$ lin. broad. Heads 15-flowered; involucral bracts 6–7, ovate, acuminate, thin, recurved during flowering, green with red margins, about equal in length to the flowers, 2 lin. broad at the base. Flowers 4-merous, red or fiery-red pedicelled; pedicel short, villous with erect hairs. Calyx-tube filiform, slender, densely pubescent, $\frac{1}{4}$–$\frac{1}{3}$ in. long; lobes ovate-oblong, sparsely clothed on the back with brown pubescence, $\frac{3}{4}$–1$\frac{1}{2}$ lin. long, about $\frac{1}{2}$ lin. broad at the base. Petals obovate, somewhat concave towards the apex, rather thick, about $\frac{2}{3}$ as long as the calyx-lobes. Ovary glabrous.

Lower Guinea. Angola: Quango (Kuango) River, *Pogge*, 209!

18. **G. fruticulosa,** *Gilg in Engl. Jahrb.* xxiii. 207. A small woody plant, 2–3 in. high, with an ascending woody rhizome; flowering stems numerous, more or less crowded, simple or more rarely branched, prostrate or ascending. Leaves alternate, sessile, crowded on the lower part of the stem, linear-lanceolate, acuminate, acute or apiculate, glabrous, coriaceous, $\frac{1}{4}$–$\frac{3}{8}$ in. long. Heads terminal, 12–18-flowered; involucral bracts 5–6, oblong or obovate-oblong, sessile, acuminate, acute or apiculate, glabrous, rather shorter than the flowers. Flowers

4-merous, pedicellate; pedicel villous, bearing a brush of long erect silky hairs. Calyx-tube cylindric, densely villous (especially below the articulation) with long erect silky hairs, $\frac{1}{4}$–$\frac{3}{8}$ in. long; lobes broadly ovate or ovate-orbicular, obtuse or rounded at the apex, silky-villous without, 1–1$\frac{1}{2}$ lin. long. Petals reduced to small teeth. Filaments short; anthers linear. Ovary glabrous or bearing a few hairs on the summit; style stout, 1–2 lin. long; stigma capitate.—*G. Rendlei*, Hiern in Cat. Afr. Pl. Welw. i. 924.

Lower Guinea. Angola: Huilla; hilly places between Lopollo and Catumba, *Welwitsch*, 6477! and between Mompulla and Nene, *Welwitsch*, 6478! Cunene River, *Johnston!* and without precise locality, *Antunes*, 116, 316! A121.

19. **G. oliveriana,** *Engl. & Gilg in Engl. Jahrb.* xix. 262. Flowering stems numerous, simple, erect, glabrous, 8-15 in. high, arising from a woody rootstock. Leaves crowded, linear or linear-lanceolate, acute, ending in a hard point, glabrous, $\frac{2}{3}$–1 in. long, 1–2 lin. broad. Heads terminal, many-flowered (20–30); involucral bracts 6–8, ovate-oblong, green, sessile, rounded at the apex, with membranous or coloured margins, glabrous ("rarely subciliate," *Gilg*), $\frac{1}{2}$–$\frac{3}{5}$ as long as the flowers. Flowers "orange" or "red," 4-merous, pedicelled; pedicel minute, crowned by a dense brush of long silvery hairs. Calyx-tube cylindric, silky-pubescent, less densely so below the articulation, $\frac{1}{2}$–$\frac{2}{3}$ in. long; lobes broadly ovate or rotund, with sinuate margins, silky-pubescent on the outside, 1$\frac{1}{2}$–2 lin. long, 1–1$\frac{1}{2}$ lin. broad. Petals minute, gland-like. Ovary glabrous.—*G. baumiana*, Gilg in Baum, Kunene-Samb. Exped. 311. *Lasiosiphon Oliveri*, Vatke MSS. ex Gilg, l.c.

Lower Guinea. Angola: Malange, *Mechow*, 325! *Gossweiler*, 1021! 1022! by the River Chitanda, near Kassinga, 4500 ft., *Baum*, 211! Kitamba Marsh, Quango Flats, *Buchner*, 676; by the River Kuango, *Pogge*, 210 211. Mukenge, *Pogge*, 1414.

The bracts of *Pogge*, 210, are distinctly acute and the leaves are longer and more crowded than in the type, in which the bracts are rounded at the apex. It is doubtfully placed in this species.

Baum 211 (*G. baumiana*, Gilg) diverges in some minor characters from the type, but the differences are hardly sufficient for the constitution of a distinct variety.

20. **G. heterophylla,** *Gilg in Ann. Istit. Bot. Roma*, vi. 98. Flowering stems much-branched, glabrous, 20 in. high. Leaves somewhat remote, stiffly membranous, flat, oval or lanceolate, rounded or somewhat acute at the apex, a little narrowed towards the base, glabrous, with inconspicuous venation, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{10}$–$\frac{1}{3}$ in. broad. Heads 10–20-flowered, supported on a leafless peduncle $\frac{1}{2}$–1$\frac{1}{4}$ in. long; involucral bracts 5–6, reddish-brown when dry, very broadly ovate, rounded at the apex, erect, persistent, stiffly membranous, $\frac{3}{5}$ as long as the flowers. Flowers 4-merous. Calyx-tube terete, slender, very densely clothed with very short adpressed silky hairs, $\frac{1}{4}$–$\frac{1}{2}$ in. long; lobes ovate, densely pilose beneath. Petals small, obsolete, membranous, glabrous. Fruit crowned by silky hairs.

Nile Land. Somaliland: Gobi Duaya, *Ruspoli-Riva*, 656; Jaribule, Nelleselve, 7000 ft., *Ruspoli-Riva*, 99.

21. **G. stenophylloides,** *Gilg in Ann. Istit. Bot. Roma,* vi. 97. Flowering stems branched above, glabrous, 9–12 in. high. Leaves densely crowded, acicular, acute, subpungent, glabrous, $\frac{1}{3}$–$\frac{2}{3}$ in. long. Heads 15–25-flowered; involucral bracts 7–10, ovate-lanceolate, acuminate-acute, not coloured, densely pilose without, $\frac{1}{2}$ as long as the flowers. Flowers 4-merous. Calyx-tube terete, $\frac{1}{2}$ in. long, densely pilose; lobes ovate, acute, very densely pilose without. Petals linear, membranous, glabrous, $\frac{1}{2}$ lin. long. Fruit (immature) always crowned with silky hairs.

Nile Land. Somaliland: between Surro and Bogono, *Ruspoli-Riva,* 187.

22. **G. microcephala,** *Meisn. in DC. Prodr.* xiv. 589. Stems erect, numerous, loosely branched, glabrous, $1\frac{1}{2}$–2 ft. high, arising from an erect woody rootstock. Leaves alternate, more or less crowded, erect, linear or linear-lanceolate, acuminate, acute (the lower ones obtuse), with the median nerve prominent, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$1\frac{1}{2}$ lin. broad (the lower even broader). Heads few-flowered (about 20), terminal on the main stem and the axillary branches; involucral bracts 8–12 in 2 series; the outer narrow, leaf-like; the inner brown-straw-coloured, ovate, acuminate, acute, with a few silky hairs on the margin, otherwise glabrous, $\frac{2}{3}$–$\frac{5}{6}$ as long as the flowers. Flowers 4-merous, pedicelled; pedicel minute, bearing a brush of erect white stiff hairs. Calyx-tube pubescent, $\frac{1}{4}$–$\frac{1}{2}$ in. long; lobes ovate or oblong, obtuse or rounded at the apex, pubescent on the outside, 1–2 lin. long. Petals cylindric or more or less club-shaped, about $\frac{1}{4}$ as long as the calyx-lobes. Ovary glabrous. Mature fruit ovoid, 1–$1\frac{1}{2}$ lin. long.—Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 40. *G. apiculata,* Gilg in Engl. Jahrb. xix. 263, partly. *Gnidiopsis microcephala,* Van Tieghem in Bull. Soc. Bot. de France, xl. (1893), 76.

Mozamb. Distr. Portuguese East Africa: Namuli Hills, Makua Country, *Last!* British Central Africa: Nyasaland; Magomero to Zomba, *Meller! Whyte!* Zomba, 2500–3500 ft., *Meller! Whyte!* Mount Mlanji, *Whyte!* and without precise locality, *Buchanan,* 89!

Also in South Africa.

23. **G. ramosa,** *H. H. W. Pearson.* An erect much-branched glabrous shrub with slender branches, about 3 ft. high. Leaves linear-oblong, obtuse or rounded at the apex, narrowed towards the base, very shortly but distinctly petioled, $\frac{1}{2}$–$\frac{2}{3}$ in. long. 1–$1\frac{1}{2}$ lin. broad. Heads small, few-flowered, peduncled; involucral bracts 5–6, ovate, abruptly acuminate, about $\frac{1}{4}$ in. long. Flowers 4-merous, pedicelled; pedicel very short, pubescent, bearing a brush of long erect hairs at the summit. Calyx-tube pubescent, $\frac{1}{4}$ in. long (? adult); lobes oblong, rounded at the apex, pubescent without, about $\frac{1}{3}$ lin. long. Petals minute, cylindric below, capitate above. Ovary glabrous.

Mozamb. Distr. British Central Africa: Nyasaland; between Kondowe and Karonga, 2000–6000 ft., *Whyte!* Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!*

24. **G. gœtzeana,** *Gilg in Engl. Jahrb.* xxx. 363. Flowering stems slender, erect, a little branched above, glabrous, 17–20 in. high. Leaves sessile, numerous, linear-lanceolate, flat, acute, cuneate at the base, with 2–4 lateral nerves on each side, glabrous, $\frac{1}{2}$–$\frac{4}{5}$ in. long. Heads 20–25-flowered; peduncle leafless for 5 lin. below the head, or bearing a single leaf; involucral bracts 4–5, ovate or broadly ovate, acuminate, acute, erect or spreading, equalling or slightly exceeding the flowers, membranous, reddish-green (when dry). Flowers 4-merous. Calyx-tube terete, slender, densely or very densely but shortly silky-pilose, about $\frac{1}{4}$ in. long; lobes very small, ovate, acute, sparsely pilose beneath, $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Petals very small, filiform, globose at the apex, about $\frac{1}{3}$ as long as the calyx-lobes. Fruit silky.

Mozamb. Distr. German East Africa: Kondeland, on mountain slopes and in open bush on the Rumbira River, 3200 ft., *Goetze*, 895.

25. **G. stenophylla,** *Gilg in Engl. Jahrb.* xix. 259. A "low undershrub" (*Holst*). Flowering stems numerous, branched, glabrous, 10 in. to $1\frac{1}{2}$ ft. high, arising from a short ascending rhizome. Leaves densely crowded, pinoid, ending in a stout point, glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$ lin. broad. Heads 10–15-flowered; involucral bracts 6–9, lanceolate, pale green, long-acuminate or caudate-acuminate, with a prominent midrib, glabrous, about $\frac{2}{5}$ as long as the flowers, 1–$1\frac{1}{2}$ lin. broad. Flowers 4-merous, pedicelled, "pale yellow" (*Holst*); pedicel $1\frac{1}{2}$–2 lin. long, bearing a brush of stiff erect hairs. Calyx-tube densely pubescent above the articulation and bearing stiff erect hairs below, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes ovate-oblong, rounded or somewhat emarginate at the apex, pubescent on the outside, 1–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad. Petals linear, somewhat fleshy towards the apex, $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Ovary shortly stalked, glabrous. —Gilg in Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, on dry steppes, 5000 ft., *Holst*, 8963! and without precise locality, *Buchwald*, 274!

Imperfectly known species.

26. **G. katangensis,** *Gilg & Dew. in Engl. Jahrb.* xix. 276. Flowering stems erect, apparently arising from a stout rhizome, glabrous. Leaves remote, linear-lanceolate, sessile, acute, membranous, quite glabrous, $\frac{3}{4}$–1 in. long, $1\frac{1}{2}$–3 lin. broad. Heads 40–60-flowered, terminal, solitary; involucral bracts 7–9, lanceolate, acute, herbaceous, rather more than $\frac{1}{2}$ as long as the flowers. Flowers 4-merous, apparently red or brick-coloured. Calyx-tube slender, cylindric, densely clothed with long white hairs, $\frac{2}{3}$–$\frac{5}{6}$ in. long; lobes ovate or broadly ovate, acute, clothed with long white hairs on the outside, glabrous within, 2–3 lin. long. Petals 0, or very rarely represented by minute points.—Gilg & Dew. in Comptes-rendus Soc. Bot. Belg. xxxiii. 105.

South Central. Belgian Congo: Katanga; abundant on the savannahs near Katete, *Cornet*.

From the description, this species would appear to be allied to *G. oliveriana,* Engl. & Gilg.

27. **G. Butayei,** *De Wild. Études Fl. Bas et Moyen Congo*, i. 170
An erect plant about 15 in. high; branches slender. Leaves scattered, linear, glabrous, narrowed into the petiole, cuneiform at the apex, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{3}{4}$–1 lin. broad. Heads terminal, not more than 15-flowered; involucral bracts 6–7, oval, acute, $1\frac{1}{2}$–2 lin. long, 1 lin. broad. Flowers 4-merous, reddish when dry. Calyx-tube slender, filiform, villous below the articulation, 3–4 lin. long; lobes oval, acute, two opposite ones bearing on the lower side a tuft of erect white hairs, $\frac{1}{2}$ lin. long. Petals much shorter than the calyx-tube.

Lower Guinea. Lower Congo, *Gillet*, 1989.

Scott-Elliot, 8131, 8128, from Karagwe, German East Africa, represent a *Gnidia* apparently allied to *G. oliveriana*, Engl. & Gilg. The material in the Kew herbarium is, however, insufficient for satisfactory description.

3. LASIOSIPHON, Fresen.; Benth. et Hook. f. Gen. Pl. iii. 197.

Flowers hermaphrodite, 5-merous. Calyx-tube articulated and finally rupturing above the level of the ovary, in a few species continuous. Petals alternating with and usually very much shorter than the calyx-lobes, entire, incised or divided to the base (in 1 species absent). Stamens 10, in 2 whorls; those of the upper whorl shortly exserted; anthers oblong or linear. Disc 0 or very minute. Ovary sessile, 1-celled; style slender; stigma capitate. Fruit dry, small, enclosed in the persistent base of the perianth. Seed-testa crustaceous; albumen scanty or 0; cotyledons rather thick.—Shrubs, frequently large and with silky leaves and stems. Leaves opposite or scattered. Flowers densely crowded at the apices of the branches in sessile or peduncled heads. Calyx-tube usually silky-pubescent.

Species numerous, chiefly in South Africa; five or six in Madagascar and one in India.

Petals 0.
- Shrub 7 ft. high, with leaves $\frac{1}{4}$–$\frac{1}{2}$ in. broad . . 1. *L. Vatkei.*
- Glaucous shrub, 2 ft. high, with distant linear leaves . 2. *L. polycephalus.*
- Glabrous shrub, 1 ft. high, with crowded linear leaves . 3. *L. somalensis.*

Petals present.
- Heads few-flowered (6–15).
  - Ovary glabrous . . . . . 4. *L. Fischeri.*
  - Ovary puberulous in the upper half . . . 5. *L. Emini.*
  - Ovary villous . . . . . 6. *L. genistifolius.*
- Heads many-flowered.
  - Leaves glabrous, glabrescent or puberulous.
    - Arborescent.
      - Young leaves glabrous . . . . . 7. *L. glaucus.*
      - Young leaves silky-tomentose . . . . 9. *L. Rivæ.*
    - An undershrub, 1–2 ft. high . . . . 8. *L. Kraussii.*
  - Leaves densely pubescent or villous.
    - Arborescent . . . . . 9. *L. Rivæ.*
    - Undershrubs.
      - Articulation above middle of calyx-tube . . 10. *L. Passargei.*

Articulation below middle of calyx-tube.
Ovary glabrous below the middle . . . 11. *L. lampranthus.*
Ovary villous or pubescent to the base.
Stem and leaves pubescent . . . 8. *L. Kraussii.*
Stem and leaves villous.
Leaves acute . . . . . 12. *L. hœpfnerianus.*
Leaves obtuse . . . . . 13. *L. Kerstingii.*

1. **L. Vatkei,** *Engl. in Engl. Jahrb.* xvii. 167. A shrub about 7 ft. high. Young branches pubescent, later glabrous. Leaves oblong or oblong-lanceolate, obtuse or rounded at the apex, narrowed towards the base, shortly petioled, adpressed pubescent, 1½–2 in. long, ¼–½ in. broad. Heads few-flowered, axillary; peduncle narrowly funnel-shaped, thick, glabrous, except at the apex, ¼–¾ in. long; involucral bracts about 4, broadly elliptic, obtuse, finely pubescent, almost as long as the flowers, caducous. Flowers 5-merous, shortly pedicelled; pedicel about 1 lin. long, pubescent. Calyx-tube articulated, densely villous on the outside with erect silky yellow-white hairs, ½–¾ in. long; lobes spreading during flowering, oblong-elliptic, rounded at the apex, pubescent on the margins, villous on the back, about ¼ as long as the tube. Petals 0. Ovary pubescent and bearing a tuft of long erect hairs at the summit; hypogynous disc minute.—*L. Hildebrandtii*, Vatke ex Engl. Hochgebirgsfl. Trop. Afr. 310 (not of Scott-Elliot in Journ. Linn. Soc. xxix. 47). *Arthrosolen latifolius*, Oliv. in Trans. Linn. Soc. ser. 2, Bot. ii. 348. *Gnidia vatkeana*, Engl. & Gilg in Engl. Jahrb. xix. 267; Gilg in Engl. Pfl. Ost-Afr. C. 283. *G. latifolia*, Gilg in Engl. Pfl. Ost-Afr. C. 283.

Nile Land. Uganda: Nandi; Nzowi, 4000–6000 ft., *Scott-Elliot*, 6682! British East Africa: near Samburu, *Kässner*, 485! Ukamba; Kitui, *Hildebrandt*, 2838! between Duruma and Teita, *Hildebrandt*, 2369! Ribe to Galla Country, *Wakefield!*

Mozamb. Distr. German East Africa; Usambara; Nyika Steppe, *Holst*, 2415! Mlalo, *Holst*, 541! Tanga; on the dry slopes of Lutindi, 1400 ft., *Holst*, 3449! Kilimanjaro; Himo River, 2900 ft., *Volkens*, 1751! 5000 ft., *Johnston!*

2. **L. polycephalus,** *H. H. W. Pearson.* A small virgate shrub about 2 ft. high with erect glaucous branches. Leaves few, scattered, erect, linear, 1-nerved, narrowed at both ends, subacute, ¼–½ in. long, ½–1 lin. broad. Heads ovoid, few-flowered, pedunculate, in erect racemes; bracts of the involucre about 9, erect, ovate or triangular-ovate, rounded at the base, acute, obtuse or rounded at the apex, silky-pubescent without, the inner about ½ in. long, ⅜ in. broad, outer smaller. Flowers 5-merous, yellow, "with a delicious scent" (*Lugard*), pedicelled; pedicel about ¾ lin. long, with a ring of erect silky hairs at the summit. Calyx-tube slender, pubescent above the articulation, densely villous with long erect silky hairs below, about ½ in. long; lobes spreading, oblong, obtuse or subacute, densely pubescent beneath, about 1½ lin. long. Petals 0. Ovary glabrous; style about 1½ lin. long; stigma cylindric. Fruit ovoid, about 2 lin. long; pericarp thin, black, brittle; testa thin; embryo large, 1½–2 lin. long.—*Passerina polycephala*, E. Meyer ex Meisn. in Linnæa, xiv. 561. *Arthrosolen polycephalus*,

E. Meyer in Bull. Acad. Pétersb. i. (1843), 359. *Dais virgata*, Lichtenst. ex Meisn. in DC. Prodr. xiv. 561.

Mozamb. Distr. Rhodesia: Ngamiland; Nakalechwe, near Lake Ngami, *Lugard*, 24! Botletle River flats, *Mrs. Lugard*, 4!

Common in South Africa.

3. **L. somalensis,** *H. H. W. Pearson.* A low shrub, unbranched or with rigid erect branches, glabrous in the older parts, $\frac{1}{2}$–$2\frac{1}{2}$ ft. high. Leaves scattered, erect, linear-lanceolate, acute, thick, glabrous, very shortly petioled, $\frac{1}{2}$–1 in. long, 1–$1\frac{1}{2}$ lin. broad. Heads terminal, many-flowered; involucral bracts 7–8, lanceolate, acute, silky on the outside, shorter than the flowers. Flowers 5-merous, pedicelled; pedicel about $\frac{1}{8}$ in. long, silky-pubescent, with a ring of long erect hairs at the summit. Calyx-tube slender, pubescent above the articulation, densely villous with long erect yellowish-white hairs below, about $\frac{1}{2}$ in. long; lobes 5, ovate, pubescent beneath, glabrous above, spreading, about $\frac{3}{4}$ lin. long. Petals 0. Ovary bearing a few silky hairs at the summit. Fruit ovoid, $1\frac{1}{2}$–2 lin. long; pericarp thin, black, brittle.—*Arthrosolen somalensis*, Franch. in Révoil, Pays çomalis, 62, t. 6. *Gnidia violacea*, Gilg in Ann. Istit. Bot. Roma, vi. 98.

Nile Land. Somaliland; Ouanentab, *Révoil;* Ononuf and Hahi, *James & Thrupp!* Golis Range, *Mrs. Lort-Phillips! Drake-Brockman*, 114! 123! 356! Guldoo Hammed, *Miss Edith Cole!* between Deragodle and Lafaru, *Riva*, 345!

Var. *glabra*, H. H. W. Pearson. Involucral bracts glabrous.—*Gnidia somalensis*, Gilg in Ann. Istit. Bot. Roma, vi. 98.

Nile Land. Somaliland: between Rer-es-Sogair and Berbera, *Robecchi Bricchetti*, 85!

4. **L. Fischeri,** *Engl. & Gilg in Engl. Jahrb.* xix. 266. Stem much-branched above, many-headed, glabrous. Leaves (upper) oblong, rigidly membranous or subcoriaceous, glabrous, subacute, rounded at the base, very shortly petioled, $\frac{2}{3}$–$\frac{3}{4}$ in. long, 2–3 lin. broad. Heads 8–10-flowered, pedunculate; peduncle leafless, 2–4 lin. long; involucral bracts 4–5, suborbicular, broader than long, thinly membranous, persistent, about $\frac{5}{6}$ as long as the flowers. Flowers 5-merous, pedicelled; pedicels about 1 lin. long, villous with long erect hairs. Calyx-tube cylindric, very densely silky-tomentose, $\frac{1}{2}$ in. long; lobes narrowly ovate, densely clothed with long silky hairs $1\frac{1}{2}$–2 lin. long, 1 lin. broad. Petals thinly membranous, linear, obtuse or somewhat emarginate, $\frac{1}{2}$–$\frac{1}{4}$ as long as the calyx-lobes. Ovary stalked, glabrous. Fruit fusiform, covered with the villous persistent base of the perianth, $\frac{1}{3}$ in. long, 1 lin. thick; hairs about $\frac{1}{3}$ in. long.—*Gnidia Fischeri*, Engl. & Gilg, l.c.; Gilg in Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Irangi, *Fischer*, 542!

5. **L. Emini,** *Engl. & Gilg in Engl. Jahrb.* xix. 266. Stem stout, much-branched above, glabrous. exceeding 1 ft. high. Leaves oblong or oblong-lanceolate, rigidly membranous, glabrous, more or less rounded at base and apex, very shortly petiolate, 1–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Heads 5–8-flowered, pedunculate; peduncle leafless, 2–3 lin. long;

involucral bracts 4–5, broadly ovate, unequal in length, the exterior shorter than the interior, thinly membranous, persistent, rounded at the apex, erect and more or less closed during flowering, about $\frac{2}{3}$ as long as the flowers. Flowers 5-merous, orange-coloured. Calyx-tube cylindric, densely silky, villous, especially below the articulation, $\frac{1}{2}$–$\frac{2}{3}$ in. long; lobes obovate-oblong, densely silky without, 3 lin. long, 1–$1\frac{1}{2}$ lin. broad. Petals very thinly membranous, pale yellow, broadly ovate or oblong, incised at the apex, about $\frac{3}{4}$ as long as the calyx-lobes. Ovary puberulous above the middle, otherwise glabrous.—*L. Stuhlmanni*, Gilg, l.c. 267. *Gnidia Emini*, Engl. & Gilg, l.c. 265; Gilg in Engl. Pfl. Ost-Afr. C. 283. *G. Stuhlmanni*, Gilg in Engl. Jahrb. xix. 267; Engl. Pfl. Ost-Afr. l.c.

Mozamb. Distr. German East Africa: forest west of Irangi, *Stuhlmann*, 4224! Usagura; Mpwapwa, 3000 ft., *Stuhlmann*, 248; Kidete, *Stuhlmann*, 185!

6. **L. genistifolius,** *Engl. & Gilg in Engl. Jahrb.* xix. 268. Stem stout, more or less branched above, erect, few-flowered, densely clothed with yellow tomentum. Leaves lanceolate, membranous, acute, narrowed at the base into the very short petiole, very densely yellow-tomentose on both sides, 1–$1\frac{1}{4}$ in. long, 2–$3\frac{1}{2}$ lin. broad. Heads 10–14-flowered, peduncled; leafless peduncle $\frac{1}{4}$–$\frac{1}{3}$ in. long; involucral bracts 6–7, linear-lanceolate, very densely white-pilose, $\frac{4}{5}$ as long as the flowers. Flowers 5-merous. Calyx-tube cylindric, very densely silky-tomentose, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes linear-oblong, emarginate, very densely silky-pubescent without, 1–$1\frac{1}{2}$ lin. long, about $\frac{1}{2}$ lin. broad. Petals linear-setiform or filiform, thinly membranous, $\frac{1}{2}$–$\frac{4}{5}$ as long as the calyx-lobes. Ovary villous with long erect hairs.—*Gnidia genistifolia*, Engl. & Gilg, l.c. 267.

Lower Guinea. Angola: between Sanza and Malange, *Pogge*, 212.

7. **L. glaucus,** *Fresen. in Flora*, 1838, 603. A shrub or tree 10–30 ft. high; branches finely pubescent when young, later glabrous. Leaves alternate, lanceolate, subsessile, with a more or less indurated acute apex, finely and obscurely pubescent near the base, otherwise glabrous, glaucous, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, 5–6 lin. broad. Heads many-flowered, terminal on short leafy branches; involucral bracts 8–12, in 2 series, broadly elliptic, obtuse, densely and very finely pubescent, almost as long as the flowers. Flowers 5-merous, shortly pedicelled; pedicel about 1 lin. long, pubescent. Calyx-tube not articulated, densely villous on the outside with stiff erect yellowish hairs, especially at the base, prominently ridged within, $\frac{1}{2}$–$\frac{3}{4}$ in. long; lobes spreading during flowering, oblong-elliptic, rounded at the apex, pubescent on the margins, villous on the back, especially in the middle line, with a tuft of stiff hairs projecting beyond the apex, about $\frac{1}{4}$ as long as the tube. Petals linear or more or less broadly spathulate, thickened and entire or more or less deeply bi- or tri-fid at the apex, about $\frac{1}{4}$ as long as the calyx-lobes. Ovary villous with long stiff erect hairs; style about $\frac{1}{4}$ in. long; stigma capitate; hypogynous disc short, annular, lobed. Mature fruit not seen.—Meisn. in DC. Prodr. xiv. 593; Engl. Hochgebirgsfl. Trop. Afr. 309. *Gnidia glauca*, Gilg in Engl. Jahrb. xix. 265 in obs. *G. Volkensii*, Gilg in Engl. Pfl. Ost-Afr. C. 283.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–7500 ft., *Mann*, 1201! 2171! Buea, 6800 ft., *Preuss*, 631!

Nile Land. Abyssinia: near Gondar, on the mountains, *Rüppel!* Gallas Plateau, *Steudel*, 1284! Amora-Gettel, *Schimper*, 1342! and without precise locality, *Plowden!* British East Africa: Mount Kenia, above 8000 ft., *Battiscombe*, 11!

Mozamb. Distr. German East Africa: Kilimanjaro; on the north side, 10,400 ft., *Volkens*, 2012! Usangu, *Goetze*, 990! and without precise locality, *Busse*, 282! British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 121! *McClounie*, 147! between M'pata and the Tanganyika Plateau, 2000–3000 ft., *Whyte!*

8. **L. Kraussii,** *Meisn. in DC. Prodr.* xiv. 596. Stems erect, simple or little-branched, arising from a stout rootstock, pubescent with spreading hairs, glabrescent or glabrous, $\frac{1}{3}$–2 ft. high. Leaves elliptic, lanceolate or narrowly ovate, glabrous or hairy, rounded, obtuse or acute, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, $\frac{1}{8}$–$\frac{7}{8}$ in. broad. Heads solitary, terminal, compact, many-flowered; peduncle velvety-pilose, 1–4 in. long; involucral bracts 6–10, lanceolate or ovate, obtuse, densely pubescent, $\frac{1}{2}$–$\frac{2}{3}$ in. long. Flowers 5-merous, shortly pedicelled; pedicel bearing a tuft of short erect hairs. Calyx-tube stout or slender, bearing a dense brush of erect white or yellowish-white hairs below the articulation, densely pubescent above, $\frac{1}{2}$–$\frac{2}{3}$ in. long; lobes oblong or obovate, truncate, rounded or emarginate at the apex, 1–2 lin. long. Petals very thinly membranous, oblong, emarginate or more or less deeply bisected, $\frac{1}{3}$–$\frac{1}{2}$ as long as the calyx-lobes. Ovary shortly stalked, densely villous with long erect white hairs about twice its length; style lateral, 2–3 lin. long; stigma capitate; hypogynous disc minute, annular. Mature fruit not seen.—Engl. in Hochgebirgsfl. Trop. Afr. 310; Wood & Evans, Natal Plants, iii. t. 256. *L. Kraussii*, vars., Meisn. l.c. *L. affinis*, Kotschy & Peyr. Pl. Tinn. 39, t. 19 B. *L. djuricus*, Gilg in Engl. Jahrb. xix. 269. *Gnidia kraussiana* (and vars.), Meisn. in Hook. Lond. Journ. Bot. ii. (1843), 552, 553; Gilg in Engl. Pfl. Ost-Afr. C. 283. *Gnidia djurica*, Gilg in Engl. Jahrb. xix. 268. *G. dschurica*, Gilg in Engl. & Prantl, Pflanzenfam. iii. 6A, 228. *G. usinjensis*, Gilg in Engl. Jahrb. xix. 269; Engl. Pfl. Ost-Afr. l.c.

Upper Guinea. Futa Jallon: Labe, *Chevalier*, 12327! Northern Nigeria: Kontagora, *Dalziel*, 53!

Nile Land. Jur: between Kurshook Ali's Seriba and the Wau River, *Schweinfurth*, iii. 116! 117! between Bongo and Jur, *Tinne*, 75! Dar Fertit; Golo Desert, *Schweinfurth*, iii. 115. Bahr-el-Ghazal, *Broun!*

Lower Guinea. Angola: near the River Cunene, *Johnston!* Huilla, *Antunes*, 119! by the River Kubango, 3600 ft., *Baum*, 376! Malange Dist., *Gossweiler*, 1014! 1017!

Mozamb. Distr. German East Africa: Unyika, *Goetze*, 1369! Usinja; Nyakamaya, *Stuhlmann*, 862! Western bank of the Nyanza to Kagera, *Trotha*, 141! Ufipa (Afipa), western boundary of the Rikwa (Rukwa) Mountains, 7000 ft., *Hostmann!* Karagwe; on dry stony hills, 4000–5000 ft., *Scott-Elliot*, 8162! Portuguese East Africa: *Johnson*, 487! 508! British Central Africa: Urungu; Fwambo, *Carson*, 96! *Nutt!* Nyasaland; Angoniland, *Sharpe*, 59! Mount Malosa, 4000–6000 ft., *Whyte! Cameron!* top of Mount Zomba, *Buchanan*, 125! and

without precise locality, *Buchanan*, 428! 1248! Rhodesia: Matopo Hills, *Miss Gibbs!*

Also in South Africa.

L. Kraussii, as thus defined, is an extremely variable species. The principal variations are seen (1) in the length and breadth of the leaves and involucral bracts; (2) in the hairiness of the stems and leaves (the extreme forms being very hairy and glabrous respectively); (3) in the lobing of the petals, which present all gradations between entire and completely bisected organs. An examination of the tropical and South African specimens shows that these variations occur in plants from the same area, and to some extent, indeed, in the same plant. Therefore, in the absence of any recognisable correlation of differential characters a subdivision of the species is impossible, and it seems that no practical advantage is gained by keeping up the varieties proposed by Meisner.

A specimen recorded by Hiern in *Cat. Afr. Pl. Welw.* i. 925 as "apparently an undescribed species of *Gnidia*, related to *Arthrosolen flavus*, Rendle," is more probably a form of *Lasiosiphon Kraussii*. It was collected in Angola: Huilla; in hilly places about Lake Ivantala, *Welwitsch*, 6480!

9. **L. Rivæ,** *H. H. W. Pearson.* Arborescent: the many-flowered branches terete, clothed with yellow tomentum, later glabrescent. Leaves shortly petioled, lanceolate, acuminate, acute, entire, covered with a white silky tomentum when young, at length glabrescent, subcoriaceous, 1–1$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Heads terminal, dense, 80–100-flowered; involucral bracts 7–8, spreading or reflexed during flowering; very densely covered with a white silky tomentum, about equal in length to the flowers; peduncle leafy. Flowers 5-merous. Calyx-tube terete, clothed very densely with long spreading silky hairs $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes oblong, rounded at the apex, silky beneath, glabrous within, yellow. Petals delicately membranous, linear, about $\frac{1}{2}$ lin. long. Fruit crowned with silky hairs.—*Gnidia Rivæ*, Gilg in Ann. Istit. Bot. Roma, vi. 98.

Nile Land. Somaliland: between Jaribule and Hars, *Ruspoli & Riva*, 189; between Bidduma and Alghe, among herbs and shrubs, *Ruspoli & Riva*, 1239.

10. **L. Passargei,** *H. H. W. Pearson.* Flowering stems erect, more or less branched, 4–8 in. high (*Passarge*); branches densely clothed with silky-velvety pubescence. Leaves oblong or lanceolate-oblong, acute, sessile, coriaceous, clothed on both surfaces with dense silky velvety pubescence, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 2–3 lin. broad. Heads solitary, terminal, many-flowered (40–50); involucral bracts 6, similar to the leaves or broader and more densely pilose, equalling the flowers in length. Flowers 5-merous, yellow (*Passarge*). Calyx-tube cylindric, densely silky-tomentose, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes oblong, deeply emarginate (? always), with white silky pubescence on the outside, about 1$\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad. Petals very thin, linear, emarginate or more or less deeply divided (sometimes to the base), about $\frac{1}{2}$ as long as the sepals.—*Gnidia Passargei*, Gilg in Engl. Jahrb. xxiii. 206.

Upper Guinea. Cameroons: Ngaumdere, 4000 ft., on the burnt savannahs, *Passarge*, 126!

11. **L. lampranthus,** *Gilg in Engl. Jahrb.* xix. 265. Stem stout, erect, much-branched near the top, bearing several heads of flowers, densely tomentose. Leaves oblong, acute or shortly apiculate, somewhat narrowed at the base, densely pubescent with long adpressed silky hairs, 1–1$\frac{1}{3}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad. Heads many-flowered (50–70); involucral bracts 7–10, ovate, densely pubescent with long adpressed hairs, spreading during flowering, about $\frac{3}{4}$ as long as the flowers. Flowers 5-merous, very shortly pedicelled; pedicel bearing long erect stiff hairs. Calyx-tube cylindric, not distinctly articulated, densely clothed with yellowish pubescence above the middle and with long stiff erect yellowish hairs below, $\frac{3}{8}$–$\frac{1}{2}$ in. long; lobes ovate or elliptic, obtuse or rounded at the apex, pubescent without, 1$\frac{1}{2}$–2 lin. long. Petals linear-subulate, about $\frac{1}{8}$ as long as the calyx-lobes. Stamens of the upper whorl shortly exserted. Ovary glabrous below, bearing a tuft of erect white hairs at the summit; style about $\frac{1}{3}$ in. long; stigma capitate, papillose; hypogynous disc very minute, annular. Fruit not seen.—*Gnidia lamprantha*, Gilg in Engl. Jahrb. l.c. 264; Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Karagwe, 4200 ft., *Stuhlmann*, 1979! 3204! Uganda: West Ankole, *Dawe*, 362! Western Toro, *Doggett!*

12. **L. hœpfnerianus,** *Vatke ex Gilg in Engl. Jahrb.* xix. 268. Flowering stems erect, simple or little-branched, densely silky-pubescent. Leaves lanceolate, membranous, densely (the upper very densely) silky-tomentose, acute, subsessile, $\frac{3}{4}$–1 in. long, 1$\frac{1}{2}$–2 lin. broad. Heads terminal, 30–50-flowered; peduncle densely silky-pubescent, 1–1$\frac{1}{2}$ in. long; involucral bracts ovate-lanceolate or lanceolate, about $\frac{3}{5}$ as long as the flowers. Flowers 5-merous. Calyx-tube cylindric, very densely silky-pubescent, villous below, $\frac{2}{3}$–$\frac{3}{4}$ in. long; lobes obovate-oblong, more or less emarginate, velvety-pubescent on the back, 2 lin. long, 1 lin. broad. Petals membranous, oblong, glabrous, $\frac{2}{5}$ as long as the calyx-lobes. Ovary silky-villous.—*Gnidia hœpfnerianus*, Gilg, l.c.; Hiern in Cat. Afr. Pl. Welw. i. 925, partly.

Lower Guinea. German South-west Africa: Okahandya, *Höpfner*, 40! Angola: Huilla; between Mumpulla and Lopollo, *Welwitsch*, 6476! 6479! and without precise locality, *Antunes*, 137! *Newton!* Mossamedes; Humpata, *Melho Ramalho!*

Mozamb. Distr. German East Africa: lower plateau north of Lake Nyasa, *Thomson!* Rhodesia: between Broken Hill and Bwana M'cuba, *Allen*, 360! 382! 100 miles north of the Zambesi Falls, *Lord Kesteven!* Batoka Highlands, *Kirk!* Nyasaland: Mount Masisi, *McClounie*, 70!

This may be only a villous form of *L. Kraussii*.

13. **L. Kerstingii,** *H. H. W. Pearson.* Stems finely tomentose, branched near the top, about 9 in. high, arising from a woody rootstock. Leaves oblong, obtuse, narrowed towards the base, finely pubescent, $\frac{3}{4}$–1 in. long, $\frac{1}{4}$ in. broad. Heads solitary, terminal, many-flowered; involucral bracts about 8, oblong, obtuse, erect during flowering, about $\frac{2}{3}$ as long as the flowers; peduncle short, tomentose. Flower yellow,

5-merous, sessile on a villous club-shaped receptacle. Calyx-tube densely villous with long light fawn-coloured silky hairs below the articulation, tomentose above, $\frac{1}{2}$–$\frac{2}{3}$ in. long; lobes broadly oblong or obovate, rounded, silky-villous outside, $1\frac{1}{2}$ lin. long, 1 lin. broad. Petals linear or oblong-linear, entire or more or less deeply bifid, very thin, about $\frac{2}{3}$ as long as the calyx-lobes. Ovary densely villous with erect silky hairs; disc minute. Fruit not seen.

Upper Guinea. Togo: Kirikiri, *Kersting*, 36!

4. **ARTHROSOLEN**, C. A. Meyer; Benth. et Hook. f. Gen. Pl. iii. 193.

Flowers hermaphrodite. Calyx-tube cylindric, slender, articulated and usually at length breaking across above the level of the ovary, glabrous below the articulation in the Tropical African species; lobes 4, spreading, naked within at the throat. Petals 0. Stamens 8, in 2 whorls, included, with short filaments; anthers oblong or linear. Hypogynous disc 0. Ovary subsessile, 1-celled; style filiform; stigma small, capitate. Fruit small, dry, with a membranous pericarp, enclosed in the persistent base of the calyx-tube. Testa brittle; albumen scanty or 0; cotyledons fleshy.—Virgate or ericoid shrubs. Leaves usually small, narrow, opposite or alternate, crowded or distant. Flowers in usually involucrate spikes or heads, rarely solitary, axillary.

Species about 20, all in South and Tropical Africa.

(See also *Gnidia katangensis*, Gilg & Dew., in which the petals are said to be usually absent.)

Outer involucral scales linear or narrowly lanceolate .	1. *A. chrysantha.*
Outer involucral scales broadly ovate or ovate-lanceolate.	
Calyx-tube finely pubescent above the articulation.	
Calyx-tube $\frac{1}{3}$ in. long	2. *A. Poggei.*
Calyx-tube $\frac{2}{3}$ in. long	3. *A. sphærantha.*
Calyx-tube silky-villous above the articulation .	4. *A. Newtonii.*
Calyx-tube glabrous, glabrescent or sparsely puberulous above the articulation.	
Heads 30–40-flowered	5. *A. dekindtiana.*
Heads 5–6-flowered	6. *A. pleurocephala.*
Calyx-tube pubescent or villous below the articulation.	
Involucral bracts distinctly shorter than the flowers	7. *A. fulgens.*
Involucral bracts equalling or slightly exceeding the flowers	8. *A. foliosa.*

1. **A. chrysantha,** *Solms-Laub. ex Schweinfurth, Beitr. Fl. Aethiop.* 165. A shrub $\frac{3}{4}$–2 ft. high, glabrous, glaucescent, with numerous erect simple or little-branched stems arising from a woody rootstock. Leaves scattered, erect, linear, acute, 1-nerved, about $\frac{3}{4}$ in. long. Heads terminal, solitary, many-flowered; involucral bracts ovate (outer ones narrower), acuminate, glabrous, shorter than the flowers. Flowers

pedicelled; pedicel $\frac{1}{16}$–$\frac{1}{8}$ in. long, bearing a ring of long erect hairs at the summit. Calyx-tube slender, 4-angled, puberulous, $\frac{3}{8}$–$\frac{1}{2}$ in. long, articulate; lobes 4, spreading, ovate-lanceolate or obovate, acute, puberulous beneath, 1–2 lin. long. Ovary glabrous; disc 0.—*A. glaucescens*, Oliver in Journ. Linn. Soc. xv. 96. *A. flavus*, Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 40. *Gnidia chrysantha*, Gilg in Engl. Jahrb. xix. 258. *G. glaucescens*, Gilg in Engl. Pfl. Ost-Afr. C. 283. *G. flava*, Gilg, l.c.

Upper Guinea. Collected on the Niger, *Baikie !* Northern Nigeria: around Zunguru and Lokoja, *Lugard !* Kontagora, *Dalziel*, 106 !

Nile Land. Cordofan: Dalisenaar, at the Nile Cataract, *Cienowsky*, 161! Dar Fertit: low swamps west of Pango, *Schweinfurth*, iii. 113! Uganda: in swampy ground, *Wilson*, 64! Buddu, *Dawe*, 327! Masisi Plateau, *McClounie*, 97! Shire Highlands, *Adamson*, 136!

Mozamb. Distr. Lake Tanganyika, *Cameron !* British Central Africa: Urungu; Fwambo, *Carson*, 112! *Nutt !* Nyasaland; Angoniland, *Sharpe*, 1901! Mount Mlanji, *Whyte !* Mount Sochi, *Kirk !* Manganja Hills, *Kirk ! Meller !* Blantyre, *Buchanan*, 94! *Last ! Scott !* Mount Zomba, 2900–5000 ft., *Purves*, 26! *Whyte !* Namasi, *Cameron*, 14! and without precise locality, *Buchanan*, 470! 1348! Rhodesia: between Umtali and Salisbury, *Hon. Mrs. Evelyn Cecil*, 55! between Broken Hill Mine and Bwana M'cuba Mine, *Allen*, 376.

Var. *ignea*, H. H. W. Pearson. Bracts narrowly lanceolate; calyx-tube red or yellowish-red.—*Gnidia ignea*, Gilg in Engl. Jahrb. xix. 258; Engl. Pfl. Ost-Afr. C. 283.

Nile Land. Uganda: Buddu, on dry hillsides, *Scott-Elliot*, 7492!

Mozamb. Distr. German East Africa: Boze, on the Ugalla River, *Böhm*, 48A! Portuguese East Africa: between Unango and Mtonia, *Johnson !* British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte !* Fort Hill and neighbourhood, *Whyte !* Shire Highlands, *Adamson*, 137!

2. **A. Poggei,** *H. H. W. Pearson.* Stem erect, stout, much-branched above, glabrous, 1$\frac{1}{2}$–2 ft. high. Leaves linear, glabrous, acute, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Heads many-flowered; involucral bracts 5–6, broadly ovate, apiculate, yellow or gold-coloured (when dry), about as long as the flowers, $\frac{1}{4}$ in. broad. Flowers 4-merous, shortly pedicelled; pedicel bearing a tuft of very fine silky hairs at the apex. Calyx-tube slender, finely pubescent above the articulation, glabrous below, $\frac{1}{3}$ inch long; lobes broadly ovate-triangular, acute, glabrous above, with a rough cushion-like swelling within at the base, $\frac{1}{2}$–1 lin. long, $\frac{1}{2}$ lin. broad.—*Gnidia Poggei*, Gilg in Engl. Jahrb. xix. 259.

Lower Guinea. Angola: by the River Kuango, *Pogge*, 208!

3. **A. sphærantha,** *H. H. W. Pearson.* A woody annual (?), about 1$\frac{1}{2}$ ft. high, branched above, glabrous. Leaves scattered, sessile, linear, acute, $\frac{1}{3}$–$\frac{3}{4}$ in. long, 1 lin. broad. Heads many-flowered, terminal; involucral bracts about 10, in 2 series, ovate, acuminate, acute, glabrous, $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad. Flowers 4-merous, shortly pedicelled; pedicel bearing a ring of erect white silky hairs above the middle. Calyx-tube

glabrous below the articulation, pubescent above, $\frac{2}{3}$ in. long; lobes ovate, acuminate, acute, about $1\frac{1}{2}$ lin. long. Ovary glabrous.

Mozamb. Distr. German East Africa: Uha; by the River Malagarazi, *Trotha*, 56!

4. **A. Newtonii,** *H. H. W. Pearson.* Flowering stems erect, unbranched or rarely branched near the apex, 6–18 in. high, arising apparently from a stout rhizome. Leaves scattered, coriaceous, thick, linear, acuminate, ending in a rigid point, glabrous, 1-nerved, $\frac{1}{3}$–$\frac{3}{4}$ in. long, 1 lin. broad. Heads terminal, solitary, many-flowered (40–60); involucral bracts 8 or 9, ovate, oblong or elliptic, acute or shortly apiculate, glabrous, $\frac{1}{4}$–$\frac{1}{2}$ as long as the flowers. Flowers red, 4-merous, pedicelled; pedicel about 1 lin. long, bearing above the middle a brush of long erect white hairs. Calyx-tube 4-angled, densely white-pubescent above, glabrous below the articulation, $\frac{1}{4}$–$\frac{3}{8}$ in. long; lobes broadly ovate, acute or more or less apiculate, silky-pubescent on the outside. Ovary glabrous; style apparently dimorphic, $\frac{1}{4}$ in. long (more rarely $\frac{1}{8}$ in. long); hypogynous scales 0. Fruit ovoid, acuminate, obtuse, 1 lin. long; pericarp thin, black, brittle.—*Gnidia Newtonii*, Gilg in Engl. Jahrb. xxiii. 205.

Lower Guinea. Angola: Huilla, common in the Chella Mountains, *Newton*, 10! *Johnston!* by the River Cunene, *Johnston!* by the River Chitanda, near Kassinga, 4200 ft., *Baum*, 213!

5. **A. dekindtiana,** *H. H. W. Pearson.* Flowering stems erect, branched above, $\frac{3}{4}$–$1\frac{1}{2}$ ft. high. Leaves more crowded than in *G. Newtonii*, linear, acute, quite glabrous, coriaceous, 1-nerved, about $\frac{1}{2}$ in. long, $\frac{1}{2}$–1 lin. broad. Heads terminal, 30–40-flowered; involucral bracts 8–12, broadly ovate, acute or shortly apiculate, glabrous, much shorter than the flowers, $\frac{1}{4}$–$\frac{1}{3}$ in. long, about 2 lin. broad. Flowers red (when dry), 4-merous, pedicelled; pedicel about 1 lin. long, bearing a brush of long erect white hairs at the apex. Calyx-tube 4-angled, puberulous with short hairs or glabrescent, glabrous below the articulation, $\frac{1}{4}$–$\frac{3}{8}$ in. long; lobes broadly ovate, acute or apiculate, glabrous above, silky-pubescent beneath. Ovary glabrous; style lateral; hypogynous scales 0. Fruit ovoid, acuminate, $1\frac{1}{2}$ lin. long.—*Gnidia dekindtiana*, Gilg in Engl. Jahrb. xxiii. 205.

Lower Guinea. Angola: Huilla, *Antunes*, 20! 45; by the River Longa above Minnesera, *Baum*, 700! Bailundo District, 5000 ft., *Wellman!*

This is very near *G. Newtonii*. When an adequate supply of material is available it may perhaps prove to be a form of the same species.

6. **A. pleurocephala,** *H. H. W. Pearson.* A shrub about 2 ft. high, with glabrous branches. Leaves more or less densely crowded, acicular-linear, acuminate-acute, pungent, flat, glabrous, subcoriaceous, with inconspicuous venation, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Heads axillary, very shortly peduncled, 5–6-flowered; involucral bracts 4, ovate-lanceolate, acute. Flowers 4-merous, very small, more or less brown in colour. Calyx-tube slender, glabrous, 1–2 lin. long; lobes oblong, rounded at the apex,

glabrous.—*Gnidia pleurocephala*, Gilg in Baum, Kunene-Samb. Exped. 310.

Lower Guinea. Angola: Longa River, 4000 ft., growing on the bank of a pool, very rare, *Baum*, 828.

7. **A. fulgens,** *H. H. W. Pearson.* Stems numerous, erect or ascending, branched, glabrous, 1–1½ ft. high, arising from a woody rhizome. Leaves crowded, linear, acute at the apex, glabrous, rigid, ⅓–⅔ in. long, about ½–1 lin. broad. Heads terminal, about 20-flowered; involucral bracts 6, oval, obtuse, glabrous or minutely glandular, somewhat coloured towards the apex, ⅓ in. long, about 2 lin. broad. Flowers brilliant scarlet, 4-merous. Calyx-tube silky-pubescent or -villous, about ½ in. long; lobes obovate, rounded at the apex, about ⅛ in. long.—*Gnidia fulgens*, Hiern in Cat. Afr. Pl. Welw. i. 923.

Lower Guinea. Angola: Pungo Andongo; at Mutollo and in marshy meadows near Sobato Nbilla, *Welwitsch*, 6483!

8. **A. foliosa,** *H. H. W. Pearson.* Flowering stems stout, woody, erect, perhaps 2–3 ft. high, bearing numerous short slender leafy branches. Leaves linear or linear-oblong, obtuse or subacute, narrowed towards the base, glabrous, with prominent venation, 1–1½ in. long. Heads about 12-flowered, axillary, peduncled; peduncle slender, usually leafless, except near its insertion, ¾–2 in. long; involucral bracts 4, elliptic or elliptic-oblong, rounded at the apex, more or less narrowed at the base, membranous, not coloured, with conspicuous venation, glabrous, scarcely exceeding the flowers. Calyx-tube silky-villous without, especially below the articulation, glabrous within, ½–¾ in. long; lobes oblong, obtuse, glabrous within, pubescent without. Ovary glabrous.

Upper Guinea. Soudan: between Bammako and Guignula, *Chevalier*, 256!

Schlechter, 12287, collected in Portuguese East Africa at "25 miles station" on April 11, 1898; a specimen collected by Dr. T. G. Nicholson in N. Nyasaland and *Chevalier*, 6656, from the Upper Chari, are represented in the Kew herbarium by specimens too incomplete for description.

5. ENGLERODAPHNE, Gilg in Engl. Jahrb. xix. 274.

Flowers hermaphrodite, 4-merous. Calyx-tube coloured, cylindric, glabrous, somewhat constricted below the middle, continuous; lobes spreading during flowering. Petals bisected to the base; lobes fleshy, linear-spathulate, toothed at the apex, about ⅔ as long as the calyx-lobes. Stamens 8, in 2 whorls, those of the upper whorl half-exserted, the lower inserted in the upper part of the calyx-tube; filaments almost obsolete; anthers with obscure connective. Ovary sessile, very hispid, 1-celled; style short, filiform, arising laterally near the summit; disc 0.—Branched shrubs with opposite flat leaves. Flowers in terminal few-flowered ebracteate fascicles.

Species 1, in East Tropical Africa and South Africa.

1. **E. leiosiphon,** *Gilg in Engl. Jahrb.* xix. 274. A much-branched shrub 3–5 ft. high (*Hildebrandt*); branches slender, glabrous. Leaves opposite, ovate or elliptic, acute or subacute, rounded or truncate, rarely subcordate, at the base, membranous, distinctly nerved, glabrous, shortly petioled, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad. Flowers white (*Scott-Elliot*), in ebracteate fascicles of 4–8, terminal on short leafy axillary branches, shortly pedicelled, 4-merous. Calyx-tube with a few long silky hairs on the outside, otherwise glabrous, about $\frac{1}{3}$ in. long; lobes oblong, obtuse, about $2\frac{1}{2}$ lin. long. Petal-segments 8, triangular-oblong, with one or two irregular serrations, glabrous, glandular, more than $\frac{1}{2}$ as long as the calyx-lobes. Ovary shortly stalked, densely hirsute with long erect white hairs.—Engl. Pfl. Ost-Afr. C. 284.

Nile Land. British East Africa: Nairobi, *Linton,* 24! Ukamba, 4000 ft., *Scott-Elliot,* 2356! *Hildebrandt,* 2751! crater south of Lake Naivasha, 7000–8000 ft., *Thomson!* Kikuyu, and on the road to Eldama Ravine, 4000–6000 ft., *Whyte!*

Also in South Africa.

E. leiosiphon appears to be identical with Meisner's *Gnidia subcordata* (Linnæa, xiv. 430; DC. Prodr. xiv. 586), of which I have not seen an authentic specimen.

6. **DICRANOLEPIS,** Planch.; Benth. et Hook. f. Gen. Pl. iii. 198.

Flowers hermaphrodite, 5-merous. Calyx-tube cylindric, usually elongate, dilated at the base, continuous; lobes spreading or reflexed. Petals opposite the calyx-lobes, bipartite or divided to the base; segments entire or irregularly incised. Stamens 10, in 2 approximated whorls in the throat of the calyx-tube, more or less exserted; filaments slender; anthers with broad connective. Ovary stalked, 1-celled, 1-ovuled, glabrous or hairy; hypogynous disc cup-shaped, thin, fleshy or leathery, closely surrounding the stalk and lower portion of the ovary; style slender; stigma clavate, capitate or discoid. Fruit spherical or somewhat elongate, closely invested by the persistent, more or less fleshy base of the calyx-tube; pericarp thick, woody or coriaceous. Seed exalbuminous; testa thin, more or less fused with the pericarp; cotyledons large.—Small trees or shrubs with alternate, usually oblong, caudate-acuminate leaves. Flowers solitary or in pairs in the leaf-axils.

Species about 25, in Tropical and South Africa.

The disc appears to be always entire in the young flower. As the ovary swells it splits into an irregular number of lobes or segments.

Stigma capitate or discoid.
  Petals distinctly longer than the calyx-lobes.
    Petal-segments incised.
      Flowers 2 in. long . . . . . 1. *D. pulcherrima.*
      Flowers less than 1 in. long . . . 2. *D. thomensis.*
    Petal-segments entire . . . . . 3. *D. grandiflora.*

Petals not longer than the calyx-lobes.
Calyx-tube glabrous or glabrescent.
Flowers exceeding 1 in. long.
Leaves glabrous or glabrescent beneath . 4. *D. stenosiphon.*
Leaves adpressed-pubescent beneath . . 5. *D. Schweinfurthii.*
Flowers not more than ½ in. long . . 6. *D. Buchholzii.*
Calyx-tube pubescent or tomentose.
Flowers 2 in. long; disc fleshy . . 7. *D. usambarica.*
Flowers not more than 1½ in. long; disc leathery . . . . . 8. *D. vestita.*
Stigma club-shaped.
Petals distinctly longer than the calyx-lobes.
Calyx-tube glabrous or glabrescent . . . 9. *D. convallariodora.*
Calyx-tube covered with stalked glands . . 10. *D. glandulosa.*
Calyx-tube pubescent, tomentose or villous.
Leaves rhomboid, not exceeding 1½ in. long . 14. *D. polygaloides.*
Leaves elliptic, not less than 3 in. long . 11. *D. Persei.*
Petals not longer than the calyx-lobes.
Calyx-tube glabrous or glabrescent.
Flowers in pairs in the leaf-axils . . 12. *D. Mannii.*
Most or all of the flowers solitary . . 13. *D. disticha.*
Calyx-tube pubescent or tomentose.
Calyx-tube not less than 1 in. long.
Leaves glabrescent or sparsely adpressed puberulous beneath.
Petal-segments entire . . . . 14. *D. polygaloides.*
Petal segments more or less incised.
Calyx-tube glabrous within . . 15. *D. laciniata.*
Calyx-tube pubescent within . . 16. *D. pubescens.*
Leaves densely pilose beneath . . . 17. *D. Soyauxii.*
Calyx-tube not exceeding ⅓ in. long . . 18. *D. parviflora.*

1. **D. pulcherrima,** *Gilg in Engl. Jahrb.* xxiii. 203. A shrub 6–13 ft. high; young branches pubescent, later glabrous. Leaves obliquely oblong, caudate-acuminate, acute, entire, very shortly petioled, glabrous above, adpressed-pubescent beneath, 2–3 in. long, about 1 in. broad. Flowers 5-merous, solitary, white (*Staudt*), sessile, about 2 in. long. Calyx-tube slender, cylindric, clothed with dense white pubescence; lobes ovate-lanceolate, finely pubescent, paralled-veined, less than ½ as long as the tube, at length reflexed. Petals exceeding the calyx-lobes, divided to the base; segments oblong, deeply laciniate towards the apex, at length reflexed. Ovary glabrous. Fruit not seen.

Upper Guinea. Cameroons: in moist shady places on Mapinda Mountain, near Lolodorf, about 2000 ft., *Staudt*, 321!

2. **D. thomensis,** *Engl. & Gilg in Engl. Jahrb.* xix. 273. Young branches puberulous, later glabrous. Leaves oblong or oblong-lanceolate, somewhat oblique, long-acuminate, obtuse, quite glabrous above, adpressed-pubescent beneath, 2–2¾ in. long, about 1¼ in. broad; petiole very short, pubescent. Flowers (apparently) solitary, sessile; calyx-tube stout, pubescent, ¾ in. long; lobes lanceolate, about ½ as long as

the tube. Petals divided to the base; segments linear-lanceolate, irregularly incised towards the apex, sparsely silky-pubescent, rather longer than the calyx-lobes. Ovary glabrous; style inserted beyond the stamens; stigma capitate.

Lower Guinea. Island of St. Thomas, 2800 ft., *Moller*, 176!

3. **D. grandiflora,** *Engl. in Engl. Jahrb.* vii. 338. A shrub, 8–15 ft. high, with pubescent, later glabrescent, branches. Leaves 2-ranked, obliquely ovate or lanceolate, obtusely caudate-acuminate, entire, very shortly petioled, glabrous or with a few scattered adpressed hairs, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, about 1 in. broad. Flowers 5-merous, white, fragrant (*Mann*), solitary, shortly pedicelled, about 2 in. long. Calyx-tube slender, clothed with dense yellowish-white tomentum, glabrous within; lobes oblong, obtuse, densely pubescent, parallel-nerved, at length reflexed. Petals exceeding the calyx-lobes, divided to the base; segments 10, oblong-lanceolate or oblong-spathulate, at length reflexed. Ovary glabrous; style exserted beyond the stamens. Fruit not seen.—*D. benthamiana*, Van Tieghem in Ann. Sci. Nat. 7^{me} sér. xvii. 197, partly (name only).

Upper Guinea. Gold Coast: Okroase, 800 ft., *Johnson*, 457! Lagos, *Punch!* Cameroons: Johann-Albrechtshöhe, forest region, *Staudt*, 473! Fernando Po: bank of the river, *Mann*, 23!

4. **D. stenosiphon,** *H. H. W. Pearson.* Branches slender, sparsely pilose. Leaves rhomboid or obliquely oblong, caudate-acuminate, acute or obtuse, entire, shortly petioled, glabrous, 2–$3\frac{1}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad. Flowers 5-merous, in pairs or solitary in the leaf-axils, $1\frac{1}{2}$–2 in. long. Calyx-tube slender, glabrous or sparsely puberulous; lobes lanceolate, acute, parallel-veined, puberulous on the edges, $\frac{1}{4}$ as long as the tube. Petals rather more than $\frac{1}{2}$ as long as the calyx-lobes, divided to the base; segments 10, linear, more or less incised near the apex, spreading. Ovary with a few erect hairs near the summit, otherwise glabrous. Fruit (? mature) ovoid, apiculate, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1277! 3026! 2762! 3655!

5. **D. Schweinfurthii,** *Gilg in Engl. Jahrb.* xix. 271. Young branches pubescent, later glabrous. Leaves obliquely oblong or oblong-lanceolate, long-acuminate or caudate-acuminate, acute, entire, shortly petioled, glabrous above, yellowish-brown beneath with adpressed hairs on the nerves, 2–3 in. long, 1–$1\frac{1}{2}$ in. broad; primary lateral nerves numerous, ascending, prominent beneath. Flowers solitary, sessile. Calyx-tube slender, elongate, glabrous; lobes lanceolate, 2 lin. long, $\frac{3}{4}$ lin. broad. Petals divided to the base, not exceeding the calyx-lobes. Stigma capitate. Drupe oval or ovate-oval, $\frac{1}{2}$ in. long, 2–3 lin. broad.

South Central. Belgian Congo: Niamniam; by the River Dyagbe, at Wando, *Schweinfurth*, 3106!

6. **D. Buchholzii,** *Engl. & Gilg in Engl. Jahrb.* xix. 273. A low bush with slender branches, sparsely pubescent when young, later glabrous. Leaves obliquely oblong or ovate-oblong, caudate-acuminate, acute, entire, shortly petioled, glabrous, brown beneath, dark green above, $3\frac{1}{2}$–5 in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ in. broad. Flowers 5-merous, solitary, rarely in pairs, very shortly pedicelled, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx-tube slender, glabrous or with scattered hairs on the outside; lobes 5, ovate-oblong, pubescent. Petals divided to the base, about $\frac{1}{2}$ as long as the calyx-lobes; segments 10, entire, linear, acute. Ovary glabrous. Fruit (not seen) berry-like (*Buchholz*).—*D. disticha*, var. *parviflora*, Engl. in Engl. Jahrb. vii. 337.

Upper Guinea. Cameroons: Mungo, abundant in moist shady woods, *Buchholz*; Johann-Albrechtshöhe, forest region, *Staudt*, 803!

7. **D. usambarica,** *Gilg in Engl. Jahrb.* xix. 272. A tree up to 55 ft. high. Branches slender, sparsely strigose when young, later glabrous. Leaves oblong or elliptic-oblong, sometimes oblique at the base, acuminate or caudate-acuminate, acute, shortly petioled, entire, glabrous above, with scattered adpressed hairs beneath, $2\frac{1}{2}$–3 in. long, 1–$1\frac{1}{4}$ in. broad. Flowers 5-merous, usually in pairs in the leaf-axils, shortly pedicelled, about 2 in. long. Calyx-tube silky-pubescent with adpressed hairs; lobes ovate or ovate-oblong, less than $\frac{1}{2}$ as long as the tube. Petals not exceeding the calyx-lobes, divided to the base; segments 10, obovate or spathulate. Ovary glabrous; style slender, exserted. Fruit unknown.—Gilg in Engl. Pfl. Ost-Afr. C. 284.

Mozamb. Distr. German East Africa: Usambara; Mbaramu, forming extensive underwood in the forests, *Holst*, 2489!

8. **D. vestita,** *Engl. in Engl. Jahrb.* vii. 337. A shrub 8–10 ft. high (*Mann*) with slender pubescent, later glabrous, branches. Leaves obliquely elliptic-lanceolate, caudate-acuminate, subacute, entire, shortly petioled, glabrous above, adpressed-puberulous beneath, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad. Flowers 5-merous, solitary, nodding, clothed on the outside with a dense yellowish-white tomentum, 1–$1\frac{1}{2}$ in. long. Calyx-tube stout; lobes 5, broadly lanceolate, $\frac{1}{3}$–$\frac{1}{2}$ as long as the tube, later reflexed. Petals somewhat shorter than the calyx-lobes, divided to the base; segments 10, linear, entire or more or less incised at the apex, at length reflexed. Ovary glabrous; disc thick, leathery; style slender, exserted beyond the stamens. Fruit not seen.—*D. vestita*, var. *parviflora*, Engl. l.c. *D. benthamiana*, Van Tieghem in Ann. Sci. Nat. 7me sér. xvii. 197, partly.

Upper Guinea. Cameroons: Buea, *Deistel*, 278! 3200 ft., *Lehmbach*, 137! Cameroon Mountain, 2000–4000 ft., *Mann*, 1214! 2161! Fernando Po, *Mann!*

9. **D. convallariodora,** *Gilg in Engl. Jahrb.* xix. 271. Young branches pubescent, later glabrous. Leaves somewhat obliquely oblong or elliptic, caudate-acuminate, acute, entire, shortly petioled, glabrous above, adpressed-puberulous beneath, 2–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. broad. Flowers 5-merous, white, scented like the lily-of-the-valley (*Poggel*),

very shortly pedicelled, usually in pairs, about $1\frac{1}{4}$ in. long. Calyx-tube slender, glabrous; lobes lanceolate, parallel-veined, finely puberulous on the margins. Petals shorter than the calyx-lobes, divided to the base; segments linear. Ovary glabrous. Fruit not seen.—De Wild. & Dur. Contr. Fl. Congo, i. fasc. 2, 55.

South Central. Lunda: Mukenge, *Pogge*, 1408! Congo, without precise locality, *Demeuse*. Sanda, *Gillet*, 3013.

10. **D. glandulosa,** *H. H. W. Pearson*. Branches slender, glabrous. Leaves obliquely oblong, caudate-acuminate, obtuse, entire, sessile, glabrous above, glabrescent beneath, 4–$7\frac{1}{2}$ in. long, 2–3 in. broad. Flowers solitary (?), 5-merous, sessile, thickly studded on the outside with stout stalked glands, $2\frac{1}{2}$–3 in. long. Calyx-tube stout; lobes ovate, obtuse, about $\frac{1}{2}$ in. long. Petals glabrous, about twice as long as the calyx-lobes, divided to the base; segments 10, oblong or narrowly obovate, rounded and entire or cut at the apex. Ovary glabrous; style slender, scarcely exserted. Fruit globular.

Upper Guinea. Cameroons; Batanga, *Dinklage*, 971! Bipinde, in forest, *Zenker*, 1951!

Zenker's specimen is without flowers or fruit. It has much larger leaves than Dinklage's plant.

11. **D. Persei,** *Cummins in Kew Bulletin*, 1898, 78. A shrub 4–8 ft. high, with slender pubescent, later glabrous, branches. Leaves shortly petioled, elliptic, entire, acuminate or caudate-acuminate, acute, cuneate at the base, with a few scattered hairs, especially on the lower surface, dark green above, lighter beneath, $3\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. broad. Flowers 5-merous, in pairs in the leaf-axils, shortly pedicelled, silky-pubescent, 1–$1\frac{1}{2}$ in. long. Calyx-lobes broadly elliptic, parallel-nerved, about 5 lin. long, at length reflexed. Petals longer than the calyx-tubes, divided to the base, at length reflexed. Segments 10, narrowly oblong or spathulate, $\frac{3}{4}$ in. long. Ovary glabrous. Fruit not seen.

Upper Guinea. Ashanti: Assin-Yan-Kumassi, *Cummins*, 186! Gold Coast, *Evans*, 22!

12. **D. Mannii,** *Baill. in Adansonia*, xi. 302. A shrub 8–10 ft. high (*Mann*), with slender pubescent or glabrous branches. Leaves 2-ranked, obliquely oblong or ovate-oblong, caudate-acuminate, obtuse, entire, shortly petioled, dark green and glabrous above, yellowish-brown with a few scattered hairs on the nerves beneath, $1\frac{3}{4}$–4 in. long, 1–$1\frac{1}{2}$ in. broad. Flowers 5-merous, 2–3 together in the leaf-axils, subsessile, 1–$1\frac{1}{2}$ in. long. Calyx-tube glabrous or puberulous without; lobes green (*Mann*), oblong, puberulous, parallel-veined. Petals white (*Mann*), more than $\frac{1}{2}$ as long as the calyx-lobes, divided to the base; segments 10, linear-oblong, entire and shortly apiculate. Ovary glabrous. Fruit ovoid, closely invested by the persistent base of the calyx-tube, $\frac{1}{4}$–$\frac{1}{2}$ in. long.

Upper Guinea. Fernando Po, *Mann*, 217!

13. **D. disticha,** *Planch. in Hook. Ic. Pl.* t. 798. A shrub 4 ft. high (*Mann*), with slender glabrous branches. Leaves 2-ranked, obliquely lanceolate, obtusely caudate-acuminate, entire, very shortly petioled, glabrous, dark green above, yellowish-green beneath (when dry), 1–3 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad. Flowers 5-merous, yellow (*Holland*), solitary, subsessile, 1–$1\frac{1}{2}$ in. long. Calyx-tube glabrous or pubescent without; lobes oblong, rounded or obtuse at the apex, pubescent, parallel-veined. Petals opposite and rather shorter than the calyx-lobes, more or less deeply bifid. Fruit oblong or more or less spherical, about $\frac{1}{2}$ in. long.—*D. disticha,* forma *glabrescens,* Engl. in Engl. Jahrb. vii. 337. *D. oligantha,* Gilg in Engl. Jahrb. xix. 274.

Upper Guinea. Sierra Leone: Samu country, *Scott-Elliot,* 4205! Scarcies River, *Scott-Elliot,* 4703! and without precise locality, *Afzelius! Don! Barter! Unwin and Smythe,* 17! Southern Nigeria: Owley, *Holland,* 179! Cameroons: Cameroon River, *Mann,* 2199!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux,* 22!

14. **D. polygaloides,** *Gilg in Schlechter, Westafr. Kautschuk-Exped.* 301, *name only.* Young branches densely pubescent, later glabrous. Leaves rhomboid or obliquely ovate, acuminate, obtuse, entire, glabrous or glabrescent above, with scattered adpressed hairs beneath, 1–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad; petioles very short, densely pubescent. Flowers 5-merous, in pairs or solitary, densely pubescent, sessile, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long. Calyx-tube slender; lobes oblong-ovate, about $\frac{1}{4}$ as long as the tube. Petals about as long as the calyx-lobes, divided to the base, glabrous; segments linear or linear-oblong, entire. Ovary glabrous. Fruit not seen.

Upper Guinea. Cameroons: along the River Mungo, between Mundame and Otam, *Schlechter,* 12889! North Cameroons, *Conrau,* 118!

15. **D. laciniata,** *Gilg in Engl. Jahrb.* xxiii. 204. A much-branched shrub about 6 ft. high, with spreading pubescent, later glabrous, branches. Leaves 2-ranked, obliquely oblong or oblong-lanceolate, caudate-acuminate, subacute, entire, very shortly petioled, glabrous above, sparsely strigose beneath, 2–$2\frac{3}{4}$ in. long, $\frac{3}{4}$–1 in. broad. Flowers 5-merous, solitary or two together, white (*Baumann*), sessile, about $1\frac{1}{2}$ in. long. Calyx-tube slender, densely pubescent; lobes lanceolate, obtuse, pubescent, parallel-veined, about $\frac{1}{3}$ as long as the tube. Petals opposite and about as long as the calyx-lobes, divided to the base; segments lanceolate or linear-lanceolate, with a deeply cut margin, reflexed. Fruit not seen.

Upper Guinea. Togo: Misahöhe, in moist shady woods, *Baumann,* 481!

This species is very near *D. disticha,* Planch.

16. **D. pubescens,** *H. H. W. Pearson.* Young branches densely pubescent, later glabrous. Leaves rhomboid or obliquely ovate, acuminate, obtuse, entire, glabrous above, with scattered adpressed hairs beneath, 2–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. broad; petioles very short, pubescent. Flowers 5-merous, solitary in the leaf-axils, densely pubescent, sessile,

nodding, 1–1½ in. long. Calyx-tube pubescent within above the level of the ovary; lobes ovate, obtuse, parallel-nerved, pubescent, ⅓–½ in. long. Petals divided almost to the base, not exceeding the calyx-lobes, glabrous; segments 10, oblong, incised at the broad apex. Ovary glabrous. Fruit not seen.

Upper Guinea. French Guinea: Kassa, north of Sierra Leone boundary, *Scott-Elliot*, 5066!

17. **D. Soyauxii,** *Engl. in Engl. Jahrb.* vii. 337. A shrub about 6 ft. high, with slender branches densely pilose with shaggy hairs. Leaves subsessile, obliquely oblong-lanceolate or rhomboid-lanceolate, long-acuminate, acute, glabrous above, densely pilose with loosely shaggy hairs beneath, 2½–4 in. long, 1–1¼ in. broad. Flowers in pairs, sessile, nodding, densely pilose, about 1½ in. long. Calyx-tube slender; lobes 5, linear-oblong, obtuse, about ⅓ as long as the tube. Petals equal to the calyx-lobes, divided to the base; segments linear, spreading. Ovary with a few long erect hairs near the summit, otherwise glabrous. Fruit ovoid-globose, about ¾ in. long.

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 170!

18. **D. parviflora,** *H. H. W. Pearson.* A shrub about 2 ft. high. Young branches pubescent, later glabrous. Leaves ovate or rhomboid-ovate, caudate-acuminate, acute, entire, glabrous above, adpressed-puberulous beneath, shortly petioled, about 2 in. long, ¾–1 in. broad. Flowers white, 5-merous, puberulous, in pairs (? sometimes solitary), sessile, about ½ in. long. Calyx-tube slender; lobes lanceolate, obtuse, parallel-veined, about 2 lin. long. Petals divided to the base, ⅔ as long as the calyx-lobes, glabrous; segments 10, linear, entire. Ovary glabrous; style slender, exserted beyond the stamens. Fruit not seen.

South Central. Belgian Congo: Boyangi, near Ndobo, 1300 ft., *Thonner*, 62!

Imperfectly known species.

19. **D. bærtsiana,** *De Wild. & Dur. Contr. Fl. Congo*, i. *fasc.* 2, 54. A small bush 10–14 ft. high, with the young branches sparsely pilose, later glabrous. Leaves membranous, ovate-oblong, very oblique, rounded or cuneate at the base, abruptly long-acuminate at the apex, obtuse, quite glabrous above, paler beneath, with scattered hairs, 1¼–2 in. long, 1–1½ in. broad; nerves very numerous, somewhat prominent on both surfaces; petiole hispid, about 1 lin. long. Flowers solitary, yellowish-white, very shortly pedicelled. Calyx-tube stout; more or less inflated at the base, densely pilose, 1¼ in. long; lobes ovate-oblong, acute, green and densely pilose on the outside, white and pilose within, ½ in. long. Petals bipartite almost to the base; segments oblong, entire or slightly lobed at the apex, about equal to the calyx-lobes. Stamens short, exserted. Style long, not exserted.

Lower Guinea. Lower Congo: Kabombo Forest, *Cabra*.

20. **D. cerasifera,** *Gilg in Engl. Jahrb.* xix. 272. A shrub with slender branches, puberulous when young, later glabrous. Leaves very variable, ovate, oblong or oblong-lanceolate, more or less oblique, long-acuminate, subacute, shortly petioled, glabrous above, with few or many adpressed hairs beneath, 1–2½ in. long, ¾–1 in. broad. Flowers (not seen) in pairs or rarely solitary, pubescent. Drupe smaller than a cherry, in colour resembling a pomegranate (*Schweinfurth*).

Nile Land. Niamniam: by the Diamvonu stream, *Schweinfurth*, 3136!

21. **D. Thonneri,** *De Wild. & Dur. in Comptes-rendus Soc. Bot Belg.* xxxviii. 114. Shrub about 16 ft. high, with branches pubescent, later glabrous. Leaves shortly petioled, oblong or ovate-oblong, oblique, long-acuminate, very acute, glabrous above, paler beneath, pilose with long hairs, especially on the nerves, 1–2½ in. long, ½–¾ in. broad; venation very prominent beneath; petiole bearing a few long hairs, about ½ lin. long. Flowers in fascicles of 1–3, subsessile. Calyx-tube terete, bearing white hairs, ⅓–½ in. long; lobes ovate-oblong, pilose, about ⅙ in. long. Petals white, bifid to the base; lobes entire, ovate, acute, about ½ as long as the calyx-lobes.

South Central. Congo Region: Boyangi, Sept. 5, 1896, *Thonner*.

7. SYNAPTOLEPIS, Oliver.

Flowers hermaphrodite, 5-merous. Calyx-tube cylindric, somewhat dilated around the ovary and near the throat, not articulated. Calyx-lobes spreading. Corolla forming a short erect entire or obscurely 5-lobed ring at the base of the calyx-lobes. Stamens 10, inserted in 2 separated whorls at the upper end of the calyx-tube, those of the upper (outer) whorl being opposite the calyx-lobes and not or only slightly exceeding the corolla-ring. Ovary shortly stalked, surrounded at the base by very minute or obsolete laciniate hypogynous scales; style long and slender, bearing at the apex a cylindric or capitate stigma. Fruit dry, oblong-ovate, enclosed in the persistent more or less fleshy base of the calyx-tube. Albumen 0; embryo with fleshy cotyledons.—Erect or climbing shrubs with alternate, membranous or subcoriaceous leaves. Flowers in terminal dense cymes or solitary or fascicled in the leaf-axils, sessile or shortly stalked.

Species 5, in Tropical and South Africa.

Calyx-tube gradually widening towards the top.
- Inflorescence terminal.
  - Leaves ovate . . . . . 1. *S. longiflora.*
  - Leaves not ovate . . . . . 2. *S. alternifolia.*
- Inflorescence axillary.
  - Leaves ovate.
    - Inflorescence branched . . . . . 3. *S. pachyphylla.*
    - Flowers in fascicles . . . . . 6. *S. macrocarpa.*
  - Leaves not ovate . . . . . 4. *S. retusa.*

Calyx-tube cylindric below, abruptly dilating above the middle.	
Fruits $\frac{1}{3}$–$\frac{1}{2}$ in. long	5. *S. Kirkii.*
Fruits $\frac{3}{4}$ in. long	6. *S. macrocarpa.*

1. **S. longiflora,** *Gilg in Engl. Jahrb.* xix. 276. Branches smooth, dark brown, lenticellate. Leaves alternate or opposite, shortly petioled, membranous, ovate or elliptic, shortly apiculate, slightly cuneate at the base, glabrous, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad; primary lateral nerves 12–15, spreading, prominent beneath. Flowers pedicelled, 8–15, in terminal umbellate bracteate cymes. Calyx-tube slender, funnel-shaped, glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; sepals ovate-oblong, about $1\frac{1}{2}$ lin. long. Petals oblong, fimbriate at the broad apex, about $\frac{1}{2}$ lin. long, free or connate at the base. Stamens short, those of the upper whorl slightly exceeding the petals; anthers about as long as the filaments, oblong. Ovary glabrous, shortly stipitate, surrounded at the base by a minute ciliated ring.

Mozamb. Distr. Portuguese East Africa: Macuri (? Macuse), *Rodrigues de Calvalho!* near Lake Nyasa, *Johnson*, 451! Pemba Flats, *Kässner*, 392!

2. **S. alternifolia,** *Oliv. in Hook. Ic. Pl. t.* 1194. A shrub. Branches slender, ascending, angular when young, with brown or black lenticellate bark. Leaves opposite or alternate, subcoriaceous, oval or elliptic, shortly petioled, obtuse, minutely mucronate, cuneate at the base, glabrous, $\frac{2}{3}$–$1\frac{1}{2}$ in. long, about $\frac{1}{2}$ in. broad; lateral nerves numerous, obscure, parallel, spreading; marginal nerve stout, distinct beneath. Flowers pedicelled, in few-flowered terminal peduncled cymes, $\frac{1}{2}$–$\frac{2}{3}$ in. long; pedicel $\frac{1}{10}$–$\frac{1}{2}$ in. long. Calyx-tube slender below, dilated above; limb with ovate or ovate-elliptic obtuse lobes. Petals scale-like, ciliate at the apex, connate below the middle, about $\frac{1}{2}$ lin. long. Stamens of the upper whorl slightly longer than the petals; filaments about as long as the anthers; anthers oblong. Ovary shortly stalked, glabrous, with a ring of minute ciliate scales at the base; style terete, 4–6 lin. long; stigma capitate, covered with small papillæ. Fruit ovoid, acuminate, with a bony pericarp, about $\frac{1}{2}$ in. long.

Mozamb. Distr. Zanzibar? *Kirk!* German East Africa: Kilwa, *Kirk!* British Central Africa: Nyasaland; Mount Sochi, *Scott-Elliot*, 8642!

The only fruits seen are detached.

3. **S. pachyphylla,** *Gilg in Engl. Pfl. Ost-Afr. C.* 284. Branches slender, black, lenticellate. Leaves shortly petioled, alternate or sub-opposite, ovate or oblong-ovate, somewhat narrowed at the base, acute, minutely apiculate, quite glabrous, thickened along the margin, 1–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad. Flowers on short slender glandular pedicels, in few-flowered axillary or terminal cymes. Calyx-tube slender, funnel-shaped, glabrous, about 5 lin. long; lobes triangular, spreading, 1–$1\frac{1}{2}$ lin. long. Petals scale-like, ciliate, about $\frac{1}{3}$ lin. long. Anthers oblong. Ovary shortly stalked, very sparsely pilose; hypogynous scales about 4, free, deeply laciniate; style 3–4 lin. long; stigma capitate.

Fruit (immature) $\frac{2}{3}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. thick, covered at the base by the fleshy lower part and crowned by the thickened upper part of the persistent calyx-tube; exocarp woody or bony.

Mozamb. Distr. Zanzibar? *Kirk !* German East Africa: Usaramo, Rukinga, *Stuhlmann*, 6897 !

I have not seen the type of this species. Dr. Gilg has kindly identified Kirk's specimen by comparison with the type.

4. **S. retusa,** *H. H. W. Pearson.* A shrub. Branches terete, with reddish bark, glabrous. Leaves coriaceous, elliptic, elliptic-oblong or obovate, very shortly petioled, retuse or emarginate, sometimes apiculate at the apex, narrowed towards the base, with a thickened revolute margin, glabrous, glaucous above, tawny beneath, with the venation prominent on the lower surface, 1–2$\frac{1}{2}$ in. long, $\frac{1}{2}$–1 in. broad. Inflorescences few-flowered, axillary; flowers shortly pedicelled; pedicel smooth. Calyx-tube glabrous, widening slightly and gradually from the base upwards; lobes oblong, obtuse, glabrous, 1–2 lin. long. Fruit ovoid, $\frac{3}{4}$ in. long (? mature), crowned by the persistent calyx-tube.

Upper Guinea. French Guinea: *Farmar !*

5. **S. Kirkii,** *Oliv. in Hook. Ic. Pl. t.* 1074. A climbing or spreading shrub. Branches divaricate, terete, with black lenticellate bark. Leaves subcoriaceous, ovate or elliptic-lanceolate, subsessile or very shortly petioled, more or less acute, minutely mucronate, rounded at the base, glabrous, pale beneath, $\frac{3}{4}$–1$\frac{1}{4}$ in. long, 5–9 lin. broad; lateral nerves numerous, parallel, spreading, obscure; marginal nerve distinct beneath. Flowers white, axillary, fascicled or solitary, shortly peduncled, 6–8 lin. long; bracteoles minute, scale-like. Calyx-tube very slender below, dilated above; lobes oblong, spreading or recurved. Corolla forming a short erect glabrous entire or lobed ring at the base of the calyx-lobes. Stamens of the upper whorl slightly exceeding the corolla-ring; anthers oblong; filaments slender, exceeding the anthers. Ovary shortly stalked, glabrous, with a ring of minute scales at the base; style 3–4 lin. long. Fruit dry, ovoid, glabrous; pericarp bony, thickened above and below.

Nile Land. British East Africa: Mombasa, *Boivin !*

Mozamb. Distr. Zanzibar: at the graveyard outside the town, *Kirk*, 37 ! *Last !*

6. **S. macrocarpa,** *Gilg in Engl. Pfl. Ost-Afr. C.* 284. A shrub (? climbing) with terete glabrous dark-coloured branches. Leaves opposite, subcoriaceous, ovate, rounded at the base, acute or shortly acuminate at the apex, quite glabrous, much thickened at the margin. Flowers pedicelled, fascicled in the leaf-axils. Fruit oblong, with a woody exocarp, $\frac{3}{4}$ in. long, 3–4 lin. thick.

Mozamb. Distr. German East Africa: Usaramo; Vikindo, *Stuhlmann*, 6098.

I have not seen a specimen. Dr. Gilg states (*l.c.*) that the large size of the fruit separates it from *S. Kirkii*.

8. **CRATEROSIPHON**, Engl. & Gilg in Engl. Jahrb. xix. 275.

Flowers hermaphrodite, 5-merous. Calyx-tube coloured, thickened, very narrowly funnel-shaped, glabrous, somewhat dilated above the middle, continuous. Petals 0. Stamens 10, inserted below the middle of the calyx-tube, deeply included; filaments of the whorl opposite the calyx-lobes, twice as long as the anthers, those of the whorl alternating with the calyx-lobes, shorter than the anthers. Ovary sessile, 1-celled; style short, apical; disc short, cup-shaped, membranous.—Climbing shrub with opposite, subopposite or alternate, stiff leathery, parallel-nerved, oval leaves. Flowers very long, in 3–5-flowered axillary clusters, subsessile, greenish-yellow, with numerous small bracteoles at the base.

Species 2, endemic.

Leaves narrowed at the base	1. *C. scandens.*
Leaves rounded at the base	2. *C. Soyauxii.*

1. **C. scandens,** *Engl. & Gilg in Engl. Jahrb.* xix. 275. A climbing shrub, perfectly glabrous. Leaves opposite, subopposite or alternate, in 2 rows, shortly petioled, distant, oblong-oval, entire, narrowed at the base, long-acuminate and obtuse at the apex, subcoriaceous, $2\frac{3}{4}$–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, with spreading, parallel, distinct nerves. Flowers "greenish-yellow," in fascicles of 3–6 in the leaf-axils, subsessile, with minute bracteoles at the base. Calyx-tube glabrous, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long; lobes oblong, obtuse, minutely puberulous on the margin, otherwise glabrous, apparently erect during flowering, $\frac{1}{3}$ in. long. Stamens inserted immediately below the middle of the tube. Ovary glabrous; hypogynous disc short, deeply lobed, bearing a few short erect hairs. Fruit not seen.

Upper Guinea. Southern Nigeria: Old Calabar, *Thomson*, 75! Cameroons: Buea, *Preuss*, 878! Bipinde, *Zenker*, 2132!

2. **C. Soyauxii,** *H. H. W. Pearson.* Glabrous. Leaves opposite, shortly petioled, ovate or elliptic, entire, rounded at the base, long-acuminate and obtuse, with distinct spreading parallel nerves, when dry glaucous above, brown beneath, $2\frac{1}{2}$–$2\frac{3}{4}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad. Flowers not seen. Fruit ovoid, rugose, 1–$1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. broad; endocarp bony. Seed not seen.

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 263!

9. **PEDDIEA**, Harv.; Benth. et Hook. f. Gen. Pl. iii. 199.

Flowers hermaphrodite, 4–5-merous. Calyx-tube cylindric, continuous, deciduous. Calyx-lobes short, erect, spreading or reflexed. Petals 0. Stamens 8–10, in 2 whorls, inserted in the calyx-tube; filaments very short; anthers linear or oblong, not exserted. Ovary

shortly stalked, densely pubescent above the middle, with 2 1-ovuled cells; style short; stigma capitate or more or less saucer-shaped; hypogynous disc cup-shaped, surrounding the base of the ovary, entire, toothed or lobed. Fruit with a more or less fleshy exocarp and a hard endocarp, 1- (rarely 2-) seeded. Seed exalbuminous (rarely containing a little albumen); cotyledons thick.—Glabrous shrubs or small trees with alternate membranous or subcoriaceous leaves. Flowers yellowish-green, long-pedicelled in loose terminal peduncled racemes or umbels.

Species 10, in Tropical and South Africa.

Inflorescence racemose.
- Calyx-tube more than $\frac{1}{2}$ in. long . . . . 1. *P. longiflora.*
- Calyx-tube less than $\frac{1}{2}$ in. long.
  - Calyx-tube glabrous.
    - Leaves $1\frac{1}{4}$–2 in. wide . . . . . 2. *P. Fischeri.*
    - Leaves less than 1 in. wide . . . . . 3. *P. longipedicellata.*
  - Calyx-tube pubescent . . . . . 4. *P. polyantha.*

Inflorescence umbellate.
- Umbel 15–20-flowered.
  - Calyx-tube less than 1 lin. wide . . . 5. *P. Volkensii.*
  - Calyx-tube $1\frac{1}{4}$–$1\frac{1}{2}$ lin. wide . . . . 2. *P. Fischeri.*
- Umbel 2–10-flowered.
  - Calyx-lobes reflexed . . . . . 6. *P. parviflora.*
  - Calyx-lobes erect or spreading.
    - Style longer than the ovary . . . . 7. *P. cyathulata.*
    - Style shorter than the ovary . . . 8. *P. Zenkeri.*

1. **P. longiflora,** *Engl. & Gilg in Engl. Jahrb.* xix. 257. A shrub. Leaves membranous, lanceolate or elliptic-lanceolate, acuminate, obtuse, rarely subacute, shortly petioled, glabrous, $4\frac{1}{2}$–6 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad; primary lateral nerves ascending, much-branched, conspicuous. Umbel terminal, 10–12-flowered, glabrous; peduncle 1–$2\frac{1}{2}$ in. long; bracts at the base of the peduncle crowded, obovate-lanceolate, $\frac{1}{2}$ in. long, 2–$2\frac{1}{2}$ lin. broad; upper bracts large, leaf-like, persistent. Flowers green, 4-merous; pedicels about $\frac{1}{2}$ in. long. Calyx-tube glabrous, with prominent longitudinal ridges, 6–7 lin. long; lobes triangular-ovate, rounded at the apex, finely pubescent on the margins, $\frac{1}{2}$–1 lin. long, erect during flowering. Anthers linear-ovate. Ovary deeply furrowed at the base; style stout, expanding above into the broad circular stigma; hypogynous disc cup-shaped, toothed or irregularly 4–5-lobed to the middle, with a crenulate villous margin, $\frac{1}{4}$–$\frac{1}{3}$ as high as the ovary. Fruit not seen.

Upper Guinea. Togo: Bismarckburg, in thickets near streams, *Büttner*, 220; wet thickets between Jegge and Konkoa, *Büttner*, 481; Assuma, in thickets, *Büttner*, 287!

Nile Land. Uganda: Entebbe, *Brown*, 214!

2. **P. Fischeri,** *Engl. Hochgebirgsfl. Trop. Afr.* 310. Leaves subcoriaceous, shortly petioled, lanceolate, obtuse, glabrous, $2\frac{3}{4}$–$3\frac{1}{2}$ in. long, $\frac{2}{3}$–$1\frac{1}{4}$ in. broad; primary lateral nerves ascending, much-branched, prominent. Umbel terminal, 8–10-flowered, glabrous; peduncle $\frac{1}{2}$–1 in.

long, bearing numerous prominent bract-scars at base and apex; bracts lanceolate, glabrous, caducous, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Flowers 4-merous; pedicels about $\frac{1}{2}$ in. long. Calyx-tube glabrous, with prominent longitudinal ridges, 5 lin. long; lobes oblong, rounded or obtuse at the apex, finely puberulous at the apex, otherwise glabrous, about 1 lin. long. Anthers oblong. Ovary deeply furrowed at the base. Style stout, a little longer than the ovary, expanding into the broad capitate stigma; hypogynous disc very short, cup-shaped, irregularly lobed or crenulate, sparsely villous on the edge. Fruit not seen.—Engl. Pfl. Ost-Afr. C. 283.

Nile Land. British East Africa; Masai Highlands, between the Victoria Nyanza and Lake Baringo, *Fischer*, 541! Uganda: Buddu, *Dawe*, 71! 214! 823! Buvuma Island, in Lake Victoria, *Bagshawe*, 606!

3. **P. longipedicellata,** *Gilg in Engl. Jahrb.* xix. 256. Leaves subcoriaceous, elliptic or elliptic-lanceolate, obtuse or rounded at the apex, very shortly petioled, glabrous, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{5}{6}$–$1\frac{1}{4}$ in. broad; primary lateral nerves spreading, much-branched, hardly conspicuous. Umbel terminal, 5–9-flowered, glabrous; peduncle $\frac{1}{4}$–$\frac{3}{4}$ in. long; bracts broadly elliptic, pubescent on the margins, otherwise glabrous, 2–3 lin. long, caducous. Flowers 5-merous; pedicels $\frac{2}{3}$–1 in. long. Calyx-tube glabrous, with prominent longitudinal ridges, $\frac{1}{3}$–$\frac{1}{2}$ in. long; lobes broadly oblong, truncate or rounded at the apex, narrowed at the base, pubescent on the margin, $1\frac{1}{2}$ lin. long, 2–$2\frac{1}{2}$ lin. broad, reflexed during flowering. Anthers linear. Style stout, rather longer than the ovary; stigma broad, cup-shaped; hypogynous disc deeply 4–5-lobed; lobes oblong or oblong-spathulate, pubescent at the apex, $\frac{1}{3}$ as long as the ovary. Fruit not seen.—Engl. Pfl. Ost-Afr. C. 283; De Wild. Études Fl. Katanga, 94, t. 26, fig. 8.

Mozamb. Distr. British Central Africa: Nyasaland; w thout precise locality, *Buchanan*, 536!

Var. *multiflora*, De Wild. Études Fl. Katanga, 94, t. 26, figs. 1–7. Leaves more coriaceous than in the type. Umbel 13–16-flowered. Pedicels shorter and calyx-tube longer than in the type. Calyx-lobes somewhat triangular, subacute.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 565.

The author (*l.c.*) expresses the opinion that this plant may prove to be connected with the type by specimens possessing intermediate characters.

4. **P. polyantha,** *Gilg in Engl. Jahrb.* xxx. 361. A bush 10–16 ft. high. Leaves subcoriaceous, shortly petioled, lanceolate or elliptic-lanceolate, obtuse, glabrous, 4–$6\frac{1}{2}$ in. long, 1–$1\frac{3}{4}$ in. broad; primary lateral nerves ascending, much-branched, prominent. Raceme terminal, loose, many-flowered, puberulous, $1\frac{1}{2}$–3 in. long (including peduncle), with prominent bract-scars at the base. Flowers 4-merous; pedicels 3–4 lin. long. Calyx-tube minutely pubescent on the outside, somewhat dilated below the middle, 3–4 lin. long; lobes ovate-triangular, truncate or rounded at the apex, pubescent without, about 1 lin. long. Anthers linear. Ovary oblong, $2\frac{1}{2}$–3 lin. long; style $\frac{1}{3}$ as long as the

ovary; stigma capitate; hypogynous disc very small, cup-shaped, with an irregularly crenulate margin. Fruit not seen.

Mozamb. Distr. German East Africa: Usafa; Rungwe Mountains, in the forests on the southern slopes, about 6000 ft., *Goetze*, 1167 !

5. **P. Volkensii,** *Gilg in Engl. Jahrb.* xix. *Beibl. No.* 47, 41. A tree about 50 ft. high. Leaves subcoriaceous, more or less crowded at the ends of the branches, very shortly pedicelled, lanceolate, obtuse, glabrous, $3\frac{1}{2}$–5 in. long, 1–$1\frac{1}{2}$ in. broad; primary lateral nerves spreading or ascending, much-branched, hardly conspicuous. Umbel terminal, 15–20-flowered, glabrous; peduncle 1–$1\frac{1}{4}$ in. long; bracts at the base of the peduncle 2–4, leaf-like, persistent; bracteole at the base of the pedicel linear, caducous. Flowers "reddish-brown," 4–5-merous; pedicels $\frac{3}{4}$ in. long. Calyx-tube glabrous, 4–5 lin. long; lobes broadly ovate, rounded or obtuse at the apex, pubescent on the margin, erect or spreading during flowering, about 1 lin. long. Anthers linear-oblong. Ovary furrowed at the base, $1\frac{1}{2}$ lin. long; style $\frac{1}{2}$ as long as the ovary; stigma capitate; hypogynous disc cup-shaped, with a villous crenulate margin, about $\frac{1}{6}$ lin. high. Fruit ovate-globose, 2-seeded, 4 lin. long, 3 lin. thick.—Engl. Pfl. Ost-Afr. C. 283.

Mozamb. Distr. German East Africa: Kilimanjaro, above Marangu, 7200 ft., *Volkens*, 1283 !

6. **P. parviflora,** *Hook. f. in Journ. Linn. Soc.* vi. 20. A tree 15–20 ft. high. Leaves membranous, elliptic, very shortly petioled, obtuse, glabrous, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–$1\frac{1}{4}$ in. broad; primary lateral nerves spreading, much-branched, prominent. Umbel terminal, 6–10-flowered, glabrous; peduncle about $\frac{1}{2}$ in. long. Flowers 4–5-merous, green; pedicels slender, about $\frac{1}{2}$ in. long. Calyx-tube glabrous, $\frac{1}{4}$ in. long; lobes oblong, truncate or rounded at the apex or somewhat emarginate, shortly pubescent at the apex, otherwise glabrous, reflexed during flowering, $\frac{1}{6}$–$\frac{1}{5}$ as long as the tube. Anthers linear. Style stout, about as long as the ovary; stigma capitate; hypogynous disc cup-shaped, irregularly lobed, ciliate on the margin, about $\frac{3}{4}$ lin. high. Mature fruit not seen.—Hook. f. in Journ. Linn. Soc. vii. 214; Engl. Hochgebirgsfl. Trop. Afr. 310.

Upper Guinea. Fernando Po: Clarence Peak, 5000 ft., *Mann*, 567 !

7. **P. cyathulata,** *H. H. W. Pearson.* Leaves subcoriaceous, more or less crowded at the apices of the branches, elliptic or elliptic-lanceolate, acuminate, obtuse, very shortly petioled, glabrous, 3–4 in. long, $\frac{3}{4}$–1 in. broad; primary lateral nerves spreading or ascending, much-branched, fairly distinct. Umbel terminal, 2–5-flowered, glabrous; peduncle 1–6 lin. long; bracts oblong, minutely pubescent on the margin, 2–3 lin. long, caducous. Flowers 4-merous; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx-tube glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, with prominent longitudinal ridges; lobes oblong or triangular, rounded or truncate at the apex, densely pubescent on the margins, $\frac{1}{2}$–1 lin. long, erect during flowering.

Anthers short, linear-ovate. Style stout, rather longer than the ovary; stigma broad, cup-shaped; hypogynous disc cup-shaped, not lobed, with a crenulate villous margin, about $\frac{1}{3}$ as high as the ovary. Fruit not seen.

Mozamb. Distr. British Central Africa: **Nyasaland**; Mount Malosa, 4000–6000 ft., *Whyte !*

8. **P. Zenkeri,** *Gilg in Engl. Jahrb.* xix. 256. A tree (? shrub). Leaves membranous, shortly petioled, elliptic-lanceolate, obtuse, glabrous, $4\frac{1}{4}$–$5\frac{1}{4}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad; primary lateral nerves ascending, much-branched, prominent. Umbel terminal, 6–10-flowered, glabrous; peduncle about $\frac{1}{2}$ in. long, with numerous prominent bract-scars near the base; bracts crowded, linear-oblong, finely pubescent on the margin, caducous, $\frac{1}{3}$–$\frac{1}{2}$ in. long, about 2 lin. broad. Flowers 4-merous; pedicels about $\frac{1}{4}$ in. long. Calyx-tube glabrous, $\frac{1}{3}$ in. long; lobes oblong or triangular, rounded or truncate at the apex, pubescent at the apex, otherwise glabrous, erect or spreading during flowering, about $\frac{1}{2}$ lin. long. Anthers oblong. Ovary deeply furrowed at the base; style stout, shorter than the ovary; stigma capitate; hypogynous disc cup-shaped, irregularly lobed, pubescent, $\frac{1}{4}$ lin. high. Fruit subglobose, narrowed towards the apex, 1-celled, containing 2 seeds, 5 lin. long, 4 lin. broad. Seed ovoid-acuminate, flattened along one face, 4 lin. long.

Upper Guinea. Cameroons: Yaunde, 2600 ft., *Zenker*, 155 !

10. **OCTOLEPIS,** Oliver; Benth. et Hook. f. Gen. Pl. iii. 201.

Calyx-tube 4- or 5-partite; lobes imbricate. Petals 8 or 10 in pairs at the base of and opposite to the calyx-lobes, entire. Stamens 8 or 10, hypogynous or slightly perigynous, alternating with the petals; filaments free, subulate; anthers small, ovate or ovate-cordate, 2-celled, dehiscing longitudinally. Ovary superior, sessile, ovoid, 4- or 5-celled; style short, terminal; stigma small, dilated, papillose. Ovule solitary in each cell, pendulous. Fruit a 4-seeded loculicidal erect leathery capsule. Seed exalbuminous, spindle-shaped, with a thin leathery testa prolonged at the lower end into a thick corky projection.—Small trees or shrubs with silky-fibrous inner bark. Leaves alternate. Flowers axillary, white.—*Makokoa*, Baill. in Bull. Soc. Linn. Paris, i. 619.

Species 5, all in West Tropical Africa.

Flower 5-merous . . . . . 1. *O. decalepis.*
Flower 4-merous.
  Leaves $2\frac{1}{2}$–7 in. long.
    Primary lateral nerves 8–9; leaves rarely above 4 in. long . . . . . 2. *O. nodosericea.*
    Primary lateral nerves 10–14; leaves always above 4 in. long.
      Young branches glabrous . . . . 3. *O. Dinklagei.*
      Young branches pubescent or puberulous . . 4. *O. Casearia.*
  Leaves 8–12 in. long.
    Leaves shortly and abruptly acuminate . . . 4. *O. Casearia.*
    Leaves long-acuminate . . . . . 5. *O. macrophylla.*

1. **O. decalepis,** *Gilg in Engl. Jahrb.* xxviii. 142. A low shrub with glabrous grey-brown branches. Leaves oblong or obovate-oblong, long-acuminate and acute or rounded at the apex, narrowed towards the base, entire, papery, glabrous, paler beneath, with venation very prominent beneath, 3–5½ in. long, 1–2 in. broad; petiole thick, pilose, 3–4 lin. long. Flowers white, 5-merous, axillary, usually solitary, rarely in pairs; pedicel 1½–2 lin. long, densely silky-hairy. Sepals ovate, broadly imbricate, acute, grey-silky-hairy above, more densely so beneath, 1½–2 lin. long, 1 lin. broad at the base. Petals bifid to the base; lobes rectangular, ⅓ as long as the sepals, densely grey-silky-hairy on the margins, elsewhere on both sides sparsely and shortly pilose. Stamens 1–1¼ lin. long; filaments somewhat flattened, villous on the edges; anthers small. Ovary very densely pilose, 4- or 5-celled; stigma 5-lobed. Fruit (hardly mature) globose, ½ in. in diam.

Upper Guinea. Liberia: Grand Bassa, Fishtown, in moist bushy shady places 16 ft. above the sea, *Dinklage*, 1741; 1860; 2044!

2. **O. nodosericea,** *Gilg in Engl. Jahrb.* xxviii. 143. A shrub 3–5 ft. high; branches yellow-tomentose when young, later glabrous, longitudinally striate. Leaves obovate-oblong or obovate-lanceolate, shortly and broadly acuminate at the apex, narrowed towards the base, sometimes subrotund, entire, membranous, glabrous above, silvery with short adpressed hairs beneath, with venation prominent above and beneath, 2½–4¾ in. long, ¾–1¾ in. broad; petiole thick, densely yellow-tomentose, about 2 lin. long. Flowers 4-merous, whitish-yellow, solitary or sometimes in pairs at the very prominent densely yellow-silky-villous nodes; pedicels much shorter than the flowers, very densely yellow-silky-villous. Sepals ovate, imbricate, acute, subglabrous within, densely yellow-silky-villous without. Petals 4, bifid to the base, free, ½ as long as the sepals, densely pilose, fimbriate along the margin. Filaments as long as the petals; anthers ovate-oval. Ovary small, very densely silky-villous; style very short, scarcely exceeding the indument; stigma thick, capitate.

Upper Guinea. Cameroons; underwood in the shady forest near Kribi, 30 ft. above the sea, *Zenker*, 823.

3. **O. Dinklagei,** *Gilg in Engl. Jahrb.* xxviii. 143. A shrub 6 ft. high, with grey branches, glabrous when young, with very numerous lenticels. Leaves obovate-oblong or obovate, sparingly pilose beneath when young, later glabrous, papery, long and abruptly acuminate-acute, usually rounded at the base, entire, paler beneath, with venation more prominent beneath, 4–7½ in. long, 1½–3½ in. broad; petiole thick, densely silky-villous when young, at length calvescent, 2–4 lin. long. Flowers dimorphic, 4-merous, few, white, in axillary fascicles at the densely yellow-silky-hairy nodes; bracteoles very small, silky; pedicels as long as the flowers, shortly pilose. Sepals free to the base, triangular-ovate, broadly imbricate, densely and shortly pilose on both sides, very shortly fimbriate, expanded during flowering,

persistent. Petals bifid to the base; lobes linear, $\frac{1}{2}$ as long as the sepals, with margins fimbriate and closely approximating to form a white urceolate or subglobose tube. Filaments a little exceeding or twice as long as the petals, filiform above, at the base somewhat flattened and pilose. Style very short or twice as long as the densely silky-villous 4-celled ovary; stigma subcapitate. Fruit dehiscing by 4 spreading valves united at the base, not deciduous. Testa dark brown, horny, loosely reddish-pilose. Cotyledons thick.

Upper Guinea. Cameroons: Ebea, *Dinklage*, 177! Bipinde, *Zenker*, 3546!

4. **O. Casearia,** *Oliver in Journ. Linn. Soc.* viii. 161. A shrub 6–8 ft. high; young branches pubescent or puberulous, at length glabrescent. Leaves shortly petioled, obovate-lanceolate, abruptly acuminate, subacute, entire, slightly revolute, membranous, glabrous, with venation very prominent beneath, $4\frac{1}{2}$–$9\frac{1}{2}$ in. long, $2\frac{1}{2}$–$3\frac{3}{4}$ in. broad; petiole thick, densely yellow-pilose, 1–3 lin. long. Flowers in axillary few-flowered (3–4) fascicles; pedicels yellow-pubescent, 2–3 lin. long. Buds ovate, about as long as the pedicels. Sepals oblong-ovate, obtuse, densely yellow-tomentose without, puberulous within. Petals bifid to the base; lobes oblong, pilose within along the margins and towards the apex. Filaments pilose at the base. Ovary densely pilose; style short. Fruit not seen.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann*, 2306! Old Calabar, *Thomson*, 81! Spanish Gaboon: River Kongui, *Mann*, 1815!

5. **O. macrophylla,** *Gilg in Engl. Jahrb.* xxviii. 144. A shrub 6–10 ft. high, with slender stem; young branches densely yellow-tomentose, at length glabrous. Leaves obovate-oblong, long and acutely acuminate, narrowed at the base, entire, membranous, glabrous above, pilose with short adpressed hairs beneath, with venation prominent beneath, 7–12 in. long, 2–4 in. broad. Flowers 4-merous, dimorphic, white, densely fascicled at the somewhat swollen yellow-tomentose nodes; pedicels as long as the flowers, densely yellow-tomentose. Sepals ovate, broadly imbricate, acute, very densely yellow-silky-villous without, glabrescent within, 2 lin. long, $1\frac{1}{2}$ lin. broad. Petals bifid to the base, loosely pilose on both sides, fimbriate, $\frac{1}{3}$ as long as the sepals. Filament filiform, equalling or about twice as long as the petals; style 0 or rather long; stigma large, globose. Ovary very densely silky-pilose.

Upper Guinea. Cameroons: near Mundame, on the Mungo, 400–440 ft., *Staudt*, 608; Johann-Albrechtshöhe, *Staudt*, 838; Bipinde, *Zenker*, 3211!

Imperfectly known species.

6. **O. congolana,** *Warb. in Engl. & Prantl, Pflanzenfam.* iii. 6A, 56. A tree 20–25 ft. high. Leaves shortly petioled, alternate, oblong or obovate-lanceolate, acuminate, somewhat thick, glabrous, paler beneath, very finely punctate. Flowers small, solitary or more usually in short axillary few-flowered cymes. Sepals 4, free, triangular, valvate or

imbricate. Petals usually in pairs opposite the sepals, ciliate, subspathulate. Stamens 8, in 2 whorls; filaments dilated at the base, subulate above, ciliate. Ovary superior, 4-celled; style elongate; ovule solitary in each cell, pendulous, anatropous. Fruit unknown.—*Makokoa congolana*, Baill. in Bull. Soc. Linn. Paris, i. 619.

Lower Guinea. French Congo: Ogowe, *Thollon*, 343.

ORDER CXIX. **LORANTHACEÆ.** (By T. A. Sprague.)

Flowers regular or zygomorphic, hermaphrodite or unisexual, 3–6-merous. Calyx superior, gamosepalous, lobed or truncate, sometimes obsolete. Corolla superior, polypetalous or gamopetalous, petaloid or sepaloid, valvate in bud. Stamens as many as and opposite the petals or corolla-lobes, and inserted on them; anthers usually 2-celled, sometimes divided into numerous small cells, which may be arranged irregularly (*Viscum*) or in 2 or 4 vertical rows (*Loranthus*). Disc superior, annular or absent. Ovary inferior, usually without a distinct placenta and ovule; style simple or absent; stigma not or hardly lobed. Fruit baccate (in all the African species), crowned by the persistent calyx when the latter is present; pericarp sticky. Seed solitary, albuminous or exalbuminous, without a distinct testa; embryo fairly large, terete or angled, with distinct hypocotyl and 2 (more rarely 3–6) cotyledons.—Chlorophyll-containing shrubs or more rarely herbs, parasitic on other plants; very rarely trees. Leaves opposite, ternate or alternate, simple, entire, exstipulate, sometimes reduced to mere scales or teeth. Inflorescence racemose or cymose. Flowers often large and brightly coloured (*Loranthus*), or small, greenish and inconspicuous (*Viscum*).

Genera 24, chiefly tropical and subtropical; species about 1000.

Calyx present, though sometimes reduced to a small rim; flowers hermaphrodite (in all the African species) . .	1. LORANTHUS.
Calyx obsolete; flowers unisexual	2. VISCUM.

1. **LORANTHUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 207 (excluding the American species); Engl. in Engl. & Prantl, Pflanzenfam. iii. i. 183.

Flowers hermaphrodite. Calyx more or less lobed, or truncate, sometimes very short, occasionally provided inside at the base with a fleshy annular thickening (*intramarginal ring*). Corolla polypetalous or, more frequently, gamopetalous, regular or zygomorphic; tube often split unilaterally for some distance downwards when the flower expands. Filaments united in their lower part with the petals; anthers introrse, not versatile. Style filiform, or gradually thickened upwards in the upper part and then rather suddenly contracted into a narrow neck below the stigma (*skittle-shaped*); stigma truncate or more or less capitate. Fruit baccate, usually globose, ovoid or ellipsoid, crowned by the persistent

calyx. Seed albuminous; embryo straight, terete.—Green leafy shrubs, parasitic on Dicotyledons, seldom on Coniferæ or Monocotyledons, often very brittle, even in a living state. Leaves opposite, ternate or alternate, penninerved, or several-nerved from the base. Inflorescence racemose (at least in the African species); subtending bract of each flower situated at the apex of the pedicel when the latter is present; flowers often large and brightly-coloured.

Species about 500, all Old World, mostly tropical and subtropical.

KEY TO THE SECTIONS.

Corolla polypetalous.	
Flowers tetramerous.	
Flowers in racemes.	
Anthers transversely septate	1. SYCOPHILA.
Anthers not transversely septate . . .	2. ACROSTACHYS.
Flowers in umbels	3. LEPIDOTEPALUM.
Flowers pentamerous	4. PLICOPETALUS.
Corolla gamopetalous.	
Corolla-lobes with several oblique folds arising from the adnate part of the filament	5. TAPINOSTEMMA.
Corolla-lobes without folds on the inner surface.	
Filaments without a tooth or ledge in front of the anther.	
Anthers tranversely septate.	
Style skittle-shaped; corolla usually rather densely clothed with rusty much-branched hairs	6. RUFESCENTES.
Style not skittle-shaped (or if slightly skittle-shaped, the corolla is clothed with tawny or greyish hairs).	
Corolla rather sparingly pilose outside with small stellate hairs or nearly glabrous .	7. LEPIDOTI.
Corolla densely clothed with tawny or greyish much-branched hairs . .	8. CINERASCENTES.
Anthers not transversely septate.	
Corolla split unilaterally; lobes cohering, involute at the apex	9. INVOLUTIFLORI.
Corolla-lobes revolute	10. CUPULATI.
Corolla-lobes neither involute nor revolute.	
Corolla-tube not split unilaterally.	
Flowers in racemes.	
Corolla densely clothed with much-branched hairs; anthers linear .	11. LAXIFLORI.
Corolla sparingly pilose with small stellate hairs; anthers oblong .	12. AMBIGUI.
Flowers in umbels or heads, or axillary, sessile.	
Flowers pentamerous.	
Flowers axillary, sessile; receptacle nearly glabrous . . .	13. INCRASSATI.
Flowers in umbels or heads; receptacle densely villous at the base or all over	14. HIRSUTI.
Flowers tetramerous . . .	15. TETRAMERI.

Corolla-tube split unilaterally.
Corolla-lobes shorter than the tube.
Corolla glabrous outside . . . 16. INFUNDIBULIFORMES.
Corolla villous-tomentose outside with verticillate-branched hairs . . 17. REMOTI.
Corolla-lobes longer than the tube.
Flowers in umbels.
Corolla swollen at the base; no intramarginal ring . . . 18. RIGIDIFLORI.
Corolla not swollen at the base; intramarginal ring present . 19. LONGIFLORI.
Flowers solitary or fascicled . . 20. LONGICALYCULATI.
Filaments produced above into a tooth or forming a ledge in front of the anther.
Flowers pentamerous.
Anthers transversely septate . . . 21. EUBRACTEATI.
Anthers not transversely septate.
Corolla-lobes longer than the tube.
Filaments involute . . . . 22. CORIACEIFOLII.
Filaments straight below, much thickened and involute above . . . . 23. RHAMNIFOLII.
Corolla-lobes much shorter than the tube.
Style not at all skittle-shaped; bract longer than or at least as long as the receptacle and calyx . . . 24. OBTECTIFLORI.
Style more or less skittle-shaped.
Calyx tubular, enclosing the basal swelling of the corolla-tube . . 25. PURPUREIFLORI.
Calyx neither tubular nor enclosing the basal swelling of the corolla-tube.
Corolla-lobes reflexed . . . 26. CONSTRICTIFLORI.
Corolla-lobes erect . . . 27. ERECTILOBI.
Flowers tetramerous.
Filaments not transversely grooved, produced into a tooth (sometimes minute) in front of the anther . . . . . 28. ISCHNANTHUS.
Filaments transversely grooved, terminating in a ledge in front of the anther . . 29. DIPLOBRACTEATI.

1. SYCOPHILA. *Racemes axillary, solitary; bract unilateral; flowers tetramerous, polypetalous. Calyx very short, subtruncate. Corolla subulate in bud; lower part of petal produced above on the inner surface into a small flap, on the dorsal surface of which the filament is inserted; upper part spreading or reflexed. Stamens erect; anthers linear-subulate, dehiscing laterally, divided transversely into numerous small cells arranged in 2 vertical rows; connective produced into a subulate point above the uppermost cells. Disc absent. Style quadrangular, subtruncate, much thickened at the base.*—Sycophila, *Van Tiegh. in Bull. Soc. Bot. France*, xli. 485, *genus*.

Corolla in bud narrowly 4-winged in its lower part, wings subtruncate above.
Leaves elliptic or elliptic-oblong, 2–2½ times as long as their breadth; petals 5 lin. long . . . . 2. *L. combretoides.*
Leaves oblanceolate-oblong, 3–3½ times as long as their breadth; petals 9½ lin. long . . . . . 1. *L. Wildemanii.*

Corolla in bud obtusely or acutely quadrangular in its lower part, not winged.
Leaves ovate-oblong, elliptic-oblong or elliptic, $1\frac{1}{2}$–$2\frac{1}{2}$ times as long as their breadth; petals $2\frac{1}{4}$ lin. long. 6. *L. rosaceus.*
Leaves narrowly oblong, lanceolate-oblong or oblanceolate-oblong, 3–5 times as long as their breadth; petals $3\frac{1}{4}$–$5\frac{1}{3}$ lin. long.
Leaves chartaceous or thinly coriaceous, margin not distinctly reflexed; petals $3\frac{1}{4}$ lin. long. . . 5. *L. sublilacinus.*
Leaves coriaceous, margin distinctly reflexed; petals $4\frac{1}{2}$–$5\frac{1}{3}$ lin. long.
Leaves opposite, upper surface glossy, base obtuse or rounded; racemes shorter than the leaves . 3. *L. Mannii.*
Leaves ternate or alternate, dull, base subcuneate; racemes longer than the leaves . . . . 4. *L. ternatus.*

2. ACROSTACHYS. *Racemes terminal and axillary; bract unilateral; flowers tetramerous, polypetalous. Calyx very short, truncate. Petals often more or less plicate on the inner surface below the insertion of the stamens, lower part erect, upper part reflexed or twisted. Stamens erect; anthers linear or oblong-linear, not transversely divided. Disc annular. Style quadrangular, subtruncate or obtuse.*—Acrostachys, *Van Tiegh. in Bull. Soc. Bot. France,* xli. 504, *genus.*

Racemes secund . . . . . 7. *L. Thomsonii.*
Racemes not secund.
Petals 2–4 lin. long . . . . . 8. *L. Kirkii.*
Petals 6–7 lin. long . . . . . 9. *L. huillensis.*

3. LEPIDOTEPALUM. *Umbels axillary, solitary; bract obliquely cupular; flowers tetramerous, polypetalous. Calyx cupular. Petals bearing a small flap on the inner surface a short distance above the base. Stamens erect; filament inserted near the middle of the petal; anther narrowly linear, not transversely divided. Disc annular, quadrangular. Style quadrangular, subtruncate.*

Only species . . . . . 10. *L. periclymenoides.*

4. PLICOPETALUS. *Umbels axillary, solitary or fascicled, or terminating leafy short-shoots; bract unilaterally developed from a saucer-shaped base, or quite unilateral; flowers pentamerous, polypetalous. Calyx short, truncate. Corolla arcuate in bud, narrowed from the base to the middle, clavate above. Petals plicate on the inner surface below the insertion of the stamens. Stamens arcuate above; anthers linear, not transversely divided. Disc absent. Base of style sunk in a depression; stigma capitate.*—Plicosepalus, *Van Tiegh. in Bull. Soc. Bot. France,* xli. 504.

Leaves sessile, more or less dimorphic, all or some of them cordate or sagittate at the base; umbels usually terminating leafy short-shoots, or leafy at the base.
Umbels 2-flowered; receptacle 4–5 lin. long; style with a double bend shortly above the base . . . 11. *L. undulatus.*
Umbels 3–5-flowered; receptacle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; style without a double bend . . . . . 12. *L. sagittifolius.*
Leaves shortly petioled, not dimorphic, cuneate, obtuse or rounded at the base; umbels axillary, not leafy at the base.
Receptacle and calyx campanulate or urceolate, $1\frac{1}{2}$–2 lin. long; leaves 2–5 lin. broad.
Umbels 3-flowered; peduncle hardly longer than the pedicels . . . . . 14. *L. Fauroti.*

Umbels 4–6-flowered; peduncle shorter than the pedicels . . . . . 13. *L. curviflorus.*
Receptacle and calyx obconical, 2–3 lin. long; leaves 5–10 lin. broad . . . . . 15. *L. kalachariensis.*

5. TAPINOSTEMMA. *Umbels axillary, solitary or fascicled; bract unilaterally developed from a saucer-shaped base; flowers pentamerous, gamopetalous. Calyx truncate in bud, irregularly split or lobed when the flower expands. Corolla arcuate in bud, 5-gibbous at the base of the lobes, narrowed from the base of the lobes to their middle, clavate above; tube cylindric, much shorter than the lobes, provided inside, a short distance above the base, with 5 ascending flaps inserted on the adnate part of the filaments; lobes plicate on the inner surface below the insertion of the stamens, reflexed or twisted about their middle. Stamens inserted some distance above the base of the corolla-lobes, arcuate above; anthers linear, not transversely divided. Disc confluent with the base of the corolla-tube, surrounding the base of the style. Stigma capitate.*—Tapinostemma, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 257, *genus.*

Leaves petioled . . . . . 16. ***L.** Acaciæ.*
Leaves sessile . . . . . 17. *L. nummulariæfolius.*

6. RUFESCENTES. *Umbels, fascicles or heads, or the flowers sessile, aggregated; bract unilateral; flowers pentamerous, gamopetalous. Calyx cupular or reduced to a short rim, truncate or lobed. Intramarginal disc sometimes present. Corolla in bud subcylindric, or clavate above, more or less densely clothed with rusty verticillate-branched hairs, at least in a young state, in a few cases becoming minutely puberulous when fully developed; tube split unilaterally; lobes erect or, more rarely, reflexed, spathulate or spathulate-linear. Stamens inserted at or shortly above the base of the corolla-lobes; filaments involute; anthers oblong or linear, divided transversely into numerous* (10–26) *small cells arranged in four vertical rows. Disc annular, pentagonal, rusty-pilose or glabrous, sometimes very small. Style skittle-shaped above; stigma more or less capitate.*—Septimetula, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 266. Metula, *Van Tiegh. l.c.* 263.

Corolla 3–3½ in. long; lobes spathulate-linear . 18. *L. kamerunensis.*
Corolla 1¼–2¾ in. long; lobes spathulate or spathulate-linear.
  Corolla-lobes reflexed, spathulate-linear; flower-buds only slightly swollen at the apex.
    Flowers shortly pedicelled; bract shorter than the receptacle and calyx . . . . 19. *L. leonensis.*
    Flowers sessile; bract longer than the receptacle and calyx . . . . . 20. *L. nigritanus.*
  Corolla-lobes erect, spathulate; flower-buds conspicuously swollen at the apex.
    Leaves sessile . . . . . 21. *L. emarginatus.*
    Leaves petioled.
      Leaves rusty-tomentellous beneath.
        Leaves glossy and prominently reticulate above, ½–⅔ in. broad . . . . 22. *L. nitidulus.*
        Leaves dull above, reticulation not very evident, ¾–1½ in. broad.
          Petiole 2–5 lin. long.
            Corolla 1½–1¾ in. long, tomentellous with short hairs . . . . 23. *L. discolor.*
            Corolla 1¼ in. long, villous-tomentose with verticillate-branched hairs . 24. *L. polycryptus.*
          Petiole 7–10 lin. long . . . . 25. *L. angolensis.*

Leaves minutely stellate-pubescent, especially on the lower surface . . . . 26. *L. Cornetii.*
Leaves soon becoming glabrous.
Leaves linear-lanceolate, often more or less falcate.
Corolla minutely and sparingly puberulous outside . . . . . 27. *L. macrosolen.*
Corolla rusty-tomentellous outside . 28. *L. dschallensis.*
Leaves ovate or oblong, not falcate.
Corolla tomentose or tomentellous outside when fully expanded.
Tube hardly enlarged towards the base; lobes 8–8½ lin. long.
Corolla densely villous-tomentose outside; flowers in sessile heads . 29. *L. regularis.*
Corolla shortly tomentose outside; flowers in shortly peduncled umbels . . . . . 30. *L. erythræus.*
Tube with a conspicuous basal swelling; lobes 3½–4½ lin. long.
Flowers fascicled . . . . 31. *L. usuiensis.*
Flowers in shortly-peduncled umbels . . . . . 32. *L. Albizziæ.*
Corolla more or less glabrescent when fully developed, at least in the upper part.
Lower part of corolla densely pubescent 33. *L. sigensis.*
Lower part of corolla puberulous.
Corolla 1¾ in. long, without a distinct basal swelling, puberulous outside . . . . . 34. *L. wentzelianus.*
Corolla over 2 in. long, with a distinct basal swelling, glabrous except towards the base . . 35. *L. berliniicola.*

Imperfectly known species of this section . . { 36. *L. crassicaulis.* 37. *L. rufescens.*

7. LEPIDOTI. *Umbels or fascicles axillary, usually fascicled, rarely solitary; bract unilateral; flowers pentamerous* (*hexamerous in* L. hexasepalus), *gamopetalous. Calyx cupular, subtruncate or lobed. Corolla in bud subcylindric, slightly clavate above, stellate-pilose or lepidote outside, more rarely glabrous; tube split unilaterally; lobes erect, spathulate-linear. Stamens inserted at or shortly above the base of the corolla-lobes; filaments involute; anthers linear, divided transversely into numerous small cells arranged in four vertical rows. Disc annular, pentagonal. Style not skittle-shaped; stigma more or less capitate. Berry developed from the lower part of the ovary.*—Thelecarpus, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 262.

Flowers pentamerous.
Pedicel, bract and receptacle densely pubescent; corolla stellate-puberulous outside.
Leaves lanceolate or oblong-elliptic, either glabrous when adult, or, if lepidote, the scales do not form a continuous covering.
Leaves narrowed to both apex and base, glabrous when adult, or sparingly lepidote on the lower surface . . . . 41. *L. irebuensis.*

Leaves narrowed to the apex only, densely stellate-lepidote on the lower surface . 40. *L. Batangæ.*
Leaves ovate, ovate-oblong, elliptic or sub-orbicular, retaining a dense continuous covering of minute scales or of rusty branched hairs on the lower surface when adult.
Adult branches glabrous; lower surface of leaves stellate-lepidote; lateral nerves distinct on the lower surface . . . 39. *L. incanus.*
Adult branches rusty-tomentose; lower surface of leaves rusty-tomentellous; lateral nerves hardly visible on the lower surface . 38. *L. Baumii.*
Pedicel, bract and receptacle glabrous; corolla glabrous outside . . . . . 42. *L. Zygiarum.*
Flowers hexamerous . . . . . 43. *L. hexasepalus.*

8. CINERASCENTES. *Umbels or more rarely heads axillary, solitary or fascicled, or terminating much-contracted axillary shoots, few-flowered; bract unilateral; flowers pentamerous, gamopetalous. Corolla in bud subcylindric, clavate above or not, rather densely pilose with tawny or greyish verticillate-branched hairs; tube split unilaterally; lobes erect, usually spathulate. Stamens inserted at or shortly above the base of the corolla-lobes; filaments involute; anthers oblong or linear, divided transversely into numerous small cells arranged in four vertical rows. Disc annular, pentagonal. Style not or very slightly skittle-shaped; stigma more or less capitate.*—Phragmanthera, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 261.

Corolla not glabrescent above.
Corolla-lobes spathulate.
Bracts foliaceous; anthers $\frac{3}{8}$ lin. long . . 44. *L. cistoides.*
Bracts usually not foliaceous; anthers $\frac{5}{8}$–$1\frac{3}{4}$ lin. long.
Anthers $\frac{5}{8}$–1 lin. long.
Corolla pubescent outside . . . . 46. *L. Sterculiæ.*
Corolla villous-tomentose outside . . 45. *L. glaucocarpus.*
Anthers $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long . . . . 47. *L. cinereus.*
Corolla-lobes lanceolate-linear . . . . 48. *L. Guerichii.*
Corolla glabrescent above . . . . . 49. *L. fulvus.*

9. INVOLUTIFLORI. *Umbels axillary, solitary, many-flowered; bract unilaterally developed from a flat, circular or more or less cupular base; flowers pentamerous, gamopetalous. Calyx very short, with a distinct intramarginal ring. Corolla in bud clavate, splitting unilaterally; lobes cohering, involute at the apex. Stamens inserted considerably above the base of the corolla-lobes; lower part of filament straight, upper part thickened, involute; anthers oblong-linear or linear, not divided transversely; connective produced above the cells. Disc annular, 5-lobed. Style not thickened above; stigma capitate.*—Oiiverella, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 258.

Bract longer than the receptacle and calyx.
Bract narrowly oblong or narrowly lanceolate . 50. *L. rubroviridis.*
Bract subulate or with a subulate dorsal horn.
Inflorescence densely pilose . . . . 51. *L. Hildebrandtii.*
Inflorescence nearly glabrous . . . . 52. *L. Bussei.*
Bract shorter than the receptacle . . . . 53. *L. campestris.*

10. CUPULATI. *Umbels axillary, fascicled, 3–8-flowered, more rarely many-flowered; bract obliquely cupular, or unilaterally developed from a cupular or saucer-shaped base; flowers pentamerous, gamopetalous. Calyx cupular. Corolla capitate in bud, angular; lobes spathulate, revolute. Filaments involute. Anthers cuneate or oblong, not divided transversely. Disc annular, 5-lobed. Style skittle-shaped above; stigma ellipsoid, cushion-shaped or peltate.*—Globimetula, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 264.

Leaves (or at least some of them) several-nerved from the base	60. *L. anguliflorus.*
Leaves not several-nerved from the base.	
Lateral nerves 2–3 on each side of the midrib and running sub-parallel with it, arising below the middle of the leaf.	
Leaf-base cuneate; nerves not visible on the upper surface	54. *L. opacus.*
Leaf-base obtuse or rounded; nerves visible on the upper surface	55. *L. Dinklagei.*
Lateral nerves 4–5 on each side of the midrib, not running parallel with it.	
Umbels about 20-flowered; stigma cushion-shaped, $\frac{1}{2}$–$\frac{5}{8}$ lin. in diam.	56. *L. oreophilus.*
Umbels 4–8-flowered; stigma distinctly peltate, $\frac{3}{4}$–1 lin. in diam.	
Leaves opposite.	
Leaves elliptic or suborbicular, cordate or rounded at the base.	
Leaves 4–6$\frac{1}{2}$ in. long, 2$\frac{1}{2}$–4$\frac{1}{4}$ in. broad; bract obliquely cupular, ventral margin suberect	57. *L. mayombensis.*
Leaves 1$\frac{1}{4}$–4 in. long, $\frac{2}{3}$–3 in. broad; bract unilaterally developed from a saucer-shaped base, ventral margin patulous	58. *L. Braunii* and var. *Zenkeri.*
Leaves elliptic or elliptic-oblong, obtuse at the base	58. *L. Braunii*, var. *Laurentii.*
Leaves ovate-oblong, obtuse at the base	58. *L. Braunii*, var. *Descampsii.*
Leaves ovate or ovate-oblong, rounded at the base	58. *L. Braunii*, var. *unguiformis.*
Leaves ternate	59. *L. mweroensis.*
Imperfectly known species of this section	61. *L. cupulatus.*

11. LAXIFLORI. *Racemes axillary, solitary; bract unilateral; flowers pentamerous, gamopetalous. Corolla in bud subcylindric, densely clothed with rusty verticillate-branched hairs; tube not split unilaterally; lobes ascending, patulous above. Stamens inserted above the base of the corolla-lobes; filaments erect; anthers linear, not transversely divided. Style not skittle-shaped; stigma capitate.*—Œdina, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 249.

Only species	62. *L. erectus.*

12. AMBIGUI. *Racemes axillary, solitary or fascicled; bract unilateral; flowers pentamerous, gamopetalous. Corolla-tube narrowly funnel-shaped from a*

globose base, not split unilaterally; lobes erect. Stamens inserted above the base of the corolla-lobes; filaments erect, much broadened above; anthers oblong, not divided transversely, connective produced beyond the cells.—Oncella, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 251.

Leaves subsessile, broadly ovate, cordate at the base . 63. *L. pœcilobotrys.*
Leaves more or less petioled, ovate-oblong, obovate-oblong or elliptic-oblong, not distinctly cordate at the base.
Leaves obovate-oblong . . . . . 64. *L. curvirameus.*
Leaves ovate-oblong or elliptic-oblong . . . 65. *L. ambiguus.*

Imperfectly known species of this section . . . 66. *L. Sacleuxii.*

13. INCRASSATI. *Leaves alternate. Flowers axillary, solitary, subsessile, pentamerous, gamopetalous; bract cupular. Calyx tubular, much longer than the bract. Corolla-tube not split unilaterally; lobes reflexed considerably above the insertion of the stamens. Stamens inserted a considerable distance above the base of the corolla-lobes; filaments erect slender and straight below, much thickened and spirally coiled above; anthers linear, not transversely divided. Disc annular, pentagonal. Style not skittle-shaped; stigma ellipsoid or ovoid.*

Only Tropical African species . . . . . 67. *L. Menyharthii.*

14. HIRSUTI. *Heads or umbels (the latter sometimes with a few additional flowers inserted racemosely on the peduncle), axillary or terminating axillary leafy short-shoots; bract distinctly unilateral or spathaceous-cupular, sometimes foliaceous; flowers pentamerous, gamopetalous. Receptacle densely villous at the base or all over. Calyx more or less cupular. Corolla usually villous (at least in a young state), with long, generally little-branched hairs; tube not split unilaterally; lobes reflexed above the insertion of the stamens. Stamens inserted a considerable distance above the base of the corolla-lobes; filaments erect, more or less broadened above, breaking below the anthers when the flower opens; anthers linear, not transversely divided; connective produced beyond the cells. Disc annular. Style not skittle-shaped; stigma more or less capitate.*—Erianthemum, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 247.

Fully developed corolla glabrescent outside, at least in the upper half.
Leaves subsessile, stellate-puberulous on both surfaces; receptacle and calyx about 1½ lin. long, receptacle densely villous, calyx sparingly pilose outside . . 68. *L. Commiphoræ.*
Leaves petioled, glabrous; receptacle and calyx under 1 lin. long, densely villous outside . . . . 69. *L. occultus.*
Fully developed corolla densely villous outside.
Corolla clothed with patulous more or less branched hairs.
Leaves oblong or ovate-oblong, cordate at the base, upper surface dark brown in a dried state, glabrescent; flowers orange . . . . . 70. *L. ulugurensis.*
Leaves elliptic, rounded at the base, greenish in a dried state, coarsely pubescent on both surfaces; flowers greenish . . . . . 71. *L. virescens.*
Corolla densely clothed with long simple or nearly simple adpressed silky hairs.
Leaves pubescent on both surfaces; heads terminating axillary leafy short-shoots; bracts not foliaceous . . . . . 72. *L. ngamicus.*

Leaves glabrous or glabrescent on the upper surface when fully developed; heads axillary or (*L. nyikensis*) terminating axillary leafy short-shoots; in the latter case the bracts are always foliaceous.
Bracts not foliaceous or with a small horizontal subfoliaceous limb.
Leaves suborbicular to elliptic, cordate or subcordate at the base, densely brownish tomentose on the lower surface . . . 73. *L. Schelei.*
Leaves neither suborbicular, nor densely tomentose on the lower surface when fully developed 74. *L. Dregei* and vars.
Bracts suberect, foliaceous.
Leaves glabrous on both surfaces.
Leaves obovate-oblong, cuneate or obtuse at the base . . . . . 76. *L. alveatus.*
Leaves ovate-elliptic or elliptic, cordate or rounded at the base . . . . 77. *L. lindensis.*
Leaves pubescent on the lower surface.
Branches short, blackish-brown; leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. long . . . . . 75. *L. nyikensis.*
Branches elongated, pale brown; leaves $1\frac{1}{2}$–$2\frac{3}{4}$ in. long . . . . . 74. *L. Dregei*, var. *foliaceus.*

15. TETRAMERI. *Umbels axillary, fascicled, few-flowered; bract unilaterally developed from a saucer-shaped base; flowers tetramerous, polypetalous. Calyx cupular. Corolla arcuate and tetragonal in bud, broadest at or below the middle, pointed, slightly broadened above; tube not split unilaterally; lobes at first erect, finally reflexed or twisted above the insertion of the stamens. Stamens inserted a considerable distance above the base of the corolla-lobes; filaments erect; anthers linear, not transversely divided; connective produced beyond the cells into a membranous flap. Disc annular. Style not skittle-shaped; stigma ellipsoid.*

Only Tropical African species . . . . . 78. *L. panganensis.*

16. INFUNDIBULIFORMES. *Umbels or heads axillary, solitary or fascicled, peduncled or sessile; bract cupular or unilaterally developed from a cupular base; flowers pentamerous, gamopetalous. Calyx cupular. Corolla glabrous outside; tube split unilaterally; lobes erect or reflexed. Stamens inserted shortly above the base of the corolla-lobes; filaments tapering upwards, deflexed or involute; anthers linear or oblong, not divided transversely. Disc annular. Style not skittle-shaped; stigma capitate.*—Agelanthus, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 246.

Corolla without a basal swelling or with only a slight swelling.
Corolla-lobes slightly shorter than the tube . . 80. *L. Bosciæ.*
Corolla-lobes $\frac{1}{2}$ as long as the tube or less.
Leaves falcate or scimitar-shaped . . . . 79. *L. falcifolius.*
Leaves not falcate.
Leaves under $\frac{1}{2}$ in. broad, penninerved; nerves inconspicuous . . . . . 81. *L. Lugardii.*
Leaves $\frac{2}{3}$–2 in. broad, 3–7-nerved from the base.
Leaves suborbicular, obovate or elliptic-oblong, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long.
Corolla-lobes erect; anthers oblong, $\frac{5}{8}$ lin. long; leaves 3–5-nerved at the base . 82. *L. Kayseri.*

Corolla-lobes reflexed; anthers linear, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long; leaves 5–7-nerved at the base — 83. *L. Deltæ.*
Leaves ovate to lanceolate, 2–$6\frac{1}{2}$ in. long.
Leaves saccate at the base . . . . — 87. *L. Lujæi.*
Leaves not saccate at the base.
Leaves sessile or subsessile; umbels sessile — 84. *L. trinervius.*
Leaves shortly petioled; umbels shortly peduncled.
Leaves ovate-lanceolate or lanceolate, 2–4 in. long, acuminate into the base — 86. *L. djurensis.*
Leaves oblong-lanceolate, 4–$6\frac{1}{2}$ in. long, obtuse at the base . . . . — 88. *L. Demeusei.*
Corolla with a conspicuous basal swelling when fully developed.
Corolla-lobes slightly shorter than the tube . . — 99. *L. rondensis.*
Corolla-lobes much shorter than the tube.
Leaves obovate-oblong to narrowly oblanceolate, 1–$2\frac{3}{4}$ in. long.
Young branchlets rusty-pilose . . . . — 89. *L. zizyphifolius.*
Young branchlets glabrous.
Leaves irregularly and obliquely penninerved or, if 3-nerved, the lateral nerves arise a considerable distance above the base . . — 90. *L. glomeratus.*
Leaves 3–5-nerved from the base or from shortly above the base.
Leaves obovate-oblong, $1\frac{1}{2}$–$2\frac{1}{2}$ times as long as their breadth . . . . . — 91. *L. loandensis.*
Leaves mostly oblanceolate, 3–4 times as long as their breadth.
Young branchlets and leaves glaucous, drying greyish . . . . — 92. *L. Henriquesii.*
Young branchlets and leaves not glaucous, drying brownish.
Corolla-lobes $3\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad at the base . . . . . — 93. *L. Gilgii.*
Corolla-lobes 5 lin. long, $\frac{3}{4}$ lin. broad at the base . . . . . — 94. *L. vittatus.*
Leaves ovate-elliptic or elliptic, $1\frac{3}{4}$–$2\frac{3}{4}$ in. long, rounded or obtuse at both ends, penninerved . — 95. *L. pennatulus.*
Leaves elliptic-oblong to narrowly lanceolate, $2\frac{1}{2}$–$6\frac{1}{2}$ in. long.
Leaves distinctly 3–5-nerved from the base . — 96. *L. brunneus.*
Leaves penninerved; lateral nerves very oblique, about 2 on each side of the midrib . . . — 97. *L. Krausei.*
Imperfectly known species of this section . . . — 85. *L. verruculosus.*

17. REMOTI. *Umbels axillary, solitary or fascicled, few-flowered; bract unilateral; flowers pentamerous, gamopetalous. Calyx short, without an intramarginal ring. Corolla in bud with a 5-grooved apical swelling, villous-tomentose outside with verticillate-branched hairs; tube split unilaterally, not distinctly swollen at the base; lobes erect. Stamens inserted at the base of the corolla-lobes; filaments erect; anthers linear, not transversely divided; connective slightly produced above the cells. Disc annular. Style not skittle-shaped; stigma capitate.*

Only species . . . . . — 98. *L. remotus.*

18. RIGIDIFLORI. *Umbels axillary, solitary, or fascicled on axillary leafy cushion-like short-shoots, few-flowered, peduncled; bract unilaterally developed from a cupular or saucer-shaped base; flowers pentamerous, gamopetalous. Corolla glabrous outside; tube split unilaterally; lobes usually longer than the tube, erect or slightly bent forwards. Stamens inserted at or above the base of the corolla-lobes; filaments involute; anthers linear, not transversely divided. Disc annular. Style not skittle-shaped; stigma capitate.*—Oncocalyx, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 258.

Leaves obovate . . . . . 101. *L. fragilis.*
Leaves not obovate.
  Flowers distinctly pedicelled.
    Umbels axillary, solitary . . . . . 100. *L. Welwitschii.*
    Umbels fascicled on axillary leafy cushion-like short-shoots . . . . . 102. *L. elegantissimus.*
  Flowers very shortly pedicelled or subsessile . . 99. *L. rondensis.*

19. LONGIFLORI. *Umbels axillary, solitary; bract unilaterally developed from a saucer-shaped base. Calyx short. Corolla in bud linear in outline, shortly beaked; tube split unilaterally; lobes erect, linear. Stamens inserted considerably above the base of the corolla-lobes; filaments inflexed or involute; anthers linear, not transversely divided; connective produced above the cells. Disc annular. Style not skittle-shaped; stigma capitate.*—Schimperina, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 256.

Leaves cuneate at the base; flowers in umbels . . 103. *L. platyphyllus.*
Leaves obtuse or rounded at the base; flowers in short much-contracted racemes . . . . . 104. *L. unyorensis.*

20. LONGICALYCULATI. *Flowers axillary, usually fascicled, pedicelled or subsessile, pentamerous, gamopetalous; bract cupular. Calyx tubular. Corolla subcylindric in bud, swollen at the insertion of the stamens, slightly broadened towards the apex, glabrous outside; tube split unilaterally; lobes longer than the tube, reflexed or twisted. Stamens inserted just below the base of the corolla-lobes; filaments subinvolute; anthers linear, not divided transversely. Disc annular. Style not skittle-shaped; stigma capitate.*

Flowers distinctly pedicelled; leaves linear-lanceolate . 105. *L. Stuhlmannii.*
Flowers subsessile; leaves obovate or obovate-oblong . 106. *L. Fischeri.*

21. EUBRACTEATI. *Umbels axillary, solitary, few-flowered, or flowers sessile, axillary, geminate; bract unilateral, subfoliaceous; flowers pentamerous, gamopetalous. Calyx small. Corolla subcylindric in bud, hardly swollen at the base, densely clothed with much-branched hairs; tube split unilaterally; lobes reflexed. Stamens inserted shortly above the base of the corolla-lobes; filaments inflexed, produced into a tooth in front of the anther; anthers divided transversely into numerous small cells arranged in 4 vertical rows. Disc annular. Style slightly skittle-shaped; stigma capitate.*

Corolla clothed with rusty verticillate-branched hairs . 107. *L. Eminii.*
Corolla clothed with tawny hairs of two kinds, some long and little-branched, others short and much-branched . . . . . 108. *L. proteicola.*

22. CORIACEIFOLII. *Umbels axillary, solitary or fascicled, peduncled or sessile, few-flowered; bract cupular; flowers pentamerous, gamopetalous. Calyx tubular. Corolla subcylindric in bud; tube split unilaterally with 5 deflexed pilose appendages alternating with the lobes, inserted above the middle of the*

tube; lobes erect or reflexed, longer than the tube. Stamens inserted at or above the base of the corolla-lobes; filaments involute, often transversely grooved on the outer surface, produced above into a tooth or rim in front of the anther; anthers linear, not divided transversely. Disc annular. Style not skittle-shaped; stigma capitate.—Odontella, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 259.

Corolla-tube without a suprabasal swelling.
Leaves very small, densely greyish-pilose in an adult state . . . . . 109. *L. Ghikæ.*
Leaves glabrous or nearly so in an adult state.
Corolla minutely and densely pilose outside . . 110. *L. kihuirensis.*
Corolla glabrous outside.
Young branchlets finely and densely warted . 111. *L. myrsinifolius.*
Young branchlets not warted.
Umbels shortly but distinctly peduncled . . 112. *L. glabratus.*
Umbels sessile.
Leaves 3–9 lin. long, $1\frac{1}{2}$–3 lin. broad, thickly coriaceous; nerves usually not visible . 113. *L. microphyllus.*
Leaves larger; nerves more or less visible.
Bract more or less pilose, sometimes minutely; calyx ciliate . . . 116. *L. Schimperi.*
Bract and calyx minutely papillate . . 115. *L. Kelleri.*
Bract and calyx glabrous . . . 114. *L. ugogensis.*
Corolla-tube with an ellipsoid suprabasal swelling . . 117. *L. sulphureus.*

23. RHAMNIFOLII. *Umbels axillary, solitary or fascicled; bract cupular; flowers pentamerous, gamopetalous. Corolla clavate above in bud, glabrous outside; tube very short, swollen above the base, not split unilaterally; lobes reflexed. Filaments filiform and straight below, thickened and involute above, produced into a tooth in front of the anther; anthers linear, not transversely divided. Disc annular. Style not skittle-shaped; stigma capitate.*

Only species . . . . . 118. *L. rhamnifolius.*

24. OBTECTIFLORI. *Umbels axillary, solitary or fascicled; bract unilaterally developed from a saucer-shaped base, sometimes foliaceous; flowers pentamerous, gamopetalous. Calyx short. Corolla capitate in bud, glabrous outside; tube slightly swollen at the base, split unilaterally; lobes erect. Filaments inflexed, produced above into a tooth in front of the anther; anthers oblong or linear, not transversely divided. Disc annular. Style not skittle-shaped; stigma capitate.*

Branchlets more or less tetragonal (at least in a young state); bract 2–6 times as long as the receptacle and calyx.
Bract narrowly boat-shaped, with a narrow dorsal wing or horn arising below the apex . . . . 119. *L. subulatus.*
Bract oblong, more or less flat, slightly apiculate, but without a dorsal appendage.
Leaves narrowly oblong, about 3 times as long as their breadth . . . . . 120. *L. latibracteatus.*
Leaves ovate or ovate-oblong, about $1\frac{1}{2}$–2 times as long as their breadth . . . . . 121. *L. usambarensis.*
Branchlets not tetragonal; bract equalling or slightly longer than the receptacle and calyx . . . . 122. *L. longipes.*

25. PURPUREIFLORI. *Heads axillary, solitary or fascicled, sessile, few-flowered; bract cupular; flowers pentamerous, gamopetalous. Calyx tubular.*

Corolla subcylindric in the bud, glabrous outside; tube split unilaterally, more or less swollen at the base; lobes erect. Filaments deflexed, produced above into a tooth in front of the anther; anthers linear, not transversely divided. Disc annular. Style more or less skittle-shaped; stigma capitate.—Dentimetula, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 265.

Leaves linear-lanceolate . . . . . 123. *L. dodoneæfolius.*
Leaves obovate to ovate-oblong.
Stamens inserted towards the middle of the corolla-lobes . . . . . 124. *L. glaucoviridis.*
Stamens inserted at the base of the corolla-lobes.
Leaves 1–2 in. long, 7–10 lin. broad; petioles shortly pubescent; bract minutely greyish-pilose outside . . . . . 125. *L. irangensis.*
Leaves $1\frac{3}{4}$–4 in. long; petioles glabrous.
Leaves thickly coriaceous; calyx ciliate with rusty hairs . . . . . 126. *L. Eylesii.*
Leaves thinly coriaceous.
Lateral nerves rather indistinct; corolla about 1 in. long . . . . . 127. *L. kilimandscharicus.*
Lateral nerves well marked; corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long . . . . . 128. *L. Tanganyikæ.*

26. CONSTRICTIFLORI. ***Umbels or heads axillary, solitary or fascicled, several-flowered; bract cupular or unilaterally developed from a cupular or saucer-shaped base. Calyx without an intramarginal ring. Corolla in bud with a distinct apical swelling; tube split unilaterally, with a distinct basal swelling; lobes much shorter than the tube, reflexed. Filaments deflexed or involute, tapering upwards, produced into a tooth in front of the anther. Anthers oblong or oblong-linear, not transversely divided. Disc annular. Style skittle-shaped; stigma capitate.***—Acrostephanus, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 267. Tapinanthus, *Van Tiegh. l.c. partly.*

Corolla glabrous outside.
Buds 5-horned at the apex.
Leaves sessile, amplexicaul . . . . 129. *L. coronatus.*
Leaves petioled.
Peduncle with an apical cup-shaped depression round which the flowers arise in a circle . . . . . 130. *L. Farmari.*
Peduncle without an apical cup.
Leaves rounded at the base . . . 131. *L. ogowensis.*
Leaves obtuse at the base . . . 147. *L. lanceolatus*, var. *corniculatus.*
Buds not horned.
Buds distinctly truncate or depressed-truncate.
Leaves linear-lanceolate, falcate; buds depressed-truncate . . . . . 132. *L. dependens.*
Leaves ovate to lanceolate.
Calyx not bent outwards; leaves subacute 133. *L. Kimuenzæ.*
Calyx slightly bent outwards by the expansion of the base of the corolla; leaves rounded at the apex; lateral nerves opposite, 2 pairs, the upper arising shortly above the base and running to the apex . . . . 134. *L. mangheensis.*

Calyx distinctly bent outwards and split by the expansion of the base of the corolla; lateral nerves neither opposite nor arising very near the base.
Leaves mostly cordate at the base, acute at the apex . . . . 135. *L. Poggei.*
Leaves mostly rounded at the base, obtuse or rounded at the apex . . 142. *L. constrictiflorus*, var. *karaguensis.*

Buds not distinctly truncate.
Corolla about $2\frac{3}{4}$ in. long, apical swelling strongly 5-winged . . . . . 136. *L. Preussii.*
Corolla about $1\frac{1}{2}$ in. long or less, apical swelling winged or not.
Apical swelling conspicuously winged.
Leaves cuneate into the base; corolla nearly $1\frac{3}{4}$ in. long . . . . 137. *L. alatus.*
Leaves rounded or obtuse at the base; corolla under $1\frac{1}{2}$ in. long.
Leaves $1–2\frac{1}{4}$ in. long; branchlets pallid . . . . . 138. *L. Pentagonia.*
Leaves $2\frac{1}{2}–3\frac{1}{2}$ in. long; branchlets dark brown . . . . . 139. *L. senegalensis.*
Apical swelling not conspicuously winged.
Corolla conspicuously speckled . . 140. *L. guttatus.*
Corolla not speckled.
Leaves very obliquely nerved, the uppermost pair of nerves running subparallel to the midrib.
Leaves ovate . . . . 141. *L. syringifolius.*
Leaves narrowly lanceolate . . 142. *L. constrictiflorus.*
Nerves less oblique, the uppermost pair not running subparallel to the midrib.
Leaves linear-lanceolate or linear-oblanceolate, attenuate into the base, 5–7 times as long as their breadth . . . . . 143. *L. globiferus*, var. *salicifolius.*

Leaves broader in proportion.
Leaves $1–3\frac{1}{4}$ ($4\frac{1}{4}$) in. long, $\frac{1}{4}–1\frac{1}{4}$ in. broad.
Leaves varying from elliptic-oblong to oblanceolate, cuneate or obtuse at the base . . . . . 143. *L. globiferus.*
Leaves varying from ovate-oblong or elliptic to lanceolate-oblong, rounded or obtuse at the base : . 143. *L. globiferus*, var. *verrucosus.*

Leaves 2–7 in. long, $\frac{3}{4}–4\frac{1}{2}$ in. broad.
Apical swelling of the bud ellipsoid . . . 144. *L. bangwensis.*

Apical swelling oblong or ovoid-oblong.
Leaves cordate at the base. 145. *L. kisantuensis.*
Leaves not cordate at the base.
Leaves acute; lateral nerves hardly visible . 146. *L. brazzavillensis.*
Leaves obtuse or rounded; lateral nerves distinct. 147. *L. lanceolatus.*

Corolla more or less pilose outside.
Buds distinctly truncate or depressed-truncate.
Peduncle with an apical cup-shaped depression round which the flowers arise in a circle.
Leaves sessile . . . . . 149. *L. Warneckei.*
Leaves petioled . . . . . 150. *L. truncatus.*
Peduncle without an apical cup.
Calyx suberect, about as broad as the receptacle . . . . . 151. *L. tschintschochensis.*
Calyx patulous, much broader than the receptacle.
Leaves ovate-oblong or lanceolate . . 152. *L. Buvumæ.*
Leaves broadly ovate or elliptic . . 153. *L. Buchneri.*
Buds not distinctly truncate.
Leaves pubescent or puberulous.
Leaves densely pubescent . . . . 154. *L. mollissimus.*
Leaves puberulous . . . . . 155. *L. malacophyllus.*
Leaves glabrous, or at most the nerves pilose.
Corolla villous . . . . . 156. *L. erianthus.*

Corolla shortly pilose.
Apical swelling of the bud obtusely pentagonal or subterete.
Young branchlets coarsely and densely rusty-pilose; leaves $2\frac{3}{4}$–4 in. long . 157. *L. Mechowii.*
Young branchlets very minutely pilose or glabrous; leaves $\frac{1}{2}$–$2\frac{3}{4}$ in. long.
Leaves sessile, broadly ovate, deeply cordate at the base . . . 158. *L. glaucophyllus.*
Leaves usually petioled, elliptic or ovate to lanceolate or oblanceolate, cuneate, obtuse or rounded at the base (very rarely subcordate) . 159. *L. namaquensis.*
Apical swelling of the bud narrowly 5-winged or conspicuously ribbed . . 160. *L. quinquangulus.*

Imperfectly known species of this section . { 148. *L. sessilifolius.* 161. *L. Thonningii.*

27. ERECTILOBI. *Umbels or heads axillary, solitary or fascicled, several-flowered; bract cupular or unilaterally developed from a cupular or saucer-shaped base. Calyx with or without an intramarginal ring. Corolla in bud with a distinct apical swelling; tube split unilaterally, with a distinct basal swelling; lobes much shorter than the tube, erect. Filaments deflexed or inflexed, tapering upwards, sometimes thickened at the apex, produced into a tooth in front of the anther. Anthers oblong or linear, not transversely divided. Disc annular. Style skittle-shaped; stigma capitate.*—Tapinanthus, *Van Tiegh. in Bull. Soc. Bot. France*, xlii. 267, *partly*.

Hard inner layer of the corolla-lobes not sharply demarcated below.
Flowers distinctly pedicelled.
Corolla densely pilose outside . . . . 162. *L. Molleri.*
Corolla very sparingly puberulous or glabrous.
Upper part of corolla-lobes keeled . . . 163. *L. buluwayensis.*
Corolla lobes not keeled.
Branchlets slender; leaves thinly coriaceous; umbels 2–3-flowered . . . . 164. *L. Fuellebornii.*
Branchlets stout; leaves rigidly coriaceous; umbels 2–6-flowered . . . . 165. *L. Gœtzei.*
Flowers sessile or subsessile.
Leaves 3–5-nerved from shortly above the base, coriaceous.
Leaves oblanceolate-oblong, $\frac{3}{4}$–$1\frac{1}{3}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad . . . . . 166. *L. Œhleri.*
Leaves elliptic, ovate or obovate, 2–$3\frac{1}{2}$ in. long, 1–2 in. broad . . . . . 167. *L. sansibarensis.*
Leaves penninerved.
Corolla 2 in. long . . . . . 168. *L. sakarensis.*
Corolla 1–$1\frac{1}{3}$ in. long.
Leaves coriaceous; nerves patulous, not visible on the upper surface . . . . 169. *L. laciniatus.*
Leaves thinly coriaceous or chartaceous; nerves oblique, visible on both surfaces.
Leaves rounded and somewhat unequal at the base . . . . . 170. *L. Keudelii.*
Leaves cuneate or subacute at the base.
Filament slightly thickened below the anther . . . . . 171. *L. elegantulus.*
Filament much thickened below the anther . . . . . 172. *L. Holtzii.*
Hard inner layer of the corolla-lobes sharply demarcated below.
Corolla glabrous outside.
Leaves linear-lanceolate . . . . . 173. *L. sambesiacus.*
Leaves elliptic to lanceolate.
Peduncle slender, equalling the pedicels . . 174. *L. nyasicus.*
Peduncle stout, much shorter than the pedicels 175. *L. polygonifolius.*
Corolla shortly pilose or pubescent outside.
Corolla-lobes strongly keeled.
Keel nearly straight; apical swelling of the bud oblong in outline . . . . . 176. *L. celtidifolius.*
Keel strongly arcuate; apical swelling of the bud broadly obovate or elliptic in outline . 177. *L. aurantiacus.*
Corolla-lobes slightly keeled.
Leaves cordate or subcordate at the base.
Leaves $\frac{3}{4}$–$2\frac{1}{4}$ in. long, bluish-green . . 178. *L. Cecilæ.*
Leaves $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, not bluish-green . 181. *L. Schweinfurthii.*
Leaves not cordate at the base.
Leaves chartaceous . . . . . 179. *L. dichrous.*
Leaves coriaceous.
Leaves ovate or ovate-oblong.
Leaves 1–2 in. long . . . . 180. *L. blantyreanus.*
Leaves $2\frac{1}{2}$–3 in. long . . . . 181. *L. Schweinfurthii.*

Leaves lanceolate . . . . . 182. *L. Keilii.*
Leaves linear-lanceolate . . . . 183. *L. Carsonii.*
Corolla-lobes not at all keeled . . . . 184. *L. Pungu.*
Corolla densely clothed with much-branched hairs . 185. *L. uhehensis.*
Corolla villous or villous-tomentose.
Corolla thinly villous, under $1\frac{1}{4}$ in. long . . 186. *L. villosiflorus.*
Corolla densely villous, $1\frac{1}{4}$–2 in. long.
Leaves cuneate or obtuse at the base.
Bract equalling the receptacle and calyx . 187. *L. Terminaliæ.*
Bract shorter than the receptacle and calyx.
Heads 1–2-flowered . . . . 188. *L. dekindtianus.*
Umbels 3- or more flowered.
Calyx $\frac{1}{2}$ lin. long; hairs on the corolla brownish in a dried state . . . 189. *L. tambermensis.*
Calyx $\frac{1}{6}$–$\frac{1}{4}$ lin. long; hairs on the corolla reddish in a dried state . . . 190. *L. heteromorphus.*
Leaves rounded or subtruncate at the base . 191. *L. musozensis.*

28. ISCHNANTHUS. *Umbels axillary, solitary or ternate; bract obliquely cupular, or unilaterally developed from a saucer-shaped or cupular base; flowers tetramerous, gamopetalous. Calyx distinct. Corolla more or less tetragonal especially in its lower part, clavate above in bud or not, glabrous outside or ciliate on the angles; tube usually oblong, split unilaterally; lobes erect or reflexed. Stamens usually inserted above the base of the corolla-lobes, rarely at the base; filaments involute, usually tapering upwards, produced into a tooth in front of the anther; anthers oblong or linear; connective produced above the cells or not. Disc annular, usually tetragonal and more or less lobed. Style not skittle-shaped; stigma capitate, often ellipsoid.*—Ischnanthus, *Van Tiegh. in Bull. Soc. Bot. France,* xlii. 260. Stephaniscus, *Van Tiegh. l.c.*

Corolla truncate in bud.
Leaves lanceolate, coriaceous; lateral nerves indistinct or not visible on the upper surface; receptacle and calyx obconical . . . . 192. *L. gabonensis.*
Leaves ovate or ovate-oblong, thinly coriaceous; lateral nerves distinct on the upper surface; receptacle and calyx campanulate . . . 193. *L. micrantherus.*
Corolla not truncate in bud.
Peduncle 2–3 times as long as the pedicels.
Receptacle and calyx twice as long as the bract.
Anthers under 1 lin. long . . . . 194. *L. parviflorus.*
Anthers $1\frac{1}{2}$ lin. long . . . . . 195. *L. luluensis.*
Receptacle and calyx as long as the bract . . 196. *L. Lecardii.*
Peduncle shorter than or equalling the pedicels.
Angles of the corolla conspicuously ciliate in bud . 197. *L. heckmannianus.*
Angles of the corolla not conspicuously ciliate.
Leaves distinctly 3-nerved from shortly above the base; umbels 4–6-flowered . . . 198. *L. triplinervius.*
Leaves penninerved.
Lateral nerves very oblique, running subparallel to the midrib.
Leaves cuneate into the base; receptacle and calyx $2\frac{3}{4}$ lin. long . . . . 202. *L. schubotzianus.*
Leaves obtuse or rounded at the base; receptacle and calyx hardly 1 lin. long . 203. *L. woodfordioides.*

Lateral nerves more or less patulous.
Anthers 6–35 times as long as the tooth.
Tooth $\frac{1}{20}$–$\frac{1}{12}$ lin. long . . . . 199. *L. Holstii.*
Tooth $\frac{1}{8}$–$\frac{1}{2}$ lin. long.
Anthers 3–$3\frac{1}{2}$ lin. long . . . 200. *L. ramulosus.*
Anthers $1\frac{7}{8}$ lin. long . . . 201. *L. kagehensis.*
Anthers about twice (rarely 4 times) as long as the tooth.
Leaves very distinctly petioled, petiole narrowly winged, margin of both blade and petiole crispate . . . 204. *L. Ehlersii.*
Margin of the petiole not crispate.
Corolla over 1 in. long.
Pedicels rusty-tomentellous . . 206. *L. muerensis.*
Pedicels glabrous.
Leaves $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, equal at the base; receptacle and calyx $\frac{5}{8}$ lin. long . . . . 207. *L. tenuifolius.*
Leaves $1\frac{3}{4}$–6 in. long, rather unequal at the base; receptacle and calyx 1 lin. long . . 208. *L. inæquilaterus.*
Corolla under 1 in. long.
Adnate part of the filament very densely glandular; anther about 4 times as long as the tooth . 209. *L. Swynnertonii.*
Adnate part of the filament not densely glandular.
Disc 1 lin. long or more . . 210. *L. Adolfi-Friderici.* = E. w.
Disc about $\frac{1}{2}$ lin. long or less.
Leaves cuneate or acute at the base.
Corolla about 6 lin. long . 211. *L. Bagshawei.*
Corolla about $9\frac{1}{2}$ lin. long . 212. *L. tschertscherensis.*
Leaves obtuse or more or less rounded at the base . . 213. *L. rugegensis.* = E. w.

Imperfectly known species of this section . . { 214. *L. viminalis.* = E. w. / 205. *L. lukwangulensis.*

29. DIPLOBRACTEATI. *Heads axillary, fascicled, subsessile, few-flowered, each flower inserted in a large cupular socket on the common peduncle; bract cupular; flowers tetramerous, gamopetalous. Calyx tubular. Corolla-tube split unilaterally, lobes erect. Filaments inserted above the base of the corolla-lobes, involute, grooved transversely, terminating abruptly in a ledge or rudimentary tooth in front of the insertion of the anther; anthers linear. Disc tetragonal, lobed. Style not skittle-shaped; stigma capitate.*

Only species of this section . . . . . 215. *L. kwaiensis.*

1. **L. Wildemanii,** *Sprague.* Young branchlets purplish-brown, finely and densely lenticellate, glabrous. Leaves opposite, oblanceolate-oblong, $2\frac{1}{2}$–$3\frac{3}{4}$ in. long, 10–13 lin. broad, obtusely acuminate, obtuse or rounded at the apex, subcuneate at the base, chartaceous or thinly coriaceous, glabrous, dull and with fairly prominent nerves on both surfaces; petioles 3–$3\frac{1}{2}$ lin. long. Racemes shorter or longer than the leaves, 2–$4\frac{1}{2}$ in. long; pedicels $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; bract broadly ovate,

obtuse, $\frac{3}{8}$ lin. long. Receptacle $1\frac{3}{8}$ lin. long. Calyx spreading. Corolla in bud very slender, narrowly 4-winged in its lower part, wings subtruncate above; petals $9\frac{1}{2}$ lin. long, lower part narrowly oblong, nearly 2 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, ribbed outside, minutely papillate inside, upper part subulate-linear, $7\frac{1}{2}$ lin. long, reflexed. Stamens 7 lin. long; filaments $2\frac{1}{2}$ lin. long, nearly glabrous; anthers $4\frac{1}{2}$ lin. long, connective produced $\frac{3}{8}$ lin. or more above the cells, cells about 27 in each row. Style $3\frac{1}{2}$ lin. long.

Lower Guinea. Lower Congo: Sanda District, near Oddu, *Gillet*, 3585!

2. **L. combretoides,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 128. Branchlets purplish-brown, densely lenticellate, glabrous. Leaves opposite, elliptic or elliptic-oblong, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, shortly and obtusely acuminate to the apex, cuneate into the base, chartaceous or thinly coriaceous, glabrous, dull and with fairly prominent nerves on both surfaces; petioles 3–4 lin. long. Racemes as long as or longer than the leaves, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long; pedicels $\frac{3}{4}$–1 lin. long; bract broadly ovate, obtuse, $\frac{3}{8}$ lin. long. Receptacle $\frac{3}{4}$–1 lin. long. Calyx spreading. Corolla in bud slender, acute, narrowly 4-winged in its lower part, wings subtruncate above; petals yellowish, 5 lin. long, lower part oblong, $1\frac{1}{8}$ lin. long, $\frac{3}{4}$–$\frac{7}{8}$ lin. broad, ribbed outside, densely papillate inside, upper part linear-subulate, $3\frac{3}{4}$ lin. long. Stamens $3\frac{1}{2}$ lin. long; filaments $\frac{3}{4}$ lin. long, glabrous; anthers $2\frac{3}{4}$ lin. long. Style $2\frac{1}{4}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 927. *L. Mannii*, var. *combretoideus*, Engl. in Engl. Jahrb. xx. 81. *Sycophila combretoides*, Welw. ex Van Tiegh. in Bull. Soc. Bot. France, xli. 486.

Lower Guinea. Angola: Pungo Andongo; on the island of Calemba, between Quisonde and Condo, in the River Cuanza, on *Ficus pendula*, Welw., *Welwitsch*, 4852!

3. **L. Mannii,** *Oliv. in Journ. Linn. Soc.* vii. 101. Branchlets purplish-brown, densely lenticellate, glabrous, $1\frac{1}{2}$–2 lin. in diam. 1 ft. below the apex. Leaves opposite, oblong-lanceolate, 2–3 in. long, $\frac{1}{2}$–1 in. broad, obtuse at the apex or shortly and obtusely acuminate, obliquely obtuse at the base, coriaceous, glabrous, upper surface glossy and with prominent nerves, lower surface dull, with much-raised midrib, lateral nerves hardly visible; petiole 2–3 lin. long. Racemes shorter than the leaves, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long; pedicels $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; bract broadly ovate, rounded, $\frac{1}{2}$ lin. long. Receptacle $1\frac{5}{8}$ lin. long. Calyx ascending. Corolla in bud rather stout, obtusely quadrangular in its lower part; petals $5\frac{1}{3}$ lin. long, lower part oblong, $1\frac{1}{4}$ lin. long, $\frac{7}{8}$ lin. broad, not ribbed, densely papillate inside; upper part linear-subulate, 4 lin. long, papillate on the inner edges, otherwise glabrous, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad at the base. Stamens over 3 lin. long; filaments $\frac{7}{8}$–1 lin. long, papillate-puberulous; anthers elongate-subulate, over 2 lin. long. Style $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long.—Hook. Ic. Pl. t. 1303; Engl. in Engl. Jahrb. xx. 81. *Sycophila Mannii*, Van Tiegh. in Bull. Soc. Bot. France, xli. 487.

Lower Guinea. Island of St. Thomas, at 5000 ft., on *Thecacoris manniana*, Muell. Arg., *Mann*, 1075!

4. **L. ternatus,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 128. Young branchlets purplish-brown, densely and finely lenticellate, glabrous, $1\frac{1}{4}$ lin. in diam. 1 ft. below the apex. Leaves ternate or alternate, lanceolate-oblong or oblanceolate-oblong, $1\frac{2}{3}$–$2\frac{2}{3}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, obtuse or subacute at the apex or shortly and obtusely acuminate, subcuneate at the base, coriaceous, margin reflexed, dull on both surfaces, midrib raised on the lower, lateral nerves inconspicuous; petiole 3–$3\frac{1}{2}$ lin. long. Racemes subequal to or longer than the leaves, 2–3 in. long; pedicels $1\frac{1}{2}$–2 lin. long; bract broadly ovate, rounded, hardly $\frac{1}{2}$ lin. long. Receptacle $\frac{7}{8}$ lin. long. Calyx patulous. Corolla in bud rather stout, obtusely quadrangular in its lower part; petals 4 lin. long, lower part broadly oblong, $1\frac{1}{4}$ lin. long, nearly 1 lin. broad, not ribbed, densely papillate inside, upper part linear-subulate, $2\frac{3}{4}$ lin. long. Stamens $2\frac{1}{2}$ lin. long; filaments $\frac{3}{8}$ lin. long, minutely and sparingly papillate on the inner surface; anthers $2\frac{1}{8}$ lin. long.—*Sycophila ternata*, Van Tiegh. in Bull. Soc. Bot. France, xli. 487.

Lower Guinea. Isla das Rolas [Turtle-dove Island], near the Island of St. Thomas, *Quintas*, 140!

5. **L. sublilacinus,** *Sprague.* Young branchlets purplish-brown, more or less lenticellate, glabrous, about 1 lin. in diam. 1 ft. below the apex. Leaves opposite, narrowly lanceolate-oblong, narrowly oblanceolate-oblong or narrowly elliptic-oblong, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{1}{4}$–1 (–$1\frac{1}{4}$) in. broad, obtuse or rounded at the apex, obtuse or narrowly cuneate into the base, chartaceous or thinly coriaceous, glabrous, dull on both surfaces, lateral nerves slightly raised on both surfaces, midrib fairly prominent especially on the lower surface; petiole 3–4 lin. long. Racemes shorter than or subequal to the leaves, about $2\frac{3}{4}$ in. long; pedicels about $\frac{3}{4}$ lin. long; bract broadly ovate, more or less truncate, hardly $\frac{1}{2}$ lin. long. Receptacle $1\frac{1}{2}$ lin. long. Calyx erect. Corolla in bud rather stout, acutely quadrangular in its lower part; petals pale lilac, $3\frac{1}{4}$ lin. long, lower part oblong, 1 lin. long, $\frac{5}{8}$ lin. broad, not obviously ribbed, minutely papillate inside, upper part linear-subulate, $2\frac{1}{4}$ lin. long. Stamens $1\frac{5}{8}$ lin. long; filaments $\frac{1}{2}$ lin. long, very minutely papillate on the inner surface; anthers $1\frac{1}{8}$ lin. long. Style $2\frac{1}{4}$ lin. long.—*L. rosaceus*, Engl. in Engl. Jahrb. xl. 521, as to *Staudt*, 757.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, *Staudt*, 757! Bipinde, *Zenker*, 2518!

6. **L. rosaceus,** *Engl. in Engl. Jahrb.* xl. 521, *with fig.* (*excl. Staudt*, 757). Branchlets purplish-brown, lenticellate, glabrous, $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex. Leaves opposite, ovate-oblong, elliptic-oblong or elliptic, $1\frac{1}{4}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, obtuse or rounded at the apex, rounded or obtuse and more or less oblique at the base, coriaceous, glabrous, dull and with slightly raised nerves on both surfaces; petiole 2–4 lin. long. Racemes about as long as the leaves, $1\frac{1}{2}$–2 in. long; pedicels hardly $\frac{1}{2}$ lin. long; bract broadly ovate, obtuse, $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Receptacle $1\frac{1}{4}$ lin. long. Calyx ascending. Corolla in bud rather stout, quadrangular in its lower part; petals

rose-coloured, $2\frac{1}{4}$ lin. long, lower part oblong, $\frac{7}{8}$ lin. long, $\frac{1}{2}$ lin. broad, not ribbed, densely papillate inside; upper part linear-subulate. Stamens $1\frac{1}{4}$ lin. long; filament $\frac{1}{4}$ lin. long, minutely papillate on the inner surface; anther 1 lin. long. Style $1\frac{3}{4}$ lin. long.—*L. Mannii*, var. *obtusifolius*, Engl. in Engl. Jahrb. xx. 81.

Upper Guinea. Cameroons: Yaunde, about 2700 ft., *Zenker*, 781! Great Batanga, *Dinklage*, 1112!

7. **L. Thomsonii,** *Sprague.* Leaves sessile, spathulate, $2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, coriaceous, glabrous, arising several together round the base of the peduncle. Racemes $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, secund, about 20-flowered; peduncle 5–6 lin. long; pedicels $\frac{1}{4}$–$\frac{3}{8}$ lin. long; bract very concave, ovate, obtuse, $\frac{1}{2}$ lin. long, ciliate. Receptacle campanulate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Calyx truncate, $\frac{1}{12}$ lin. long. Corolla in bud linear, slightly enlarged above, obtuse, quadrangular; petals linear, about 11 lin. long, papillate-ciliate, twisted near the middle, $\frac{1}{2}$ lin. broad between the insertion of the filament and the base, not plicate, $\frac{1}{4}$ lin. broad in the middle, $\frac{3}{8}$ lin. broad above. Stamens inserted 1–$1\frac{1}{4}$ lin. above the base of the petals, about 9 lin. long; filaments thickened and adnate for $\frac{1}{4}$ lin. at their base; anthers linear, $1\frac{1}{4}$ lin. long. Disc $\frac{1}{8}$ lin. high. Style nearly 1 in. long; stigma ellipsoid, $\frac{1}{6}$–$\frac{1}{4}$ lin. long.

Nile Land. Somaliland: Haudh, on *Balsamodendron* sp., *Thomson*, 23!

8. **L. Kirkii,** *Oliv. in Journ. Linn. Soc.* vii. 101. Young branchlets subterete or compressed, finely striate or not, glabrous or puberulous, older ones terete, lenticellate. Leaves opposite, suborbicular, elliptic-oblong, ovate or lanceolate, acute, obtuse or rounded at the apex, obtuse or rounded at the base, $1\frac{1}{4}$–$3\frac{1}{4}$ in. long, $\frac{1}{2}$–$2\frac{1}{4}$ in. broad, coriaceous, glabrous, margin undulate or crenate; petiole $2\frac{1}{2}$–7 lin. long. Racemes terminal or terminal and axillary, 2–6 in. long; rhachis glabrous or minutely and rather densely pilose; pedicels spreading, $1\frac{1}{4}$–$2\frac{3}{4}$ lin. long, glabrous or pilose; bract suborbicular, very concave, $\frac{1}{2}$ lin. in diam., ciliate. Receptacle campanulate, about $\frac{3}{4}$ lin. long. Calyx $\frac{1}{12}$–$\frac{1}{8}$ lin. long or less. Corolla in bud obtuse, slightly curved upwards, quadrangular, narrowed towards the middle; petals red, orange, yellow or yellowish-green, reflexed above the insertion of the stamens, $2\frac{1}{8}$–$4\frac{1}{4}$ lin. long, lower part $\frac{7}{8}$–$1\frac{5}{8}$ lin. long, $\frac{1}{2}$–1 lin. broad, plicate within. Stamens arising at the top of the plicate part of the petal which is sometimes produced upwards as a narrow flap; filaments $\frac{1}{4}$–1 lin. long; anthers linear or oblong-linear, $\frac{3}{4}$–$1\frac{3}{4}$ lin. long. Disc $\frac{1}{12}$–$\frac{1}{6}$ lin. high. Style $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long. Berry red or yellow.—Hook. Ic. Pl. t. 1309; Engl. in Engl. Jahrb. xx. 129; Pfl. Ost-Afr. C. 167; Hiern in Cat. Afr. Pl. Welw. i. 935. *Acrostachys Kirkii*, Van Tiegh. in Bull. Soc. Bot. France, xli. 504.

Nile Land. British East Africa: Witu; Kau, *Thomas*, 152! Takaunga, *Thomas*, ser. ii. 78! between Witu and Mombasa, *Whyte!* Mombasa, *Wakefield!*

Lower Guinea. Angola: Mossamedes; by the River Maiombo, on *Cordia* sp., *Welwitsch*, 4872! 4873! 4874! Huilla; near the Bruco rivulet, at the base of the Chella mountains, on *Copaifera Mopane*, Kirk, *Welwitsch*, 4878!

Mozamb. Distr. German East Africa: Moschi District; south-east of Simangori Mountain, *Uhlig*, 400! Wilhelmstal District; Pare Mountains, *Uhlig*, 861! Usambara; Nyika Country, *Holst*, 2406! Tanga District; Amboni, *Holst*, 2820! 2820A! Muhesa, *Busse*, 2152! Pangani, *Stuhlmann*, 88! Bagamoyo, parasitic on various trees, *Hildebrandt*, 1274! *Stuhlmann*, 7265! Kingani River, *Hildebrandt*, 1141! Dar-es-Salam, *Kirk*, 47! *Holtz*, 348! *Stuhlmann*, 131! 7321! 7480! 7829! 7831! Usaramo; Mengwa, *Stuhlmann*, 8616! Lindi District; Ruaha-Mtua, *Braun*, 1255! Rovuma Bay, *Kirk!*

A widely spread and polymorphic species. Engler (in *Engl. Jahrb.* xx. 129) distinguishes the following varieties: var. *ciliatus*, characterised by ovate leaves and ciliate petals; and var. *populifolius*, with broadly ovate or suborbicular leaves, cordate at the base. A careful study of the very rich material of *Loranthus Kirkii* preserved in the Berlin Herbarium has resulted, however, in my being unable to recognise any distinct varieties, those established by Engler being connected with one another and the type by numerous transitional forms. The anther is most frequently 2–3 times as long as the filament: in *Uhlig*, 861, it is 4–5 times as long as the filament; and in *Stuhlmann*, 131, it is equal to or slightly shorter than the filament. The size of the flowers and the shape of the leaves also vary greatly.

A specimen which may prove to be a distinct variety or species when flowers are known was collected by Welwitsch (4871) in Bumbo, Angola, in the heart of the Chella mountains, parasitic on *Combretaceæ*. It has blackish-purple berries.

9. **L. huillensis**, *Engl. in Engl. Jahrb.* xl. 539. Branchlets greenish, striate, glabrous, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, internodes about 2 in. long. Leaves opposite, pale green in a dried state, ovate-oblong or elliptic, obtuse or rounded at the apex, rounded at the base, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous; lateral nerves 3–5 on each side, arcuate-ascending, raised on both surfaces; petiole $3\frac{1}{2}$–4 lin. long. Raceme terminal, 5–6 in. long; pedicels $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, pale green; bract almost semicircular, very concave, finely ciliate, hardly $\frac{3}{4}$ lin. long, 1 lin. broad. Receptacle campanulate, $1\frac{1}{4}$ lin. long. Calyx nearly obsolete. Corolla in bud subacute, acutely quadrangular, oblong-linear from an ovoid base, $6\frac{1}{2}$ lin. long; petals reflexed above the insertion of the stamens, lower part broadly ovate-oblong, $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. broad, not plicate within, upper part lanceolate-linear, acute, 6 lin. long, $\frac{7}{8}$ lin. broad. Stamens arising from a small fleshy flap at the apex of the lower part of the petals; filaments $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; anthers linear, $3\frac{1}{2}$ lin. long. Disc $\frac{1}{8}$–$\frac{1}{6}$ lin. high. Style nearly 3 lin. long.

Lower Guinea. Angola: Benguella; Huilla, *Antunes*, 267!

10. **L. periclymenoides**, *Engl. & Krause in Engl. Jahrb.* xliii. 400. Young branchlets terete, smooth, dirty orange-yellow, glabrous, very slightly glossy, the uppermost internodes 1–$1\frac{1}{2}$ lin. in diam. at the middle, older branches $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., bark dark grey, longitudinally cracked; nodes much swollen, internodes 1–5 in. long. Leaves opposite, sessile, ovate-oblong or elliptic-oblong, rounded at apex and base, $3\frac{1}{4}$–6 in. long, $1\frac{1}{2}$–$3\frac{1}{4}$ in. broad, rigidly coriaceous, glabrous, upper surface slightly glossy, lower surface dull; lateral nerves rather oblique, 4–5 on each side of the midrib, slightly raised on the upper surface, hardly

visible on the lower. Umbels 12–18-flowered; peduncle about $\frac{1}{2}$ in. long; pedicels 1–$1\frac{1}{4}$ lin. long; bract ovate-cupular, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together subcylindric, the former $\frac{3}{4}$ lin. long. Calyx cupular, $\frac{7}{8}$ lin. long, shortly and irregularly 4-lobed; lobes subtruncate or emarginate. Corolla rounded at the apex in bud, carmine-red; petals narrowly linear, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{8}$ lin. broad near the middle, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad near the base, ventral flap inserted about $1\frac{1}{2}$ lin. above the base, $\frac{1}{4}$–$\frac{3}{8}$ lin. long, emarginate or subtruncate. Stamens inserted 8–$8\frac{1}{2}$ lin. above the base of the petals; filaments linear; 5 lin. long, grooved; anthers very narrowly linear, 2–3 lin. long. Disc $\frac{1}{8}$–$\frac{1}{6}$ lin. high.

Upper Guinea. Cameroons: on islands in the Mbiave Rapids, *Zenker*, 3406!

11. **L. undulatus,** *E. Meyer in Drège, Zwei Pfl. Docum.* 200, *name only.* Branchlets slender, patulous, rather nodose, inconspicuously lenticellate, glabrous. Leaves opposite, sessile, linear-oblong, ovate-oblong, ovate or suborbicular, obtuse or rounded at the apex, cordate at the base, $\frac{1}{2}$–2 in. long, $2\frac{1}{2}$–11 lin. broad, coriaceous, glabrous, faintly 3-nerved. Umbels terminating leafy short-shoots, 2-flowered; peduncle $1\frac{1}{2}$–3 lin. long; pedicels stout, 2–3 lin. long; bract unilateral, broadly oblong or ovate-oblong, truncate, $\frac{3}{4}$–$1\frac{1}{2}$ lin. long, thickly keeled, ciliate above. Receptacle obconical, 4–5 lin. long. Calyx ascending, $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Petals about $1\frac{3}{4}$ in. long, subspathulate-linear above, obtuse, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. broad, $\frac{3}{4}$–$\frac{7}{8}$ lin. broad in the middle, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. broad in the lower third, with 4 pairs of oblique folds arising from the adnate part of the filament. Filaments inserted 4 lin. above the base of the petals. Style with a double bend shortly above the base, minutely pilose above; stigma depressed-capitate, $\frac{5}{8}$ lin. in diam.—Harv. in Harv. & Sond. Fl. Cap. ii. 577; Engl. in Engl. Jahrb. xx. 130; Schinz in Bull. Herb. Boiss. iv. App. iii. 54. *Plicosepalus undulatus,* Van Tiegh. in Bull. Soc. Bot. France, xli. 504, 540.

Lower Guinea. German South-west Africa: Amboland; South-east Ondonga, at Grootfontein, *Schinz,* 283! Hereroland, *Nels!*

Also in South Africa.

12. **L. sagittifolius,** *Sprague.* Branchlets slender, spreading, lenticellate, glabrous. Leaves opposite, sessile, some elliptic, obovate-elliptic or elliptic-oblong, rounded at the apex, obtuse, rounded or subcordate at the base, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, 4–14 lin. broad, thinly coriaceous, glabrous, 3–5-nerved, nerves very oblique, slightly raised, others ovate-oblong or narrowly oblong, obtuse or rounded at the apex, sagittate at the base, $\frac{1}{2}$–$1\frac{1}{3}$ in. long, 3–4 lin. broad. Umbels solitary, 3–5-flowered, usually leafy at the base; peduncle $2\frac{1}{2}$–5 lin. long; pedicels slender, $2\frac{1}{2}$–4 lin. long; bract saucer-shaped with a shortly ovate dorsal lobe, strongly and acutely umbonate, umbo $\frac{1}{4}$–$\frac{3}{8}$ lin. long, dorsal margin $\frac{1}{2}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle cupular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Calyx patulous, $\frac{5}{8}$ lin. long. Petals $1\frac{2}{3}$–$1\frac{3}{4}$ in. long or more, oblanceolate-linear above, subacute,

$\frac{5}{8}$–$\frac{3}{4}$ lin. broad, under $\frac{1}{2}$ lin. broad at the middle, much broadened downwards from 2 lin. below the insertion of the filaments, about $1\frac{1}{2}$ lin. broad near the base, with 4–5 pairs of oblique folds arising from the adnate part of the filament. Filaments inserted $3\frac{1}{2}$–7 lin. above the base of the petals, 9–10 lin. long, flattened, tapering slightly upwards; anthers linear, $4\frac{1}{2}$–5 lin. long, tapering slightly downwards. Style without a double bend near the base; stigma capitate, $\frac{3}{8}$ lin. in diam.—*L. undulatus*, var. *sagittæfolius*, Engl. Pfl. Ost-Afr. C. 167, t. 18, figs. A–C; Engl. Jahrb. xxx. 304.

Nile Land. British East Africa: parasitic on many trees in the coast districts, *Battiscombe*, 162! Kibwezi, on Leguminosæ, *Scheffler*, 338! Kapte Plains, *Gregory!* Gondeona, on the Umba River, *Kässner*, 116!

Mozamb. Distr. German East Africa: Usambara; Gombelo, *Holst*, 2173! Masheua, *Holst*, 8835! Muoa, *Holst*, 3103! Kilimanjaro Region; Lake Jalla, *Volkens*, 337! Usafua; lower slopes of Poroto Mountain, 5600 ft., on *Acacia* sp., *Goetze*, 1038.

13. **L. curviflorus,** *Benth. ex Oliv. in Hook. Ic. Pl. t.* 1304. Branches spreading; branchlets slender, more or less nodose, glabrous, soon lenticellate. Leaves opposite, subopposite or alternate, linear, oblanceolate-linear or oblanceolate (more rarely obovate-oblong), obtuse or rounded at the apex, cuneate at the base, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, 2–5 lin. broad, rigidly coriaceous, glabrous, 3–5-nerved, nerves indistinct or hidden; petiole $\frac{1}{2}$–1 lin. long. Umbels solitary, 4–6-flowered; peduncle 1–3 lin. long; pedicels 2–4 lin. long; bract elliptic-cupular or ovate-cupular, dorsal margin $\frac{5}{8}$ lin. long, lateral $\frac{1}{8}$ lin., ventral $\frac{1}{4}$–$\frac{3}{8}$ lin. long, more rarely saucer-shaped with a small dorsal lobe, conspicuously umbonate, umbo obtuse or horned. Receptacle campanulate or urceolate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Calyx patulous, $\frac{1}{4}$–$\frac{3}{8}$ lin. long. Petals $1\frac{3}{4}$ in. long, reflexed above the middle, with 4–8 (usually 5) pairs of oblique folds arising from the adnate part of the filament. Filaments inserted 4–5 lin. above the base of the petals, 6–10 lin. long; anthers linear, slightly tapering downwards, 4–5 lin. long. Style broadened into the stigma in the uppermost $1\frac{1}{4}$–$1\frac{1}{2}$ lin.; stigma depressed-capitate, $\frac{3}{8}$–$\frac{1}{2}$ lin. in diam.—Engl. in Engl. Jahrb. xx. 130; Engl. Pfl. Ost-Afr. C. 167; Schweinf. et Volk. in Ghika, Pays des Somalis, 200; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 150. *Plicosepalus curviflorus*, Van Tiegh. in Bull. Soc. Bot. France, xli. 504, 540.

Nile Land. Nubia; coast region, *Bent!* Eritrea: Farach Mountain, near Ailet, 1700 ft., *Schweinfurth*, 450; Aigede Valley, below Aidereso, 4300 ft., *Schweinfurth*, 1836. Abyssinia, *Plowden!* Somaliland: Golis Range, *Drake-Brockman*, 193! 195! 197! Burka Region, *Ghika;* Brava (Barava), *Kirk!* Habrawal; Ania, *Donaldson-Smith!*

Mozamb. Distr. German East Africa: Usambara; Doda, *Holst*, 2936! Amboni, *Holst*, 2726! Nyika Country, *Wakefield!*

Also in Arabia.

14. **L. Fauroti,** *Franch. in Journ. de Bot.* i. 135. Branches virgate, bark dirty-grey, lenticellate. Leaves shortly petioled, linear-oblong, obtuse, hardly more than 1 in. long, arising from the older nodes.

Umbels 3-flowered, solitary or 2–4 together; peduncle 2–2½ lin. long, hardly longer than the pedicels; bract deltoid-cupular, acute, ciliate, umbonate on the back. Flowers reddish, about 1 in. long. Calyx spreading. Anthers very shortly bidentate at the apex.—*Plicosepalus Fauroti*, Van Tiegh. in Bull. Soc. Bot. France, xli. 504, 540.

Nile Land. Somaliland, at the wells of Meraya, *Révoil.*

Also in Arabia.

Perhaps a mere form of *L. curviflorus.* I have seen no specimen.

15. **L. kalachariensis,** *Schinz in Bull. Herb. Boiss.* iv. *App.* iii. 53 (1896). Branchlets slightly lenticellate, glabrous. Leaves opposite or alternate, oblong, oblong-linear or linear, rounded at the apex, cuneate, obtuse or rounded at the base, 1½–3⅓ in. long, 5–10 lin. broad, rigidly coriaceous, glabrous, 3–5-nerved; petiole ½–2½ lin. long. Umbels solitary or fascicled, sessile or peduncled, 2–6-flowered; peduncle up to 5 lin. long; pedicels 5–6 lin. long; bract saucer-shaped with an ovate or oblong limb, dorsal margin ⅝–1½ lin. long, strongly umbonate or keeled, ventral margin ⅙ lin. long. Receptacle obconical, 2–3 lin. long. Calyx ascending, ½–⅝ lin. long. Petals 2¼ in. long or less, reflexed below the middle, coiling into loose spirals, much broadened into the base, middle part linear, upper part linear-oblanceolate, basal part with 4–8 (usually 5) pairs of oblique folds arising from the adnate part of the filament. Filaments inserted 3½–11 lin. above the base of the petals, about 1 in. long, tapering slightly upwards; anthers linear, 3½–7 lin. long. Stigma capitate, ⅝ lin. in diam.—*L. Fleckii*, Schinz, l.c. *L. Pentheri*, Schlechter in Journ. Bot. 1898, 376. *L. Dinteri*, Schinz in Bull. Herb. Boiss. 2me sér. i. 869 (1901). *L. splendens*, N. E. Br. in Kew Bulletin, 1909, 136. *L. curviflorus*, Schinz, Pl. Menyharth. 42; Rendle in Journ. Bot. 1905, 52; not of Benth.

Lower Guinea. Angola: Benguella, *Gossweiler*, 1693! on the Kutehi River, on *Burkea africana*, Hook., *Gossweiler*, 3951! German South-west Africa: Hereroland; between Ubib and Modderfontein, *Fleck*, 416! Pot Mine, *Fleck*, 404! Koiras, *Fleck*, 107! Windhoek, *Dinter*, 306! Grootfontein, *Dinter*, 698!

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Boruma, *Menyharth*, 940! British Central Africa: Nyasaland; Namasi, *Cameron*, 3! Rhodesia; Buluwayo, *Kolbe*, 3184! *Rand*, 392! *Chubb*, 313! *Eyles*, 78! Tuli River, *Penther*, 1626! Ngamiland: Lake Ngami, *Fleck*, 314A! Okavango Valley, *Lugard*, 232! *Fleck*, 307!

Usually parasitic on *Acacia horrida*, Willd.; also on a *Euphorbia* (Fleck, 416).

16. **L. Acaciæ,** *Zucc. Pl. Nov.* 249, *t.* 2, *fig.* 3 (1837–43). Young branchlets slender, smooth, glabrous, brownish, slightly glossy, older ones more or less rugose, lenticellate. Leaves opposite or suboppposite, straight or slightly arcuate, oblong, elliptic-oblong or lanceolate-oblong, obtuse or rounded at the apex, cuneate or obtuse at the base, 1½–4½ in. long, 4–15 lin. broad, rigidly coriaceous, glabrous, 3–5-nerved; petioles 1–5 lin. long. Umbels axillary, solitary or fascicled, 2-flowered; peduncle 1–2 lin. long; pedicels 2–3 lin. long; bract saucer-shaped, with a shortly ovate or oblong subtruncate dorsal lobe, sometimes

2-lipped with a small ventral lobe, dorsal margin $\frac{3}{4}$–1 lin. long, umbonate or obtusely keeled, ventral margin $\frac{1}{8}$–$\frac{1}{2}$ lin. long. Receptacle and calyx together cupular or suburceolate, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long. Calyx deeply lobed, $\frac{5}{8}$–$\frac{7}{8}$ lin. long. Corolla about $1\frac{1}{2}$ in. long; tube $2\frac{1}{2}$–3 (more rarely 5) lin. long, with 5 ascending membranous flaps inserted on the adnate part of the filaments about 1 lin. above the base of the tube, flaps broadly ovate or oblong, rounded, $\frac{3}{4}$ lin. long, $\frac{5}{8}$–$\frac{3}{4}$ lin. broad at the base; lobes oblanceolate-linear, broadened into the base, about $1\frac{1}{4}$ in. long, with about 5 oblique folds arising on each side of the adnate filaments, the lowermost 1 lin. of each lobe reduplicate-valvate, thus forming 5 gibbosities in bud. Filaments inserted $3\frac{1}{2}$–4 lin. above the base of the corolla-lobes, 5 lin. long; anthers linear, 4–$4\frac{1}{2}$ lin. long. Disc about $\frac{1}{4}$ lin. deep. Stigma ovoid, hardly $\frac{3}{4}$ lin. long.—Oliv. in Trans. Linn. Soc. xxix. 80; Engl. Hochgebirgsfl. Trop. Afr. 198; Engl. in Engl. Jahrb. xx. 130; Penzig in Atti Congr. Bot. Genova, 1892, 358; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 151; Pax in Engl. Jahrb. xxxix. 616. *L. gibbosulus*, A. Rich. Tent. Fl. Abyss. i. 342. *L. lætus*, R. Br. in Salt, Abyss. App. 64, name only. *L. venustus*, Fenzl ex Van Tiegh. in Bull. Soc. Bot. France, xlii. 258, name only. *Tapinostemma Acaciæ*, Van Tiegh. l.c. *T. gibbosulum*, Van Tiegh. l.c. *T. venustum*, Van Tiegh. l.c.

Nile Land. Eritrea: various localities, 4300–7300 ft., *Schweinfurth*, 183! 651, 791, 1218; *Schweinfurth & Riva*, 719! 799! 929! 1169! *Beccari*, 14! *Penzig*. Abyssinia: near Adowa, *Schimper*, 256! Samen; by the Ataba River, near Abena, *Steudner*, 171! Shabagenne, 5500 ft., *Schimper*, 820! Amhara; Bida, Dildi, 5500–6000 ft., on *Acacia Seyal*, Delile, *Rosen*. Sudan: White Nile; near Gebeleni, *Broun*, 43! Njemati, *Schweinfurth*, 1027! Blue Nile; near Wad-el-Gazal, on *Acacia Seyal*, Delile, *Muriel*, L 14! Æthiopia, *Kotschy*, 57! 286! Kordofan; Melbes, *Pfund*, 310! *Kotschy*, 23! Darfur: Surutj District; Wadi Haschaba, *Pfund*, 783! Uganda: Nile banks, between 2° and 9° N. lat., generally parasitic on *Acacia Seyal*, Delile, *Grant!*

In Eritrea, according to Schweinfurth (l.c.), *L. Acaciæ* grows principally on species of *Acacia*—*e.g.*, *A. etbaica*, Schweinf.—but is also parasitic on trees belonging to the most widely separated orders.

17. **L. nummulariæfolius,** *Franch. in Journ. de Bot.* i. 135, *in obs.* Glabrous, glaucous-pruinose. Branchlets slender, fuscous. Leaves subopposite, sessile, small, orbicular or broadly ovate, cordate and amplexicaul at the base, thick. Pedicels short; bract obliquely cupular, obscurely trilobed, the middle lobe larger than the lateral ones, rounded. Calyx very short, truncate. Corolla over 1 in. long, reddish, glabrous, "divided to a fourth part" (? from the base); lobes linear, narrowly spathulate, reflexed about the middle. Filaments glabrous; anthers linear, adnate, connective slightly produced above the cells, obtuse.—*Tapinostemma nummulariifolium*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 258.

Nile Land. Italian Somaliland: Modie Valley, *Révoil*.

Known to me only from Franchet's very imperfect description. As Van Tieghem has placed it in the genus *Tapinostemma*, it is probably allied to *L. Acaciæ*.

18. **L. kamerunensis,** *Engl. in Engl. Jahrb.* xl. 525. Branchlets stout, 3–3½ lin. in diam. 1 ft. below the apex, glabrous in the adult state, dark brown, rather smooth, sparingly and inconspicuously lenticellate; internodes ½–1¼ in. long. Leaves opposite, subopposite or alternate, elliptic, elliptic-oblong or more rarely obovate-oblong, rounded at the apex, rounded or obtuse at the base, more rarely cuneate, 2½–4½ in. long, 1⅓–2¼ in. broad, thickly coriaceous, very shortly stellate-puberulous in a young state, soon becoming glabrous; lateral nerves 4–5 on each side, visible on both surfaces; petiole 6–10 lin. long. Flowers subsessile; pedicel ½ lin. long; bract ovate, subacute, 1½–2 lin. long. Receptacle cupular, 3 lin. long. Corolla 3–3½ in. long, slightly constricted above the base, split unilaterally, very shortly rusty-pubescent or puberulous outside; lobes apparently erect, spathulate-linear, 12 lin. long, 1½–2 lin. broad. Filaments linear; anthers linear, 2½ lin. long. Berry ellipsoid, 7–8 lin. long, 5½–6½ lin. in diam., crowned by the persistent cup-like calyx, which is 1–1½ lin. deep.

Upper Guinea. Cameroons, *Winkler*, 1067!

19. **L. leonensis,** *Sprague.* Young branchlets rusty-tomentose or pubescent with much-branched hairs, older ones glabrous. Leaves oblong-lanceolate or elliptic-oblong, shortly acuminate to an obtuse apex, rounded at the base, 1½–4½ in. long, ¾–1¾ in. broad, coriaceous, dull above and glabrous except in a young state, rusty-tomentose or pubescent beneath; petioles 1–4 lin. long. Fascicles dense, many-flowered, rusty-tomentose; pedicels ¾ lin. long; bract deltoid-ovate, ⅞–1 lin. long, glabrous within. Receptacle ⅝–⅞ lin. long. Calyx ⅜–⅝ lin. long, ciliate with hairs ¼ lin. long. Corolla 1½ in. long, rusty-tomentose outside with spreading verticillate-branched hairs about ½ lin. long, reflexed above a basal swelling, which is 1½ lin. long, 1 lin. in diam.; tube minutely glandular within; lobes patulous or spreading, spathulate-linear, about 5½ lin. long. Filaments inserted about 1 lin. above the base of the corolla-lobes, tapering upwards, 2½–2¾ lin. long, ¼ lin. broad at the base, connate ½–¾ lin. above, glabrous; anthers linear, 1–1¼ lin. long; cells 6–7 in each vertical row. Disc densely rusty-pilose, hairs stiff, erect, ¼–⅜ lin. long. Style glabrous, skittle-shaped above, neck 1–1⅛ lin. long; stigma ellipsoid, ¼ lin. long.

Upper Guinea. Sierra Leone: Bagroo River, *Mann!* Oldfield's Farm, on *Psidium pyriferum,* Linn., *Barter!* Wallia, Scarcies Valley, *Scott-Elliot,* 4578! Talla Hills, near Lumbaraya, *Scott-Elliot,* 4997! Falaba, by Dantilia River, *Scott-Elliot,* 5294! near Kabusa (Limba), *Scott-Elliot,* 5472!

20. **L. nigritanus,** *Hook. f. in Hook. Niger Fl.* 376. Young branchlets rusty-tomentose with much-branched hairs, older ones glabrous. Leaves ovate or ovate-oblong, obtuse or rounded at the apex, rounded or subcordate at the base, 1½–3 in. long, 1–1¼ in. broad, coriaceous, dull above and glabrous except in a young state, rusty-tomentose beneath; petioles 2½–5 lin. long. Heads sessile, dense, rusty-villous-tomentose; bract spathulate-oblong, 2–2½ lin. long, accrescent, upper part densely pubescent within. Receptacle ¾–⅞ lin. long. Calyx

about $\frac{1}{2}$ lin. long, ciliate with hairs about $\frac{1}{2}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, split unilaterally, rusty-tomentose outside with ascending verticillate-branched hairs 1–$1\frac{1}{4}$ lin. long or less, more or less reflexed above a basal swelling about $1\frac{1}{2}$ lin. long; lobes spreading or reflexed, spathulate-linear, $4\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, linear, slightly broadened towards the base, 3 lin. long, connate $\frac{3}{4}$ lin. above at an early stage; anthers linear, $\frac{3}{4}$–$\frac{7}{8}$ lin. long; cells 4–5 in each vertical row. Disc densely rusty-pilose, hairs less than $\frac{1}{4}$ lin. long. Style skittle-shaped above, neck $\frac{3}{4}$ lin. long; stigma ellipsoid, $\frac{3}{8}$–$\frac{1}{2}$ lin. long.—*L. hirsutissimus,* Engl. in Engl. Jahrb. xx. 100, t. 1, fig. E; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132.

Upper Guinea. Lagos: Abeokuta, parasitic on *Melia* sp., *Barter,* 3383! *Harrison,* 9! *Rowland!* Nigeria, *McWilliam!* Northern Nigeria: Mount Patteh, *Vogel,* 170! Cameroons: Yaunde, *Zenker,* 594!

21. **L. emarginatus,** *Engl. in Engl. Jahrb.* xx. 100. Young branchlets rusty-tomentose with verticillate-branched hairs, older ones glabrescent, lenticellate. Leaves sessile, oblong or ovate-oblong, emarginate at the apex, cordate at the base, 2–$5\frac{1}{2}$ in. long, 1–$2\frac{3}{4}$ in. broad, brown in a dried state, glabrous and minutely wrinkled above (stellate-pubescent in a young state), minutely and densely stellate-pubescent beneath. Umbels fascicled in the axils, about 3-flowered, rusty-pubescent; peduncle 1 lin. long; pedicels $\frac{1}{2}$–$\frac{5}{8}$ lin. long; bract oblong, $\frac{3}{4}$ lin. long, hardly $\frac{3}{8}$ lin. broad, glabrous inside. Receptacle $\frac{5}{6}$ lin. long. Calyx $\frac{1}{6}$ lin. long. Corolla $1\frac{1}{4}$ in. long, split unilaterally, rusty-pubescent outside with branched hairs, narrowed above a basal ovoid swelling 2 lin. long, then gradually widened upwards; tube glandular within; lobes erect, spathulate, $3\frac{1}{2}$ lin. long. Filaments inserted almost at the base of the corolla-lobes, linear, $2\frac{1}{2}$–3 lin. long; anthers oblong, $\frac{1}{2}$ lin. long; cells 2 in each of the outer, and 3 in each of the inner rows. Disc very small, rusty-pilose. Style glabrous, skittle-shaped above, neck $\frac{1}{2}$ lin. long; stigma capitate, hardly $\frac{1}{4}$ lin. in diam.—*L. Engleri,* Hiern in Cat. Afr. Pl. Welw. i. 930.

Lower Guinea. Angola; Pungo Andongo; in the Præsidium, parasitic on sapotaceous plants, rather rare, *Welwitsch,* 4849!

Loranthus emarginatus, Sw. (a West Indian plant), belongs to *Phthirusa,* which is now treated as generically distinct from *Loranthus;* hence Engler's name for the above species need not be changed.

L. cinnameus, Hiern in Cat. Afr. Pl. Welw. i. 930 (*Welwitsch,* 4846!), was collected in the same locality as *L. emarginatus,* and is probably a mere state of that species. The type specimen of *L. cinnameus* has oblong-lanceolate leaves, obtuse or rounded at the apex, 3–5 in. long, 1–$1\frac{3}{4}$ in. broad, glossy on the upper surface; in other respects it agrees closely with the type of *L. emarginatus.*

22. **L. nitidulus,** *Sprague.* Young branchlets rusty-pubescent with much-branched hairs, soon glabrous. Leaves narrowly lanceolate-oblong, obtuse at the apex, obtuse or rounded at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. broad, coriaceous, glabrous and slightly shining above, rusty-tomentose beneath; petioles 5–7 lin. long. Umbels 4-flowered,

rusty-pubescent; peduncle $1\frac{1}{4}$ lin. long; pedicels $\frac{3}{4}$–1 lin. long; bract ovate-oblong, 1 lin. long, suberect, glabrous inside. Receptacle 1 lin. long. Calyx about $\frac{1}{4}$ lin. long, obscurely lobed, shortly ciliate. Corolla $1\frac{1}{4}$-$1\frac{1}{2}$ in. long, straight, without basal swelling, rusty-pubescent outside with stellate hairs, of which the rays are directed upwards and downwards; tube glandular inside; lobes spathulate. Anthers oblong, $\frac{3}{4}$ lin. long; cells 4 in each vertical row. Disc small, rusty-pilose. Style glandular, skittle-shaped above, neck $\frac{5}{8}$ lin. long; stigma capitate, $\frac{3}{8}$ lin. in diam. Berry ellipsoid, $3\frac{1}{2}$ lin. long, rusty-pubescent.

Upper Guinea. Fernando Po: Fernando Po Mountain, 7000 ft., *Mann*, 2346!

23. **L. discolor,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 131, *name only.* Young branchlets rusty-tomentose with verticillate-branched hairs, older ones puberulous. Leaves oblong or ovate-oblong, obtuse at the apex, rounded and subequal at the base, 2–$3\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{3}$ in. broad, glabrous and dull above, rusty-tomentellous beneath; petiole 2–5 lin. long. Umbels several in each axil, 3–4-flowered, rusty-pubescent; peduncle $1\frac{1}{2}$ lin. long; pedicels $\frac{3}{4}$–1 lin. long; bract suberect, broadly ovate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, glabrous inside. Receptacle $\frac{3}{4}$–1 lin. long. Calyx $\frac{1}{4}$ lin. long, lobed, ciliate. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, straight, split unilaterally, rusty-pubescent outside with short stellate hairs, of which the rays are directed upwards and downwards, basal swelling $1\frac{1}{2}$ lin. long; tube densely glandular within; lobes erect, spathulate, 6 lin. long. Filaments inserted about $\frac{1}{2}$ lin. above the base of the corolla-lobes, linear, 5 lin. long; anthers oblong, $\frac{1}{2}$–$\frac{5}{8}$ lin. long; cells 2–4 in each vertical row. Disc very small, rusty-pilose. Style densely glandular, skittle-shaped above, neck $\frac{1}{2}$–$\frac{5}{8}$ lin. long; stigma depressed-capitate, $\frac{3}{8}$ lin. in diam.—Comptes-rendus Soc. Bot. Belg. xxxix. 26, descr.; De Wild. Enum. Pl. Laurent, 27; Miss. É. Laurent, 75.

Lower Guinea. Lower Congo; cataract region, between Lutete and Ngombe, *Bentley!* Stanley Pool, *Laurent!*

South Central. Belgian Congo: Imese, on the Ubangi River, *Laurent!*

The flowers have been described from Bentley's specimen.

24. **L. polycryptus,** *F. Didr. in Kjoeb. Vidensk. Meddel.* 1854, 194. Branchlets spreading, over 1 ft. long, terete, nodose, 2–$2\frac{1}{2}$ lin. in diam. 1 ft. below the apex, younger part rusty-tomentose with verticillate-branched hairs. Leaves lanceolate, subacute at the apex, subcordate at the base, $3\frac{1}{4}$–$3\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, thinly coriaceous, margin slightly reflexed, upper surface glabrous and dull with impressed midrib and inconspicuous lateral nerves, lower surface rusty-tomentellous, midrib much raised, lateral nerves slightly raised, nearly hidden by the coating of hairs; petiole 4–5 lin. long, rusty-tomentellous. Flowers axillary, fascicled, several together, subsessile; pedicels $\frac{1}{2}$ lin. long, rusty-tomentose; bract ovate, $1\frac{1}{4}$ lin. long, tomentose outside. Receptacle and calyx together slightly shorter than the bract, broadly cylindric, tomentose; receptacle $\frac{3}{4}$ lin. long.

Calyx $\frac{1}{8}$ lin. long, truncate. Corolla $1\frac{1}{4}$–$1\frac{1}{3}$ in. long, villous-tomentose outside with verticillate-branched hairs, hairs about $\frac{3}{8}$ lin. long; tube slender, split unilaterally, basal swelling slight, about 1 lin. long; lobes erect, spathulate, $5\frac{1}{2}$ lin. long, apical enlargement elliptic, acute, 1 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad. Filaments inserted about the base of the corolla-lobes, linear, 4–$4\frac{1}{2}$ lin. long; anthers elliptic-oblong, $\frac{7}{16}$ lin. long; cells 2–4 in each vertical row. Disc very small, densely rusty-pilose, hairs $\frac{1}{4}$–$\frac{3}{8}$ lin. long. Style densely glandular-papillate above the glabrous lower third, strongly skittle-shaped above, neck $\frac{5}{8}$ lin. long; stigma peltate, $\frac{1}{4}$–$\frac{1}{3}$ lin. in diam.

Lower Guinea. Lower Congo, *Smith !*

25. **L. angolensis,** *Engl. in Engl. Jahrb.* xx. 101. Young branchlets rusty-tomentose with much-branched hairs, older ones puberulous. Leaves lanceolate or ovate-oblong, obtuse at the apex, rounded and slightly unequal at the base, 2–$4\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous and dull above, rusty-tomentellous beneath; petiole 7–10 lin. long. Umbels several in an axil, 3–4-flowered, rusty-tomentellous with verticillate-branched hairs; peduncle $1\frac{3}{4}$–2 lin. long; pedicels $1\frac{3}{4}$ lin. long; bract broadly ovate, $\frac{3}{4}$ lin. long, suberect, glabrous inside. Receptacle 1 lin. long. Calyx $\frac{1}{4}$ lin. long, 5-lobed. Corolla 2 in. long, split unilaterally, only slightly enlarged towards the base, rusty-tomentellous outside with short much-branched hairs; tube densely glandular within; lobes erect, spathulate, $6\frac{1}{2}$ lin. long. Filaments inserted $\frac{1}{2}$ lin. above the base of the corolla-lobes, $5\frac{1}{2}$ lin. long; anthers oblong, $\frac{5}{8}$ lin. long; cells 3–4 in each vertical row. Disc small, 5-lobed, rusty-pilose. Style densely glandular, skittle-shaped above, neck $\frac{1}{2}$ lin. long; stigma capitate, $\frac{3}{8}$ lin. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 930; Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 132. *Metula angolensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 263.

Lower Guinea. Angola: Golungo Alto; in forests in Sobato Quilombo, parasitic on *Spondias microcarpa*, A. Rich., *Welwitsch*, 4844!

26. **L. Cornetii,** *A. Dewèvre in Comptes-rendus Soc. Bot. Belg.* xxxiii. 106, *name only;* xxxiv. 92 (1895), *descr.* Young branchlets and leaves rusty-tomentose with verticillate-branched hairs, branchlets $1\frac{1}{2}$–2 lin. in diam. 2 in. below the apex; uppermost internodes $\frac{1}{2}$–1 in. long. Leaves opposite, elliptic or elliptic-oblong, obtuse or rounded at the apex, rounded or more or less cuneate at the base, $3\frac{1}{2}$–5 in. long, $1\frac{3}{4}$–$2\frac{1}{4}$ in. broad, thickly coriaceous, very minutely and densely stellate-pilose especially on the lower surface, the hairs just visible under a powerful lens, dull, greyish in a dried state; lateral nerves oblique, 6–7 on each side, conspicuously raised on the upper surface, less so on the lower; midrib broad, very prominent on both surfaces; petiole 4–8 lin. long, finely rusty-pubescent especially on the lower surface. Heads 2–3-flowered, rusty-tomentose; peduncle $1\frac{1}{2}$ lin. long; bract ovate, $1\frac{3}{4}$ lin. long, solid base $\frac{1}{2}$ lin. long. Receptacle $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Calyx cupular, shortly lobed, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, ciliate. Corolla $1\frac{2}{3}$–2 in. long,

split unilaterally down to the middle, rusty-villous-tomentose outside with verticillate-branched hairs; tube glandular within, basal swelling 2½–4 lin. long, ellipsoid or ovoid; lobes erect, spathulate, 5½–6 lin. long, ⅞–1⅛ lin. broad. Stamens inserted ¼–½ lin. above the base of the corolla-lobes; filaments 3–3½ lin. long, tapering upwards; anthers elliptic-oblong, 1–1⅛ lin. long; cells about 5 in each vertical row. Disc pentagonal, shortly rusty-pilose at least on the angles. Style skittle-shaped above, neck ⅞–1 lin. long.—*L. rubiginosus*, De Wild. Études Fl. Katanga, 173. *L. rubiginosus*, var. *grandiflorus*, De Wild. l.c. 174.

South Central. Belgian Congo: Katanga, *Cornet!* near Lake Moero, *Verdick!*

The same specimen appears to have served as the type of *L. Cornetii*, A. Dewèvre, and of *L. rubiginosus*, var. *grandiflorus*, De Wild. It is accompanied by a pencil note in Dewèvre's handwriting, but appears never to have been written up by him as the type of *L. Cornetii*. On incorporation in the Brussels Herbarium after Dewèvre's death it was labelled as collected by Captain Descamps.

27. **L. macrosolen,** *Steud. ex A. Rich. Tent. Fl. Abyss.* i. 340. Youngest branchlets rusty-pubescent, soon becoming puberulous. Leaves linear-lanceolate, straight or slightly falcate, narrowed to both ends, apex obtuse, base acute, 3–7½ in. long, ½–1 in. broad, stellate-pubescent in a young state, soon glabrous; petiole 5–10 lin. long. Umbels 2 or more fascicled in each axil, 4–6-flowered, rusty-pubescent; peduncle 2–3 lin. long; pedicels 1¼–1½ lin. long; bract erect, oblong-lanceolate or oblong, obtuse, 1¾ lin. long, tomentellous within above the middle. Receptacle about 1½ lin. long. Calyx ⅜–¾ lin. long, bent outwards, at first subtruncate, afterwards distinctly 5-lobed, lobes triangular. Buds ribbed above. Corolla 2½–2¾ in. long, puberulous outside with minute rusty-stellate hairs, basal swelling inconspicuous, 3 lin. long; lobes erect, spathulate, 7½–7¾ lin. long. Filaments 5 lin. long, quadrangular, angles ribbed, dorsal surface flat, ventral and lateral surfaces slightly concave, ribs glandular, the two ventral ones approximating towards the base; anthers oblong, 1⅛–1¼ lin. long; cells about 7 in each vertical row. Disc small, sunk, 5-lobed, glabrous. Style glabrous, skittle-shaped above, neck 1 lin. long; stigma capitate, ⅜ lin. in diam. Berry ellipsoid, 7–8 lin. long.—Engl. in Engl. Jahrb. xx. 82, 89; Hochgebirgsfl. Trop. Afr. 197; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132. *Septimetula macrosolen*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 266.

Nile Land. Abyssinia: Samen; Shoata, *Schimper*, 529! 1288! Begemeder; Ouilla, near Gafat, *Schimper*, 1490!

28. **L. dschallensis,** *Engl. Pfl. Ost-Afr.* C. 166. Young branchlets shortly rusty-tomentose, adult ones puberulous, flowering branches 3–4 lin. in diam.; internodes 1½–2 lin. long on the youngest branchlets, ¾ in. long or less on older ones. Leaves crowded, irregularly ternate, decussate, straight or more or less falcate, linear-lanceolate, gradually narrowed into the petiole, obtuse or rounded at the apex, 2–3½ lin. long, 4–7 lin. broad, coriaceous, in a young state rusty or fulvous-tomentellous with short much-branched hairs, soon glabrous, dull; petiole 2–3½

lin. long. Fascicles about 3-flowered, rusty-tomentellous with short much-branched hairs, the bract and calyx excepted; pedicels 1–1½ lin. long; bract broadly ovate, 1¼–1½ lin. long, puberulous outside, glabrous within. Receptacle 1¼ lin. long. Calyx ¾ lin. long, truncate, puberulous outside, ciliate. Corolla 2 in. long, rusty-tomentellous outside, basal swelling ovoid-oblong, 3–4 lin. long; tube glandular within; lobes erect, spathulate, slightly broadened towards the base, 4½ lin. long. Filaments tapering upwards, 3 lin. long, glandular on the edges in the lower half; anthers oblong, 1–1¼ lin. long; cells 6 in each vertical row. Disc nearly obsolete. Style glabrous, abruptly widened above, thickened part tapering slightly to the neck, neck ⅞ lin. long; stigma capitate, about ¼ lin. in diam.—Engl. & Prantl, Pflanzenfam. Nachtr. i. 132.

Mozamb. Distr. German East Africa: Kilimanjaro Region; Lake Jalla, *Volkens*, 1776! Usagara; between Mdunhwi Valley and Manyonge, 3250 ft., *Speke & Grant!* Lat. 2°–7° S., *Hannington!*

29. **L. regularis,** *Steud. ex A. Rich. Tent. Fl. Abyss.* i. 339. Youngest branchlets rusty-tomentose with much-branched hairs, older ones pubescent, finally glabrous, ½ in. in diam. or less, lenticellate. Leaves broadly ovate or elliptic-oblong, very obtuse or rounded at the apex, obtuse or rounded and unequal at the base, 2–5 in. long, 1–3½ in. broad, coriaceous, minutely stellate-puberulous above in a young state, soon becoming glabrous, minutely stellate-pubescent or puberulous below, dull on both surfaces; petiole 4–13 lin. long. Heads dense, sessile, densely rusty-tomentose with verticillate-branched hairs; bract broadly ovate or suborbicular, 1½ lin. long, glabrous inside. Receptacle 1⅛–1¼ lin. long. Calyx ½–⅝ lin. long, truncate. Corolla 2–2¼ in. long, straight, split unilaterally, rusty-villous-tomentose with very unequal verticillate-branched hairs 1 lin. long or less, basal swelling inconspicuous, 2½–3 lin. long; tube glandular within; lobes erect, spathulate, 8–8½ lin. long. Filaments inserted ½ lin. above the base of the corolla-lobes, 6 lin. long; anthers narrowly oblong, 1⅛–1½ lin. long; cells about 5 in each vertical row. Disc small, pentagonal, rusty-pilose. Style glabrous, skittle-shaped above, neck 1⅜ lin. long; stigma capitate, ¼ lin. in diam. Berry ellipsoid, 6–7 lin. long, 4 lin. in diam., apical cup hardly ½ lin. long.—Engl. in Engl. Jahrb. xx. 84; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132. *L. rufescens*, A. Rich. Tent. Fl. Abyss. i. 339, not of DC. *Septimetula regularis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 266.

Nile Land. Abyssinia: near Adowa, parasitic on species of *Ficus* and *Mimosa*, *Schimper*, 747! Geat, on *Celastrus* sp., *Schimper*, 665! Gorgora, on Lake Tana, *Steudner*, 173! Amba Sea, on *Ficus* sp., *Pullen!* and without precise locality, *Petit*, 6!

30. **L. erythræus,** *Sprague.* Youngest branchlets rusty or fulvous-tomentose with branched hairs, soon puberulous or glabrous. Leaves ovate, ovate-oblong or elliptic-oblong, obtuse or rounded at the apex, obtuse and slightly unequal at the base, 2¼–6¾ in. long, 1–3½ in. broad, tomentose in a very young state, soon glabrous; petiole

5–13 lin. long. Umbels fascicled in the axils, 2-flowered, rusty-tomentose with branched hairs; peduncle 1–1¼ lin. long; pedicels ¾–1 lin. long; bract broadly ovate or suborbicular, 1¼–1½ lin. long, glabrous inside. Receptacle 1¼ lin. long. Calyx ¾ lin. long, shortly ciliate. Corolla 1¾–2 in. long, split unilaterally, hardly enlarged towards the base, rusty-tomentose outside; lobes erect, spathulate, 8 lin. long. Filaments 5 lin. long; anthers narrowly oblong, 1⅛–1⅜ lin. long; cells about 3 in each vertical row. Disc small, pentagonal, glabrous. Style glabrous, skittle-shaped above, neck 1¼ lin. long; stigma capitate, ⅜ lin. in diam. Berry ellipsoid, 5–6 lin. long, rusty-pubescent, apical cup ¾ lin. long.

Nile Land. Eritrea: near Saganeiti, about 7300 ft., *Schweinfurth & Riva*, 785! 1800!

31. **L. usuiensis,** *Oliv. in Trans. Linn. Soc.* xxix. 80, *t.* 44. Youngest branchlets fulvous-tomentose with branched hairs, soon becoming glabrous. Leaves ovate-oblong or oblong, 1¾–3½ in. long, 1–2 in. broad, obtuse or rounded at the apex, subequal and obtuse or rounded at the base, more rarely subcordate, stellate-pubescent in a very young state especially towards the base, soon glabrous; petiole 4–6 lin. long. Fascicles many-flowered, tomentellous with verticillate-branched hairs; pedicels ¾–⅞ lin. long; bract glabrous within, suborbicular, hardly ¾ lin. in diam., or ovate, acute, 1¼–1⅜ lin. long. Receptacle 1 lin. long. Calyx ¼–½ lin. long, slightly lobed, shortly ciliate. Corolla 1¼–1½ in. long or slightly less, straight, tomentellous outside, basal swelling subglobose, 1¼–1½ lin. in diam.; tube glandular within; lobes erect, spathulate, 3½–4 lin. long. Filaments 2½ lin. long; anthers oblong, ¾–⅞ lin. long; cells 3 in each vertical row. Disc small, pentagonal, glabrous. Style glabrous, skittle-shaped above, neck ⅝ lin. long; stigma capitate, ¼–⅜ lin. in diam.—Engl. in Engl. Jahrb. xx. 82; Pfl. Ost-Afr. C. 165; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132; Rendle in Journ. Linn. Soc. Bot. xxxvii. 204. *L. bukobensis*, Engl. in Engl. Jahrb. xx. 102; Pfl. Ost-Afr. C. 166.

Nile Land. Uganda: near Mulema, *Bagshawe*, 356! British East Africa: Mau Plateau, 7000–8000 ft., *Scott-Elliot*, 6952! and without precise locality, *Elliott*, 252! Kicha, *Elliott*, 317!

Mozamb. Distr. German East Africa: Usui, 4000 ft., *Speke & Grant*, 6! Bukoba, on Lake Victoria, *Stuhlmann*, 1092! 3776! 4057! by the Ugalla River, *Böhm*, 53A! without precise locality, *Kaiser!*

32. **L. Albizziæ,** *De Wild. Miss. É. Laurent*, 74. Young shoots densely whitish- or tawny-tomentellous with branched hairs, soon becoming glabrous. Branches stout, 3 lin. in diam. 1 ft. below the apex, finely wrinkled and pale brown in a dried state. Leaves opposite, ovate-oblong or elliptic-oblong, obtuse or rounded at the apex, rounded at the base, 2½–4½ in. long, 1¼–1¾ in. broad, coriaceous, glabrous when fully developed, brown in a dried state; lateral nerves 6–7 on each side, rather oblique, raised on the upper surface, indistinct or not visible on the lower; midrib slightly raised on the upper surface, very pro-

minent on the lower; petiole 6–8 lin. long. Umbels axillary, fascicled, 4–5-flowered, rusty-tomentose; peduncle $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; pedicels 1–$1\frac{1}{4}$ lin. long; bract ovate or ovate-elliptic, obtuse, 1 lin. long. Receptacle $1\frac{1}{4}$ lin. long. Calyx $\frac{1}{2}$–$\frac{3}{4}$ lin. long, shortly lobed, ciliate. Intramarginal ring densely rusty-pilose. Corolla with a subglobose apical swelling in bud, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, split unilaterally, rusty-tomentose with verticillate-branched hairs outside, basal swelling ovoid, 2 lin. long; lobes erect, spathulate, broadened into the base, 4–$4\frac{1}{2}$ lin. long, $\frac{3}{4}$–$\frac{7}{8}$ lin. broad. Stamens inserted $\frac{3}{8}$–$\frac{1}{2}$ lin. above the base of the corolla-lobes; filaments $2\frac{3}{4}$ lin. long, tapering upwards; anthers elliptic-oblong, nearly $\frac{1}{2}$ lin. long, cells 3 in each vertical row. Disc small. Style slightly skittle-shaped above, neck $\frac{3}{8}$ lin. long; stigma depressed-capitate, $\frac{1}{3}$ lin. in diam.

South Central. Belgian Congo: Aruwimi District; Basoko, *Laurent!*

Var. *Rogersii*, Sprague. Leaves elliptic-oblong, obtuse or cuneate at the base, remaining green in a dried state, 3–4 in. long, 1–$1\frac{3}{4}$ in. broad. Pedicels $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Anthers $\frac{5}{8}$ lin. long.

Mozamb. Distr. North-west Rhodesia: near Ndola, *Rogers*, 8318!

The Rhodesian plant may possibly represent a distinct species, but until further material comes to hand it seems best to treat it as a variety of *L. Albizziæ*.

33. **L. sigensis,** *Engl. in Engl. Jahrb.* xx. 101. Young parts rusty-tomentellous; branchlets soon glabrous, greenish, 3–$3\frac{1}{2}$ lin. in diam. 9 in. below the apex, slightly compressed at the nodes; older branches 5–6 lin. in diam., coarsely and densely lenticellate, the bark forming short longitudinal cracks with a lenticel as centre. Leaves ovate or ovate-oblong, rounded at the apex, rounded or subcordate at the base, $3\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{1}{2}$–4 in. broad, coriaceous, minutely stellate-puberulous or glabrous; petiole 6–10 lin. long. Umbels axillary, fascicled, many together on the older branches, 3–4-flowered, shortly fulvous-tomentellous with adpressed branched hairs; peduncle 1 lin. long or less; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract ovate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, glabrous within. Receptacle $\frac{7}{8}$–1 lin. long, tomentellous. Calyx cupular, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, subtruncate or obscurely lobed, puberulous outside, ciliate. Corolla $1\frac{3}{4}$–2 in. long, with an ellipsoid pentagonal apical swelling in bud, fulvous-tomentellous outside in a young state, when fully developed pubescent below and puberulous above with stellate hairs, the rays directed mainly upwards and downwards, basal swelling inconspicuous, 2–5 lin. long; tube glandular within; lobes erect, spathulate, $4\frac{3}{4}$–5 lin. long. Filaments inserted about $\frac{3}{8}$–$\frac{1}{2}$ lin. above the base of the corolla-lobes, $3\frac{3}{4}$ lin. long; anthers oblong, $\frac{5}{8}$–$\frac{7}{8}$ lin. long; cells 3–4 in each vertical row. Style glandular, skittle-shaped above, neck $\frac{5}{8}$–$\frac{3}{4}$ lin. long; stigma capitate, $\frac{1}{4}$ lin. in diam.—Pfl. Ost-Afr. C. 166; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132.

Mozamb. Distr. German East Africa: Usambara; Derema, in forest clearings, *Holst*, 2230! Mafia Island, *Kirk!*

34. **L. wentzelianus,** *Engl. in Engl. Jahrb.* xxviii. 381. Young parts densely stellate-pilose with rusty hairs. Branches stout, $2\frac{1}{2}$–4 lin.

in diam., densely lenticellate; nodes swollen; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite, ovate-oblong or elliptic-oblong, obtuse or rounded at the apex, rounded at the base or more rarely subcordate, $1\frac{3}{4}$–$3\frac{1}{2}$ in. long, 1–2 in. broad, stellate-lepidote in a young state, more especially on the lower surface, almost glabrous in the adult state, thickly coriaceous; lateral nerves about 5 on each side, patulous or oblique, slightly raised on both surfaces or inconspicuous; midrib very prominent on the lower surface; petiole 5–9 lin. long, fulvous-pilose with much-branched hairs in a young state. Flowers axillary, usually geminate; pedicels 1–$1\frac{3}{4}$ lin. long; bract ovate or elliptic, 1–$1\frac{1}{2}$ lin. long. Receptacle rusty-tomentellous, $\frac{7}{8}$ lin. long. Calyx cupular, slightly lobed, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, puberulous outside. Corolla in bud with an ellipsoid apical swelling, $1\frac{3}{4}$ in. long, very narrowly cylindric-funnel-shaped, split unilaterally, stellate-puberulous outside, not distinctly swollen at the base; lobes erect, lanceolate-spathulate, broadened into the base, $5\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad. Stamens inserted $\frac{1}{2}$–$\frac{3}{4}$ lin. above the base of the corolla-lobes; filaments tapering upwards; anthers oblong, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; cells about 5 in each vertical row. Disc closely adherent round the enlarged base of the style. Style skittle-shaped above, neck nearly $1\frac{1}{4}$ lin. long. Berry ellipsoid, about $4\frac{1}{2}$ lin. long, $3\frac{1}{2}$ lin. in diam., minutely stellate-lepidote.

Mozamb. Distr. German East Africa: Mrogoro; on the Lukwangule Plateau, Uluguru Mountains, 8000 ft., on *Agauria salicifolia*, Hook. f., ***Goetze,*** 278! *Stuhlmann*, 9119!

35. **L. berliniicola,** *Engl. in Engl. Jahrb.* xxviii. 382. Young branches rusty-pilose. Branches brown, very stout, 2–6 lin. in diam., the older densely lenticellate; lenticels oblong or linear; internodes $\frac{3}{4}$–2 in. long. Leaves opposite or subopposite, ovate-oblong or elliptic-oblong, obtuse or rounded at the apex, rounded or subcordate at the base, 2–$3\frac{1}{2}$ in. long, 1–$2\frac{1}{2}$ in. broad, coriaceous, glabrous, slightly glossy and wrinkled in a dried state on the upper surface, dull on the lower surface; lateral nerves 5–6 on each side, patulous, slightly raised on the upper surface, hardly visible on the lower; midrib broad, prominent on the lower surface; petiole 3–4 lin. long. Umbels fascicled, subsessile, 6–8-flowered; peduncle 1 lin. long; pedicels $\frac{5}{8}$–$\frac{3}{4}$ lin. long, shortly and densely pubescent; bract ovate, acute, 1 lin. long, puberulous outside. Receptacle slightly constricted at the apex, $1\frac{1}{8}$ lin. long, very densely stellate-pubescent. Calyx slightly ascending, $\frac{3}{8}$–$\frac{1}{2}$ lin. long, obscurely lobed, sparingly ciliate. Corolla in bud with an ellipsoid apical swelling, orange, over 2 in. long, narrowly cylindric-funnel-shaped, unilaterally split, $3\frac{1}{2}$ lin. broad at the insertion of the stamens when flattened out, minutely rusty-puberulous outside towards the base, glabrous elsewhere; basal swelling obliquely ovoid or ellipsoid, $2\frac{1}{2}$–3 lin. long; lobes erect, spathulate, broadened into the base, $5\frac{1}{2}$ lin. long, $\frac{5}{8}$–$\frac{3}{4}$ lin. broad. Stamens inserted $\frac{1}{2}$–$\frac{3}{4}$ lin. above the base of the corolla-lobes; filaments $3\frac{1}{2}$ lin. long, tapering upwards; anthers oblong, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Disc pentagonal, conspicuous, more or less pilose on the inner surface. Style skittle-shaped above, neck $\frac{5}{8}$ lin. long.

Mozamb. Distr. German East Africa: Uhehe; Matauana Plateau, on *Berlinia Eminii*, Harms, *Goetze*, 742!

36. **L. crassicaulis,** *Engl. in Comptes-rendus Soc. Bot. Belg.* xxxix. 30, *emend.* Branchlets stout, smooth, glabrous, greenish-yellow, with very prominent nodes, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam. near the apex. Leaves alternate, ovate or ovate-oblong, obtuse or rounded at the apex, rounded at the base, $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $2\frac{1}{4}$–$2\frac{1}{2}$ in. broad, thickly coriaceous, glabrous, dull, minutely corrugated, margin cartilaginous, undulate; midrib slightly impressed on the upper surface, very prominent on the lower; lateral nerves 8–9 on each side, spreading or patulous, anastomosing far from the margin, slightly raised on both surfaces; petiole stout, enlarged at the base, $3\frac{1}{2}$–6 lin. long. Umbels 4–5-flowered; peduncle 1–$1\frac{1}{2}$ lin. long at the time of fruiting; pedicels $\frac{1}{4}$ lin. long, densely rusty-pilose; bract broadly ovate, very concave, hardly $\frac{1}{2}$ lin. long, densely rusty-pilose outside. Receptacle cupular, nearly 1 lin. long, rusty-pilose. Calyx about $\frac{1}{8}$ lin. long, subtruncate. Corolla 1–$1\frac{1}{4}$ in. long in bud, stellate-puberulous outside, basal swelling ellipsoid, ribbed, 1–$1\frac{1}{4}$ lin. long, apical swelling ellipsoid, $1\frac{1}{4}$ lin. long; tube narrowly funnel-shaped, glandular inside; lobes erect, spathulate, apical enlargement ovate acute, 1 lin. long, $\frac{5}{8}$ lin. broad. Anthers elliptic-oblong, hardly $\frac{1}{2}$ lin. long. Disc sunk, about $\frac{1}{8}$ lin. high, 5-lobed, minutely rusty-pilose on the inner surface.—De Wild. & Th. Dur. Reliq. Dewèvr. 200; De Wild. Études Fl. Bas- et Moyen-Congo, i. 29.

Lower Guinea. Lower Congo: Mayombe District; near Shinganga, *Dewèvre*, 278! Stanley Pool District; Kimuenza, *Gillet*, 2036!

Engler included under his *L. crassicaulis* two distinct species, one of which (Dewèvre, 278) belongs to the section *Rufescentes*, and the other (Demeuse, 119) to the section *Constrictiflori*. Demeuse, 119, was subsequently by some mistake distributed as *L. Demeusei*; and De Wildeman, recognising that it had nothing to do with *L. Demeusei*, and apparently unaware that it formed part of Engler's *L. crassicaulis*, described it as a new species, *L. brazzavillensis* (Comptes-rendus Soc. Bot. Belg. xxxix. 102). Demeuse, 119, having been made the type of a new species, the name *L. crassicaulis* must be applied to Dewèvre, 278, although Engler's description applies mainly to the former.

37. **L. rufescens,** *DC. Prodr.* iv. 303. Branches terete, slightly compressed towards the apex. Leaves petioled, rusty-pubescent in a young state, elliptic, obtuse at the apex and base, coriaceous. Umbels 1–3 in each axil, rusty-pubescent, 2–3-flowered; peduncle shorter than the petiole; bract oblong. Receptacle and calyx together urceolate, truncate. Corolla in bud 3 lin. long, pentagonal at the apex. Berry ovoid. —*Septimetula rufescens*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 266.

Upper Guinea. Senegambia: near Nghianga, *Leprieur & Perrottet.*

Known to me only from A. P. De Candolle's very brief description.

38. **L. Baumii**, *Engl. & Gilg in Warb. Kunene-Samb. Exped.* 228. Young branchlets subterete, rather stout, densely rusty-tomentose with verticillate-branched hairs. Leaves opposite, ovate or ovate-oblong, rounded or more rarely subacute at the apex, rounded at the

base, $2\frac{1}{2}$–4 in. long, $1\frac{1}{4}$–2 in. broad, rusty-tomentellous on both surfaces in a young state, soon becoming glabrous on the upper surface; lateral nerves slightly raised on the upper surface, inconspicuous on the lower; petiole 3–4 lin. long. Umbels axillary, fascicled, sessile, 2–4-flowered; pedicels 1 lin. long; bract broadly ovate or suborbicular, very concave, 1–$1\frac{1}{4}$ lin. in diam. Receptacle $\frac{7}{8}$ lin. long. Calyx $\frac{5}{8}$–$\frac{3}{4}$ lin. long, rather irregularly lobed. Buds hardly broadened towards the apex, not winged. Corolla $1\frac{3}{4}$ in. long, sparingly stellate-pilose outside, not distinctly swollen at the base; lobes subspathulate-linear, $8\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad above. Filaments inserted at the base of the corolla-lobes, 5 lin. long; anthers linear, $2\frac{3}{4}$ lin. long, transversely septate, cells about 9 in each vertical row. Disc about $\frac{1}{4}$ lin. high, hardly lobed, minutely and sparingly rusty-pilose within. Style acutely pentagonal, not appreciably thickened upwards; stigma subglobose, nearly $\frac{1}{2}$ lin. in diam.

Lower Guinea. Angola: by the Chitanda River, between Kassinga and Kolove, 4300 ft, on *Parinarium* sp., *Baum*, 217! by the Kubango River, at Princeza Amelia, on *Securidaca longipedunculata*, Fres., *Gossweiler*, 1986!

39. **L. incanus**, *Schum. & Thonn. Beskr. Guin. Pl.* 180. Youngest parts rusty-tomentose, tomentum usually disappearing very quickly, disclosing a continuous covering of minute stellate scales; branchlets terete, eventually becoming glabrous. Leaves opposite, ovate, elliptic or suborbicular, 2–6 in. long, 1–$3\frac{1}{2}$ in. broad, cuneate, rounded or subcordate at the base, obtuse or rounded at the apex, coriaceous, upper surface glabrous, dull or glossy, lower surface minutely and densely lepidote; lateral nerves oblique, 4–5 on each side, slightly raised on the lower surface; petiole 4–9 lin. long, channelled. Umbels axillary, fascicled, rusty-lepidote, about 4-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels $1\frac{1}{8}$–$1\frac{3}{4}$ lin. long; bract shorter than or subequal to the receptacle and calyx, ovate or ovate-oblong, $\frac{5}{8}$–$\frac{7}{8}$ lin. long, rarely longer. Receptacle $\frac{5}{8}$–$1\frac{1}{8}$ lin. long. Calyx subtruncate or slightly lobed, densely ciliate, $\frac{1}{4}$–$\frac{3}{8}$ lin. long. Corolla $1\frac{1}{2}$–2 in. long, yellow, tipped with red, sparingly lepidote outside, glandular within; lobes spathulate-linear, $7\frac{1}{2}$–9 lin. long, broadened into the base. Filaments inserted $\frac{1}{4}$–$\frac{3}{8}$ lin. above the base of the corolla-lobes, $3\frac{1}{2}$–4 lin. long; anthers linear, about 2 lin. long, transversely septate, cells about 8 in each vertical row. Disc annular, 5-lobed, $\frac{1}{6}$ lin. high, fleshy, minutely rusty-pilose within. Style acutely pentagonal; stigma subcapitate or ellipsoid, $\frac{1}{4}$–$\frac{3}{8}$ lin. long. Berry obovoid, verdigris-coloured.—*L. celtidifolius*, Willd. ex Schult. Syst. vii. 161. *L. Thonningii*, DC. Prodr. iv. 303, not of Schum. & Thonn. *L. clavatus*, Thonn. ex DC. l.c., not of Desr. *L. leptolobus*, Benth. in Hook. Niger Fl. 375; Engl. in Engl. Jahrb. xx. 82. *L. Soyauxii*, Engl. l.c. 97, t. 2, fig. B. *L. capitatus*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 131; Th. Dur. & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 126; De Wild. Énum. Pl. Laurent, 27. *L. capitatus*, var. *latifolius*, Engl. ex Th. Dur. & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 126; De Wild. & Th. Dur. in Bull. Herb. Boiss. 2me sér. i. 836; Reliq. Dewèvr. 200; De Wild. Énum. Pl. Laurent, 27; Miss. É. Laurent, 75; Études Fl. Bas- et Moyen-Congo, i. 29, 237;

ii. 124; name only. *L. angustitepalus*, Engl. in Engl. Jahrb. xl. 525. *Exostemma capitatum*, Spreng. Neue Entdeck. ii. 143. *Thelecarpus Soyauxii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 262.

Upper Guinea. Guinea, *Arnim!* Gold Coast: by the Volta River, *Thonning!* Togo: Tuaro, *Kersting*, A261! near Lome, *Warnecke*, 332! Lagos: Abeokuta, on *Melia Azedarach*, Linn., *Barter*, 3324! Eppah, *Barter*, 3288! Southern Nigeria: Attah (Idda), *Vogel*, 47! Old Calabar, *Thomson*, 129! *Holland!* Cross River, *Johnston!* Northern Nigeria: Nupe, *Barter*, 1147! Mount Patteh, *Dalziel*, 215! Cameroons: Buea, *Preuss*, 772! Victoria, *Winkler*, 99! Bipinde, *Zenker*, 827! Batanga, *Bates*, 35! Cameroon Mountains, up to 3000 ft., *Kalbreyer*, 95!

Lower Guinea. Spanish Gaboon: Muni (Danger) River, *Mann*, 1741! French Congo: Brazzaville, *Chevalier*, 11754! Lower Congo: Mayombe, *Laurent*; Temvo, *Laurent*; Luvituku, *Laurent*; Leopoldville, *Dewèvre*, 479, *Laurent*, 693; Kisantu, *Gillet*, 1238, *Laurent*, 404; Djuma Valley, *Gillet*.

South Central. Belgian Congo: Lake Leopold II. District; Malepie, Kutu, *Laurent*. Equator District; Eala, *Pynaert*, 405. Kasai District; Mushenge, *Lescrauwet*, 388.

Var. *sessilis*, Sprague. Umbels sessile; pedicels $\frac{1}{2}$ lin. long; bract exceeding the receptacle and calyx, even in bud, elliptic-oblong or ovate-oblong, $1\frac{3}{4}$ lin. long. Calyx irregularly lobed, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, densely ciliate, the longer lobes being on the posticous side. Corolla 2 in. long, lobes 9 lin. long. Anthers about 2 lin. long. Disc densely rusty-pilose within.

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 386!

Engler's description and figures of *L. Soyauxii* do not agree with the specimen of *Soyaux*, 386, in the Kew herbarium, and were apparently taken from the Cameroons specimens quoted above under typical *L. incanus*.

Var. *albus*, Sprague. Corolla less than $1\frac{1}{2}$ in. long, white. Anthers $1\frac{3}{8}$–$1\frac{3}{4}$ lin. long.

Upper Guinea. Fernando Po, *Mann*, 275!

Var. *Gossweileri*, Sprague. Branchlets and lower surface of the leaves retaining the covering of rusty hairs, which is characteristic of the youngest parts, much longer than in the type.—*L. Gossweileri*, Engl. & Krause in Engl. Jahrb. xliii. 402.

Lower Guinea. Angola: District of Cazengo, *Gossweiler*, 695!

Var. *Gossweileri* is not unlike *L. Baumii*, from which it may be distinguished by the lateral nerves, which are rather conspicuous on the lower surface, as in typical *L. incanus*.

40. **L. Batangæ,** *Engl. in Engl. Jahrb.* xx. 98. Branchlets slender, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. about 1 ft. below the apex, young parts very densely lepidote, internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite or subopposite, lanceolate or more rarely ovate-acuminate, apex acute or subacute, base obtuse, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 7–14 lin. broad, chartaceous or thinly coriaceous, glabrescent on the upper surface, minutely stellate-lepidote on the lower, scales not forming a continuous covering; lateral nerves about 3 on each side, rather oblique, slightly raised on both surfaces; petiole $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Umbels sessile, solitary or geminate, 2-flowered; pedicels hardly $\frac{3}{4}$ lin. long, rusty-lepidote; bract ovate-lanceolate, shorter than the receptacle and calyx, rusty-lepidote. Receptacle and calyx together hardly $\frac{3}{4}$ lin. long. Corolla yellow, under $1\frac{1}{4}$ in. long, sparingly stellate-lepidote outside; tube $8\frac{1}{2}$–9 lin.

long. Filaments inserted $\frac{3}{8}$ lin. above the base of the corolla-lobes, 3 times as long as the anthers; anthers linear.—*Thelecarpus Batangæ*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 262.

Upper Guinea. Cameroons: Great Batanga, *Dinklage*, 676!

41. **L. irebuensis,** *De Wild. Miss. É. Laurent*, 76, *t.* 35. Youngest parts stellate-lepidote, soon glabrous. Branchlets slender, subterete, dark brown, finely and densely lenticellate. Leaves opposite or subopposite, oblong-elliptic or lanceolate, acutely acuminate, cuneate at the base, straight or subarcuate, 2–3$\frac{1}{2}$ in. long, $\frac{3}{4}$–1$\frac{1}{4}$ in. broad, thinly coriaceous, glabrous or with a few stellate scales on the lower surface, slightly glossy and rather finely reticulate on the upper surface, dull on the lower; lateral nerves 3–4 on each side, oblique, slightly raised on the upper surface, less so on the lower; petiole 2$\frac{1}{2}$–4 lin. long. Fascicles axillary, several-flowered, rusty or fulvous-pubescent with small stellate hairs; pedicels 1 lin. long; bract broadly ovate or elliptic, rounded, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, very concave, ventral margin hardly surrounding the receptacle. Receptacle $\frac{1}{2}$ lin. long. Calyx $\frac{1}{4}$–$\frac{3}{8}$ lin. long, 5-lobed, ciliate; lobes triangular, $\frac{1}{8}$–$\frac{1}{6}$ lin. long. Corolla about 1$\frac{1}{2}$ in. long, narrowly cylindric in bud, sparingly stellate-lepidote outside in the upper part; tube glandular within, split unilaterally and slightly funnel-shaped above; lobes subspathulate-linear, 6$\frac{1}{2}$–7 lin. long, eventually slightly deflexed. Filaments inserted $\frac{1}{4}$ lin. above the base of the corolla-lobes, about 4 lin. long, tapering upwards; anthers linear, 1$\frac{1}{2}$ lin. long, transversely septate; cells about 8 in each vertical row. Disc annular, $\frac{1}{6}$ lin. high, fleshy. Style filiform, pentagonal; stigma ellipsoid, $\frac{1}{4}$ lin. long, $\frac{1}{6}$ lin. in diam.

Lower Guinea. Gaboon River, *Mann*, 989!

South Central. Belgian Congo: Equator District; Irebu, *Laurent!*

42. **L. Zygiarum,** *Hiern in Cat. Afr. Pl. Welw.* i. 929. Branchlets nodose, youngest parts densely rusty-pilose, soon becoming glabrous; internodes 1$\frac{1}{2}$–5 lin. long. Leaves opposite, ovate-oblong or elliptic, rounded or obtuse at both ends, 1$\frac{1}{2}$–3 in. long, $\frac{3}{4}$–1$\frac{2}{3}$ in. broad, coriaceous, sparingly stellate-pilose in a young state, when adult glabrous or nearly so on the upper surface, stellate-puberulous on the lower; petiole 3–4$\frac{1}{2}$ lin. long. Flowers fascicled on the old wood; pedicels about 1$\frac{3}{8}$ lin. long, almost glabrous; bract broadly ovate, 1 lin. long and broad, pilose at the apex, otherwise glabrous. Receptacle $\frac{3}{4}$–$\frac{7}{8}$ lin. long, glabrous. Calyx glabrous, $\frac{1}{4}$–$\frac{3}{8}$ lin. long, margin undulate. Corolla scarlet, about 1$\frac{2}{3}$ in. long, glabrous; tube narrowly cylindric, about 13 lin. long; lobes erect, subspathulate-linear, 7 lin. long. Filaments inserted $\frac{7}{8}$ lin. above the base of the corolla-lobes, 3$\frac{1}{2}$ lin. long; anthers linear, 1$\frac{1}{4}$–1$\frac{3}{8}$ lin. long, transversely septate, cells about 5 in each vertical row. Stigma ovoid, $\frac{3}{8}$ lin. long. Young berries globose, green.

Lower Guinea. Angola: Golungo Alto; by the Delamboa River, and in the Capopa Forests, on *Albizzia* sp., *Welwitsch*, 5281!

43. **L. hexasepalus,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 131. Leaves smaller than in *L. incanus.* Bract shorter than the receptacle. Flowers hexamerous.—*Thelecarpus hexasepalus,* Van Tiegh. in Bull. Mus. Hist. Nat. Par. i. 166; and in Bull. Soc. Bot. France, xlii. 263.

Lower Guinea. French Congo: near Mayomba Lake, at Mambi, *Lecomte.*

Known to me only from the very brief description reproduced above. It may possibly be a form of the widely spread *L. incanus.*

Thelecarpus Thollonii, Van Tiegh. in Bull. Mus. Hist. Nat. Par. i. 166, is another imperfectly known species belonging to the section *Lepidoti.* It was found by Thollon (754) on the banks of the Ogowe River, and is said to be distinguished from the other species of the section by its thin and transparent corolla ("calyx" of Van Tieghem).

44. **L. cistoides,** *Welw. ex Engl. in Engl. Jahrb.* xx. 103, *partly.* A much-branched shrublet, 1–3 ft. high, whitish-tomentose in a living state, fulvous in a dried state. Leaves opposite, elliptic or ovate-elliptic, obtuse or rounded at the apex, rounded or subcordate at the base, 8–13 lin. long, 5–7 lin. broad, tomentose with verticillate-branched hairs on both surfaces, eventually becoming pubescent on the upper surface; petiole 1–1½ lin. long. Heads terminating very short axillary branchlets, which bear 1–2 pairs of leaves, 3–4-flowered, tomentose; peduncle about 2½ lin. long; bract foliaceous, broadly ovate, rounded, ½ in. long. Receptacle cupular, ¾ lin. long, densely rusty-villous with branched hairs. Calyx about $\frac{1}{12}$ lin. long, truncate. Corolla 1⅔ in. long, 5-winged at the apex in bud, greenish-yellow or yellow, the tips of the lobes sometimes rosy purple, tomentose outside, glandular within, basal swelling ellipsoid, 1¾ lin. long; lobes erect, spathulate, 5½ lin. long, upper enlarged part ovate, 1½–1¾ lin. long, ⅞–1 lin. broad including the thin margins, which are ¼–⅓ lin. broad. Filaments inserted at the base of the corolla-lobes, 4 lin. long, eventually involute; anthers oblong, ⅜ lin. long, cells 3 in each vertical row. Disc ⅛ lin. high, fleshy. Style not broadened upwards; stigma capitate, ¼ lin. in diam. Berry blue when ripe.—*Phragmanthera cistoides,* Van Tiegh. in Bull. Soc. Bot. France, xlii. 262. *L. glaucocarpus,* Hiern in Cat. Afr. Pl. Welw. i. 928, partly, not of Peyr.

Lower Guinea. Angola: Pungo Andongo, a common parasite of *Citrus medica,* Linn., *Welwitsch,* 4848! on various trees, *Welwitsch,* 4847! *Mechow,* 90!

L. cistoides, var. *longiflora,* Schinz in Bull. Herb. Boiss. iv. App. iii. 52, from Amboland, German South-west Africa, is unknown to me. It is said to have flowers 2 in. long.

45. **L. glaucocarpus,** *Peyr. in Wawra & Peyr. Sert. Benguel.* 31. A shrub, 5–6 ft. high, fulvous-tomentose in a dried state. Leaves opposite, broadly ovate, elliptic-oblong or elliptic, rounded at apex and base, ¾–1½ in. long, ½–1 in. broad, tomentellous or pubescent in a young state, eventually puberulous or glabrous, thinly coriaceous; lateral nerves slightly raised on the upper surface; petiole 1–1½ lin. long. Umbels axillary, 4–6-flowered, villous-tomentose with branched hairs; peduncle

1½ lin. long; pedicels ½–¾ lin. long; bract ovate-oblong or elliptic, 1½–2 lin. long. Receptacle cupular, ⅞–1 lin. long. Calyx ⅙–¼ lin. long, very slightly lobed or undulate, long villous-ciliate. Corolla 1½–1⅔ in. long, pentagonal at the apex in bud, greenish-yellow or yellow, villous-tomentose outside, basal swelling oblong-ellipsoid, 2–2½ lin. long; lobes erect, narrowly spathulate, 7–7½ lin. long, upper enlarged part lanceolate, 2–2¼ lin. long, ⅞ lin. broad including the margins which are about ⅙ lin. broad. Filaments 5½–6 lin. long, finally involute; anthers narrowly oblong, ⅞–1 lin. long, cells 5–6 in each vertical row. Disc ⅛–⅙ lin. high, fleshy. Style not broadened upwards; stigma over ¼ lin. in diam. Berry ovoid, 4–5 lin. long, glaucous, at first stellate-pubescent, afterwards glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 928, partly. *L. cistoides*, Welw. ex Engl. in Engl. Jahrb. xx. 103, partly.

Lower Guinea. Angola: Benguella; in open sandy maritime forests near Benguella, on *Cordia* sp., *Welwitsch*, 4853! Mossamedes; by the River Maiombo, below Cazimba, on *Tamarix orientalis*, Forsk., *Welwitsch*, 4857! Humpata, *Pearson*, 2627! without precise locality, *Gossweiler!*

46. **L. Sterculiæ,** *Hiern in Cat. Afr. Pl. Welw.* i. 928. A shrub, 5–7 ft. high. Branchlets nodose, younger parts tawny or greyish-tomentose with verticillate-branched hairs, older parts densely lenticellate. Leaves ternate or subternate, ovate-oblong or lanceolate, obtuse at the apex, unequally rounded or subcordate at the base, 2–3 in. long, ¾–1½ in. broad, stellate-pubescent on both surfaces in a young state, upper surface eventually glossy and glabrous; lateral nerves about 4 on each side; petiole ½–1 in. long. Umbels axillary, fascicled, 3–4-flowered; peduncle, pedicels and bract tawny-tomentose; peduncle 1–1½ lin. long; pedicels ¾–1 lin. long; bract ovate, concave, ¾–⅞ lin. long. Receptacle about 1 lin. long, constricted above, tomentose. Calyx ascending, ¼ lin. long, hardly lobed, tomentellous outside, densely ciliate. Corolla nearly 2 in. long, clavate at the apex in bud, woolly-pubescent outside; tube nearly 1½ in. long, basal swelling slight, 3½ lin. long; lobes spathulate, nearly ½ in. long, upper enlarged part elliptic, 1½ lin. long, ⅞–1 lin. broad. Filaments inserted about 1 lin. above the base of the corolla-lobes, about 4 lin. long; anthers elliptic-oblong, ⅝–¾ lin. long, transversely septate, cells 3–4 in each vertical row. Disc ⅛ lin. high, densely pilose. Style very slightly skittle-shaped above. Young berry ¼ in. long.

Lower Guinea. Angola: Golungo Alto; by the Delamboa River, on *Sterculia* and *Acacia* spp., *Welwitsch*, 5283! 5284! right-hand side of the Ambaca road, *Welwitsch*, 5285!

47. **L. cinereus,** *Engl. in Engl. Jahrb.* xx. 103, *t.* 2, *fig. C.* A densely branched shrublet, 1–1½ ft. high. Young branchlets whitish- or greyish-tomentose, older ones glabrous. Leaves opposite, elliptic-oblong or ovate-oblong, rounded at the apex, cuneate, obtuse or rounded at the base, ¾–1¾ in. long, ½–1⅙ in. broad, densely whitish- or greyish-pubescent in a young state, inconspicuously puberulous in the adult state, fleshy, brittle, pale green; petiole 1½–3 lin. long. Umbels axillary, solitary or fascicled, 3–4-flowered, whitish-floccose-tomentose; peduncle 1–2 lin.

long; pedicels $\frac{3}{4}$–1 lin. long; bract broadly ovate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Receptacle about $\frac{7}{8}$ lin. long, densely whitish-tomentose. Calyx $\frac{1}{2}$–$\frac{5}{8}$ lin. long, distinctly 5-lobed, lobes triangular. Corolla nearly $1\frac{3}{4}$ in. long, pale rose-coloured, purple inside, whitish-floccose-tomentellous outside below, sparingly so above, basal swelling oblong-ellipsoid, $2\frac{3}{4}$–3 lin. long, upper part narrowly 5-winged in bud; lobes erect, spathulate, $8\frac{1}{2}$ lin. long, the upper enlarged part ovate or narrowly ovate, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, hardly $1\frac{1}{4}$ lin. broad, including the thin margins, which are $\frac{1}{4}$–$\frac{3}{8}$ lin. broad. Stamens and style orange-coloured. Filaments inserted at the base of the corolla-lobes, about 6 lin. long, finally involute; anthers linear, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, cells 5–6 in each of the 2 outer rows, 7–8 in each of the inner. Disc crenately 5-lobed, $\frac{1}{4}$ lin. high, fleshy. Style not appreciably thickened upwards; stigma ovoid or ellipsoid, $\frac{3}{8}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 928; Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 131; Engl. & Gilg in Baum, Kunene-Samb. Exped. 227. *Phragmanthera cinerea*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 262.

Lower Guinea. Angola: Mossamedes; near S. João do Croque, Rio Croque, Cabo Negro, on *Tamarix orientalis*, Forsk., *Welwitsch*, 4884! Rio Croque, *Johnston!* near Garganto do Diabo, 650 ft., *Baum*, 4! Umpupe, on the Coroca River, 1000 ft., *Baum*, 6!

48. **L. Guerichii,** *Engl. in Engl. Jahrb.* xix. 130. Branches stout, about $2\frac{1}{2}$ lin. in diam. in a dried state 1 ft. below the apex, youngest part tawny-tomentose with much-branched hairs, soon becoming glabrous, greyish-brown, slightly glossy, deeply grooved in a dried state. Leaves alternate or subopposite, elliptic or ovate-elliptic, obtuse or rounded at both ends, 5–7 lin. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, coriaceous, densely tawny-stellate-tomentose; petiole $1\frac{1}{2}$–2 lin. long. Flowering branchlets arising in the axils of fallen leaves, much contracted, bearing 1–2 pairs of leaves at the base. Flowers shortly pedicelled, usually geminate; pedicels about 1 lin. long; bract exceeding the receptacle and calyx, linear, obtuse, tapering very slightly upwards, $2\frac{1}{4}$ lin. long. Receptacle $1\frac{3}{4}$ lin. long, slightly constricted below the apex, tawny-tomentose. Calyx nearly obsolete. Corolla over $2\frac{1}{4}$ in. long, greyish-tomentose outside in a living state, tawny in a dried state, subcylindric and pointed in bud; tube $1\frac{1}{2}$ in. long, not swollen at the base; lobes erect, lanceolate-linear, about 10 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad above. Filaments inserted $1\frac{1}{2}$–2 lin. above the base of the corolla-lobes, about 4 lin. long, slightly tapering upwards; anthers linear, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, transversely septate, cells about 7–9 in each vertical row; connective apiculate. Disc sunk, crenately 5-lobed, $\frac{1}{4}$ lin. high. Style swollen at the base, upper part slightly skittle-shaped; stigma ellipsoid, $\frac{5}{8}$ lin. long.—Engl. l.c. xx. 84; Schinz in Bull. Herb. Boiss. iv. App. iii. 53.

Lower Guinea. German South-west Africa: Damaraland; Karibib, *Gürich*, 35! Hereroland; Stanley Mine, *Fleck*, 425!

49. **L. fulvus,** *Engl. in Engl. Jahrb.* xx. 103. Youngest part of branchlets densely fulvous-tomentose with verticillate-branched hairs in a dried state, older branchlets greyish, glabrous, wrinkled. Leaves

opposite, elliptic-oblong or ovate-oblong, rounded at base and apex, 1–1¾ in. long, ½–1 in. broad, stellate-pubescent on both surfaces; petiole 1–1½ lin. long. Umbels axillary or terminating an extremely short axillary 2-leaved branchlet, subsessile, solitary or geminate, 2-flowered, fulvous-tomentellous the bracts excepted; pedicels 1⅜–1⅝ lin. long; bract ovate-oblong, 1¼ lin. long, pubescent or puberulous outside. Receptacle 1¼–1⅜ lin. long. Calyx truncate or very slightly lobed, ⅕–¼ lin. long. Corolla 1¾–2 in. long, orange-coloured, tomentellous outside below the middle, puberulous above, basal swelling not conspicuous, oblong, 3–3½ lin. long, upper part 5-winged in bud; lobes erect, narrowly spathulate, 10½ lin. long, the upper enlarged part lanceolate, 4 lin. long, 1¼–1⅜ lin. broad including the thin margins, which are ⅜–½ lin. broad. Filaments inserted almost at the base of the corolla-lobes, 6–7 lin. long, tapering upwards, finally involute; anthers linear, 2½ lin. long, cells about 11 in each of the two outer rows, 13–16 in each of the inner. Disc crenately 5-lobed, ¼ lin. high, fleshy. Style not appreciably thickened upwards; stigma broadly ellipsoid, ⅜ lin. long. —Hiern in Cat. Afr. Pl. Welw. i. 928; Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 131. *Phragmanthera fulva*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 262.

Lower Guinea. Angola: Huilla; in the Monino forests, on *Dodonæa viscosa*, Jacq., and on a *Combretacea*, *Welwitsch*, 4886! Huilla, 5800–6000 ft., *Dekindt*, 23! 441! By the Kubango River, near Princeza Amelia, on *Dombeya* sp., *Gossweiler*, 3647!

50. **L. rubroviridis,** *Oliv. in Hook. Ic. Pl. t.* 1464. Young branchlets velvety-pubescent, adult ones glabrous, wrinkled, lenticellate, up to 2½ lin. in diam. Leaves opposite or subopposite, lanceolate, obtuse at the apex, cuneate at the base, 3–4 in. long, 1–1⅓ in. broad, thinly coriaceous, pubescent on both surfaces; lateral nerves very oblique, 2–3 on each side of the midrib; petiole 4–7 lin. long. Umbels 13–18-flowered; peduncle 7–8 lin. long, velvety-pubescent; pedicels 1¼ lin. long, velvety-pubescent; bract narrowly lanceolate from a saucer-shaped base, acute or subacute at the apex, 4½–8 lin. long, 1–3 lin. broad, velvety-pubescent on both surfaces, lateral and ventral margin saucer-shaped, ⅕–¼ lin. long. Receptacle hardly ⅞ lin. long, ciliate, shortly and densely pilose outside. Calyx ⅛ lin. long, intramarginal ring 1/16–1/12 lin. long, ciliate. Corolla rather under 1 in. long, shortly and densely pilose outside; tube 1¼–1½ lin. long; limb split unilaterally; lobes 9½–10½ lin. long, remaining connate in a single piece, involute at the apex, the lowermost 2½ lin. of the lobes darker than the upper part, with inflexed ciliate margins. Filaments inserted 1¾–2 lin. above the base of the corolla-lobes, about 6 lin. long, nearly glabrous, lower part filiform, about 4 lin. long, eventually contracted into a tendril-like spiral, upper part 2 lin. long, gradually thickened upwards, inflexed, the uppermost ⅛ lin. again narrower, reflexed; anthers oblong-linear, 1⅜ lin. long; connective rounded at the apex. Disc 5-lobed, ⅛–⅙ lin. high.—Engl. in Engl. Jahrb. xx. 83; Pfl. Ost-Afr. C. 165. *Oliverella rubroviridis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 259.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; opposite Sena, on *Uvaria* sp., *Kirk!*

Var. *bechuanica*, Sprague. Pedicels $\frac{5}{8}$ lin. long; bract narrowly oblong, obtuse, $1\frac{3}{8}$–2 lin. long, $\frac{3}{8}$–$\frac{5}{8}$ lin. broad. Corolla-tube $\frac{3}{4}$–$1\frac{1}{8}$ lin. long; lobes $8\frac{1}{2}$ lin. long, slightly inflexed at the apex. Filaments inserted $1\frac{1}{4}$–$1\frac{1}{2}$ lin. above the base of the corolla-lobes, the lowermost 4 lin. minutely papillate-pilose.

Mozamb. Distr. Bechuanaland: Eastern Bamanguato Territory; between Nagatatollo and Henrys-pan, *Holub!*

Differs from typical *L. rubroviridis* in the much smaller bracts.

51. **L. Hildebrandtii,** *Engl. in Engl. Jahrb.* xx. 96. Young branchlets coarsely pubescent, adult ones glabrous, lenticellate. Leaves opposite or subopposite, lanceolate, acute at the apex, cuneate at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 5–8 lin. broad, more rarely ovate, $1\frac{1}{4}$–2 in. long, $\frac{2}{3}$–$1\frac{1}{4}$ in. broad, thinly coriaceous, sparingly pubescent on both surfaces, eventually nearly glabrous; lateral nerves very oblique, 3–4 on each side of the midrib; petiole 3–5 lin. long. Umbels about 18-flowered; peduncle $1\frac{1}{2}$ lin. long, pilose; pedicels $\frac{7}{8}$ lin. long, densely pilose; bract subulate from a saucer-shaped base, 2–$2\frac{1}{4}$ lin. long, densely pilose outside, ventral margin $\frac{1}{8}$ lin. long. Receptacle cupular, about $\frac{3}{4}$ lin. long, densely pilose. Calyx subtruncate, ciliate, $\frac{1}{16}$ lin. long, intramarginal ring $\frac{1}{16}$ lin. long, glabrous. Corolla about 9 lin. long, pilose outside; tube 2–$2\frac{1}{2}$ lin. long, with 5 appendages inside inserted above the middle, appendages alternating with the corolla-lobes, triangular, deflexed, $\frac{3}{8}$ lin. long, pilose; limb splitting unilaterally; lobes about $6\frac{1}{2}$ lin. long, remaining connate in a single piece, reflexed, involute at the apex, pilose within below the insertion of the stamens on the adnate part of the filament and the margins. Filaments inserted 3–$3\frac{1}{2}$ lin. above the base of the corolla-lobes, $2\frac{1}{2}$ lin. long, glabrous, broadened upwards, the uppermost $\frac{1}{6}$ lin. again narrowed; anthers oblong-linear, $\frac{3}{4}$ lin. long; connective emarginate-bicuspidate. Disc 5-lobed, $\frac{1}{6}$ lin. high.—Pfl. Ost-Afr. C. 165, t. 15, ff. J–L. *Oliverella Hildebrandtii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 259.

Nile Land. Mittu: near Moslo, by the River Rohl, *Schweinfurth*, 2858. British East Africa: Taita; Ndi Mountain, *Hildebrandt*, 2523! 2852.

Mozamb. Distr. German East Africa: Kilimanjaro Region; Meru Mountain, *Fischer*, 534.

L. orientalis, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 131 (= *Oliverella Sacleuxii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 259), from Zanzibar, is said to differ from *L. Hildebrandtii* in having smaller flowers. No description of it has been published, and I have not seen the type.

52. **L. Bussei,** *Sprague*. Branchlets nodose, about $1\frac{1}{4}$ lin. in diam. 1 ft. below the apex, puberulous in a young state, quickly becoming glabrous, densely lenticellate. Leaves opposite, lanceolate, obtuse, cuneate into the base, 2–$2\frac{1}{2}$ in. long, 8–11 lin. broad, coriaceous, glabrous; lateral nerves oblique, raised on both surfaces; petiole $2\frac{1}{2}$–4 lin. long. Peduncle 1 lin. long; pedicels $\frac{5}{8}$–$\frac{3}{4}$ lin. long, sparingly puberulous; bract lanceolate from a cup-shaped base, with a long

subulate dorsal horn, $\frac{3}{4}$–1 lin. long without the horn, $1\frac{1}{4}$–2 lin. long including the horn, $\frac{3}{8}$ lin. broad, ciliate, ventral margin $\frac{1}{6}$ lin. long. Receptacle under $\frac{1}{2}$ lin. long, glabrous. Calyx $\frac{1}{8}$–$\frac{1}{6}$ lin. long, slightly lobed, ciliate. Corolla red, $6\frac{1}{2}$–7 lin. long, sparingly puberulous outside, with 5 appendages inside inserted $\frac{3}{4}$–1 lin. above the base, appendages alternating with the corolla-lobes, deflexed, triangular, pilose; lobes remaining connate in a single piece, pilose within below the insertion of the stamens on the adnate part of the filament and the margins. Filaments glabrous, broadened upwards; anthers oblong-linear, $\frac{3}{4}$ lin. long; connective emarginate-bicuspidate. Disc about $\frac{1}{8}$ lin. high, hardly lobed.

Mozamb. Distr. German East Africa: Lindi District; Mtange, on the way to Lindi, *Busse*, 2462! Lindi, *Busse*, 2997! Namguru, *Busse*, 2949! Nondora, *Braun*, 1254!

53. **L. campestris,** *Engl. in Engl. Jahrb.* xx. 95. Young branchlets slender, densely and shortly pilose, adult ones stout, terete, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. in diam., greyish, rather prominently lenticellate; internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite or subopposite, elliptic or ovate-oblong, obtuse or rounded at the apex, obtuse or subcuneate at the base, $\frac{2}{3}$–$1\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. broad, coriaceous, more or less pilose, especially on the lower surface; lateral nerves about 3 on each side, arcuate, ascending, raised on both surfaces; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, densely and shortly pilose. Umbels subsessile; peduncle 1 lin. long; pedicels $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract oblong or lanceolate-oblong from a flat circular base, keeled, $\frac{7}{8}$–1 lin. long, keel more or less produced above into a short horn. Receptacle and calyx together $1\frac{1}{2}$ lin. long, densely greyish-pilose in a young state. Corolla 7 lin. long, pilose outside, and pilose on the adnate part of the filaments; tube $1\frac{1}{4}$ lin. long, with 5 appendages inserted below the middle, appendages alternating with the corolla-lobes, deflexed, triangular, pilose; lobes ciliate on their inner margin, upper enlarged part of the lobes $1\frac{1}{2}$–2 lin. long, $\frac{3}{4}$ lin. broad. Anthers linear, $\frac{7}{8}$–1 lin. long; connective produced beyond the cells, emarginate-bicuspidate.—Pfl. Ost-Afr. C. 165, t. 15, ff. E–H. *Oliverella campestris*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 259.

Mozamb. Distr. German East Africa: Usambara; Kumba Valley, near Masheua, 1500 ft., *Holst*, 3504!

54. **L. opacus,** *Sprague*. Young branchlets subterete, greenish-grey, glabrous, older ones greyish, coarsely lenticellate; internodes 1–3 in. long. Leaves opposite, ovate-lanceolate, acuminate to the acute or obtuse apex, cuneate at the base, $2\frac{1}{4}$–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–2 in. broad, coriaceous, glabrous, dull and very finely wrinkled in a dried state, not reticulate; nerves very oblique, 2 on each side of the midrib, concealed on the upper surface, raised on the lower; margin finely crinkled in a dried state; petiole $1\frac{1}{2}$–3 lin. long, flattened on the upper surface. Umbels axillary, fascicled, 3–4-flowered; peduncle $\frac{3}{4}$–1 lin. long; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long, inserted in cupular sockets; bract obliquely cupular or obliquely saucer-shaped, hardly $\frac{3}{4}$ lin. long, minutely ciliate, dorsal margin

$\frac{1}{2}$ lin. long, not umbonate, ventral margin $\frac{1}{8}$–$\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, $\frac{7}{8}$ lin. long; receptacle with 5 conspicuous depressions outside. Calyx subtruncate, minutely ciliate, hardly $\frac{1}{2}$ lin. long. Corolla $1\frac{1}{4}$ in. long, apical swelling of the bud not winged, suprabasal swelling ellipsoid, $1\frac{3}{4}$–2 lin. long, $\frac{1}{4}$–$\frac{3}{8}$ lin. above the base; tube bilobed to within $4\frac{1}{2}$ lin. from the base, glandular within; lobes elongate-spathulate, 8 lin. long. Filaments 6 lin. long; anthers oblong, slightly emarginate-biapiculate, $\frac{5}{8}$ lin. long. Disc $\frac{1}{6}$ lin. high, fleshy. Neck of the style $\frac{5}{8}$ lin. long; stigma broadly ovoid-spindle-shaped, $\frac{3}{8}$–$\frac{1}{2}$ lin. long.

Lower Guinea. Gaboon River, *Mann!*

55. **L. Dinklagei,** *Engl. in Engl. Jahrb.* xx. 94, *t.* 2, *fig. A.* Young branchlets slender, subangular, finely striate, glabrous, greyish, older ones finely lenticellate. Leaves opposite, ovate or lanceolate, acuminate to the obtuse or subacute apex, obtuse or rounded at the base, $1\frac{3}{4}$–4 in. long, $\frac{2}{3}$–$1\frac{3}{4}$ in. broad, coriaceous, glabrous, minutely reticulate; lateral nerves very oblique, 2–3 on each side, slightly arcuate, indistinctly anastomosing; petiole 2–4 lin. long, channelled. Umbels axillary, fascicled, 4–6-flowered; peduncle $2\frac{1}{2}$–$5\frac{1}{2}$ lin. long; pedicels about 2 lin. long; bract obliquely cupular, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, ciliate, dorsal margin $\frac{1}{2}$–$\frac{3}{4}$ lin. long, umbonate on the lower half, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, $1\frac{1}{8}$–$1\frac{3}{8}$ lin. long. Calyx irregularly lobed, ciliate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Corolla $1\frac{1}{3}$ in. long, apical swelling of the bud narrowly winged, basal swelling ellipsoid or obovoid, $1\frac{5}{8}$–2 lin. long; tube split unilaterally or irregularly, glandular within; lobes elongate-spathulate, 8 lin. long. Filaments 7 lin. long, broadened towards the apex, cohering together until after the expansion of the corolla-lobes; anthers oblong, emarginate-biapiculate, $\frac{5}{8}$ lin. long. Disc pentagonal, $\frac{1}{8}$ lin. high, fleshy. Style glabrous, neck $\frac{5}{8}$ lin. long; stigma cushion-shaped, $\frac{5}{8}$ lin. in diam. Berry subglobose, 2 lin. in diam., apical cup cylindric, 1 lin. long.—*L. bipindensis*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 132, name only. *L. Ledermannii*, Engl. & Krause in Engl. Jahrb. xliii. 404. *Globimetula Dinklagei*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Upper Guinea. Cameroons: Victoria, *Hanke*, 622! Kribi, *Winkler*, 799! Great Batanga, *Dinklage*, 803! 1400! Elephant Mountain; Nkolebunde, *Ledermann*, 708! 972! Bipinde, *Zenker*, 1139! 2838! 3452! 3579!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 243!

Soyaux, 243, differs in some respects from typical *L. Dinklagei*, and may possibly represent a distinct species. The internodes are longer, and the lateral nerves of the leaves less oblique. The persistent calyx, which forms a cup crowning the berry, is shorter and broader than in the type.

56. **L. oreophilus,** *Oliv. in Journ. Linn. Soc.* vii. 196. Young branchlets brown, slightly glossy, compressed above, subterete and lenticellate below, glabrous, older ones yellowish-brown, longitudinally lenticellate; internodes 1–$1\frac{3}{4}$ in. long. Leaves opposite, ovate-oblong or lanceolate, obtuse or shortly acuminate to an obtuse apex,

rounded or subcordate at the base, $2\frac{1}{2}$–4 in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous, slightly glossy; lateral nerves 4–5 on each side, patulous, arcuate-ascending, anastomosing well within the margin; petiole 4–7 lin. long. Umbels axillary, fascicled, about 20-flowered; peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long; pedicels 2–$2\frac{1}{2}$ lin. long; bract obliquely cupular, 1–$1\frac{1}{8}$ lin. long, ciliate, dorsal margin $\frac{7}{8}$ lin. long, umbonate on the lower half, ventral margin $\frac{3}{8}$ lin. long, more or less toothed. Receptacle and calyx together campanulate, 1–$1\frac{1}{8}$ lin. long. Calyx irregularly lobed, ciliate, $\frac{1}{2}$ lin. long. Corolla $1\frac{1}{2}$ in. long, split unilaterally to within $6\frac{1}{2}$ lin. above the base, apical swelling of the bud not winged, basal swelling obovoid, pentagonal, 2 lin. long; tube glandular within; lobes elongate-spathulate, $8\frac{1}{2}$ lin. long from the point of insertion of the filaments, remaining united nearly to the apex. Filaments 7 lin. long, broadened towards the apex; anthers oblong, emarginate, $\frac{7}{8}$ lin. long. Disc $\frac{1}{4}$ lin. high, fleshy. Style glabrous, neck 1 lin. long; stigma cushion-shaped, $\frac{1}{2}$–$\frac{5}{8}$ lin. in diam., grooved on the upper surface.—Engl. in Engl. Jahrb. xx. 83; Engl. Hochgebirgsfl. Trop. Afr. 197. *Globimetula oreophila*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Upper Guinea. Cameroons: Cameroon Mountain, 6000–8000 ft., *Mann*, 2163! 1210! Buea, 7000–8300 ft., on *Hypericum angustifolium*, Lam., *Preuss*, 811!

57. **L. mayombensis,** *De Wild. Miss. É. Laurent*, 78. Young branchlets compressed towards the apex, smooth, yellowish-green, glabrous, slightly glossy, nodes very prominent. Branches fairly stout, cylindric, $2\frac{1}{2}$–3 lin. in diam. about 1 ft., and 4 lin. in diam. $1\frac{1}{2}$ ft. below the apex, yellowish-green or yellowish-brown, densely lenticellate; internodes 2–$4\frac{1}{2}$ in. long. Leaves opposite or subopposite, broadly ovate-elliptic or elliptic, rounded at the apex, rounded or truncate at the base, $3\frac{1}{2}$–$6\frac{1}{2}$ in. long, $2\frac{1}{2}$–5 in. broad, coriaceous, glabrous, dull; lateral nerves about 4 on each side, ascending or patulous-ascending, slightly raised on both surfaces, the lowest or two lowest pairs produced beyond their junction with the nerves next above into a series of loops round the margin; midrib much raised on the lower surface; petiole 6–9 lin. long, stout, flattened on the upper surface. Umbels axillary, fascicled, 4–6-flowered; peduncle $3\frac{1}{2}$–7 lin. long, much swollen at the base; pedicels $1\frac{1}{2}$–2 lin. long; bract obliquely cupular, dorsal margin $\frac{7}{8}$–1 lin. long, produced into a truncate lobe, ventral margin $\frac{1}{2}$ lin. long, suberect. Receptacle and calyx together campanulate, $1\frac{1}{2}$ lin. long. Calyx truncate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Corolla about $1\frac{1}{2}$ in. long, apical swelling of the bud not winged, basal swelling obovoid, $1\frac{3}{4}$–2 lin. long; tube split unilaterally to within 5–6 lin. from the base, glandular inside; lobes elongate-spathulate, 7 lin. long above the insertion of the filaments, apical enlargement elliptic, very concave, $1\frac{1}{4}$ lin. long when flattened out, $\frac{7}{8}$ lin. broad. Anthers cuneate, emarginate, $\frac{5}{8}$ lin. long. Disc sunk, inconspicuous, $\frac{1}{8}$ lin. high. Style glandular-papillate on the angles in the upper part, neck $\frac{5}{8}$ lin. long; stigma peltate, $\frac{1}{2}$ lin. in diam. Berry ellipsoid, about 4 lin. long, apical cup $\frac{5}{8}$ lin. long.

Lower Guinea. Lower Congo: Mayombe; Benza-Masola, *Laurent!*

58. **L. Braunii,** *Engl. in Engl. Jahrb.* xx. 93. Young branchlets dark brown, finely striate, glabrous, 1½ lin. in diam. 1 ft. below the apex, older ones paler. Leaves opposite, elliptic or elliptic-oblong, rounded at base and apex, sometimes minutely apiculate, 1¼–3½ in. long, ⅔–2½ in. broad, penninerved, thinly coriaceous, glabrous; petiole 2½–4 lin. long. Umbels axillary, fascicled, 4–8-flowered; peduncle ¼–¾ in. long; pedicels 1¼–2 lin. long; bract obliquely ovate-saucer-shaped, glandular-ciliate, dorsal margin ½ lin. long, ventral margin patulous, ¼ lin. long. Receptacle and calyx together shortly urceolate, ¾ lin. long. Calyx minutely and sparingly glandular-ciliate, ¼–⅜ lin. long. Corolla 1¼–1⅓ in. long, basal swelling subglobose, 1¼ lin. in diam., or more rarely ellipsoid, 2¼ lin. long; tube bilobed to within 3½–5 lin. from the base, glandular within; lobes 7½–8½ lin. long, lower part linear, 6–7 lin. long, upper part ovate, acute, 1½ lin. long, ⅞–1 lin. broad. Filaments 5½–6½ in. long; anthers cuneate, ¾ lin. long, emarginate in a young state. Disc ⅕–¼ lin. high, fleshy. Style minutely glandular-papillate; stigma peltate, ¾ lin. in diam., 10-ribbed beneath. Berry depressed-globose, nearly 3 lin. in diam., 2½ lin. long, apical cup hardly ¼ lin. long.—*L. nigrescens*, De Wild. & Th. Dur. Ill. Fl. Congo, 177, t. 89; Études Fl. Bas- et Moyen-Congo, i. 29, 237. *Globimetula Braunii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Upper Guinea. Lagos: Ilaro, *Punch*, 40! Igbajun, *Moloney*, 24!

Lower Guinea. Spanish Gaboon: Muni (Danger) River, *Mann*, 1833! Lower Congo: Banana District; Moanda, *Gillet*, 3236. Banana Creek, on *Citrus Aurantium*, Linn., *Monteiro!* Kisantu, *Gillet*, 1310! valley of the Djuma River, *Gillet*, 2745, *Gentil.*

Var. *Zenkeri*, Sprague. Leaves suborbicular or broadly ovate, elliptic, subcordate or cordate at the base, 2–5 in. long, 1½–3 in. broad.—*L. Zenkeri*, Engl. in Engl. Jahrb. xx. 95. *Globimetula Zenkeri*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann*, 2294! Cameroons: Yaunde, *Zenker*, 595!

Var. *Laurentii*, Sprague. Leaves elliptic or elliptic-oblong, obtuse at the base, 1½–3¼ in. long, 1–2 in. broad. Bract obliquely ovate-saucer-shaped.—*L. Laurentii*, Engl. in Comptes-rendus Soc. Bot. Belg. xxxix. 25; De Wild. & Th. Dur. Contrib. Fl. Congo, i. 54; De Wild. Énum. Pl. Laurent, 27; Miss. É. Laurent, 77; Études Fl. Bas- et Moyen-Congo, i. 237, ii. 124.

Nile Land. Uganda: Mabira Forest, *Ussher*, 18!

Lower Guinea. Lower Congo: Kisantu, *Gillet!* Sanda, *Oddon in Herb. Gillet*, 384. Angola: between the Longa River and Luassinga, *Gossweiler*, 2704!

South Central. Belgian Congo: Equator District; Eala, *Laurent*, 1189! Bombinha, *Laurent*, 1587. Bangala District; Bumba, *Laurent!* Aruwimi District; Basoko, *Laurent*. Welle District; Guago, *Seret*, 278. Bomokandi District; Amadis, *Seret*, 340.

Ussher, 18! and Gossweiler, 2704! differ from the other specimens quoted in their leaves, which are narrower in proportion and more coriaceous.

Var. *Descampsii*, Sprague. Leaves ovate-oblong or broadly elliptic, obtuse at the base, 2–3 in. long, 1–2 in. broad. Bract obliquely cupular.—*L. Descampsii*, Engl. in Comptes-rendus Soc. Bot. Belg. xxxix. 25.

South Central. Belgian Congo: Lomami River, *Descamps !*

Var. *unguiformis*, Sprague. Leaves ovate or ovate-oblong, rounded at the base, 2¼–4 in. long, 1⅙–2¼ in. broad. Bract obliquely ovate-saucer-shaped.—*L. unguiformis*, Engl. in Engl. Jahrb. xx. 94. *L. elongatus*, De Wild. Miss. É. Laurent, 75, t. 34; Études Fl. Bas- et Moyen-Congo, ii. 124. *Globimetula unguiformis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Lower Guinea. French Congo: Loango; Chinchocho, *Soyaux*, 52!

South Central. Belgian Congo: Equator District; Irebu, *Laurent*, 658. Kasai District; Bulebu, *Laurent*.

After long consideration it has seemed best to group *L. nigrescens*, *Zenkeri*, *Laurentii*, *Descampsii*, *unguiformis* and *elongatus* under *L. Braunii*. The differential characters on which the species were founded do not appear to be constantly correlated, and some of them seem to represent merely different stages of development. This is especially the case with characters derived from the flower-bud. The shape of the basal swelling of the corolla does not appear to be very constant in species of *Loranthus:* typical *L. Braunii* has usually a globose swelling, but Monteiro's specimen from Banana Creek has an ellipsoid swelling, though agreeing in other respects with the type.

59. **L. mweroensis,** *Baker in Kew Bulletin*, 1895, 292. Branchlets terete, slightly costate, greenish, glabrous, finely lenticellate; branches wrinkled, coarsely lenticellate; internodes ¾–3 in. long. Leaves ternate, lanceolate, apex not known, base obtuse, 3¼–4½ in. long, 1¼–2 in. broad coriaceous, glabrous, dull; lateral nerves patulous-ascending, 4–5 on each side, slightly raised especially on the lower surface; petiole 6–7 lin. long, channelled. Umbels fascicled on the old wood, 6–7-flowered; peduncle 4–4½ lin. long; pedicels 1 lin. long; bract subequal to the calyx and receptacle, obliquely ovate-saucer-shaped, ciliate, dorsal margin ¾ lin. long, ascending, umbonate on the lower half, ventral and lateral margins ¼ lin. long, spreading. Receptacle and calyx together suburceolate, ¾–⅞ lin. long. Calyx sparingly denticulate, ¼–⅜ lin. long. Corolla 1½ in. long, apical swelling of the bud cushion-shaped, 5-ribbed, basal swelling ellipsoid, 1¼ lin. long; tube glandular within; lobes elongate-spathulate. Anthers cuneate, emarginate, 1¼ lin. long, cells diverging upwards. Disc ¼ lin. high, fleshy. Stigma peltate, ¾ lin. in diam.

Mozamb. Distr. Rhodesia: Moero Plateau, *Carson*, 27! Salisbury, on *Protea* sp., *Rand*, 532!

Rand's specimen differs from the type in the leaves, which are elliptic-oblong, rounded or obtuse at the apex, 2–3 in. long, 1–1¼ in. broad. It may possibly represent a distinct species.

60. **L. anguliflorus,** *Engl. in Engl. Jahrb.* xx. 107. A big radiately-branched shrub. Young branchlets slender, glabrous, dark, adult ones rather stout, wrinkled, yellowish-brown, 3 lin. in diam. 1 ft. below the apex; internodes ½–1¾ in. long. Leaves opposite, elliptic, broadly ovate or suborbicular, apex rounded, base obtuse, 1½–2¼ in. long, 1–2 in. broad, chartaceous or thinly coriaceous, glabrous, about 7-nerved at or shortly above the base; nerves slightly raised on both surfaces; petiole 5–10 lin. long. Umbels axillary, fascicled, 3–6-

flowered; peduncle 3–6 lin. long; pedicels 1–2 lin. long; bract broadly ovate from a saucer-shaped base, truncate, ciliolate, 1–1½ lin. long, dorsal margin ¾–1¼ lin. long, ventral margin spreading or patulous, ¼ lin. long. Receptacle and calyx together campanulate, 1 lin. long; receptacle ½ lin. long. Calyx ½ lin. long, hardly lobed. Corolla clavate in bud, narrowly 5-winged, about 1¼ in. long, pale rose outside, greenish inside; tube split unilaterally, basal swelling ellipsoid, about 2 lin. long; lobes elongate-spathulate, about 8½ lin. long. Filaments 6½ lin. long; anthers cuneate-oblong, 1¼–1½ lin. long. Disc pentagonal, ⅕ lin. high. Style glandular-papillate on the angles, neck 1⅗–1½ lin. long; stigma peltate, ⅞–1 lin. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 930. *Globimetula anguliflora*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Lower Guinea. Angola: Huilla; at Lake Ivantala, *Welwitsch*, 4887! Malange; Cutoto River, Kimbundo Jamaiambe, *Gossweiler*, 3204!

Goetze, 1003! from the Kinga (Livingstone) Mountains, German East Africa, has been referred to *L. anguliflorus* by Engler in Engl. Jahrb. xxx. 301. It differs from the type, however, in having thickly coriaceous leaves, shorter petioles (3–4 lin. long), and larger receptacle and calyx; most of the leaves are very distinctly penninerved, with patulous lateral nerves, but a few of them are several-nerved from the base, as in the type of *L. anguliflorus*.

61. **L. cupulatus,** *DC. Prodr.* iv. 298. Branches terete, slightly compressed towards the apex; branchlets rusty-hirsute. Leaves petioled, ovate or oblong, subacute at the apex, more or less cordate at the base, coriaceous, rusty-pubescent in a young state; petioles rusty-pubescent. Umbels many-flowered; peduncle very short, rusty-pubescent; bract cupular; flowers rusty-pubescent. Corolla in bud with a globose pentagonal swelling at the apex; tube cylindric. Berry obovoid-globose.—*Globimetula cupulata*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 264.

Upper Guinea. Senegambia: Casamance, *Perrottet & Leprieur*.
Known to me only from the inadequate description in DC. Prodr.

62. **L. erectus,** *Engl. in Engl. Jahrb.* xx. 99. Much branched. Young parts densely rusty-tomentose with branched hairs. Branchlets nodose, greyish, scurfy; internodes ¼–½ in. long. Leaves opposite, elliptic or elliptic-oblong, rounded at the apex, rounded, truncate or subcordate at the base, ¾–2 in. long, ⅓–1¼ in. broad, coriaceous, upper surface scurfy-puberulous, with slightly sunk midrib, lower rusty-tomentose; petiole ¾ lin. long. Racemes longer than the leaves, up to 2 in. long, densely rusty-tomentose; pedicels 1 lin. long; bract cymbiform, 1 lin. long, densely rusty-tomentose outside. Receptacle and calyx together 1 lin. long, rusty-tomentose. Corolla densely rusty-pubescent outside; tube 4½–5 lin. long, slightly constricted above the base; lobes spathulate-linear, 11 lin. long, ⅜ lin. broad about the middle, ½ lin. broad above. Stamens inserted 2½ lin. above the base of the corolla-lobes; filaments 6 lin. long; anthers linear, 1¾ lin. long. Style slender, pentagonal, 1¼ in. long; stigma compressed, broadly elliptic,

$\frac{3}{8}$ lin. long.—Pfl. Ost-Afr. C. 166, t. 16, figs. A–C; Engl. & Prantl, Pflanzenfam. Nachtr. i. 129. *Oedina erecta*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 249.

Mozamb. Distr. Usambara; Mtai, by the stream Tewe, on *Agauria salicifolia*, Hook. f., *Holst*, 2460, 2466!

63. **L. pœcilobotrys,** *Werth, Veg. Ins. Sansibar*, 35. Branchlets terete, dark brown, nearly smooth, $1\frac{1}{2}$ lin. in diam. 9 in. below the apex, rusty-pilose in a young state; internodes 1–$1\frac{1}{4}$ in. long. Leaves subopposite, subsessile, broadly ovate, rounded at the apex, cordate at the base, 1–$1\frac{3}{4}$ in. long, 1–$1\frac{1}{3}$ in. broad, chartaceous or thinly coriaceous, rusty-pilose in a young state, soon becoming glabrous; lateral nerves 2–3 on each side, patulous, very slightly raised on both surfaces; petiole bout $\frac{1}{4}$ lin. long. Racemes axillary, solitary, about 10-flowered, exceeding the leaves; peduncle 7–10 lin. long, stellate-puberulous; rhachis 4–7 lin. long; pedicels $\frac{3}{4}$–1 lin. long, rusty-pilose; bract erect, ovate-anceolate, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, rusty-pilose outside; insertion of the flower very oblique. Receptacle and calyx together cupular, $\frac{5}{8}$ lin. long, rusty-pilose. Calyx about $\frac{1}{12}$ lin. long. Corolla $1\frac{1}{3}$ in. long, minutely rusty-pilose outside with stellate hairs, basal swelling ovoid-globose, 1–$1\frac{1}{4}$ lin. long, remainder of tube funnel-shaped, 6 lin. long; lobes united in the shape of an hour-glass in bud, separating from below upwards, linear-spathulate from a triangular base, 9 lin. long. Filaments inserted $3\frac{1}{2}$ lin. above the base of the corolla-lobes, linear below, much broadened above; anthers hardly $\frac{3}{4}$ lin. long. Style broadened above.

Mozamb. Distr. Zanzibar: Mitschawi, *Werth!*

Very near *L. ambiguus*, Engl., from which it seems to differ in very little except the leaves.

64. **L. curvirameus,** *Engl. Pfl. Ost-Afr. C.* 165. Branchlets greyish, $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, finely and rather densely lenticellate; internodes $\frac{3}{4}$–$1\frac{3}{4}$ in. long. Leaves opposite, subopposite or alternate, obovate-oblong or more rarely obovate, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, rounded at the apex, obtuse or acute at the base, coriaceous, glabrous; lateral nerves 2–3 on each side, obliquely ascending, raised on both surfaces; petiole 2–5 lin. long. Racemes axillary, 1–3 together; peduncle up to 6 lin. long; rhachis $1\frac{1}{2}$–2 in. long, rather densely fulvous-pilose; pedicels about $\frac{1}{4}$ lin. long, fulvous-pilose; bract ovate, acute, shorter than the receptacle and calyx, fulvous-pilose. Receptacle and calyx together narrowly cupular, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, densely fulvous-pilose. Calyx about $\frac{1}{6}$ lin. long. Corolla nearly $1\frac{1}{2}$ in. long, rather densely fulvous-pilose outside with stellate hairs, basal swelling ovoid-oblong, 2 lin. long, remainder of tube funnel-shaped, $6\frac{1}{2}$ lin. long; lobes linear-spathulate from a triangular base, 9 lin. long. Filaments inserted about $3\frac{1}{4}$ lin. above the base of the corolla-lobes, linear below, broadened above; anthers truncate-emarginate (*Engler*). Disc $\frac{1}{8}$ lin. high. Berry ellipsoid, $2\frac{1}{2}$ lin. long.—Engl. Jahrb. xl. 523.

Mozamb. Distr. German East Africa: Usambara; Amani, *Braun*, 977! coast opposite Zanzibar; Vikindo, *Stuhlmann*, 6107!

65. **L. ambiguus,** *Engl. in Engl. Jahrb.* xx. 98. Youngest parts rusty-pubescent with short branched hairs, very soon glabrous; young branchlets dark, striate, older ones greyish, lenticellate; internodes $\frac{1}{3}$–$1\frac{1}{2}$ in. long. Leaves subopposite, elliptic, elliptic-oblong or ovate-oblong, obtuse or rounded at the apex, rounded or subcordate at the base, $1\frac{1}{3}$–3 in. long, $\frac{3}{4}$–$1\frac{1}{3}$ in. broad, coriaceous, glabrous, dull, penni-nerved; lateral nerves 4–5 on each side, arcuate-ascending, slightly raised, especially on the lower surface; petiole 1–3 lin. long. Racemes axillary, solitary or fascicled, equalling or exceeding the leaves, pilose with small stellate hairs; rhachis 1–$1\frac{1}{2}$ in. long; pedicels 1–$1\frac{1}{2}$ lin. long; bract broadly ovate or oblong, rounded, $\frac{3}{8}$–$\frac{1}{2}$ lin. long, strongly or slightly umbonate at or above the middle. Receptacle and calyx together cupular, $\frac{3}{4}$ lin. long. Calyx $\frac{1}{12}$ lin. long. Corolla $1\frac{1}{3}$ in. long, basal swelling ovoid-globose, $1\frac{1}{2}$ lin. long, remainder of tube funnel-shaped, 6–7 lin. long; lobes united in the shape of an hour-glass in bud, separating from below upwards, linear-spathulate from a triangular base, about 8 lin. long. Filaments inserted $2\frac{1}{2}$–$2\frac{3}{4}$ lin. above the base of the corolla-lobes, filiform, $1\frac{3}{4}$ lin. long, broadened towards the apex; anthers oblong, $\frac{5}{8}$ lin. long; connective hammer-headed. Disc annular, $\frac{1}{8}$ lin. high, fleshy. Style gradually broadened upwards to the stigma; stigma ellipsoid, $\frac{1}{4}$–$\frac{3}{8}$ lin. long.—Pfl. Ost-Afr. C. 166, t. 18, figs. D–F. *Oncella ambigua,* Van Tiegh. in Bull. Soc. Bot. France, xlii. 251.

Mozamb. Distr. German East Africa: Bagamoyo District; banks of the Wami River, *Hildebrandt,* 1032! Dar-es-Salaam, *Kirk!*

Var. *subacutus,* Engl. in Engl. Jahrb. xx. 99. Leaves narrowly oblong, subacute or obtuse at the apex, acute at the base.

Mozamb. Distr. German East Africa: Bagamoyo, *Stuhlmann,* 7! Dar-es-Salaam, *Stuhlmann,* 7316! Dunda, *Stuhlmann,* 6510!

66. **L. Sacleuxii,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 131. Internodes longer than in *L. ambiguus.* Leaves larger, nearly sessile. Racemes solitary. Basal swelling of the corolla smaller than in *L. ambiguus.* Anthers shorter.—*Oncella Sacleuxii,* Van Tiegh. in Bull. Soc. Bot. France, xlii. 251.

Mozamb. Distr. German East Africa: Bagamoyo, *Sacleux,* 676.

Perhaps identical with *L. pœcilobotrys,* Werth. I have not seen a specimen.

67. **L. Menyharthii,** *Engl. & Schinz ex Schinz, Pl. Menyharth.* 43. Young branchlets velvety-pilose, adult ones glabrous. Leaves alternate, obovate-oblong, elliptic-oblong or elliptic, rounded or obtuse at the apex, sometimes minutely apiculate, obtuse, subcuneate or rounded at the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, 5–10 lin. broad, coriaceous, velvety-pubescent on both surfaces, 3-nerved from shortly above the base; petiole $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Flowers axillary, solitary, subsessile; pedicels hardly $\frac{1}{2}$ lin. long; bract elongate-cupular, subtruncate or slightly 2-lipped, long-ciliate, pilose outside, slightly umbonate, margin about 1 lin. long. Receptacle and calyx together tubular, $3\frac{1}{4}$ lin. long, glabrous outside. Calyx $2\frac{3}{8}$–$2\frac{1}{2}$ lin. long, shallowly 5-lobed, rusty-ciliate;

lobes $\frac{1}{8}$–$\frac{1}{6}$ lin. long. Corolla under 2 in. long; tube not split unilaterally, lower part clavate, 3–3$\frac{1}{4}$ lin. long, upper part narrowly funnel-shaped, 4$\frac{1}{2}$ lin. long; lobes 1$\frac{1}{4}$–1$\frac{1}{3}$ in. long, linear, broadened into the base, uppermost quarter linear-lanceolate. Filaments inserted 5$\frac{1}{2}$–6 lin. above the base of the corolla-lobes, 7–8$\frac{1}{2}$ lin. long, slender and straight below, much thickened and involute above, with a few transverse grooves on the outer surface; anthers linear, 1$\frac{7}{8}$–2$\frac{1}{2}$ lin. long. Disc pentagonal, 5-lobed, $\frac{1}{5}$ lin. high. Stigma ellipsoid, $\frac{3}{8}$ lin. long.

Mozamb. Distr. Portuguese East Africa: Mambone, on mangrove trees, *Johnson*, 266! Lower Zambesi; Boroma, *Menyharth!* Tete, *Kirk!*

68. **L. Commiphoræ,** *Engl. in Engl. Jahrb.* xxviii. 380. Young branchlets pubescent, adult ones smooth, glabrous, greyish. Leaves opposite or subopposite, subsessile, oblong, oblanceolate or lanceolate-oblong, rounded at the apex, cuneate or obtuse at the base, 1–1$\frac{1}{4}$ in. long, 2$\frac{1}{2}$–4$\frac{1}{2}$ lin. broad, stellate-puberulous on both surfaces. Heads terminating much-contracted cushion-shaped short-shoots, which bear 1–2 pairs of leaves, 4-flowered; peduncle 7–8 lin. long, grooved, sparingly stellate-puberulous; bract oblong, rounded at the apex, 8$\frac{1}{2}$ lin. long, 2$\frac{1}{2}$ lin. broad, stellate-puberulous on both surfaces. Receptacle and calyx together cupular, 1$\frac{1}{2}$–1$\frac{5}{8}$ lin. long, subtruncate, densely villous below, sparingly pilose above, the villous band $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Calyx $\frac{7}{8}$–1 lin. long, ciliate, hairs about $\frac{1}{4}$ lin. long. Corolla 1$\frac{3}{4}$ in. long; tube 5$\frac{1}{2}$ lin. long, basal swelling obovoid-oblong, 2$\frac{1}{4}$ lin. long, the lowermost 1 lin. glabrous, remainder of tube rather densely pubescent with short stellate and longer little-branched hairs; lobes over 1$\frac{1}{4}$ in. long, subspathulate-linear, puberulous below. Filaments inserted 3$\frac{3}{4}$ lin. above the base of the corolla-lobes, about 8 lin. long, broadened above; anthers linear, 2$\frac{1}{4}$ lin. long. Disc $\frac{1}{8}$ lin. high. Stigma ellipsoid, $\frac{3}{8}$ lin. long.

Mozamb. Distr. German East Africa: Uhehe; by the Lukosse River, 2600 ft., on *Commiphora pilosa*, Engl., *Goetze*, 477!

69. **L. occultus,** *Sprague.* Young branchlets soon becoming glabrous except round the bases of the leaves, brownish, adult ones distinctly grooved, greyish. Leaves obovate-oblanceolate, rounded at the apex, cuneate into the base, 5$\frac{1}{2}$–7$\frac{1}{2}$ lin. long, 2$\frac{1}{2}$–3$\frac{3}{4}$ lin. broad, glabrous; petiole 2–2$\frac{1}{2}$ lin. long, whitish-tomentellous. Heads terminating much-contracted cushion-shaped short-shoots, 4-flowered; peduncle 6–7 lin. long, grooved, very sparingly stellate-puberulous; bract obovate-oblong, rounded at the apex, 8–9 lin. long, 3$\frac{1}{2}$–4$\frac{1}{2}$ lin. broad, glabrous. Receptacle and calyx together cupular, $\frac{7}{8}$ lin. long, densely whitish-villous outside, villous band exceeding the calyx by 1 lin. Calyx $\frac{1}{4}$ lin. long, villous-ciliate. Corolla whitish-villous outside in young bud, at the time of expansion glabrescent except at the constriction, over 1$\frac{3}{4}$ in. long; tube 6–6$\frac{1}{2}$ lin. long, basal swelling ellipsoid, 2 lin. long, constriction very evident, whitish-pilose; lobes subspathulate-linear, over 1$\frac{1}{4}$ in. long, reflexed above the insertion of the filaments. Filaments inserted 4 lin. above the base of the corolla-lobes, about 8 lin.

long, broadened above; anthers linear, $2\frac{1}{2}$ lin. long, biapiculate. Disc $\frac{1}{5}$ lin. high. Stigma ellipsoid, $\frac{1}{4}$ lin. long.

Mozamb. Distr. German East Africa: without precise locality, *Busse*, 1128!

70. **L. ulugurensis,** *Engl. in Engl. Jahrb.* xxviii. 381. Young branchlets and leaves villous-tomentose with rusty verticillate-branched hairs; branchlets about $1\frac{1}{4}$ lin. in diam. 1 ft. below the apex. Branches yellowish-grey, lenticellate, $2\frac{1}{2}$–3 lin. in diam.; internodes 2–$2\frac{1}{4}$ in. long. Leaves opposite, oblong or ovate-oblong, more rarely elliptic, rounded at the apex, deeply cordate at the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad, thinly coriaceous, upper surface glabrescent, dark brown in a dried state, lower surface coarsely rusty-pubescent with verticillate-branched hairs; lateral nerves hardly visible; midrib prominent on the lower surface, tomentose; petiole about 3 lin. long, rusty-tomentose with verticillate-branched hairs. Heads axillary, 4-flowered; peduncle about 1 lin. long, rusty-tomentose, villous at the apex; bract subfoliaceous, trough-shaped, $4\frac{1}{2}$ lin. long, $1\frac{3}{4}$–2 lin. broad when flattened out, glabrous inside near the base, elsewhere fulvous-tomentellous with verticillate-branched hairs. Receptacle and calyx together narrowly cupular, almost 1 lin. long; receptacle very densely villous with red erect branched hairs up to 1 lin. long. Calyx $\frac{1}{2}$ lin. long, truncate, not so densely villous as the receptacle, ciliate. Corolla orange, $1\frac{1}{2}$ in. long, clothed with long little-branched and short much-branched hairs, basal swelling narrowly obovoid-oblong, 2 lin. long, glabrescent below, remainder of tube $6\frac{1}{2}$ lin. long; lobes 9–10 lin. long, reflexed below the middle, lower half linear, upper half linear-oblanceolate. Filaments inserted $2\frac{1}{2}$–3 lin. above the base of the corolla-lobes, 4–$4\frac{1}{2}$ lin. long, lower half linear, upper half much-thickened, involute; anthers narrowly oblong, nearly $\frac{3}{4}$ lin. long. Disc pentagonal, $\frac{1}{6}$ lin. high. Style slender, very slightly thickened above; stigma ellipsoid-spindle-shaped, $\frac{3}{8}$ lin. long.

Mozamb. Distr. German East Africa: Uluguru; Nglewenu, *Stuhlmann*, 8832!

71. **L. virescens,** *N. E. Br. in Kew Bulletin*, 1906, 168. Young branchlets fulvous-tomentose with verticillate-branched hairs, older ones greyish, glabrous. Leaves opposite, elliptic or elliptic-ovate, rounded at the apex, rounded or hardly subcordate at the base, 1–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–1 in. broad, densely stellate-pubescent; petiole 2–4 lin. long. Umbels 4-flowered (or 5–7-flowered racemes, 1–3 additional flowers being inserted lower down the peduncle), axillary, or terminating axillary much-contracted short-shoots bearing 2 pairs of leaves; peduncle (or rhachis) $\frac{1}{2}$–$1\frac{1}{2}$ in. long, tomentellous; pedicels $1\frac{1}{2}$–4 lin. long; bract subfoliaceous, narrowly oblong, lanceolate, spathulate-oblong or recurved-trough-shaped, 3–6 lin. long, $\frac{5}{8}$–$1\frac{1}{2}$ lin. broad, pubescent on the lower surface, glabrous on the upper. Receptacle and calyx together cupular or subturceolate, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long, villous-tomentose outside. Calyx truncate or slightly 5-lobed, $\frac{1}{8}$–$\frac{1}{2}$ lin. long. Corolla 2–$2\frac{1}{4}$ in. long, hirsute-villous outside with branched hairs; tube about 8 lin. long, basal swelling

ovoid or ovoid-oblong, $3\frac{1}{2}$ lin. long; lobes linear, slightly broadened upwards, about $1\frac{1}{2}$ in. long. Filaments inserted $2\frac{1}{2}$–$3\frac{1}{2}$ lin. above the base of the corolla-lobes, straight, 9–10 lin. long, broadened above; anthers linear, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long; connective emarginate-mallet-headed. Disc crenately 5-lobed, $\frac{1}{6}$ lin. high, fleshy. Style acutely pentagonal below; stigma hardly $\frac{3}{4}$ lin. in diam.

Mozamb. Distr. British Central Africa: Nyasaland; Chikala, 2000 ft., *Purves*, 13! Shire Highlands, *Buchanan*, 49! Mashonaland: near Salisbury, *Hon. Mrs. Evelyn Cecil*, 147! *Rand*, 1374!

72. **L. ngamicus,** *Sprague*. Young branchlets tomentellous with verticillate-branched hairs, older ones glabrous, longitudinally wrinkled. Leaves opposite, elliptic or elliptic-oblong, rounded at the apex, obtuse or rounded at the base, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, 4–7 lin. broad, coriaceous, rather densely pubescent on both surfaces; petiole 1–$4\frac{1}{2}$ lin. long. Heads solitary, terminating much-contracted axillary short-shoots, 3–5-flowered; peduncle 4–12 lin. long, tomentellous; bract subequal to or shorter than the receptacle and calyx, ovate-oblong, very concave, $2\frac{1}{2}$–3 lin. long, tomentellous outside. Receptacle and calyx together cupular, $2\frac{1}{4}$–$2\frac{3}{8}$ lin. long, very densely villous from the base, villous band $1\frac{3}{4}$–2 lin. long. Calyx subtruncate or slightly lobed, more sparingly villous than the receptacle, long-ciliate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Buds subcylindric. Corolla greenish cream-coloured, about 2 in. long, densely silky-villous outside; tube 9 lin. long, basal swelling very slight, about $3\frac{1}{2}$ lin. long; lobes linear, broadened upwards, $1\frac{1}{4}$–$1\frac{1}{3}$ in. long, reflexed above the insertion of the filaments. Filaments inserted $2\frac{1}{2}$–$2\frac{3}{4}$ lin. above the base of the corolla-lobes, 9 lin. long; anthers linear, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, 2-horned after dehiscence. Style pentagonal, not thickened upwards; stigma capitate, $\frac{1}{4}$ lin. in diam. Berry ellipsoid, 6–7 lin. long, bright red, hirsute, terminal cup $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long.—*L. Dregei*, var., N. E. Br. in Kew Bulletin, 1909, 135, not of Eckl. & Zeyh.

Mozamb. Distr. Bechuanaland: Ntschokutsa, 3000 ft., *Seiner*, ser. ii. 124! Ngamiland: Kwebe Hills, 3300 ft., *Mrs. Lugard*, 44! near Lake Ngami, on *Acacia* sp., *Lugard*, 30! on *Acacia detinens*, Burch., *Fleck*, 313A!

73. **L. Schelei,** *Engl. in Engl. Jahrb.* xx. 105. Young branchlets rusty-tomentose with verticillate-branched hairs, older ones glabrous; internodes $\frac{1}{2}$–5 in. long. Leaves opposite, elliptic or suborbicular, rounded at the apex, cordate or subcordate at the base, 1–$2\frac{1}{4}$ in. long, 1–$2\frac{1}{4}$ in. broad, glabrous and finely reticulate on the upper surface, densely brownish-tomentose on the lower; lateral nerves about 5 on each side, slightly raised on the upper surface; petiole 3–7 lin. long. Heads axillary, fascicled, 4-flowered; peduncle 3–$4\frac{1}{2}$ lin. long, rusty-tomentose; bract broadly elliptic or ovate, very concave, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. long, $1\frac{1}{8}$–$1\frac{1}{2}$ lin. broad, rusty-tomentellous outside. Receptacle and calyx together cupular, $1\frac{5}{8}$–$2\frac{1}{4}$ lin. long, shortly adpressed-pilose above, basal villous band $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Calyx shortly and sparingly ciliate, 1–$1\frac{3}{8}$ lin. long. Corolla about 2 in. long; tube $8\frac{1}{2}$–$9\frac{1}{2}$ lin. long, basal swelling clavate, 2–$2\frac{1}{2}$ lin. long, glabrescent below, very long-villous in the upper part; lobes

about $1\frac{1}{4}$ in. long, reflexed above the insertion of the stamens. Filaments inserted $2\frac{1}{2}$–$3\frac{1}{2}$ lin. above the base of the corolla-lobes, $8\frac{1}{2}$–10 lin. long; anthers linear, $1\frac{3}{4}$–2 lin. long, biapiculate. Disc crenately 5-lobed, $\frac{1}{8}$ lin. high, glabrous. Stigma ellipsoid, $\frac{3}{8}$ lin. long.—Pfl. Ost-Afr. C. 166, t. 17, figs. E–J. *Erianthemum Schelei*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 248.

Mozamb. Distr. German East Africa: Usambara; Sakare, 4500–4600 ft., *Engler*, 938A! 970! Lutindi, *Holst*, 3302! Silai, 3600 ft., *Holst*, 2298! Derema, *Scheffler*, 108! Rondo-Lutamba, *Braun*, 1274! east side of Rondo Plateau, *Busse*, 2572! Nyasaland: Namasi, on *Cordia abyssinica*, R. Br., *Cameron*, 8!

74. **L. Dregei,** *Eckl. & Zeyh. Enum.* 358. Young parts rusty-tomentellous with verticillate-branched hairs, adult branches glabrous; internodes $\frac{1}{2}$–2 in. long. Leaves opposite, oblong or elliptic, rounded at the apex, cuneate, obtuse or rounded at the base, 1–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, coriaceous or thinly coriaceous, usually glabrous on both surfaces when adult; petiole $1\frac{1}{2}$–4 lin. long, rusty-pubescent in a young state, usually glabrous when adult. Heads axillary, fascicled, 2–6-flowered; peduncle 2–8 lin. long, pubescent or tomentellous; bract broadly elliptic or suborbicular, very concave, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Receptacle and calyx together 2–$2\frac{1}{8}$ lin. long; receptacle densely villous with simple adpressed hairs. Calyx $1\frac{1}{4}$ lin. long, sparingly adpressed-pilose, ciliate. Corolla over 2 in. long, densely adpressed-villous outside; tube 10 lin. long, basal swelling clavate, $2\frac{1}{2}$–$3\frac{1}{4}$ lin. long, glabrescent near the base; lobes $1\frac{1}{4}$ in. long, linear, gradually broadened upwards, upper part linear-lanceolate. Filaments inserted 3–$3\frac{1}{2}$ lin. above the base of the corolla-lobes, about $9\frac{1}{2}$ lin. long, the lowermost $3\frac{1}{2}$ lin. straight, linear, the remainder much thickened, involute; anthers linear, 2-horned at the apex, $1\frac{3}{4}$–2 lin. long. Disc $\frac{1}{6}$ lin. high.—Harv. in Harv. & Sond. Fl. Cap. ii. 575; Engl. in Engl. Jahrb. xx. 84, 104; Pfl. Ost-Afr. C. 166; M. S. Evans in Nature, li. 236; Schinz in Mém. Herb. Boiss. No. 10, 31; J. M. Wood, Natal Plants, iv. t. 312. *L. Dregei*, forma *subcuneifolia*, Engl. l.c. 104, as to the South African specimens. *L. Dregei*, forma *obtusifolia*, Engl. l.c. 105, as to the South African specimens. *L. roseus*, Klotzsch in Peters, Reise Mossamb. Bot. i. 177; Schinz in Mém. Herb. Boiss. No. 10, 32. *L. oblongifolius*, E. Meyer ex Harv. in Harv. & Sond. Fl. Cap. ii. 575. *Erianthemum Dregei*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 248.

Lower Guinea. Angola: between the rivers Cusaba and Cunene, on *Brachystegia tamarindoides*, Welw., *Gossweiler*, 2865!

Mozamb. Distr. Portuguese East Africa: Mozambique; Boane, *Braga*, 32! Rhodesia: Sebakwe District, 4000 ft., *Eyles*, 177!

Also in South Africa. According to M. S. Evans (*l.c.*) the flowers of *L. Dregei* are visited by sunbirds, which insert their beaks into the slits between the corolla-lobes and cause the flower to open with a jerk. As the flower opens, the anthers are said to be all broken sharply off, and to fly off into space with great violence, parting with their pollen as they go. The point of breakage is evidently at the junction between the slender and thickened parts of the filament, judging from dried specimens, and it is apparently the sudden contraction and coiling up of the thickened portion of the filament which causes the explosive opening of the flower.

Engler (in *Engl. Jahrb.* xx. 104, 105) has distinguished two forms and one variety of *L. Dregei*, based solely on leaf-characters. A more satisfactory subdivision of *L. Dregei* seems attainable by taking into consideration floral characters also. It seems best not to retain forma *obtusifolia*, Engl., as it includes specimens here referred to typical *L. Dregei*, and others referred to *L. Dregei*, var. *Sodenii*, as well as specimens from Gallabat and Eritrea, on which a new variety, var. *kerenicus*, is now founded.

Var. *subcuneifolius*, Sprague. Youngest parts rusty-tomentose. Leaves distinctly petioled, obovate-oblong or elliptic, rounded at the apex, cuneate or obtuse at the base, $1\frac{1}{4}$–5 in. long, $\frac{3}{4}$–$2\frac{1}{2}$ in. broad, thinly coriaceous, coarsely pubescent in a young state, especially on the lower surface, glabrous when fully developed; petiole 2–11 lin. long. Heads 2–4-flowered; peduncle $2\frac{1}{2}$–5 lin. long, rather stout, tomentose; bract obliquely spathaceous-cupular, 2–$2\frac{1}{2}$ lin. long or less, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. deep. Receptacle and calyx together, 4–$4\frac{1}{2}$ lin. long or less, basal villous band $1\frac{1}{2}$–3 lin. long. Calyx $2\frac{3}{4}$–$3\frac{3}{4}$ lin. long or less. Corolla 2–$2\frac{1}{2}$ in. long, densely villous-tomentose outside; tube about $\frac{3}{4}$ in. long; lobes about $1\frac{1}{2}$ in. long. Filaments inserted $2\frac{3}{4}$–$3\frac{1}{2}$ lin. above the base of the corolla-lobes; anthers 4–$4\frac{1}{4}$ lin. long, biapiculate. Disc 5-lobed, lobes pilose.—*L. Dregei*, forma *subcuneifolia*, Engl. in Engl. Jahrb. xx. 104, excluding the South African specimens and *Holst*, 2946. *L. Dregei*, forma *obtusifolia*, Engl. l.c. 105, partly; Engl. Jahrb. xxviii. 383, partly. *L. Dregei*, var. *subcurvifolia*, Engl. ex Schinz, Pl. Menyharth. 43, name only (a mistake for *subcuneifolia*). *L. oblongifolius*, Steud. ex A. Rich. Tent. Fl. Abyss. i. 342, not of E. Meyer. *L. hirsutiflorus*, Klotzsch in Peters, Reise Mossamb. Bot. 178.

Nile Land. Abyssinia: near Gapdia, *Schimper*, 768!

Mozamb. Distr. German East Africa: Usambara; Gombelo, *Holst*, 2174! Pangani, *Stuhlmann*, 196! *Braun*, 1514! Dar-es-Salaam, *Holtz*, 395! Ruaha River, 1600 ft., on *Vitex* sp., *Goetze*, 421! Portuguese East Africa: Lower Zambesi; Lupata Mountains, between Sena and Tete, on *Cordyla africana*, Lour., *Peters*, 8! between Sena and Lupata, *Kirk!* Boruma, *Menyharth*, 509! British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte!*

The floral measurements given above are from Schimper's and Whyte's specimens, which have large flowers and resemble var. *taborensis* except in the leaves. The remaining specimens quoted have smaller flowers, and form a transition to typical *L. Dregei*.

Var. *kerenicus*, Sprague. Leaves ovate-oblong or ovate, more rarely suborbicular, rounded or obtuse at the apex, rounded or cordate at the base, $1\frac{1}{2}$–3 in. long, 1–$2\frac{3}{4}$ in. broad, coriaceous, coarsely pubescent on both surfaces in a young state, upper surface glabrous and lower puberulous when fully developed; petiole 4–7 lin. long, tomentellous or pubescent. Heads 2–4-flowered; peduncle $2\frac{1}{2}$–8 lin. long, stout, tomentose or tomentellous; bract spathaceous-cupular, about $2\frac{1}{2}$ lin. long. Receptacle and calyx together $3\frac{1}{4}$ lin. long, basal villous band $1\frac{3}{4}$–2 lin. long. Calyx subtruncate, 2–$2\frac{1}{4}$ lin. long, thinly adpressed-villous outside. Corolla 2 in. long, very densely villous.—*L. Dregei*, forma *obtusifolia*, Engl. in Engl. Jahrb. xx. 105, as to the specimens from Galabat and Eritrea.

Nile Land. Eritrea: Bogos, *Beccari*, 82! Keren, on *Combretum hartmannianum*, Schweinf., *Hildebrandt*, 517! Gallabat: Matamma, *Schweinfurth*, 2193!

Near var. *subcuneifolius*, from which it differs mainly in the shape of the leaves.

Var. *taborensis*, Sprague. Young branchlets rusty-tomentose. Leaves subsessile, elliptic-oblong, ovate-oblong or broadly ovate, rounded at the apex, subcordate or cordate at the base, 3–$4\frac{1}{2}$ in. long, $1\frac{3}{4}$–3 in. broad, coriaceous, coarsely stellate-pubescent on the lower surface. Heads or contracted spikes 4–8-flowered; peduncle short, stout, tomentose; bract spathaceous-cupular, $2\frac{1}{4}$ lin. long. Receptacle and

calyx together tubular, $4\frac{3}{4}$ lin. long, basal villous band about 3 lin. long. Calyx truncate, about 4 lin. long, sparingly adpressed-villous outside. Corolla over $2\frac{1}{4}$ in. long, densely villous-tomentose outside, yellowish-green; tube orange. Berry oblong-ellipsoid, about 7 lin. long, adpressed-villous, apical cup $3\frac{1}{2}$ lin. long.—*L. taborensis*, Engl. in Engl. Jahrb. xx. 106, t. 2, fig. D; l.c. xxx. 301. *Erianthemum taborense*, Van. Tiegh. in Bull. Soc. Bot. France, xlii. 248.

Mozamb. Distr. German East Africa: Unyamwezi; Tabora, *Stuhlmann*, 573! Usafua; Beya Mountain, 6000 ft., on *Bauhinia tomentosa*, Linn., *Goetze*, 1068! Lower Plateau, north of Lake Nyasa, *Thomson!* British Central Africa: Nyasaland; Blantyre, *Buchanan in herb. Wood*, 6809! Zomba, *Kirk!* and without precise locality, *Buchanan*, 257!

Near the large-flowered specimens of var. *subcuneifolia*, from which it differs in the subsessile leaves, cordate or subcordate at the base.

Var. *Sodenii*, Engl. in Engl. Jahrb. xx. 105. Leaves broadly elliptic or elliptic-oblong, rounded at the apex, cordate or subcordate at the base, more rarely obtuse, 1–$2\frac{3}{4}$ in. long, $\frac{1}{2}$–2 in. broad, thinly coriaceous, upper surface pubescent in a young state, soon glabrous, lower surface rusty-tomentellous in a young state, soon pubescent, eventually glabrous; lateral nerves 4–5 on each side, prominent in the adult leaves; petiole 2–4 lin. long. Heads 2–4-flowered; peduncle 1–2 lin. long or less, rusty-tomentellous; bract spathaceous-cupular, subtruncate, $\frac{3}{4}$–1 lin. long, sometimes produced dorsally, at or $\frac{1}{4}$ lin. below the apex, into a horizontal rounded flap, $\frac{1}{2}$ lin. broad or less. Receptacle and calyx together elongate-cupular, $1\frac{7}{8}$ lin. long, with a dense basal villous band $\frac{5}{8}$–1 lin. long, upper part sparingly pilose outside or nearly glabrous. Calyx subtruncate, sparingly and minutely ciliate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long; tube 6–7 lin. long, basal swelling clavate, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long; lobes about 1 in. long or more. Filaments inserted $2\frac{1}{2}$–3 lin. above the base of the corolla-lobes; anthers $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; connective mallet-headed. Disc pentagonal, slightly 5-lobed, $\frac{1}{8}$–$\frac{1}{5}$ lin. high, lobes sparingly pilose at the apex.—*L. Dregei*, forma *obtusifolia*, Engl. l.c., as to the Zanzibar and Usambara specimens.

Nile Land. British East Africa: Mombasa, *Wakefield!* Witu, *Thomas*, 162!

Mozamb. Distr. Zanzibar, on *Citrus Aurantium*, Linn., *Hildebrandt*, 2025! on *Caryophyllus aromaticus*, Linn., *Kirk*, 45! German East Africa: Tanga, *Volkens*, 182! *Heinsen*, 105! Gombelo, *Holst*, 2177! Bagamoyo, *Kirk!* Dar-es-Salaam, *Hildebrandt*, 1224! Portuguese East Africa: lower valley of the Shire River, *Meller!*

Differs from typical *L. Dregei* in the shape of the leaves, which retain their pubescence for a long time on the lower surface, and in the very shortly peduncled heads. The flowers are rather smaller than in the type.

Var. *nyasicus*, Sprague. Leaves elliptic, obovate-elliptic or ovate-elliptic, rounded at the apex, rounded or obtuse at the base, more rarely subcordate, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{3}$ in. broad, thinly coriaceous, coarsely and densely pubescent on both surfaces in a young state, glabrous on the upper surface and pubescent on the lower when fully developed; petiole 3–9 lin. long. Heads 3–4-flowered; peduncle 1–$1\frac{1}{2}$ lin. long, tomentellous; bract spathaceous-cupular, $\frac{3}{4}$ lin. long, with or without a small horizontal foliaceous limb inserted $\frac{1}{4}$–$\frac{3}{8}$ lin. below the edge of the cup; limb broadly elliptic or suborbicular, 1–$1\frac{3}{4}$ lin. in diam., tomentellous on both surfaces. Receptacle and calyx together elongate-cupular, $2\frac{3}{8}$–$2\frac{1}{2}$ lin. long, basal villous band 2 lin. long, upper part glabrescent. Calyx subtruncate, ciliate, $1\frac{3}{4}$ lin. long. Corolla about 2 in. long, rather thinly villous outside; tube $9\frac{1}{2}$–10 lin. long, basal swelling clavate, $3\frac{1}{2}$–4 lin. long, glabrous below, long-pilose above; lobes under $1\frac{1}{4}$ in. long. Filaments inserted 3–$3\frac{1}{4}$ lin. above the base of the corolla-lobes; anthers $1\frac{3}{4}$ lin. long.

Disc $\frac{1}{6}$ lin. high, slightly 5-lobed, lobes sparingly pilose.—*L. Dregei*, forma *obtusifolia*, Engl. in Engl. Jahrb. xxviii. 383, partly, not of Engl. Jahrb. xx. 105.

Mozamb. Distr. German East Africa: Uluguru Mountains, 3300 ft., *Goetze*, 162! Kinga (Livingstone) Mountains, *Goetze*, 1014! Nyasaland: Zomba, *Purves*, 154!

Near var. *Sodenii*, Engl., but with narrower leaves, remaining pubescent on the lower surface when fully developed, longer petioles and longer calyx and anthers. The bract usually has a foliaceous limb.

Var. *ovatus*, Sprague. Leaves broadly ovate, rounded or very obtuse at the apex, cordate or subcordate at the base, more rarely rounded, $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, 1–$2\frac{1}{4}$ in. broad, coriaceous, very coarsely pubescent with verticillate-branched hairs on both surfaces in a young state, upper surface glabrous, lower surface coarsely pubescent when fully developed; petiole $2\frac{1}{2}$–6 lin. long. Peduncle 1–$2\frac{1}{2}$ lin. long, tomentose. Corolla about $1\frac{3}{4}$ in. long, very densely rusty-villous.

Mozamb. Distr. German East Africa: Usambara; Amani, *Braun*, 1092! 1970! *Warnecke*, 349! clearings in Rain forest, 3000 ft., on *Citrus Aurantium*, Linn., *Engler*, 707!

Differs from var. *Sodenii* in the larger ovate leaves and the very densely villous flowers.

Var. *foliaceus*, Sprague. Leaves subsessile or petioled, elliptic or ovate, rounded or very obtuse at the apex, rounded or subcordate at the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 10–20 lin. broad, coriaceous, very coarsely pubescent on both surfaces in a young state, upper surface glabrous, lower surface pubescent when fully developed; petiole up to 4 lin. long. Heads 4–6-flowered; peduncle 6–14 lin. long, coarsely and densely villous; bract foliaceous or subfoliaceous, elliptic, 4–10 lin. long, very coarsely and densely pubescent on both surfaces. Corolla $1\frac{3}{4}$–2 in. long.

Nile Land. Abyssinia: Harar, *Ellenbeck*, 797! Walenzo, 6600 ft., *Ellenbeck*, 1303! Djebel Haquim, *Ellenbeck!* British East Africa: Kibwezi, 2600–3300 ft., *Scheffler*, 193! 346! Makindu River, *Kässner*, 575!

Near var. *subcuneifolius* and var. *kerenicus*, from which it may be distinguished by the foliaceous bracts.

Var. *kilimanjaricus*, Sprague. Leaves elliptic or ovate-elliptic, rounded at the apex, cordate or more rarely rounded at the base, $1\frac{1}{4}$–2 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly coriaceous, glabrous on the upper surface, coarsely pubescent on the lower; petiole $2\frac{1}{2}$–4 lin. long. Heads solitary, axillary, 4–6-flowered, sessile or very shortly peduncled; peduncle up to 3 lin. long, tomentellous; bract subspathaceous below, upper part foliaceous, suborbicular, 2–4 lin. in diam., flat or more or less concave or convex, tomentose with verticillate-branched hairs. Receptacle and calyx together elongate-cupular, $2\frac{1}{4}$ lin. long, basal villous band $1\frac{1}{2}$–2 lin. long. Calyx $1\frac{5}{8}$ lin. long. Corolla over $1\frac{3}{4}$ in. long; tube 7–8 lin. long, basal swelling clavate, $2\frac{3}{4}$ lin. long, glabrescent below, long-villous above; lobes 1–$1\frac{1}{4}$ in. long. Filaments inserted $3\frac{1}{4}$ lin. above the base of the corolla-lobes, broadened above and grooved within; anthers $1\frac{3}{8}$ lin. long; connective emarginate-mallet-headed. Disc $\frac{1}{6}$ lin. high, glabrous.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, on *Albizzia maranguensis*, Taub., *Volkens*, 1934!

Differs from var. *foliaceus* in the sessile or subsessile inflorescence, and from var. *Sodenii* in the bracts.

Var. *longipes*, Sprague. Young branchlets rusty-tomentose. Leaves elliptic-oblong or obovate-oblong, rounded, subtruncate or emarginate at the apex, obtuse, rounded or subcordate at the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, 4–7 lin. broad, chartaceous or thinly coriaceous, densely pubescent on both surfaces in a young state; petiole 3–$4\frac{1}{2}$ lin.

long. Heads 4-flowered; peduncle slender, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, densely pubescent; bract with a horizontal or reflexed foliaceous limb, densely pubescent on both surfaces. Receptacle and calyx together $2\frac{3}{8}$ lin. long. Calyx irregularly toothed, ciliate, 2 lin. long, nearly glabrous outside. Corolla about $1\frac{2}{3}$ in. long, greenish-yellow, base of the tube reddish. Anthers $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; connective mallet-headed.

Mozamb. Distr. German East Africa: Ssongea District; Kwa Kihingi, *Busse*, 764!

Distinguished by the small thin leaves, the long peduncle and the horizontal or reflexed foliaceous limb of the bract.

75. **L. nyikensis,** *Sprague*. Much-branched. Young branchlets pubescent or tomentellous. Branches short, flexuous, glabrous, finely wrinkled, dark, inconspicuously lenticellate; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite, sessile or shortly petioled, elliptic, elliptic-oblong or ovate-elliptic, rounded at the apex, rounded or subcordate at the base, $\frac{3}{4}$–$1\frac{1}{3}$ in. long, $\frac{1}{2}$–1 in. broad, thinly coriaceous, coarsely stellate-pubescent especially on the lower surface, upper surface finally more or less glabrescent; petiole up to 3 lin. long. Heads solitary, axillary or terminating much-contracted leafy axillary short-shoots, 3–4-flowered; peduncle 3–8 lin. long, tomentellous; bract foliaceous, broadly ovate, $4\frac{1}{2}$–7 lin. long, 3–$5\frac{1}{2}$ lin. broad, tomentellous on both surfaces. Receptacle and calyx together cupular, $\frac{7}{8}$ lin. long, densely villous from the lower part, villous band about $1\frac{1}{4}$ lin. long, thinly and shortly villous above. Calyx subtruncate, ciliate, $1\frac{1}{2}$–$1\frac{3}{8}$ lin. long. Corolla $1\frac{3}{4}$ lin. long; tube 7–$7\frac{1}{2}$ lin. long, basal swelling clavate, $2\frac{1}{2}$ lin. long, subglabrous below, densely villous above; lobes 1–$1\frac{1}{4}$ in. long. Filaments inserted $2\frac{2}{3}$–3 lin. above the base of the corolla-lobes, $8\frac{1}{2}$–9 lin. long; anthers linear, $1\frac{7}{8}$ lin. long, biapiculate. Disc 5-lobed, $\frac{1}{4}$ lin. high, fleshy.

Mozamb. Distr. British Central Africa: Nyika Plateau, *McClounie*, 111!

L. nyikensis resembles in some respects *L. Dregei*, var. *foliaceus*. The latter, however, has long straight branches, longer internodes than *L. nyikensis*, larger and more coriaceous leaves, smaller bracts, and a denser covering of hairs on the younger parts; and the hairs on the corolla are denser and less adpressed.

76. **L. alveatus,** *Sprague*. Young branchlets tomentellous or pubescent, older ones glabrous, greyish. Leaves opposite, obovate-oblong, rounded at the apex, cuneate or obtuse at the base, 1–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, coriaceous, glabrous; petiole $1\frac{1}{2}$–2 lin. long. Heads solitary, axillary, 4-flowered; peduncle 5–7 lin. long, pubescent; bract foliaceous, recurved-trough-shaped, $4\frac{1}{2}$–5 lin. long, stellate-pubescent. Receptacle and calyx together cupular, $1\frac{7}{8}$–2 lin. long, basal villous band 1–$1\frac{1}{2}$ lin. long, upper part more sparingly villous. Calyx subtruncate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Corolla over $1\frac{1}{2}$ in. long; tube about $6\frac{1}{2}$ lin. long, basal swelling obovoid-oblong, $2\frac{1}{4}$ lin. long, glabrescent below, upper part long and densely villous, constriction very inconspicuous owing to the hairs; lobes subspathulate-linear, over 1 in. long. Filaments inserted $2\frac{3}{4}$ lin. above the base of the corolla-lobes, about 7 lin. long, broadened above and finely grooved on the inner surface; anthers linear, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long; connective mallet-shaped. Disc $\frac{1}{8}$ lin. high,

fleshy, glabrous.—*L. Dregei*, forma *subcuneifolia*, Engl. in Engl. Jahrb. xx. 104, in small part.

Mozamb. Distr. German East Africa: Usambara; Doda, *Holst*, 2946!

77. **L. lindensis,** *Sprague.* Branchlets long, straight, pendulous, slender, slightly over 1 lin. in diam. 1 ft. below the apex, youngest part rusty-pubescent, older parts stellate-puberulous, finally glabrous, finely and rather densely lenticellate; nodes rather conspicuous, internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite, shortly petioled, elliptic or ovate-elliptic, rounded at the apex, cordate or subcordate at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly coriaceous, glabrous, slightly glaucous; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ ($-4\frac{1}{2}$) lin. long, pubescent. Heads axillary, solitary, 4-flowered; peduncle $\frac{3}{4}$–1 in. long, rather slender, glabrous or stellate-puberulous; bract foliaceous, elliptic, $\frac{1}{2}$–1 in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, glabrous on both surfaces. Receptacle and calyx together tubular, $2\frac{3}{4}$–3 lin. long, basal villous band about 1 lin. long. Calyx subtruncate or irregularly lobed, $2\frac{1}{4}$ lin. long, sparingly pilose outside, ciliate. Corolla $2\frac{1}{4}$ in. long, densely villous outside except the lowermost 2 lin., orange, with green lobes; tube 9–10 lin. long; lobes $1\frac{1}{2}$ in. long, linear, the uppermost $3\frac{1}{2}$ lin. linear-lanceolate. Filaments inserted $3\frac{3}{4}$ lin. above the base of the corolla-lobes; anthers 2 lin. long. Disc not lobed, $\frac{1}{6}$ lin. high, glabrous. Berry oblong-ellipsoid, 4 lin. long, glabrous, deep red, apical cup $1\frac{3}{4}$ lin. long.

Mozamb. Distr. German East Africa: Lindi, on *Terminalia Catappa*, Linn., *Busse*, 3005!

78. **L. panganensis,** *Engl. in Engl. Jahrb.* xx. 92. Branchlets smooth, glabrous, more or less ribbed in a dried state, dark grey or purplish, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, rather sparingly and inconspicuously lenticellate. Leaves opposite, subopposite or alternate, those on the 1-year-old shoots deciduous before the production of flowers, elliptic, ovate or obovate, obtuse or rounded at the apex, obtuse or cuneate at the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, coriaceous, glabrous; petiole 2–5 lin. long. Umbels subsessile, 3–5-flowered; peduncle at most 1 lin. long, sometimes almost suppressed; pedicels 1–$1\frac{1}{4}$ lin. long; bract broadly ovate from a saucer-shaped base, acute, or more rarely rounded, $\frac{5}{8}$–$\frac{7}{8}$ lin. long, ventral margin $\frac{1}{8}$–$\frac{1}{12}$ lin. long. Receptacle and calyx together $1\frac{7}{8}$–$2\frac{1}{4}$ lin. long, glabrous. Calyx patulous, $\frac{1}{2}$–1 lin. long, truncate. Corolla $2\frac{1}{2}$–$2\frac{3}{4}$ in. long, rose-coloured or purple; tube 8–13 lin. long, slightly broadened upwards, minutely and densely papillate inside; lobes $1\frac{2}{3}$–2 in. long, linear, much broadened into the base, linear-lanceolate above, lowermost 3 lin. with a dense longitudinal band of papillæ on the inner surface $\frac{1}{4}$ lin. within the margin on either side. Filaments inserted $2\frac{1}{2}$–6 lin. above the base of the corolla-lobes, 11–13 lin. long, linear, flattened, with 3 grooves on the ventral surface; anthers linear, 5–10 lin. long; connective produced beyond the cells into a membranous flap, $\frac{3}{8}$–$\frac{7}{8}$ lin. long. Disc $\frac{1}{6}$ lin. high. Style tetragonal, minutely papillate on the angles; stigma ellipsoid, $\frac{3}{8}$ lin. long.—Pfl. Ost-Afr. C.

165, t. 14, figs. H–L; Engl. & Prantl, Pflanzenfam. Nachtr. i. 131; Engl. Jahrb. xxx. 301.

Nile Land. Somaliland: Wagga Mountain, *Mrs. Lort Phillips!* Rassa-Alla, *Donaldson-Smith!* British East Africa: Makindu River, *Kässner*, 590! between Makindu and Kibwezi, *Powell*, 20! Kibwezi, 3300 ft., *Scheffler*, 170! Taita; Ndi Mountain, *Hildebrandt*, 2579! Machakos, *Pospichal!*

Mozamb. Distr. German East Africa: Usambara; Kumba Valley, Masheua, 1500 ft., *Holst*, 3503! Tanga; Doda, *Holst*, 2933! Pangani, *Stuhlmann*, ser. i. 773!

The length of the anthers and the relative length of the tube and lobes appear to be very variable in *L. panganensis*. When the flower opens the stamens remain attached for some time to the style by the membranous appendages of their connectives, which adhere closely to the neck of the style.

79. **L. falcifolius,** *Sprague*. Young branchlets subangular, somewhat compressed, glabrous, greenish-grey. Branches nodose, coarsely wrinkled, 1½–4 lin. in diam. Leaves mostly alternate, falcate or scimitar-shaped, rounded at the apex, sometimes apiculate, gradually narrowed into the base, 2½–3¾ in. long, 5½–7 lin. broad, coriaceous, glabrous, 5–7-nerved from near the base; nerves more prominent on the upper surface; petiole 2–4 lin. long. Umbels axillary, solitary, 3-flowered; peduncle about 1 lin. long; pedicels ¾ lin. long; bract obliquely cupular, thickly keeled dorsally, dorsal margin 1 lin. long, ventral margin ⅝ lin. long. Receptacle and calyx together tubular, very slightly constricted near the middle, 3½ lin. long, glabrous outside. Calyx 2¼–2½ lin. long, subtruncate. Corolla reddish-orange, 2⅓ in. long, acutely pentagonal in bud, broadest above the middle; tube nearly 2 in. long, split unilaterally less than half-way down; lobes erect, linear, 5½ lin. long, ⅝–¾ lin. broad. Filaments inserted about the base of the corolla-lobes, slightly tapering upwards, 2¾–3¼ lin. long, deflexed; anthers linear, 1⅞ lin. long, ⅜ lin. broad. Disc slightly lobed, about ¼ lin. high. Style broadened into the base, slightly thickened above.

Lower Guinea. Angola: near Kaconda, on Cæsalpinieæ, *Gossweiler*, 1701!

L. falcifolius bears a strong resemblance to *L. dodoneæfolius*, DC., from which it may be distinguished by the absence of a tooth in front of the anther.

80. **L. Bosciæ,** *Engl. & Krause in Engl. Jahrb.* xliii. 401. Branches rather stout, about 2 lin. in diam. 6 in. below the apex, buff-coloured, slightly wrinkled longitudinally in a dried state; branchlets ascending, puberulous or glabrous. Leaves mostly alternate, oblanceolate or oblong, rounded at the apex, attenuate to the base, ½–1¼ in. long, 1½–4½ lin. broad, coriaceous, minutely and densely pilose, 3-nerved; lateral nerves often not visible; petiole ½ lin. long. Flowers solitary or fascicled on leafy axillary cushion-like short-shoots; pedicels and bracts minutely and rather densely pilose; pedicels 1 lin. long; bract obliquely cupular, 2-lipped or not, dorsal margin 1–1⅛ lin. long, slightly umbonate, ventral margin ⅞–1 lin. long. Receptacle and calyx together tubular, 2⅛–2¾ lin. long, minutely and densely pilose outside. Calyx slightly 5-lobed, 1–1¼ lin. long excluding the

intramarginal ring; intramarginal ring $\frac{1}{8}$ lin. long, minutely puberulous above. Corolla over $1\frac{1}{2}$ in. long, minutely papillate-pilose outside, not swollen at the base, swollen at the insertion of the stamens in bud; tube split unilaterally $4\frac{1}{2}$–6 lin. down; lobes erect, linear, 9 lin. long, inner surface apiculate. Filaments inserted $\frac{1}{2}$ lin. above the base of the corolla-lobes, $4\frac{1}{2}$ lin. long, deflexed, dorsal surface without transverse grooves; anthers linear, $3\frac{1}{2}$ lin. long; connective produced above the filaments. Disc pentagonal, 5-lobed, $\frac{1}{6}$ lin. high. Stigma depressed-globose, under $\frac{1}{2}$ lin. in diam.—*L. discolor*, Schinz in Bull. Herb. Boiss. iv. App. iii. 52, not of Engl.

Lower Guinea. German South-west Africa: Damara Land; Okahandya, on *Boscia Pechuelii*, Kuntze, *Dinter*, 284! Rehoboth, *Fleck*, 452! 881!

81. **L. Lugardi,** *N. E. Br. in Kew Bulletin*, 1909, 135. Young branchlets striate, minutely and densely puberulous, older ones glabrous, greyish, longitudinally lenticellate; internodes 2–5 lin. long. Leaves alternate, oblong-oblanceolate or oblong, obtuse or rounded at the apex, cuneate into the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $2\frac{1}{2}$–5 lin. broad, rigidly coriaceous, minutely and densely puberulous; lateral nerves slightly raised or inconspicuous on the upper surface, not visible on the lower. Flowers axillary, subsessile, 2–4 together; pedicels $\frac{1}{4}$–$\frac{1}{2}$ lin. long; bract obliquely cupular, $\frac{3}{4}$–$\frac{7}{8}$ lin. long ventrally, 1 lin. long dorsally, ciliate, minutely puberulous outside, dorsally thickened. Receptacle and calyx together cupular, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long. Calyx obscurely 5-lobed, sparingly ciliate, hardly 1 lin. long. Corolla narrowly cylindric, $1\frac{1}{2}$ in. long; tube 11 lin. long; lobes subspathulate-linear, 6 lin. long, at first erect, finally slightly reflexed. Filaments attached about $\frac{3}{4}$ lin. above the base of the corolla-lobes, $2\frac{3}{4}$ lin. long, slightly tapering upwards, inflexed; anthers linear, $1\frac{3}{4}$ lin. long. Disc $\frac{1}{8}$ lin. high, fleshy. Style pentagonal, the uppermost $\frac{1}{2}$ lin. slightly thickened upwards; stigma capitate, $\frac{3}{8}$ lin. in diam. Berry ellipsoid, 3–$3\frac{1}{2}$ lin. long, orange, red at the apex, apical cup $\frac{3}{4}$ lin. long, red.

Mozamb. Distr. Ngamiland: Kwebe Hills, mostly on *Acacia* spp., *Mrs. Lugard*, 20! Totin, near Lake Ngami, *Lugard*, 32!

In *L. Lugardi* the flowers are axillary on the ordinary shoots of the current year; in *L. Bosciæ* they terminate short shoots borne on the previous year's growth.

82. **L. Kayseri,** *Engl. in Engl. Jahrb.* xx. 89. Young branchlets green, older ones greyish, much lenticellate, glabrous. Leaves subopposite or alternate, sessile, broadly obovate, obovate-elliptic or suborbicular, rounded at the apex, obtuse or cuneate at the base, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–2 in. broad, thickly coriaceous, glabrous, 3–5-nerved at the base. Umbels subsessile, 3–5-flowered; pedicels $\frac{1}{2}$–$\frac{5}{8}$ lin. long; bract cupular, truncate, $\frac{3}{8}$–$\frac{1}{2}$ lin. long, glabrous. Receptacle and calyx together tubular, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long, glabrous. Calyx subtruncate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Corolla 1 in. long or rather more, glabrous outside; tube cylindric-funnel-shaped, split unilaterally, glandular within; lobes separating from below upwards, linear-spathulate, $3\frac{1}{2}$ lin. long, erect. Filaments $2\frac{1}{2}$ lin. long, narrowed above; anthers oblong, $\frac{5}{8}$ lin. long.

Disc 5-lobed, hardly $\frac{1}{8}$ lin. high, fleshy. Style not thickened upwards, pentagonal, glabrous. Berry ellipsoid or oblong-ellipsoid, smooth, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, $1\frac{7}{8}$ lin. in diam., apical cup 1 lin. long.—Pfl. Ost-Afr. C. 165, t. 13, figs. A–D. *L. crassissimus*, Engl. in Engl. Jahrb. xx. 122, as to the Pangani specimen.

Mozamb. Distr. German East Africa: Pangani, *Stuhlmann*, ser. i. 107! 116! Dar-es-Salaam, *Hildebrandt*, 1226!

83. **L. Deltæ,** *Baker & Sprague.* Young branchlets papillate, older ones greyish, glabrous. Leaves opposite or alternate, obovate, elliptic or elliptic-oblong, rounded at the apex, obtuse or cuneate at the base, slightly oblique, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{2}{3}$–$1\frac{1}{2}$ in. broad, coriaceous, glabrous 5–7-nerved at the base; petiole $1\frac{1}{2}$–4 lin. long. Umbels axillary, subsessile, 3-flowered, solitary or fascicled; pedicels $\frac{3}{8}$ lin. long; bract cupular, irregularly truncate, 1 lin. long, densely glandular-papillate outside. Receptacle and calyx together shortly tubular, $1\frac{3}{8}$ lin. long. Calyx $\frac{5}{8}$–$\frac{3}{4}$ lin. long, very sparingly glandular-ciliate. Corolla pink, nearly $1\frac{1}{2}$ in. long, glandular-papillate outside, especially above; tube cylindric-funnel-shaped, split unilaterally, glandular within; lobes separating from below upwards, linear-spathulate, 5–$5\frac{1}{4}$ lin. long, eventually reflexed. Filaments $2\frac{1}{2}$ lin. long, deflexed; anthers linear, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long. Disc slightly lobed, $\frac{1}{6}$ lin. high, fleshy. Style not thickened upwards, pentagonal, glabrous; stigma capitate, $\frac{3}{8}$ lin. in diam. Berry oblong-ellipsoid, $4\frac{1}{2}$ lin. long, apical cup $\frac{1}{2}$ lin. long.

Mozamb. Distr. Portuguese East Africa: Zambesi Delta; at the mouths of the Luabo and Kongone Rivers, on *Avicennia* sp., *Kirk!*

Engler, 2198! from Dar-es-Salaam, German East Africa, probably belongs to *L. Deltæ*, but the material is not sufficient to determine the species with certainty.

84. **L. trinervius,** *Engl. in Engl. Jahrb.* xl. 527. Branchlets rather slender, glabrous, younger part angular, adult part grey, very densely and conspicuously lenticellate, $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex. Leaves opposite, sessile or subsessile, ovate to lanceolate, gradually narrowed to the apex, obtuse or rounded at the base, $2\frac{1}{2}$–$4\frac{3}{4}$ in. long, $\frac{3}{4}$–2 in. broad, coriaceous, glabrous, slightly glossy on the upper surface, very distinctly 3-nerved from the base; nerves prominent, especially on the upper surface. Flowers axillary, subsessile; pedicels hardly $\frac{1}{2}$ lin. long; bract obliquely cupular, produced dorsally into a triangular lobe, acutely umbonate at the base of the lobe, dorsal margin $1\frac{1}{8}$–$1\frac{1}{2}$ lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together elongate-cupular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Calyx erect, slightly toothed, glandular-ciliate, 1 lin. long. Corolla $1\frac{1}{2}$ in. long or rather more, glabrous outside; tube elongate-funnel-shaped, slightly enlarged towards the base, split unilaterally, ribbed outside, glandular inside; lobes erect, subspathulate-linear, $3\frac{3}{4}$ lin. long. Filaments tapering from a broad base, $1\frac{3}{4}$ lin. long, inflexed; anthers linear, retuse at the apex, $\frac{7}{8}$ lin. long. Disc hardly $\frac{1}{6}$ lin. high. Style not thickened above, glabrous; stigma ellipsoid, rather over $\frac{1}{4}$ lin. long. Berry in a young

state oblong-ellipsoid, 3 lin. long, finely tubercled, apical cup $\frac{3}{4}$ lin. long.

Upper Guinea. Cameroons: Lolodorf; Mbanga Mountain, *Staudt*, 127! 368!

85. **L. verruculosus,** *Sprague.* Branches brown, densely lenticellate, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, youngest part subangular; internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite or more rarely alternate, shortly petioled, ovate or lanceolate, acutely acuminate, abruptly contracted to the obtuse base, $2\frac{3}{4}$–$4\frac{1}{2}$ in. long, 1–$2\frac{1}{4}$ in. broad, coriaceous, glabrous, dull, 3-nerved from the base, sometimes with two additional less distinct lateral nerves; nerves prominent on the upper surface, much less so on the lower; petiole $\frac{1}{2}$–1 lin. long. Umbels axillary, solitary, 3–4-flowered; peduncle about $1\frac{1}{2}$ lin. long; pedicels about $\frac{3}{4}$ lin. long; bract shortly ovate from a saucer-shaped base, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Flowers not known. Berry oblong-obovoid, $3\frac{1}{2}$ lin. long, 2 lin. in diam., finely tubercled, apical cup $\frac{1}{2}$ lin. long.—*Viscum lenticellatum*, De Wild. in Bull. Herb. Boiss. 2me sér. i. 45; Ill. Fl. Congo, i. 187, t. 94.

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 686!

86. **L. djurensis,** *Engl. in Engl. Jahrb.* xx. 90, *t.* 1, *fig. C.* Branchlets slender, glabrous, brownish, younger part angular, adult part rather densely lenticellate, hardly $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex. Leaves opposite or alternate, ovate or lanceolate, gradually narrowed to the rounded or acute apex, rather abruptly narrowed to the acute base, 2–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly coriaceous, glabrous, dull, very distinctly 3-nerved from the base; nerves prominent, especially on the upper surface; petiole 1–2 lin. long. Umbels 3–5-flowered; peduncle $\frac{1}{2}$–$1\frac{1}{2}$ lin. long; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract obliquely ovate-cupular, $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle and calyx together campanulate, $1\frac{5}{8}$ lin. long. Calyx truncate, ciliolate, $\frac{5}{8}$ lin. long. Corolla $1\frac{3}{4}$ in. long or a little less, glabrous outside; tube elongate-funnel-shaped, very slightly enlarged towards the base, split unilaterally, ribbed outside, glandular inside; lobes erect, separating from below upwards, linear-subspathulate, 4 lin. long. Filaments tapering upwards, $2\frac{1}{4}$ lin. long, inflexed; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc very slightly lobed, hardly $\frac{1}{6}$ lin. high, fleshy. Style not thickened above, glabrous; stigma ellipsoid, rather over $\frac{1}{4}$ lin. long.

Nile Land. Jur: on the Great Wau River, *Schweinfurth*, 1632!

87. **L. Lujæi,** *De Wild. & Durand, Contrib. Fl. Congo*, i. ii. 55. Branches greyish, glabrous, very finely lenticellate; internodes 1–$3\frac{1}{4}$ in. long. Leaves opposite, ovate, shortly acuminate to an acute apex, rounded at the base, 4–$5\frac{1}{2}$ in. long, $2\frac{1}{2}$–3 in. broad, coriaceous, glabrous, blackish in a dried state, 5-nerved from the base, sometimes with 2 additional less distinct lateral nerves; nerves prominent on both surfaces; petiole winged, about $2\frac{1}{2}$ lin. long, wings pouched, mouth of the

pouch opening on the upper surface. Umbels axillary, fascicled, sessile, 3–4-flowered; pedicels 1 lin. long; bract ovate cupular, subtruncate, acutely umbonate, dorsal margin $1\frac{1}{8}$ lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together elongate-cupular, $1\frac{7}{8}$ lin. long, slightly constricted about the middle; receptacle minutely and densely tuberculate. Calyx hardly toothed, ciliolate, 1 lin. long. Corolla nearly 2 in. long, at first whitish, then rose-coloured, glabrous and ribbed outside, ribs green; tube slightly swollen in the basal 4 lin., elongate-funnel-shaped above, split unilaterally, glandular within; lobes erect, subspathulate-linear, 3 lin. long from the insertion of the filaments. Filaments tapering upwards, $1\frac{5}{8}$ lin. long, deflexed; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc pentagonal, $\frac{1}{8}$ lin. high. Style very slightly thickened above. Berry ellipsoid, $2\frac{1}{2}$ lin. long, 2 lin. in diam., minutely and densely tuberculate.—Ill. Fl. Congo, i. 171, t. 86.

South Central. Belgian Congo: Kasai; Bena-Dibele, *Luja*, 260A!

88. **L. Demeusei,** *Engl. in Comptes-rendus Soc. Bot. Belg.* xxxix. 29. Branches fairly thick, about $1\frac{3}{4}$ lin. in diam. 9 in. below the apex, brown, very densely lenticellate, youngest part angular, greenish; internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite or subopposite, oblong-lanceolate, acuminate to an acute apex, obtuse at the base, 4–$6\frac{1}{2}$ in. long, 1–$2\frac{1}{2}$ in. broad, coriaceous, glabrous, dull, 3-nerved from the base, nerves prominent on the upper surface, less so on the lower, margin slightly reflexed in a dried state; petiole 1–2 lin. long. Umbels axillary, fascicled, 5–7-flowered; peduncle about $1\frac{1}{4}$ lin. long; pedicels $\frac{1}{2}$ lin. long; bract ovate from a cupular base, thickly keeled dorsally, dorsal margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long, ventral margin $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Receptacle and calyx together shortly tubular, slightly constricted about the middle, $1\frac{1}{2}$ lin. long. Calyx subtruncate, ciliolate, $\frac{7}{8}$ lin. long. Corolla skittle-shaped in bud, about $1\frac{1}{2}$ in. long, not known in an expanded state; lobes $3\frac{1}{2}$ lin. long from the insertion of the filaments. Filaments tapering upwards from a broad base, 2 lin. long in bud; anthers oblong-linear, truncate, $\frac{7}{8}$ lin. long in bud. Disc shortly and obtusely lobed, $\frac{1}{8}$ lin. high. Style distinctly skittle-shaped above, neck $1\frac{1}{4}$ lin. long in bud, upper half gradually thickened upwards to the stigma. Berry red, obovoid, $3\frac{1}{2}$ lin. long, $2\frac{1}{4}$ lin. in diam., apical cup $\frac{3}{4}$–$\frac{7}{8}$ lin. long.

South Central. Belgian Congo: Bangala, *Demeuse*, 355!

Engler described the filaments of *L. Demeusei* as produced above into a short triangular tooth, but this appears to be a mistake. The anthers are inserted in a notch at the apex of the filament, and both the dorsal and ventral sides of the notch are completely adnate to the base of the anther.

89. **L. zizyphifolius,** *Engl. in Engl. Jahrb.* xx. 92. Young branchlets nodose, rusty-pubescent, soon glabrous, older ones up to 5 lin. in diam. Leaves alternate or irregularly ternate, obovate-oblong, rounded at the apex, cuneate into the base, $1\frac{1}{4}$–2 in. long, $\frac{1}{2}$–1 in. broad, coriaceous, glabrous, dull, distinctly 3-nerved from a short distance above the base; petiole 1–2 lin. long. Umbels resembling heads owing to the reduction of the pedicels, axillary, sessile, few-flowered, solitary

or fascicled; pedicels $\frac{3}{8}$ lin. long; bract cupular, with an oblong, rather irregular obtuse or acute dorsal lobe, which is $\frac{3}{8}$–$\frac{1}{2}$ lin. long, minutely glandular-pubescent outside, especially on the dorsal side, glandular-ciliate, dorsal margin $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, umbonate, ventral margin $\frac{5}{8}$–$\frac{7}{8}$ lin. long, lateral margins $\frac{1}{2}$ lin. long. Receptacle and calyx together tubular-flask-shaped, 2–$2\frac{1}{4}$ lin. long. Calyx subtruncate or slightly and irregularly lobed, glandular-ciliate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long; tube glandular within, swelling situated $\frac{3}{4}$–1 lin. above the base, ellipsoid, 2 lin. long; lobes erect, linear, $4\frac{1}{2}$ lin. long, pale below, red above. Filaments $2\frac{1}{2}$ lin. long, tapering upwards, 2-ribbed on the inner surface, ribs glandular-papillate, the uppermost $\frac{3}{8}$ lin. of the filament slightly swollen, subglandular; anthers linear, $\frac{7}{8}$–$1\frac{1}{8}$ lin. long. Disc acutely 5-lobed, $\frac{1}{4}$ lin. high.

Nile Land. British East Africa: between Machakos and Kikuyu, 5000–6000 ft., *Scott-Elliot*, 6580! and without precise locality, *Elliott*, 368!

Mozamb. Distr. German East Africa: Unyamwezi; Rubugua, *Stuhlmann*, 493!

90. **L. glomeratus,** *Engl. in Engl. Jahrb.* xx. 89. Branches stout, slightly flexuous, nodose, greyish, glabrous, about $2\frac{1}{4}$ lin. in diam. 9 in. below the apex, younger part smooth, older part with longitudinally cracked bark; internodes $\frac{1}{2}$–1 in. long. Leaves subopposite or alternate, very shortly petioled, obovate-oblong to oblanceolate, rounded or more rarely obtuse at the apex, sometimes minutely apiculate, cuneate into the base, $1\frac{1}{3}$–$2\frac{3}{4}$ in. long, $\frac{1}{2}$–1 in. broad, thickly coriaceous, glabrous, irregularly penninerved, or triplinerved with the lateral nerves arising a considerable distance above the base; nerves prominent on the upper surface, much less so on the lower, the lateral ones very oblique; petiole $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Flowers axillary, several together, subsessile; pedicel (solid base of bract) $\frac{3}{8}$ lin. long; bract obliquely cupular, glandular-ciliate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long including the pedicel, umbonate 1 lin. above the base, dorsal tooth triangular, $\frac{1}{4}$ lin. long, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Receptacle and calyx together tubular-flask-shaped, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long. Calyx subtruncate, minutely and sparingly glandular-ciliate, $\frac{7}{8}$ lin. long. Corolla nearly $1\frac{1}{4}$ in. long, skittle-shaped in bud; tube about 10 lin. long, glandular inside, suprabasal swelling subglobose, $1\frac{1}{4}$ lin. in diam., commencing $\frac{5}{8}$ lin. above the base, neck $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, inflated part of tube 7 lin. long; lobes erect, linear, 4 lin. long. Filaments tapering upwards, $2\frac{1}{4}$ lin. long, the uppermost $\frac{1}{2}$ lin. slightly swollen; anthers oblong-linear, $\frac{5}{8}$ lin. long. Disc acutely 5-lobed, $\frac{1}{4}$ lin. high. Style glabrous, slightly thickened above, stigma ellipsoid, $\frac{3}{8}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 931. *L. Henriquesii*, Engl. l.c. 88, as to Welwitsch, 4881. *Agelanthus glomeratus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 246, 738.

Lower Guinea. Angola: Huilla; near Lake Ivantala, on *Gardenia Jovistonantis*, Hiern, *Welwitsch*, 4880! between Nene and Jau, on *Parinarium Mobola*, Oliv., *Welwitsch*, 4881! near Lopollo, *Welwitsch*, 4881B!

91. **L. loandensis,** *Engl. & Krause in Engl. Jahrb.* xliii. 406. Branchlets rather slender, about 1 lin. in diam. 1 ft. below the apex,

conspicuously nodose, greyish, finely and densely lenticellate, glabrous, slightly ribbed in a dried state, youngest parts angular, brownish; internodes $\frac{1}{4}$–1 in. long. Leaves alternate, obovate-oblong, elliptic-oblong or more rarely elliptic, rounded at the apex, sometimes minutely apiculate, more or less cuneate into the base, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{3}$–$1\frac{2}{3}$ in. broad, thickly coriaceous, glabrous, 3-nerved from the base or from shortly above the base, dark brown in a dried state; nerves raised on the upper surface, not visible on the lower; petiole $\frac{3}{4}$–$1\frac{1}{2}$ lin. long. Flowers axillary, several together; pedicels $\frac{1}{2}$ lin. long, slightly constricted below the base of the bract; bract obliquely cupular, glandular-ciliate, thickly keeled dorsally, dorsal margin $\frac{3}{4}$–1 lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together tubular-flask-shaped, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long. Calyx slightly toothed, glandular-ciliate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Corolla nearly $1\frac{1}{2}$ in. long; tube about 13 lin. long, split unilaterally about half-way down, suprabasal swelling commencing $\frac{1}{2}$–$\frac{5}{8}$ lin. above the base, ellipsoid, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, neck about $1\frac{1}{4}$ lin. long; lobes erect, linear, acute, $3\frac{1}{2}$ lin. long. Filaments tapering upwards, 2–$2\frac{1}{4}$ lin. long, inflexed, the uppermost $\frac{3}{8}$ lin. slightly thickened; anthers linear, truncate, $\frac{7}{8}$ lin. long. Disc acutely lobed, $\frac{1}{8}$–$\frac{1}{6}$ lin. high. Style slightly thickened above; stigma ovoid-ellipsoid, $\frac{3}{8}$ lin. long.

Lower Guinea. Angola: Loanda, *Gossweiler*, 350!

92. **L. Henriquesii,** *Engl. in Engl. Jahrb.* xx. 88. Branches greyish-buff-coloured, very inconspicuously lenticellate, $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, glabrous; branchlets subangular, glaucous; internodes $\frac{1}{3}$–1 in. long. Leaves opposite, ternate or alternate, very shortly petioled, oblanceolate or linear-oblanceolate, straight or subfalcate, obtuse at the apex, sometimes apiculate, long-cuneate into the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 4–8 lin. broad, rigidly coriaceous, glabrous, greyish-glaucous in a dried state, 3–5-nerved; nerves prominent on the upper surface, much less so on the lower; petiole $\frac{1}{2}$–1 lin. long. Flowers axillary, several together; pedicels $\frac{3}{8}$–$\frac{1}{2}$ lin. long; bract obliquely cupular, glandular-ciliate, umbonate about $1\frac{1}{2}$ lin. above the base of the pedicel, dorsal margin $1\frac{1}{4}$ lin. long, ventral margin $\frac{5}{8}$ lin. long, dorsal lobe $\frac{3}{8}$ lin. long, emarginate-bicuspidate. Receptacle and calyx together tubular, $1\frac{3}{4}$–$1\frac{7}{8}$ lin. long. Calyx subtruncate, glandular-ciliate, $1\frac{1}{8}$ lin. long. Corolla not known in an expanded condition, $1\frac{1}{4}$ in. long in bud, whitish-rosy (*Welwitsch*), glandular inside; lobes about $3\frac{1}{2}$ lin. long. Filaments 2 lin. long, tapering upwards, thickened in the uppermost $\frac{1}{4}$ lin.; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc acutely lobed, $\frac{1}{6}$ lin. high.—Hiern in Cat. Afr. Pl. Welw. i. 931. *Agelanthus Henriquesii*, Durand & Jacks. Ind. Kew. Suppl. i. 14, by error.

Lower Guinea. Angola: Huilla; near Mumpulla, *Welwitsch*, 4885!

93. **L. Gilgii,** *Engl. in Engl. Jahrb.* xx. 91. Branches brownish, subterete, nodose, glabrous, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, younger part subangular, smooth, older part finely ribbed in a dried state, minutely and very inconspicuously lenticellate; internodes $\frac{1}{4}$–1 in.

long. Leaves ternate or alternate, subsessile, oblanceolate, minutely apiculate from an obtuse apex, long-cuneate into the base, $1\frac{1}{4}$–2 in. long, 4–6 lin. broad, rigidly coriaceous, glabrous, brownish in a dried state, 3-nerved from the base; nerves prominent on the upper surface, hardly visible on the lower. Flowers axillary, several together, subsessile; pedicels $\frac{1}{4}$–$\frac{3}{8}$ lin. long; bract cupular, glandular-ciliate, umbonate 1–$1\frac{1}{8}$ lin. above the base, dorsal margin $\frac{3}{4}$–1 lin. long, ventral margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, dorsal lobe $\frac{1}{5}$–$\frac{1}{4}$ lin. long, emarginate or emarginate-bicuspidate. Receptacle and calyx together tubular-flask-shaped, $1\frac{3}{4}$ lin. long. Calyx subtruncate, glandular-ciliate, $1\frac{1}{8}$ lin. long. Corolla about $1\frac{1}{3}$ in. long; tube slightly glandular inside, suprabasal swelling commencing about $\frac{3}{4}$ lin. above the base, ellipsoid, $1\frac{3}{4}$ lin. long; lobes erect, subspathulate-linear, $3\frac{1}{2}$ lin. long. Filaments tapering upwards, $2\frac{1}{8}$–$2\frac{1}{4}$ lin. long, the uppermost $\frac{1}{3}$ lin. slightly thickened; anthers linear, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Disc acutely lobed, $\frac{1}{5}$ lin. high.—Hiern in Cat. Afr. Pl. Welw. i. 931. *Agelanthus Gilgii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 246, 738.

Lower Guinea. Angola: Huilla; Lopollo Country, on Combretaceæ and Mimoseæ, *Welwitsch*, 4893!

94. **L. vittatus,** *Engl. in Engl. Jahrb.* xxx. 301. Branches about $2\frac{1}{2}$ lin. in diam. 1 ft. below the apex, younger part green, older part purplish-brown; bark cracked both longitudinally and transversely; internodes $2\frac{1}{2}$–5 lin. long. Leaves alternate, oblanceolate-oblong to obovate-oblong, obtuse or rounded at the apex, cuneate into the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $4\frac{1}{2}$–9 lin. broad, coriaceous, glabrous, 3-nerved from shortly above the base; nerves prominent on the upper surface, much less evident on the lower; veins visible on the upper surface only; petiole 1–2 lin. long. Flowers axillary, several together, subsessile; pedicel about $\frac{3}{8}$ lin. long; bract obliquely cupular, glandular-ciliolate, umbonate about 1 lin. above the base of the pedicel, dorsal margin 1–$1\frac{1}{8}$ lin. long, ventral margin $\frac{5}{8}$ lin. long, dorsal lobe triangular, $\frac{1}{4}$–$\frac{3}{8}$ lin. long, bicuspidate or not. Receptacle and calyx together tubular, slightly constricted about the middle, 2 lin. long. Calyx subtruncate, glandular-ciliolate, $1\frac{1}{4}$ lin. long. Corolla $1\frac{2}{3}$–$1\frac{3}{4}$ in. long, tubular, glandular inside, split unilaterally about 6 lin. down, suprabasal swelling commencing about $\frac{3}{4}$ lin. above the base, ellipsoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, neck 2–$2\frac{1}{4}$ lin. long; lobes erect, linear, broadened into the base, 5 lin. long. Filaments inserted about $\frac{1}{2}$ lin. above the base of the corolla-lobes, tapering upwards, 3 lin. long, inflexed, uppermost $\frac{3}{8}$ lin. darker-coloured; anthers linear, truncate, $1\frac{1}{8}$ lin. long. Disc shortly and acutely lobed, $\frac{1}{3}$ lin. high. Style slightly thickened above.

Mozamb. Distr. German East Africa: Unyika; near Suntas Dorf, 5300 ft., *Goetze*, 1431!

95. **L. pennatulus,** *Sprague.* Young branchlets subangular, glabrous, older ones terete, greyish, densely lenticellate. Leaves subternate or alternate, ovate-elliptic or elliptic, obtuse or rounded at the apex, rounded or obtuse at the base, $1\frac{3}{4}$–$2\frac{3}{4}$ in. long, 1–2 in. broad, coriaceous, glabrous, with red nerves (*Scheffler*); lateral nerves 2–3 on

each side, slightly raised on both surfaces; petiole 1 $2\frac{1}{2}$ lin. long. Flowers axillary, sessile, several or many together; bract obliquely cupular, minutely ciliate, solid base $\frac{1}{4}$–$\frac{3}{8}$ lin. long, dorsal margin $\frac{3}{4}$–$\frac{7}{8}$ lin. long, truncate or slightly emarginate, umbonate $\frac{1}{4}$ lin. below the apex, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together cylindric-flask-shaped, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long. Calyx 5-toothed, 1 lin. long. Corolla red and purple (*Scheffler*), $1\frac{3}{4}$–2 in. long, basal portion narrow, $\frac{3}{4}$–1 lin. long, suprabasal swelling ellipsoid, $2\frac{1}{2}$ lin. long; tube split unilaterally 6–7 lin. down; lobes erect, linear, broadened upwards and into the base, $4\frac{3}{4}$ lin. long. Filaments inserted $\frac{3}{8}$ lin. above the base of the corolla-lobes, $2\frac{3}{4}$ lin. long, tapering upwards, involute; anthers linear, slightly emarginate, $1\frac{1}{8}$ lin. long. Disc acutely 5-lobed, $\frac{3}{8}$ lin. high. Stigma subglobose, $\frac{3}{8}$ lin. in diam.

Nile Land. Uganda: Lamuru, 10,000 ft., *Scheffler*, 308! British East Africa, *Elliott*, 23!

Differs from *L. brunneus*, Engl., in the more or less pinnate nervation of the leaves. Individual leaves may show an approach to a triuerved condition.

96. **L. brunneus,** *Engl. in Engl. Jahrb.* xx. 88. Branches slightly flexuous, terete or subangular, greyish, about $1\frac{5}{8}$ lin. in diam. 1 ft. below the apex, younger part angular, smooth, older part finely and densely lenticellate. Leaves ternate cr alternate, subsessile, elliptic-oblong, rounded at the apex, often apiculate, acute or obtuse at the base, $2\frac{1}{2}$–4 in. long, 1–2 in. broad, rigidly coriaceous, glabrous, dull, conspicuously 3 5-nerved from the base; nerves prominent on the upper surface, slightly raised on the lower; veins raised on the upper surface, hardly visible on the lower; petiole $\frac{1}{2}$–1 lin. long. Flowers axillary, several or many together, subsessile; pedicels represented only by the solid base of the bract; bract obliquely cupular, minutely and very sparingly puberulous outside, ciliolate, umbonate 1–$1\frac{1}{4}$ lin. above the base, dorsal margin $1\frac{1}{4}$ lin. long including the lobe, ventral margin $\frac{7}{8}$–1 lin. long, dorsal lobe quadrangular, truncate, $\frac{1}{6}$ $\frac{1}{4}$ lin. long, $\frac{1}{3}$–$\frac{3}{8}$ lin. broad. Receptacle and calyx together about $2\frac{1}{2}$ lin. long, narrowly campanulate, much expanded in the upper half. Calyx inconspicuously 5-toothed, glandular-ciliolate, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long. Corolla about $1\frac{1}{2}$ in. long, carmine, suprabasal swelling commencing about $\frac{1}{2}$ lin. above the base, ellipsoid, $1\frac{3}{4}$–2 lin. long, neck about 2 lin. long; lobes erect, linear, acute, $5\frac{1}{4}$ lin. long. Filaments inserted about $\frac{3}{8}$ lin. above the base of the corolla-lobes, 4-angled, tapering upwards, $2\frac{1}{2}$ lin. long, angles glandular-papillate, dorsal surface slightly convex, uppermost $\frac{1}{4}$ lin. of filament slightly swollen; anthers linear, $1\frac{1}{8}$ lin. long. Disc shortly and subacutely lobed, $\frac{1}{4}$ lin. high. Style slightly skittle-shaped.—Hiern in Cat. Afr. Pl. Welw. i. 931. *L. malangensis*, Engl. & Krause in Engl. Jahrb. xliii. 406. *L. Buchholzii*, Engl. in Engl. Jahrb. xx. 91, as to the Angola specimens. *Agelanthus brunneus*, Van Tiegh. in Bull. Soc. Bot. France. xlii. 246, 738.

Lower Guinea. Angola: Pungo Andongo; in the forests of Pedras de Guinga and Mutollo, on Cæsalpineæ, *Welwitsch*, 4850! Malange, *Mechow*, 392! 392A! *Gossweiler*, 1011! on *Diplorhynchus* sp., *Gossweiler*, 1012!

Var. *Durandii*, Sprague. Branches and leaves as in the type. Flowers shortly but distinctly pedicelled; pedicels $\frac{1}{2}$–$\frac{5}{8}$ lin. long, much less in diam. than the bract; bract obliquely cupular, dorsally keeled, dorsal margin $\frac{3}{4}$–$\frac{7}{8}$ lin. long, ventral margin $\frac{3}{8}$–$\frac{5}{8}$ lin. long. Receptacle and calyx together about $1\frac{3}{8}$ lin. long. Calyx suberect or patulous. Corolla $1\frac{1}{2}$ in. long or less, suprabasal swelling subglobose or oblong-ellipsoid; lobes $3\frac{1}{2}$–$4\frac{3}{4}$ lin. long. Anthers $\frac{3}{4}$–$1\frac{1}{8}$ lin. long.—*L. Durandii*, Engl. in Comptes-rendus Soc. Bot. Belg. xxxix. 27; De Wild. & Durand, Reliq. Dewevr. 201; De Wild. Miss. É. Laurent, 75. *L. Buchholzii*, Engl. in Engl. Jahrb. xx. 91, t. 1, fig. D, excluding the Angola specimens.

Lower Guinea. French Congo: Ogowe River; Lambarene, *Buchholz!*

South Central. Belgian Congo: Equator District; Eala, *Laurent*, 203! Basankusu, *Dewèvre*, 775A! between Lulanga and Bangala, *Dewèvre*, 858.

Differs from typical *L. brunneus* in having well-marked pedicels, and also in the smaller receptacle and calyx. In Laurent's specimen the suprabasal swelling of the corolla is oblong-ellipsoid, the corolla about $3\frac{1}{2}$ lin. long, the anthers $\frac{3}{4}$ lin. long. Buchholz's specimen and Dewèvre's specimen from Basankusu have a subglobose suprabasal swelling of the corolla, and longer lobes and anthers. Buchholz's and Laurent's specimens have a suberect calyx, whilst Dewèvre's specimen has a patulous calyx irregularly split by the suprabasal expansion of the corolla.

Var. *Butayei*, Sprague. Leaves narrowly oblong or oblong-lanceolate, $2\frac{1}{2}$–$6\frac{3}{4}$ in. long, $\frac{3}{4}$–$2\frac{1}{2}$ in. broad. Pedicels $\frac{1}{4}$–$\frac{1}{2}$ lin. long, stout, not well-marked; dorsal margin of the bract 1 lin. long, ventral margin $\frac{3}{4}$ lin. long. Receptacle and calyx together about 2 lin. long, narrowly campanulate, much expanded in the upper half. Calyx patulous, split by the suprabasal expansion of the corolla, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Corolla $1\frac{3}{4}$ in. long or rather more, suprabasal swelling obovoid-globose, over 2 lin. long; lobes about 6 lin. long. Anthers $1\frac{1}{8}$ lin. long.—*L. Butayei*, De Wild. Études Fl. Bas- et Moyen-Congo, i. 28.

Lower Guinea. Lower Congo, *Butaye in Herb. Gillet*, 2248! Dyuma Valley, *Gillet*, 2899!

Differs from typical *L. brunneus* in the rather longer and narrower leaves.

Var. *Thonneri*, Sprague. Branches very densely lenticellate. Leaves narrowly lanceolate, obtuse or acute at the apex, often mucronulate, subcuneate at the base, 2–$3\frac{1}{4}$ in. long, 5–10 lin. broad, thinly coriaceous, 3-nerved. Pedicels $\frac{3}{8}$–$\frac{1}{2}$ lin. long, well-marked, much less in diam. than the bract; bract dorsally bicuspidate, cusps subulate, $\frac{1}{4}$–$\frac{1}{3}$ lin. long, dorsal margin $\frac{7}{8}$ lin. long without the cusps, ventral margin $\frac{3}{4}$ lin. long. Receptacle and calyx together $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long, narrowly campanulate. Calyx $\frac{3}{4}$–$1\frac{1}{8}$ lin. long, patulous, irregularly split by the suprabasal expansion of the corolla. Corolla over $1\frac{1}{2}$ in. long, suprabasal swelling ellipsoid, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; lobes $4\frac{1}{2}$ lin. long. Anthers about 1 lin. long.—*L. Thonneri*, Engl. in De Wild. & Durand, Pl. Thonn. Congol. 12, t. 23; De Wild. & Durand, Reliq. Dewevr. 202; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 124.

South Central. Belgian Congo: Equator District; Coquilhatville, *Dewèvre*, 578! Bangala District; Bokapo, Ngali, *Thonner*, 61! Aruwimi District; Yambuya, *Laurent*, 1847!

97. **L. Krausei,** *Engl. in Engl. Jahrb.* xliii. 311. Branchlets glabrous, $1\frac{3}{4}$ lin. in diam. 1 ft. below the apex, young part angular, smooth, older parts terete, very densely lenticellate; internodes $\frac{3}{4}$–2 in. long. Leaves ternate or alternate, subsessile, oblanceolate-oblong or lanceolate-oblong, apiculate from an obtuse or rounded apex, gradually narrowed into the base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 7–11 lin. broad, stiffly coriaceous, glabrous, triplinerved; lateral nerves arising about $\frac{1}{5}$ above the base, prominent on the upper surface, rather inconspicuous on the

lower; petiole about 1 lin. long. Umbels head-like, sessile, solitary or fascicled, about 3-flowered; pedicels (solid base of bract) about $\frac{1}{4}$ lin. long; bract cupular, dorsal margin produced into a triangular acute lobe, umbonate, $1\frac{3}{4}$ lin. long, ventral margin $\frac{7}{8}$ lin. long. Receptacle and calyx together $2\frac{3}{4}$ lin. long, subcylindric, constricted in the middle. Calyx ascending, irregularly toothed or split, $1\frac{3}{8}$ lin. long. Corolla orange, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, basal swelling ovoid, $1\frac{1}{2}$–2 lin. long; tube split unilaterally about $\frac{1}{2}$ in. down; lobes erect, linear, $4\frac{1}{4}$ lin. long from the insertion of the filaments. Filaments tapering upwards, $2\frac{3}{4}$ lin. long, inflexed; anthers oblong-linear, truncate, $\frac{1}{2}$ lin. long (*Engler*). Disc acutely lobed, $\frac{1}{5}$ lin. high.

Mozamb. Distr. German East Africa: Ruanda District; Rugege Forest, *Mildbraed*, 882!

98. **L. remotus,** *Baker & Sprague*. Branches stout, $2\frac{1}{4}$ lin. in diam. 1 ft. below the apex, slightly flexuous, nodose, younger part densely whitish-tomentose with verticillate-branched hairs, older part pubescent or puberulous, finally becoming glabrous, buff or ash-coloured; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite, subopposite or alternate, shortly petioled, obovate or obovate-oblong, rounded at the apex, cuneate into the base, 2–$2\frac{3}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad, thickly coriaceous, densely whitish-tomentose with verticillate-branched hairs in a young state, glabrescent when adult, penninerved; nerves slightly raised on the upper surface, hardly visible on the lower, lateral ones about 4 on each side, oblique, very slightly curved; veins not visible; petiole 2–3 lin. long. Umbels axillary, solitary or geminate, densely whitish-tomentose all over with verticillate-branched hairs, 5–6-flowered; peduncle $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, stout; pedicels 1–$1\frac{1}{2}$ lin. long; bract unilaterally developed from a circular base, narrowly oblong or oblong-linear, slightly broadened into the base, about 2 lin. long, concave, glabrous inside, margins inflexed. Receptacle and calyx together cupular, $1\frac{1}{8}$ lin. long. Calyx truncate, reduced to a mere rim, about $\frac{1}{8}$ lin. long. Corolla cylindric-funnel-shaped, $1\frac{3}{4}$ in. long; tube slightly broadened into the base, split unilaterally more than half-way down; lobes erect, oblong-linear, very concave, induplicate in bud, $4\frac{1}{2}$ lin. long. Filaments remaining erect (*Kirk*, drawing), about $1\frac{1}{4}$ lin. long, much thickened and darker below the anther; anthers linear, $1\frac{3}{4}$ lin. long; connective produced about $\frac{1}{12}$ lin. above the cells. Disc sunk, pentagonal, shortly lobed, $\frac{1}{8}$ lin. long, densely whitish-pilose with branched hairs. Style tapering upwards, thick and densely pilose with branched hairs in the lower half, slender and glabrous in the upper half; stigma ellipsoid, very slightly bilobed, $\frac{3}{8}$ lin. long.

Mozamb. Distr. Portuguese East Africa: Shupanga, *Kirk*, 40!

A very isolated species resembling the section *Cinerascentes* in general appearance, but differing in the induplicate corolla-lobes, the erect filaments and the anthers, which are not divided transversely.

99. **L. rondensis,** *Engl. in Engl. Jahrb.* xl. 524. Branches slightly flexuous, terete, nodose, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the

apex, densely lenticellate, glabrous; branchlets spreading or ascending, angular; internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite or subopposite, oblong, oblong-lanceolate or ovate-oblong, acute or obtuse at the apex, obtuse or more rarely rounded at the base, $1\frac{1}{4}$–$2\frac{3}{4}$ in. long, 7 16 lin. broad, rigidly coriaceous, glabrous, penninerved, upper surface slightly glossy; lateral nerves patulous, 4–6 on each side, anastomosing well within the margin, slightly raised on the upper surface, very inconspicuous or not visible on the lower; petiole $2\frac{1}{2}$–4 lin. long, channelled. Umbels axillary, fascicled, 2–4-flowered; peduncle $\frac{1}{2}$–$\frac{3}{4}$ lin. long; pedicels $\frac{1}{4}$ lin. long; bract cupular, produced dorsally into a shortly ovate truncate lobe, umbonate, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Receptacle and calyx together suburceolate, $\frac{7}{8}$ lin. long. Calyx subtruncate, sparingly ciliolate, $\frac{1}{2}$ lin. long. Corolla 1 in. long or rather more, suprabasal swelling yellow, ellipsoid, 1–$1\frac{1}{4}$ lin. long, remainder of the corolla purplish-red; tube altogether $6\frac{1}{2}$–7 lin. long, very slightly split unilaterally, glandular inside; lobes erect, linear-spathulate, 5–$5\frac{1}{2}$ lin. long. Filaments inserted $\frac{5}{8}$ lin. above the base of the corolla-lobes, tapering upwards, $2\frac{1}{2}$ lin. long, grooved transversely on the outer surface, involute; anthers linear, $1\frac{7}{8}$ lin. long; connective produced beyond the cells into a transversely elliptic appendage, $\frac{1}{12}$ lin. long. Disc pentagonal, $\frac{1}{8}$ lin. high. Style broadened above into the stigma.

Mozamb. Distr. German East Africa: eastern slopes of Rondo Plateau, *Busse*, 2554!

Differs from the other species of sect. *Rigidiflori* in having the corolla-lobes shorter than the tube.

100. **L. Welwitschii,** *Engl. in Engl. Jahrb.* xx. 87, *t.* 1, *fig. B.* Branchlets slender, subangular, puberulous in a young state, soon glabrous; internodes up to 1 in. long. Leaves opposite, subopposite or alternate, recurved-arcuate, lanceolate, lanceolate-oblong or elliptic, acute, obtuse or rounded at the apex, more or less cuneate into the base, $1\frac{1}{4}$–2 in. long, $\frac{1}{2}$–1 in. broad, thinly coriaceous, glabrous, penninerved, or trinerved from shortly above the base; lateral nerves oblique, slightly raised on both surfaces; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Umbels axillary, solitary, 3–4-flowered; peduncle 2–$2\frac{1}{2}$ lin. long; pedicels $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long; bract narrowly ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, ciliolate, obtusely keeled, ventral margin saucer-shaped, $\frac{1}{6}$ lin. long. Receptacle and calyx together narrowly campanulate, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long. Calyx slightly 5-lobed, sparingly ciliolate, $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Corolla nearly 1 in. long; tube about 3 lin. long, split unilaterally down to the middle, basal swelling ellipsoid, $1\frac{3}{4}$ lin. long, 5-ribbed; lobes linear, slightly broadened upwards, about $8\frac{1}{2}$ lin. long, bent forwards. Filaments inserted at the base of the corolla lobes, 4–$4\frac{1}{2}$ lin. long, tapering upwards, with numerous transverse grooves on the outer surface, involute; anthers linear, $2\frac{7}{8}$ lin. long; connective produced $\frac{1}{12}$ lin. above the cells. Disc pentagonal, $\frac{1}{5}$ lin. high. Stigma ellipsoid, $\frac{1}{3}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 927. *Oncocalyx Welwitschii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 258, 740.

Lower Guinea. Angola: Mossamedes; by the Bero River, on *Tamarix orientalis*, Forsk., *Welwitsch*, 4883!

101. **L. fragilis,** *Sprague*. Branches very brittle, subterete, greyish-brown in a dried state, glabrous, very nodose, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes 2–6 lin. long. Leaves opposite, subopposite or alternate, obovate, rounded at the apex, cuneate into the base, $\frac{1}{2}$–1 in. long, $3\frac{1}{2}$–6 lin. broad, succulent, glaucous-green (*Gossweiler*), rigidly coriaceous in a dried state; lateral nerves hardly visible; midrib slightly raised on both surfaces; petiole $\frac{1}{2}$–1 lin. long. Umbels axillary, apparently fascicled, 3–4-flowered; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; pedicels 1 lin. long; bract ovate from a saucer-shaped base, rounded or subemarginate, very concave, thickly keeled, glandular-ciliolate, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{8}$–$\frac{1}{5}$ lin. long. Receptacle and calyx together narrowly campanulate, $1\frac{1}{4}$ lin. long. Calyx patulous, truncate, glandular-ciliolate, $\frac{3}{8}$ lin. long. Corolla about 9 lin. long, greenish with sulphur-yellow lobes; tube $2\frac{1}{4}$ lin. long, constricted about the middle, split unilaterally to $\frac{3}{4}$ lin. above the base; lobes suberect, $6\frac{1}{2}$ lin. long, subspathulate-linear, slightly incurved in the upper part. Filaments inserted at the base of the corolla-lobes, $3\frac{1}{2}$ lin. long, slightly tapering upwards, involute; anthers linear, $2\frac{3}{4}$ lin. long; connective produced $\frac{1}{8}$ lin. beyond the cells, $\frac{1}{5}$ lin. broad. Disc shortly lobed, $\frac{1}{5}$ lin. high. Style not thickened above; stigma subglobose, $\frac{3}{8}$ lin. in diam.

Lower Guinea. Angola: common in woods near Benguella, *Gossweiler*, 1683!

Near *L. Welwitschii*, from which it differs in the very nodose branches and smaller obovate leaves.

102. **L. elegantissimus,** *Schinz in Bull. Herb. Boiss.* iv. *App.* iii. 52. Branchlets spreading, elongated, yellowish-grey, glabrous. Leaves opposite, subopposite or alternate, narrowly lanceolate or oblanceolate, acute, obtuse or rounded at the apex, cuneate or attenuate into the base, $\frac{2}{3}$–$1\frac{1}{3}$ in. long, $1\frac{1}{2}$–6 lin. broad, thinly coriaceous, glabrous, irregularly 3-nerved from shortly above the base; petiole $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Umbels fascicled on leafy axillary cushion-like short-shoots, 3–4-flowered; peduncle 1 lin. long; pedicels $\frac{3}{4}$ lin. long; bract ovate-cupular, strongly umbonate, umbo laterally compressed, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle and calyx together tubular, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Calyx subtruncate, minutely ciliolate, $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Corolla orange, $8\frac{1}{2}$ lin. long, slightly constricted 1 lin. above the base; tube split unilaterally down to $\frac{5}{8}$ lin. above the base; lobes erect, linear below, oblanceolate-linear above, $6\frac{1}{4}$–$6\frac{1}{2}$ lin. long, acute. Filaments inserted about the base of the corolla-lobes, about $3\frac{1}{2}$ lin. long, much involute, dorsal surface with about 7 deep transverse grooves; anthers linear, $2\frac{3}{8}$–$2\frac{1}{2}$ lin. long; connective produced $\frac{1}{12}$ lin. beyond the cells. Disc 5-lobed, hardly $\frac{1}{6}$ lin. high. Stigma ellipsoid, over $\frac{3}{8}$ lin. long.—*L. karibibensis*, Engl. in Engl. Jahrb. xl. 524.

Lower Guinea. German South-west Africa: Amboland; Oombale, *Schinz*, 291! Hereroland; Karibib, *Dinter*, 1445! Pot Mine, *Fleck*, 415! Spitzkoppjes, *Dinter*, 17! Amutoni, *Dinter*, 730!

Chiefly parasitic on species of *Acacia*. According to Schinz, the filaments coil inwards explosively at the moment of expansion of the flower.

103. **L. platyphyllus,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* i. 341. Young branchlets smooth, subglaucous, about $1\frac{1}{2}$ lin. in diam. 6 in. below the apex, older ones rough, glabrous. Leaves ternate, subopposite or alternate, lanceolate, ovate-oblong or elliptic-oblong (the lowermost ones of each branchlet elliptic or obovate, smaller than the others), subacute, obtuse or rounded at the apex, cuneate into the base, 2–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, coriaceous, glabrous, bluish-green (*Rosen*), penninerved; lateral nerves oblique, about 5–8 on each side, slightly raised on the upper surface, raised on the lower surface; petiole 4–8 lin. long. Umbels axillary, solitary, 5–8-flowered; peduncle 4–6 lin. long; pedicels $2\frac{1}{2}$ lin. long; bract shorter than the receptacle and calyx, broadly elliptic-ovate from a saucer-shaped base, $\frac{7}{8}$ lin. long, minutely ciliate, umbonate at the base, ventral and lateral margins $\frac{1}{8}$–$\frac{1}{6}$ lin. long. Receptacle and calyx together cupular, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long, glabrous. Calyx truncate, about $\frac{1}{5}$ lin. long; intramarginal ring $\frac{1}{8}$ lin. long. Corolla orange-red, subcylindric in bud, broadest about the middle, slightly tapering upwards and downwards, shortly acuminate to the apex, $1\frac{3}{4}$–2 in. long; tube split unilaterally; lobes separating from below upwards, linear, shortly acuminate. Filaments inserted $2\frac{1}{2}$–$2\frac{3}{4}$ lin. above the base of the corolla-lobes, 4–5 lin. long, tapering upwards, inflexed or involute; anthers linear, $3\frac{1}{2}$–$4\frac{1}{2}$ lin. long; connective produced $\frac{1}{4}$ lin. beyond the cells. Disc pentagonal, not distinctly lobed, $\frac{1}{4}$–$\frac{1}{3}$ lin. high. Style not skittle-shaped above; stigma ellipsoid, $\frac{1}{2}$ lin. long.—Schweinf. in Bull. Herb. Boiss. iv. App. ii. 148; Pax in Engl. Jahrb. xxxix. 615. *Schimperina platyphylla*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 257.

Nile Land. Eritrea: plains between Mareb and Godofelassi, 5000 ft., *Schweinfurth*, 181! Abyssinia: Tigre; Jelajeranne, *Schimper*, 1584! Mai Sellasa, 6000 ft., *Rosen*.

Loranthus amœnus, Delile ex Van Tiegh. in Bull. Soc. Bot. France, xlii. 257, name only (*Schimperina amœna*, Van Tiegh. l.c.), is unknown to me. It is founded on a specimen in the Delessert herbarium, collected by Figari at Fazokl, Upper Sennar; and is probably a form of *L. platyphyllus*.

104. **L. unyorensis,** *Sprague.* Young branches slightly compressed and blackish in the upper part, tawny and finely lenticellate in the lower, older ones subterete, $1\frac{3}{4}$ lin. in diam. 9 in. below the apex, pale greyish-brown, finely lenticellate; internodes $1\frac{1}{2}$–$2\frac{1}{2}$ in. long. Leaves opposite or subopposite, lanceolate, acuminate to an acute apex, obtuse or rounded at the base, $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, thickly coriaceous, glabrous, penninerved; lateral nerves patulous, about 8 on each side, slightly raised on the upper surface, hardly visible on the lower; midrib prominent, especially on the lower surface; petiole 5–8 lin. long. Racemes axillary, solitary or fascicled, very short, much-contracted, umbel-like, 8–13-flowered; peduncle $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long, clavate, broadened into the base; pedicels borne on the upper $1\frac{1}{2}$–$2\frac{1}{2}$ lin. of the peduncle, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, broadened into the base; bract ovate-cupular, dorsal margin rounded, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, ventral margin about $\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, $1\frac{3}{8}$ lin. long, glabrous. Calyx

truncate, $\frac{3}{8}$–$\frac{5}{12}$ lin. long; intramarginal ring about $\frac{1}{10}$ lin. long. Corolla not known in an expanded state, about $1\frac{1}{3}$ in. long in bud, pinkish with yellow tip (*Bagshawe*), broadest about the middle, tapering upwards to a slightly incurved apex, narrowed downwards and then slightly broadened towards the base; tube glandular inside; lobes linear, about 5 lin. long in bud. Filaments slightly tapering upwards, about $2\frac{3}{4}$ lin. long in bud; anthers oblong-linear, $1\frac{1}{8}$ lin. long in bud; connective slightly produced beyond the cells. Disc hardly lobed, $\frac{1}{5}$ lin. high. Style not skittle-shaped; stigma subglobose, $\frac{3}{8}$–$\frac{5}{12}$ lin. in diam. Berry obovoid or oblong-ellipsoid, $3\frac{1}{2}$–4 lin. long, apical cup $\frac{1}{2}$ lin. long.

Nile Land. Uganda: Unyoro; above Kibero, 3000 ft., on *Ficus* sp., *Bagshawe*, 911!

105. **L. Stuhlmannii,** *Engl. in Engl. Jahrb.* xx. 85. Branchlets long, slender, sparingly greyish-pilose, $\frac{3}{4}$–1 lin. in diam. Leaves alternate, linear-lanceolate, subacute or obtuse at the apex, cuneate into the base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 4–5 lin. broad, subcoriaceous, sparingly pilose in a young state, soon glabrous; lateral nerves 2–3 on each side, very oblique, slightly raised on both surfaces, the uppermost pair running subparallel to the midrib; petiole $1\frac{1}{2}$–3 lin. long. Flowers axillary, solitary or geminate; pedicels $\frac{3}{4}$–$\frac{7}{8}$ lin. long, puberulous; bract cupular, slightly oblique, sparingly puberulous or glabrous outside, ciliate, dorsal margin 1 lin. long, slightly umbonate $\frac{3}{8}$ lin. below the apex, ventral margin $\frac{7}{8}$ lin. long. Receptacle and calyx together 3 lin. long; receptacle campanulate, hardly $\frac{7}{8}$ lin. long. Calyx tubular, truncate, 2 lin. long, glabrous outside, ciliate; intramarginal ring $\frac{1}{10}$ lin. long. Corolla about 10 lin. long; tube narrowly cylindric, about 2 lin. long; lobes about 8 lin. long, linear below, linear-oblanceolate above, reflexed below the middle, papillate along the inner edges. Filaments inserted $1\frac{1}{4}$ lin. above the base of the corolla-lobes, linear, $4\frac{1}{2}$ lin. long, involute; anthers linear, $1\frac{7}{8}$ lin. long; connective produced about $\frac{1}{12}$ lin. beyond the cells, emarginate. Disc pentagonal, $\frac{1}{6}$ lin. high. Style narrowed in the uppermost 2 lin.; stigma ellipsoid, $\frac{1}{3}$ lin. long.—Pfl. Ost-Afr. C. 165, t. 12, figs. A–C.

Mozamb. Distr. German East Africa: Muansa, *Stuhlmann*, 4572! Ukerewe Island, in Lake Victoria; Neuwied, *Conrads*, 260!

Var. *somalensis*, Engl. Branches puberulous in a young state, soon becoming glabrous; internodes 3–7 lin. long. Leaves oblanceolate, rounded at the apex, gradually narrowed into the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $3\frac{1}{2}$–8 lin. broad, 3- (or 5-) nerved from shortly above the base; nerves slightly raised on the upper surface, less so on the lower; petiole $\frac{1}{2}$–2 lin. long. Pedicels hardly $\frac{1}{2}$ lin. long. Receptacle and calyx together $2\frac{3}{8}$ lin. long. Corolla 8 lin. long in bud; tube 2 lin. long; lobes 6 lin. long. Filaments $4\frac{3}{4}$ lin. long, much flattened; anthers, $1\frac{3}{8}$ lin. long.

Nile Land. Somaliland: Webi Abdallah, *Keller*, 218!

Var. *somalensis* may be distinguished at a glance from typical *L. Stuhlmannii* by the shape of the leaves, and will probably be found to represent a distinct species when better material is received.

106. **L. Fischeri,** *Engl. in Engl. Jahrb.* xx. 85, *t.* 1, *fig. A.* Young branchlets velvety-pilose, adult ones greyish, puberulous or glabrous;

internodes $1\frac{1}{2}$–5 lin. long. Leaves alternate, obovate-oblong or obovate, rounded at the apex, more or less cuneate into the base, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, 4–8 lin. broad, rigidly coriaceous, densely pilose in a young state, minutely puberulous when adult; lateral nerves about 2 on each side, very oblique, the upper pair running nearly to the apex; petiole $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Flowers axillary, 2 or more together; pedicels about $\frac{3}{8}$ lin. long; bract cupular, subtruncate or slightly 2-lipped, ciliate, densely or sparingly pilose outside, margin $\frac{7}{8}$–$1\frac{1}{4}$ lin. long, dorsal surface slightly or distinctly umbonate. Receptacle and calyx together tubular, $1\frac{7}{8}$–$2\frac{1}{8}$ lin. long, glabrous outside. Calyx subtruncate, ciliate, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Corolla orange or yellow, about 1 in. long, swollen and 5-ribbed in bud at the insertion of the stamens; tube $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, splitting unilaterally to the middle or below; lobes linear, about 9 lin. long, separating from below upwards, reflexed or twisted about the middle. Filaments inserted near the base of the corolla-lobes, $6\frac{1}{2}$–7 lin. long, involute; anthers linear, $1\frac{7}{8}$–$2\frac{1}{4}$ lin. long. Disc pentagonal, $\frac{1}{6}$ lin. high. Stigma globose or ellipsoid, $\frac{1}{4}$–$\frac{1}{3}$ lin. long.—Pfl. Ost-Afr. C. 165; Engl. & Prantl, Pflanzenfam. Nachtr. i. 132.

Nile Land. Somaliland: Imi, *Riva*, 1044! British East Africa: near Lake Naivasha, 6000 ft., *Scott-Elliot*, 6887! Mau Plateau, 7000 ft., *Johnston*, 2! Guaso Nyiro, 6000 ft., *Evans*, 752! Kibwezi, *Scheffler*, 169! 169A! Taita, on *Acacia* sp., *Hildebrandt*, 2494! Kiboko Mountains, 3300 ft., *Gregory!* and without precise locality, *Elliott*, 91!

Mozamb. Distr. German East Africa: Kilimanjaro; by the Himo River, 3600 ft., *Volkens*, 1746!

Parasitic on *Gymnosporia senegalensis*, Loes., and species of *Acacia*.

107. **L. Eminii,** *Engl. in Engl. Jahrb.* xx. 113. Young branches, leaves and inflorescences rusty-tomentellous with verticillate-branched hairs. Branches sharply quadrangular in a young state, $1\frac{3}{4}$–2 lin. in diam. 1 ft. below the apex; internodes 2–4 in. long. Leaves opposite, ovate or ovate-oblong, obtuse or subacute at the apex, rounded or subcordate at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, 8–13 lin. broad, coriaceous, rusty-tomentellous; lateral nerves 5–7 on each side, patulous, raised on both surfaces but more or less hidden (especially on the lower surface) by the dense covering of hairs; petiole 2–3 lin. long, densely tomentellous. Flowers axillary, fascicled, 2–5 together; pedicels 1 lin. long; bract unilateral, patulous, trough-shaped, when flattened out ovate-oblong, $1\frac{3}{4}$–$2\frac{3}{4}$ lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, densely tomentellous outside, glabrous inside except towards the apex. Receptacle and calyx together subturceolate, $1\frac{3}{4}$–2 lin. long; receptacle rusty-tomentellous. Calyx ascending, slightly 5-lobed, $\frac{7}{8}$–1 lin. long, long-ciliate, stellate-pubescent outside, nearly glabrous inside. Corolla narrowly cylindric-funnel-shaped, $1\frac{3}{4}$–2 in. long, densely clothed outside with rusty verticillate-branched hairs; tube about $1\frac{1}{2}$ in. long, glandular inside, splitting unilaterally; lobes reflexed, narrowly spathulate, $4\frac{1}{2}$–5 lin. long, upper enlarged part oblong-lanceolate, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad. Filaments inserted about $\frac{1}{4}$ lin. below the base of the corolla-lobes, involute, about 3 lin.

long, slightly tapering upwards, ventral tooth narrowly triangular, about $\frac{1}{3}$ lin. long, slightly bicuspidate; anthers linear, $1\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad after dehiscence, transversely divided, cells about 9 in each of the four vertical rows. Disc pentagonal, about $\frac{1}{5}$ lin. high, glabrous. Style slightly skittle-shaped above, neck $1\frac{1}{8}$ lin. long; stigma oblong-ellipsoid, $\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. in diam. Young berry ellipsoid, $3\frac{1}{2}$ lin. long, rusty-tomentose, apical cup $\frac{1}{2}$–$\frac{5}{8}$ lin. long.—Pfl. Ost-Afr. C. 166, t. 16, figs. D–K; Engl. & Prantl, Pflanzenfam. Nachtr. i. 133.

Mozamb. Distr. German East Africa: Bukumbi, on Lake Victoria, *Stuhlmann*, 819!

L. Eminii was placed by Engler in the group *Obtectiflori*, from which it differs in the verticillate-branched hairs, transversely septate anthers and slightly skittle-shaped style. In all these respects it agrees with *L. proteicola*, Engler, the type of the group *Eubracteati*.

108. **L. proteicola,** *Engl. in Engl. Jahrb.* xxx. 303. Young branches stout, subterete, villous-tomentose with rusty verticillate-branched hairs, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. in diam. 1 ft. below the apex; internodes 7–10 lin. long. Leaves opposite, ovate or ovate-oblong, obtuse or subacute at the apex, rounded or obtuse at the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, 5–8 lin. broad, coriaceous, greyish-pubescent on the upper surface, tawny-tomentellous with much-branched hairs on the lower; petiole 2–3 lin. long, villous-tomentose. Flowers axillary, geminate, subsessile; pedicel about $\frac{1}{2}$ lin. long; bract consisting of a concave sheath and a foliaceous or subfoliaceous blade, sheath about 1 lin. long, glabrescent inside, blade ovate or elliptic, 3–4 lin. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, densely tomentellous with verticillate-branched hairs on both surfaces. Receptacle and calyx together cupular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long excluding the hairs, villous-tomentose outside with simple or nearly simple hairs, 1–$1\frac{1}{2}$ lin. long. Calyx subtruncate, $\frac{3}{8}$–$\frac{1}{2}$ lin. long, densely ciliate, hairs $\frac{5}{8}$–$1\frac{1}{4}$ lin. long. Corolla about $2\frac{1}{4}$ in. long, tomentellous outside with short verticillate-branched hairs and sparingly villous with long nearly simple hairs; tube cylindric, nearly $1\frac{3}{4}$ in. long, entire when the corolla expands, afterwards splitting unilaterally; lobes reflexed, spathulate, 6–7 lin. long, upper enlarged part oblong-lanceolate, $2\frac{1}{2}$–3 lin. long, $\frac{5}{8}$–$\frac{3}{4}$ lin. broad. Filaments inserted $\frac{1}{4}$–$\frac{3}{8}$ lin. above the base of the corolla-lobes, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long, tapering upwards, connate in their upper part round the style when the corolla expands, afterwards separating and becoming involute, tooth oblong, bicuspidate, $\frac{3}{8}$ lin. long; anthers linear, $1\frac{3}{4}$–2 lin. long, transversely divided, cells 6–7 in each of the four vertical rows. Disc about $\frac{1}{6}$ lin. high, densely rusty-pilose above, hairs up to $\frac{5}{8}$ lin. long. Style slightly skittle-shaped above.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Range, on Lipanye Mountain, 8000 ft., on *Protea kingaensis*, Engl., *Goetze*, 995!

The group *Eubracteati* was founded to accommodate *L. proteicola* by Engler (*l.c.*), who characterised it by the presence of verticillate-branched hairs, large bracts and toothed filaments. An additional character is that the anthers are transversely septate. *L. nigritanus*, which was assigned to the *Eubracteati* by Engler (*l.c.*), has no tooth on the filament, and belongs to the section *Rufescentes*.

109. **L. Ghikæ,** *Volkens & Schweinf. in Ghika, Pays des Somalis*, 200. Young branchlets densely greyish-pilose, $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam., adult ones glabrous, bark longitudinally cracked, inconspicuously lenticellate; internodes $1\frac{1}{2}$–4 lin. long. Leaves alternate, subsessile, oblong, rounded at the apex, obtuse or rounded at the base, $2\frac{1}{2}$–5 lin. long, 1–$1\frac{1}{2}$ lin. broad, thickly coriaceous, densely and shortly greyish-pilose; nerves not visible. Flowers solitary; pedicels about $\frac{1}{4}$ lin. long; bract obliquely cupular, dorsal margin 1 lin. long, prominently keeled, keel sometimes apiculate, ventral margin nearly $\frac{5}{8}$ lin. long. Receptacle and calyx together tubular, about $2\frac{1}{4}$ lin. long. Calyx about $1\frac{1}{2}$ lin. long, shortly lobed; lobes rounded, crenulate. Corolla about 13 lin. long; tube cylindric, nearly 5 lin. long, split unilaterally nearly 2 lin. down, with 5 horizontal depressions outside $1\frac{5}{8}$–$1\frac{3}{4}$ lin. above the base alternating with the lobes and corresponding to 5 oblong deflexed fleshy densely papillate appendages inside the tube, $\frac{3}{8}$–$\frac{1}{2}$ lin. long; lobes erect, linear, about $8\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, linear, slightly broadened into the base, 4 lin. long, tooth about $\frac{1}{8}$ lin. long, rounded; anthers linear, $2\frac{1}{2}$–3 lin. long (*Volkens & Schweinfurth*). Disc $\frac{1}{6}$ lin. high, shortly lobed.

Nile Land. Somaliland: Bourka; Kaldesch Mountain, *Ghika!*

110. **L. kihuirensis,** *Engl. in Engl. Jahrb.* xl. 528. Branchlets terete, about $1\frac{1}{2}$ lin. in diam., minutely greyish-pilose in a young state, glabrous in an adult state; lenticels numerous; internodes 5–10 lin. long. Leaves oblong, rounded or obtuse at the apex, cuneate into the base, 1–2 in. long, $\frac{1}{2}$–1 in. broad, thickly coriaceous, puberulous in a young state, glabrous when adult, 3–5-nerved from the base; nerves slightly raised; petiole $2\frac{1}{2}$–4 lin. long. Flowers axillary, fascicled, 2 or more together; pedicels about $\frac{3}{4}$ lin. long; bract cupular, minutely papillate-pilose outside, margin $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long, dorsally keeled. Receptacle and calyx together tubular, $3\frac{1}{2}$ lin. long, minutely papillate outside. Calyx about $2\frac{1}{2}$ lin. long, subtruncate, minutely ciliolate. Corolla $12\frac{1}{2}$–14 lin. long, minutely and densely papillate-pilose outside; tube cylindric, $4\frac{3}{4}$–$5\frac{1}{4}$ lin. long, split unilaterally about $2\frac{1}{2}$ lin. down, with 5 small horizontal depressions outside $1\frac{1}{2}$–2 lin. above the base alternating with the lobes and corresponding to 5 ovate-oblong deflexed fleshy densely papillate appendages inside the tube, $\frac{3}{8}$–$\frac{1}{2}$ lin. long; lobes erect, linear, 8–$8\frac{1}{2}$ lin. long, minutely hooked at the apex on the inner surface. Filaments inserted at the base of the corolla-lobes, involute, stout, linear, broadened into the base, about $4\frac{1}{2}$ lin. long, with a few transverse grooves on the dorsal surface, tooth oblong, $\frac{1}{6}$ lin. long, rounded or subtruncate; anthers linear, 3–$3\frac{1}{2}$ lin. long (*Engler*). Disc shortly lobed, $\frac{1}{6}$ lin. high. Stigma subglobose, $\frac{3}{8}$ lin. in diam.

Mozamb. Distr. German East Africa: Pare Mountains; between Kihuiro and Gonja, *Engler*, 1541!

111. **L. myrsinifolius,** *Engl. & Krause in Engl. Jahrb.* xliii. 310. Branches $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, much wrinkled, glabrous; young branchlets quadrangular, minutely and densely warted,

internodes $1\frac{1}{2}$–5 lin. long. Leaves opposite or subopposite, elliptic or obovate-elliptic, rounded at the apex, obtuse at the base, 5–8 lin. long, $3\frac{1}{2}$–5 lin. broad, thickly coriaceous, glabrous, brownish or blackish in a dried state, lateral nerves not visible; petiole $\frac{3}{8}$–1 lin. long. Umbels axillary, solitary, 2-flowered; peduncle $\frac{1}{2}$–$\frac{3}{4}$ lin. long, subtended at its base by a transverse pair of deltoid scale-leaves, $\frac{3}{8}$ lin. long, sockets of the pedicels saucer-shaped, $\frac{1}{6}$–$\frac{1}{5}$ lin. deep; pedicels $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract obliquely cupular, dorsal margin $\frac{7}{8}$ lin. long, keeled on the lower $\frac{1}{2}$ lin., keel truncate above, ventral margin $\frac{5}{8}$ lin. long. Receptacle and calyx together $2\frac{5}{8}$ lin. long; receptacle oblong-ellipsoid, $1\frac{3}{4}$ lin. long, $\frac{7}{8}$ lin. broad. Calyx cylindric, shortly lobed, $\frac{3}{4}$ lin. long. Corolla about $1\frac{1}{2}$ in. long, glabrous; tube narrow, slightly broadened towards the apex, split unilaterally $\frac{1}{3}$ of its length; lobes erect, linear-lanceolate, acute, nearly 5 lin. long, rigid, slightly thickened towards the apex. Filaments linear, 2 lin. long, broadened into the base, involute, ventral surface terminating in a distinct rim in front of the anther; anthers linear-oblong, obtuse, $\frac{1}{2}$–$\frac{3}{4}$ lin. long.

Mozamb. Distr. German East Africa: Ruanda; Rugege Forest, 6000 ft., *Mildbraed*, 903!

The above description, from the corolla onwards, is a translation from Engler and Krause. The position of the species is doubtful: I have placed it in the section *Coriaceifolii* on account of the filament terminating in a rim (rudimentary tooth) on the ventral surface. The lobes, however, are described as shorter than the tube.

112. **L. glabratus,** *Sprague.* Branchlets subtetragonal in a young state, brown, glabrous, afterwards becoming subterete with 4 longitudinal ridges, yellowish-grey, very finely lenticellate; internodes $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Leaves alternate, obovate-elliptic or elliptic, rounded at the apex, obtuse or cuneate at the base, 1–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, rigidly coriaceous, glabrous, dull, margin irregularly undulate, 3–5-nerved from the base; nerves prominent on the upper surface, less so on the lower; petiole $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Umbels axillary, 4-flowered; peduncle $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; pedicels $\frac{3}{4}$ lin. long; bract obliquely cupular, glabrous, dorsal margin thickly keeled, $\frac{7}{8}$ lin. long, emarginate, ventral margin $\frac{5}{8}$ lin. long. Receptacle and calyx together cylindric, 2–$2\frac{1}{8}$ lin. long. Calyx truncate, $1\frac{3}{8}$ lin. long. Corolla 8–$8\frac{1}{2}$ lin. long, swollen in bud at the insertion of the stamens; tube cylindric, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, unappendaged; lobes reflexed below the middle, linear, much broadened at the insertion of the stamens, about 7 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, enlargement elliptic, $\frac{1}{2}$ lin. broad. Filaments inserted 1 lin. above the base of the corolla-lobes, involute, slightly tapering upwards, $2\frac{3}{4}$ lin. long, 4-angled, angles rigidly serrate, tooth $\frac{1}{16}$ lin. long; anthers linear, $2\frac{5}{8}$ lin. long. Disc slightly lobed, $\frac{1}{6}$ lin. high.—*L. Fischeri*, var. *glabratus*, Engl. in Engl. Jahrb. xl. 528.

Nile Land. Galla Highlands; Abu-el-Kasin, *Ellenbeck!* Luku, 5000 ft., *Ellenbeck*, 1229!

Distinguished from *L. Fischeri*, Engl., to which it is nearly related, by the presence of a tooth on the filament, and the serrate margins of the latter, as well as by the glabrous branchlets, bract and calyx. The extent to which the corolla-lobes

of *L. glabratus* separate from one another is a little uncertain: the flowers described above were young ones soaked and expanded in boiling water; and it is possible that the corolla in a living state splits unilaterally and that the lobes cohere slightly in a single piece up to the insertion of the stamens, as in *L. Fischeri*.

Following Engler in *Engl. Jahrb.* xx. 81, 107, I have kept up the two sections *Longicalyculati* and *Coriaceifolii*, transferring to the latter, however, all species in which I have found a tooth at the apex of the filament, in strict accordance with Engler's scheme of classification. That too much reliance has been placed on the presence or absence of a tooth on the filament is evident, however, from the close relationship between *L. glabratus*, which has a tooth, and *L. Fischeri*, which has none.

It would probably be a more natural arrangement to make the presence of appendages within the corolla-tube the criterion of the *Coriaceifolii*.

113. **L. microphyllus,** *Engl. in Engl. Jahrb.* xx. 86. Branchlets slender, pruinose in a young state, glabrous; internodes $2\frac{1}{2}$–5 lin. long. Leaves alternate, narrowly oblong or elliptic-oblong, rounded at the apex, obtuse at the base, 3–9 lin. long, $1\frac{1}{2}$–3 lin. broad, thickly coriaceous, glabrous; nerves usually not visible; petiole $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Flowers axillary, fascicled, few together; pedicels $\frac{1}{4}$–$\frac{3}{8}$ lin. long; bract cupular, with a rounded dorsal lobe $\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad, dorsally keeled, glabrous, dorsal margin $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long, ventral margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Receptacle and calyx together tubular, $2\frac{1}{4}$ lin. long, glabrous. Calyx $1\frac{1}{2}$ lin. long; lobes short, rounded, crenulate. Corolla 14 lin. long; tube cylindric, 5 lin. long, split unilaterally, with 5 horizontal depressions outside $1\frac{1}{2}$–$1\frac{7}{8}$ lin. above the base alternating with the lobes and corresponding to 5 oblong deflexed fleshy densely papillate appendages inside the tube, $\frac{3}{8}$ lin. long; lobes erect, linear, 9 lin. long. Filaments inserted about the base of the corolla-lobes, tapering upwards, about 4 lin. long, involute, tooth oblong, $\frac{1}{6}$ lin. long; anthers linear, about 4 lin. long (*Engler*). Disc shortly lobed, $\frac{1}{8}$ lin. high.

Mozamb. Distr. German East Africa: Masai Steppe? *Fischer*, 311!

114. **L. ugogensis,** *Engl. in Engl. Jahrb.* xx. 86. Branches subterete, greyish, fairly slender, about $1\frac{1}{4}$ lin. in diam. 10 in. below the apex, finely lenticellate, young parts pruinose; internodes up to 1 in. long. Leaves alternate, those of the previous year mostly falling off at the time of flowering, elliptic-oblong, rounded at the apex, obtuse or cuneate at the base, $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, $\frac{2}{3}$–$1\frac{1}{6}$ in. broad, coriaceous, glabrous or minutely puberulous, distinctly 3-nerved; nerves raised, especially on the upper surface; petiole about $\frac{1}{2}$ lin. long; leaves of the flowering shoots elliptic or elliptic-oblong, 4–7 lin. long. Flowers fascicled on axillary leafy cushion-like short-shoots; pedicels $\frac{3}{8}$–$\frac{1}{2}$ lin. long; bract cupular with a concave dorsal lobe, glabrous, dorsal margin $\frac{3}{4}$ lin. long, conspicuously keeled, keel $\frac{3}{4}$ lin. long, $\frac{1}{4}$ lin. broad above, narrowed downwards, truncate above or produced into a horn, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together tubular, $2\frac{1}{2}$–3 lin. long, glabrous. Calyx $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long; lobes short, crenulate. Corolla $1\frac{1}{4}$ in. long or more; tube cylindric, about $4\frac{1}{2}$ lin. long, with 5 slight horizontal depressions outside $2\frac{1}{4}$–3 lin. above the base alternating with the lobes and corresponding to 5 ovate-oblong deflexed densely papillate appendages

inside the tube, $\frac{3}{8}$ lin. long; lobes about 1 in. long, linear, slightly broadened upwards, reflexed below the middle. Filaments inserted about $1\frac{3}{4}$ lin. above the base of the corolla-lobes, about 6 lin. long, broadened into the base, slightly tapering upwards, involute, with about 5–7 transverse grooves on the dorsal surface, tooth $\frac{1}{8}$–$\frac{1}{6}$ lin. long; anthers linear, $3\frac{1}{2}$ lin. long. Disc $\frac{1}{8}$–$\frac{1}{6}$ lin. high. Stigma ellipsoid, $\frac{1}{4}$ lin. long.—Engl. Jahrb. xl. 524. *L. tanaensis*, Engl. l.c. 528.

Nile Land. British East Africa: Witu, *Thomas*, 58!

Mozamb. Distr. German East Africa: Muansa District; near Sonjo, *Merker*, 435! Moshi District; Gelei Mountain, near Lake Natron, *Uhlig*, 312! Ugogo; Mjesse, *Stuhlmann*, 342!

It is difficult to determine in a dried state where the corolla-tube ends and the lobes begin: see note under *L. glabratus*.

115. **L. Kelleri,** *Engl. in Engl. Jahrb.* xl. 537. Branches short, terete, about $1\frac{1}{2}$ lin. in diam. 3 in. below the apex; bark greyish, longitudinally cracked, lenticellate; internodes $\frac{1}{4}$–1 in. long. Leaves subopposite or alternate, ovate-elliptic or broadly elliptic, rounded or very obtuse at the apex, obtuse or rounded at the base, $2\frac{1}{3}$–$2\frac{1}{2}$ in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad, thickly coriaceous, glabrous, glaucescent, 5–7-nerved from the base; nerves raised on both surfaces; petiole stout, $2\frac{1}{2}$ lin. long, 1 lin. broad. Pedicels $\frac{3}{8}$–$\frac{1}{2}$ lin. long; bract obliquely cupular, densely papillate outside, more or less produced into a retuse or subtruncate dorsal lobe, thickly keeled, dorsal margin 1–$1\frac{1}{4}$ lin. long, ventral margin $\frac{7}{8}$–1 lin. long. Receptacle and calyx together tubular, $2\frac{3}{4}$–$2\frac{7}{8}$ lin. long. Calyx slightly lobed, $1\frac{5}{8}$ lin. long, minutely and densely papillate outside. Corolla-tube cylindric, split unilaterally; lobes narrowly linear, $7\frac{1}{2}$ lin. long. Filaments linear, $1\frac{1}{2}$ lin. long, tooth subulate, $\frac{3}{8}$ lin. long; anthers linear, $4\frac{1}{2}$ lin. long. Disc shortly lobed, $\frac{1}{6}$ lin. high.

Nile Land. Somaliland: Webi Abdallah, *Keller*, 219!

An imperfectly known species. The description of the flower is mainly from Engler.

116. **L. Schimperi,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* i. 341. Young branchlets velvety-pilose, or puberulous, soon becoming glabrous, adult ones greyish, glabrous, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam. 1 ft. below the apex. Leaves alternate, elliptic, elliptic-ovate or elliptic-oblong, rounded at the apex, rounded, obtuse or cuneate at the base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. broad, rigidly coriaceous, glabrous, or minutely puberulous in a young state, soon becoming glabrous, 3–5-nerved; nerves slightly raised, especially on the upper surface; petiole $\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Flowers axillary, fascicled; pedicels $\frac{1}{2}$–1 lin. long, puberulous; bract cupular, subtruncate, 2-lipped or with a slight dorsal lobe, more or less pilose outside, ciliate, slightly keeled or not, dorsal margin 1–$1\frac{1}{4}$ lin. long, ventral margin $\frac{5}{8}$–1 lin. long. Receptacle and calyx together tubular, $2\frac{1}{4}$–$3\frac{1}{2}$ lin. long. Calyx truncate or slightly 5-lobed, ciliate, $1\frac{3}{4}$–2 lin. long. Corolla 11–12 lin. long; tube $4\frac{1}{2}$–5 lin. long, split unilaterally, with 5 depressions outside, $1\frac{1}{2}$-2 lin. above the base, alternating with

the lobes, corresponding to 5 oblong deflexed densely pilose appendages inside the tube, $\frac{1}{4}$–$\frac{1}{3}$ lin. long; lobes linear, separating from below upwards, $6\frac{1}{2}$–$7\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, 3–$3\frac{1}{2}$ lin. long, involute, tooth $\frac{1}{8}$–$\frac{1}{4}$ lin. long; anthers linear, 2–$3\frac{1}{4}$ lin. long; connective produced $\frac{1}{8}$ lin. beyond the lobes. Disc pentagonal, $\frac{1}{12}$–$\frac{1}{10}$ lin. high.—Engl. in Engl. Jahrb. xx. 108; Engl. Hochgebirgsfl. Trop. Afr. 198; Deflers, Voy. Yemen, 197; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 149; Pax in Engl. Jahrb. xxxix. 615. *L. calycinus*, R. Br. in Salt, Abyss. App. 64, name only. *Odontella Schimperi*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Nile Land. Eritrea: numerous localities, 4600–6600 ft., *Schweinfurth & Riva*, 787! 1188! *Schweinfurth*, 642, 678, 821, 1551; *Steudner*, 179! *Beccari*, 10! Abyssinia: Schahageni Valley, *Schimper*, 158! near Adowa, *Schimper*, 1983! Amba Sea, *Schimper*, 579! Tigre; near Axum, Mariama, 7300 ft., on *Acacia Lahai*, Steud. & Hochst., *Rosen*. Samen; Ataba, *Steudner*, 180! Harar, *Ellenbeck*, 620! British Somaliland: Golis Range, *Drake-Brockman*, 280! 284! and without precise locality, *Drake-Brockman*, 338! 339!

Also in Arabia.

Steudner, 180, has exceptionally large leaves, $2\frac{1}{2}$ in. long, $1\frac{1}{4}$ in. broad.

117. **L. sulphureus,** *Engl. Pfl. Ost-Afr. C.* 165. Branchlets pallid, nodose, rather slender, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, younger part angular, adult part subterete, finely lenticellate; internodes short. Leaves alternate, obovate-oblong or obovate, rounded at the apex, cuneate into the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, 4–9 lin. broad, thinly coriaceous, glabrous; lateral nerves 2–3 on each side, very oblique, slightly raised, especially on the upper surface; petiole $\frac{1}{2}$–1 lin. long. Umbels sessile, few-flowered; pedicels $1\frac{1}{4}$ lin. long; bract obliquely ovate-cupular, $\frac{1}{3}$ as long as the receptacle and calyx. Receptacle and calyx together subtubular, slightly constricted above the lower two-thirds, $1\frac{1}{2}$ lin. long. Calyx shortly lobed, glandular-ciliolate, nearly $\frac{1}{2}$ lin. long. Corolla $1\frac{1}{2}$ in. long or less, sulphur-yellow; tube $5\frac{1}{2}$–6 lin. long, not split unilaterally, suprabasal swelling commencing $\frac{1}{4}$ lin. above the base, ellipsoid, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, neck about 1 lin. long; lobes about 11 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad at the base, tapering upwards in the lowermost 3 lin., linear in the middle 6 lin., linear-lanceolate in the uppermost $2\frac{1}{2}$ lin., cohering together above, slightly inflexed at the apex. Filaments inserted 4–$5\frac{1}{2}$ lin. above the base of the corolla-lobes, $3\frac{1}{2}$–4 lin. long, involute, terminating above on the ventral surface in a bifid membranous flap $\frac{1}{8}$ lin. long, produced dorsally $\frac{1}{6}$ lin. above the insertion of the flap; anthers linear, truncate, $1\frac{3}{4}$–$1\frac{7}{8}$ lin. long; connective slightly produced beyond the cells. Disc slightly lobed, $\frac{1}{5}$ lin. high. Style not thickened above; stigma ellipsoid, $\frac{3}{8}$ lin. long.

Mozamb. Distr. German East Africa: Kilimanjaro; Karrakia Ravine in Useri district, 6000–6300 ft., *Volkens*, 2002!

L. sulphureus was placed by Engler in section *Rigidiflori*, from which it differs in the filaments, which are inserted a considerable distance above the base of the corolla-lobes, and are provided with a flap-like ventral tooth. It is probably related to *L. rhammifolius*, Engl., which was also placed in section *Rigidiflori*.

118. **L. rhamnifolius,** *Engl. in Engl. Jahrb.* xx. 87. Young branchlets subangular, dark, glabrous, adult ones stout, nodose, pallid, densely lenticellate. Leaves opposite, subopposite or alternate, elliptic-oblong or lanceolate-oblong, obtuse at the apex, cuneate into the base, 1½–2 in. long, 6–10 lin. broad, thinly coriaceous, glabrous; lateral nerves 2–3 on each side, very oblique, slightly raised on both surfaces, the lowermost short, the next running beyond the middle of the leaf; petiole 1–1½ lin. long. Umbels 1–3 together in the axils of the fallen leaves, 3–7-flowered; peduncle 1 lin. long; pedicels ¾–1 lin. long; bract inserted very obliquely on the pedicel, cupular, with a rounded dorsal lobe, dorsal margin ⅝ lin. long, umbonate, umbo acutely horned above, horn ¼ lin. long, ventral margin ⅜ lin. long. Receptacle and calyx together elongate-cupular, 1⅛ lin. long. Calyx ascending, irregularly lobed, minutely ciliolate, ½ lin. long or rather less. Corolla 7 lin. long in bud; tube flask-shaped, not split unilaterally, 1¼ lin. long; lobes 5¾ lin. long, linear below, linear-oblanceolate above, broadened into the base, reflexed below the middle. Filaments inserted about the base of the corolla-lobes, about 4 lin. long, straight below, much thickened and involute above, tooth ⅛ lin. long; anthers linear, 1⅛ lin. long. Disc slightly lobed, ⅛ lin. high. Stigma depressed-globose, ¼ lin. in diam.—Pfl. Ost-Afr. C. 165, t. 12, figs. D–H. *L. Carvalhi*, Engl. in Engl. Jahrb. xx. 87, in error. *Oncocalyx rhamnifolius*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 740.

Mozamb. Distr. German East Africa: Tanga District; Amboni, *Holst*, 2796! 2813! Pangani, *Stuhlmann*, ser. i. 774! 781! Dar-es-Salaam, *Holtz*, 546! Mtange, on the way to Lindi, *Busse*, 2459! Portuguese East Africa: Gorungosa, *Carvalho!*

119. **L. subulatus,** *Engl. in Engl. Jahrb.* xx. 112. Branchlets acutely tetragonal or narrowly 4-winged, glabrous, 1–1½ lin. in diam. 9 in. below the apex, dark and smooth in a young state, greyish and rather densely lenticellate when adult; internodes ⅙–2 in. long. Leaves opposite or subopposite, ovate, ovate-oblong or ovate-lanceolate, acute or obtuse at the apex, rounded or obtuse at the base, 1–3 in. long, ½–1½ in. broad, thinly coriaceous, glabrous; lateral nerves 2–3 on each side, oblique, slightly raised on both surfaces; petiole 1½–2½ lin. long. Umbels axillary, solitary, up to 20-flowered; peduncle tetragonal, stout, 5–9 lin. long; pedicels ⅜–1 lin. long; bract boat-shaped, 1⅜–3 lin. long, minutely ciliate, thickly keeled, keel extending ⅛–½ lin. below the apex, produced above into a spreading or ascending triangular or oblong acute or obtuse lobe, ¾–1½ lin. long, ventral margin saucer-shaped, ⅛–¼ lin. long, sometimes bifid. Receptacle and calyx together campanulate, ¾–1⅛ lin. long. Calyx subtruncate, ciliate, ⅜–½ lin. long. Corolla 1¼–1½ in. long, purplish (*Engler*), with an oblong-ellipsoid apical swelling (hardly 2 lin. long) in bud; tube about 13½ lin. long, split unilaterally, broadest in the middle in bud, slightly broadened again into the base; lobes erect, narrowly spathulate, acute, 4 lin. long. Filaments inserted at the base of the corolla-lobes, inflexed, flattened, tapering upwards, 2¾–3 lin. long, tooth oblong, obtuse, ⅙–¼ lin. long;

anthers oblong, $\frac{3}{4}$–$\frac{7}{8}$ lin. long; connective produced $\frac{1}{10}$ lin. beyond the cells, $\frac{1}{8}$ lin. broad. Disc $\frac{1}{8}$ lin. high. Stigma $\frac{1}{4}$ lin. in diam.—Pfl. Ost-Afr. C. 166, t. 17, figs. B–D.

Mozamb. Distr. German East Africa: Pare Mountains, *Trotha*, 272! Usambara; Sakare, 4300 ft., *Engler*, 934A! 942A! 1005! Lutindi, *Holst*, 3304! Kwai, *Eick*, 129! 262! Silai, 3600 ft., *Holst*, 2299! Uguelo, *Scheffler*, 61! Amani, 3000 ft., *Braun*, 318! 1866! Kwa Mshuza, *Holst*, 4117! and without precise locality, *Buchwald*, 63A! 63C! 338!

L. subulatus is remarkable for the great variation in the shape of the dorsal appendage of the bract.

120. **L. latibracteatus,** *Engl. in Engl. Jahrb.* xxx. 303. Young branchlets subtetragonal, blackish or dark brown, older ones terete; internodes about $\frac{3}{4}$ in. long. Leaves opposite, narrowly oblong, obtuse at both ends, 2–4 in. long, 7–16 lin. broad, coriaceous, glabrous, slightly roughened in a dried state with raised points; lateral nerves 2–3 on each side, very oblique, slightly raised on the upper surface, less so on the lower; petiole 1–2 lin. long. Umbels axillary, solitary, head-like, many-flowered; peduncle stout, about $\frac{3}{4}$ in. long; pedicels $\frac{1}{4}$ lin. long; bract oblong, obscurely apiculate, slightly concave, $4\frac{1}{2}$–5 lin. long, 2–3 lin. broad when flattened out. Receptacle and calyx together campanulate, $1\frac{1}{4}$ lin. long. Calyx ascending, very slightly toothed, ciliate, $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Corolla $1\frac{3}{4}$–2 in. long, with an oblong-ellipsoid subacute apical swelling in bud 2 lin. long, white, reddish above; lobes yellowish-green; basal swelling oblong-ellipsoid, 3–$3\frac{1}{2}$ lin. long; tube narrowly cylindric-funnel-shaped upwards, split unilaterally; lobes erect, spathulate, $4\frac{1}{4}$ lin. long, upper enlarged part elliptic-lanceolate, $1\frac{3}{4}$ lin. long, $\frac{5}{8}$ lin. broad. Filaments inserted at the base of the corolla-lobes, tapering upwards, inflexed, 3 lin. long, tooth subulate, $\frac{1}{3}$ lin. long; anthers oblong-linear, 1 lin. long. Disc not distinctly lobed, $\frac{1}{6}$ lin. high.

Mozamb. Distr. German East Africa: Langenburg District; Konde Land, Ntuli Mountain, 5600 ft., on *Ficus kondensis*, Warb., *Goetze*, 1310!

121. **L. usambarensis,** *Engl. in Engl. Jahrb.* xx. 111. Young branchlets acutely tetragonal, blackish, the youngest part very shortly and sparingly puberulous, quickly becoming glabrous, older branchlets greyish, densely lenticellate; internodes $\frac{1}{2}$–2 in. long. Leaves opposite or subopposite, varying from ovate-oblong to broadly ovate, obtuse or rounded at the apex, obtuse, rounded or subcordate at the base, $1\frac{1}{2}$–3 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, thinly coriaceous, glabrous; lateral nerves 2–3 on each side, slightly raised on both surfaces; petiole 1–$2\frac{1}{2}$ lin. long. Umbels axillary, solitary, 10–20-flowered; peduncle $2\frac{1}{2}$–10 lin. long; pedicels $\frac{3}{4}$ lin. long; bract ovate-oblong or lanceolate, more or less apiculate, 3–6 lin. long, 1–$1\frac{3}{4}$ lin. broad, glabrous or sparingly puberulous, ventral margin saucer-shaped, $\frac{1}{6}$ lin. long. Receptacle and calyx together campanulate, 1–$1\frac{1}{4}$ lin. long. Calyx slightly toothed, ciliate, $\frac{3}{8}$ lin. long in bud. Corolla $1\frac{1}{3}$–$1\frac{1}{2}$ in. long, rose-coloured or red with yellow or greenish lobes, with an ellipsoid obtuse apical swelling in bud, $1\frac{3}{8}$ lin.

long; tube split unilaterally; lobes spathulate, 4–5 lin. long. Filaments $2\frac{1}{2}$–3 lin. long, tooth $\frac{1}{4}$ lin. long; anthers oblong, $\frac{3}{4}$–1 lin. long. Disc slightly lobed, $\frac{1}{6}$ lin. long.—Pfl. Ost-Afr. C. 166. *L. Thomasii*, Engl. in Engl. Jahrb. xl. 531.

Nile Land. British East Africa: Takaunga; Muerani, *Thomas*, ser. ii. 63!

Mozamb. Distr. German East Africa: coast opposite Zanzibar; Muoa, *Holst*, 3130! Vikindo, *Stuhlmann*, 6132!

122. **L. longipes,** *Baker & Sprague.* Young branches slender, blackish, slightly compressed towards the apex, soon becoming terete, adult ones terete, greyish, minutely lenticellate, $1\frac{3}{4}$ lin. in diam. 1 ft. below the apex; internodes $\frac{3}{4}$–2 in. long. Leaves opposite, ovate-elliptic, obtuse or rounded at the apex, subcordate, rounded or obtuse at the base, $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, thinly coriaceous, glabrous; lateral nerves 4–5 on each side, patulous, anastomosing far from the margin, slightly raised on both surfaces; petiole 2–3 lin. long. Umbels axillary, fascicled, 10–14-flowered; peduncle slender, $\frac{1}{2}$–$1\frac{1}{2}$ in. long; pedicels $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long; bract shortly and broadly boat-shaped, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long, rounded or retuse, sparingly ciliolate, very thickly keeled, keel horned above, horn $\frac{1}{6}$–$\frac{1}{4}$ lin. long or less, ventral margin saucer-shaped, $\frac{1}{6}$ lin. long. Receptacle and calyx together cupular, $\frac{7}{8}$–1 lin. long. Calyx subtruncate, $\frac{1}{4}$–$\frac{1}{3}$ lin. long, intramarginal ring $\frac{1}{10}$ lin. high. Corolla $1\frac{1}{2}$–$1\frac{2}{3}$ in. long, with an oblong-ellipsoid pentagonal apical swelling in bud; tube rose-madder with darker lines, basal swelling slight; lobes spathulate, $5\frac{1}{2}$ lin. long. Filaments tapering upwards, 4 lin. long, tooth $\frac{1}{3}$ lin. long; anthers oblong, $1\frac{1}{8}$ lin. long; connective slightly produced beyond the cells. Disc not distinctly lobed, $\frac{1}{5}$ lin. high.

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Kirk!*

123. **L. dodoneæfolius,** *DC. Mém.* vi. *t.* 9. Branchlets rather slender, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, pallid, slightly wrinkled or striate in a dried state, glabrous; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite, ternate or alternate, linear-lanceolate, straight or subfalcate, obtuse or rounded at the apex, narrowly cuneate into the base, 2–4 in. long, 3–11 lin. broad, rather thinly coriaceous, glabrous, penninerved; lateral nerves about 4 on each side, very oblique, inconspicuous or slightly raised; petiole 2–5 lin. long. Heads axillary, solitary or geminate, 2–3-flowered; peduncle 2 lin. long; sockets cupular, $\frac{3}{4}$ lin. deep, glabrous; bract cupular, subtruncate, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, solid basal part $\frac{3}{8}$–$\frac{1}{2}$ lin. long, margin $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Receptacle and calyx together tubular, inflated in the middle, 4–$4\frac{1}{2}$ lin. long, glabrous outside. Calyx shortly 5-toothed, minutely and sparingly ciliate, 3–$3\frac{1}{4}$ lin. long, split unilaterally by the expansion of the base of the corolla-tube. Corolla 2 in. long, basal swelling subglobose, 2–$2\frac{1}{2}$ lin. in diam.; tube split unilaterally, papillate within; lobes erect, linear below, lanceolate-linear above, 7–8 lin. long. Stamens inserted at or just below the base of the corolla-lobes, 4–5 lin. long including the tooth, flattened, slightly tapering upwards, inflexed, the upper 2 lin. much darker, tooth narrowly

triangular, ½ lin. long; anthers linear, 2½ lin. long; connective not produced. Disc deeply 5-lobed, over ¼ lin. high. Style skittle-shaped above, thickened part 3–4 lin. long, broadest at or above the middle, neck 2¼–2½ lin. long; stigma oblong-ovoid or ellipsoid, ⅝–¾ lin. long. Berry ellipsoid, 5–6 lin. long, apical cup 1½–2 lin. long.—DC. Prodr. iv. 303; Engl. in Engl. Jahrb. xx. 108. *L. Knoblecheri*, Kotschy, Pl. Knoblech. 10. *L. Chevalieri*, Engl. & Krause in Engl. Jahrb. xliii. 403. *Dentimetula dodoneæfolia*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 265.

Upper Guinea. Senegal, on *Tamarindus* sp., *Perrottet & Leprieur; Roger!* Togo: Gbele, on *Afzelia* sp., *Busse*, 3624! Sokode, on *Parkia*, *Terminalia*, *Adansonia*, &c., *Kersting*, ser. A, 57! 220! Lagos, *Dawodu!* Northern Nigeria: Nupe, on *Parkia africana*, R. Br., *Barter*, 1559! Jeba, *Barter!* Katagum District, on *Bauhinia reticulata*, DC., and *Acacia* spp., *Dalziel*, 203!

North Central. Upper Shari River, *Chevalier*, 6580! Upper Ubangi River; Fort Lamy, *Chevalier*, 10375!

Nile Land. Uganda: Gondokoro, *Knoblecher!*

124. **L. glaucoviridis,** *Engl. in Engl. Jahrb.* xl. 533. Branchlets stout, 1½–1¾ lin. in diam. 6 in. below the apex, younger ones more or less compressed, smooth, tawny, older ones terete, longitudinally cracked, darker; internodes ¾–2½ in. long. Leaves opposite or subopposite, elliptic or obovate-elliptic, rounded at the apex, obtuse or subcuneate at the base, 2½–3½ in. long, 1¼–1¾ in. broad, coriaceous, glabrous; lateral nerves about 4 on each side, rather oblique, slightly raised on the upper surface, indistinct on the lower; petioles stout, channelled, 3–4 lin. long. Heads axillary, 3–4-flowered; peduncle stout, 2¾–3½ lin. long; sockets bowl-shaped, ½ lin. deep, glabrous; bract cupular, truncate, 2–2¼ lin. long, glabrous, slightly umbonate, margin 1½–1⅝ lin. long. Receptacle and calyx together tubular, 3½–3¾ lin. long, glabrous. Calyx truncate, 2¾ lin. long. Corolla 2½–3 in. long; tube not obviously swollen at the base, lower half cylindric, upper half cylindric-funnel-shaped; lobes erect, linear, slightly broadened at the insertion of the filaments, ¾–1 in. long. Filaments inserted 6–7 lin. below the apex of the corolla-lobes, tapering upwards from a broad base, 3½–3¾ lin. long, deflexed, tooth obtuse, ⅛ lin. long; anthers linear, 1⅝–1⅞ lin. long, slightly retuse. Disc not distinctly lobed, ⅛ lin. high. Style conspicuously skittle-shaped above, neck 2½ lin. long.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2678!

125. **L. irangensis,** *Engl. in Engl. Jahrb.* xx. 111. Young branchlets rusty-tomentellous, soon becoming pubescent, adult ones rather stout, rather tawny, 1½–2 lin. in diam. 1 ft. below the apex, pubescent or puberulous, finely and inconspicuously lenticellate; internodes 5–10 lin. long. Leaves opposite or subopposite, ovate or ovate-oblong, obtuse or rounded at the apex, rounded or obtuse at the base, thickly coriaceous, minutely puberulous, especially towards the base on the lower surface, or glabrous; lateral nerves 3–4 on each side, the lowest pair very oblique, nerves anastomosing far from the margin, raised on the upper surface, hardly visible on the lower; petiole 1–2 lin.

long, densely pubescent. Heads sessile, 1–3-flowered; axis over 1 lin. long, densely pubescent, sockets cupular; bract cupular, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, pubescent outside, dorsal lobe $\frac{3}{8}$ lin. long, truncate or subretuse. Receptacle and calyx together subcylindric, $4\frac{1}{2}$ lin. long. Calyx irregularly toothed, sparingly ciliolate, $3\frac{1}{2}$ lin. long. Corolla $2\frac{1}{4}$–$2\frac{1}{2}$ in. long, purplish; tube cylindric-funnel-shaped, basal swelling inconspicuous, subovoid, $1\frac{1}{2}$ lin. long; lobes erect, linear, acute, 8 lin. long. Filaments inserted at the base of the corolla-lobes, tapering upwards from a broad base, $3\frac{3}{4}$ lin. long, deflexed, tooth $\frac{3}{8}$ lin. long; anthers linear, 3 lin. long. Disc slightly lobed, $\frac{1}{4}$ lin. high. Style skittle-shaped above, neck about 3 lin. long.—Pfl. Ost-Afr. C. 166, t. 13, figs. E–H; Engl. & Prantl, Pflanzenfam. Nachtr. i. 133; Engl. Jahrb. xxx. 302. *L. Prittwitzii*, Engl. in Engl. Jahrb. xl. 527.

Mozamb. Distr. German East Africa: Mpapua District; west of Irangi, *Stuhlmann*, 4230! Ussangu; Chimala River, *Goetze*, 1022! Utengule, *Prittwitz*, 173!

126. **L. Eylesii,** *Sprague*. Branches stout, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. in diam., brownish, rather coarsely and densely lenticellate; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves opposite or subopposite, broadly elliptic or ovate-elliptic, rounded at the apex, rounded and then abruptly cuneate into the base, 2–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{2}{3}$ in. broad, thickly coriaceous, glabrous, subglaucous, nerves and veins prominent; lateral nerves irregular, 2–3 on each side, the upper ones oblique, running nearly to the apex; petiole stout, 2–$3\frac{1}{2}$ lin. long. Heads axillary, sessile, several together, 2-flowered; axis $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, sockets very oblique, saucer-shaped; bract very obliquely cupular, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long, more or less 2-lipped, ciliate, dorsal margin $\frac{7}{8}$–1 lin. long, ventral margin about $\frac{1}{2}$ lin. long. Receptacle and calyx together narrowly campanulate, slightly constricted about the middle, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long. Calyx irregularly toothed, rusty-ciliate, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long. Corolla red-orange (*Eyles*), about $1\frac{3}{4}$ in. long, basal swelling ellipsoid-oblong, 3–$3\frac{1}{2}$ lin. long; tube narrowly funnel-shaped above the swelling, split unilaterally; lobes erect, linear, $4\frac{1}{2}$ lin. long. Filaments inserted $\frac{1}{2}$ lin. above the base of the corolla-lobes, tapering upwards, 2 lin. long, deflexed, tooth $\frac{1}{3}$ lin. long; anthers linear, $1\frac{1}{4}$ lin. long. Disc very distinctly lobed, $\frac{3}{8}$ lin. high. Style skittle-shaped above, neck about $1\frac{1}{2}$ lin. long.

Mozamb. Distr. Rhodesia: Buluwayo, 4500 ft., *Eyles*, 1194!

127. **L. kilimandscharicus,** *Engl. Pfl. Ost-Afr. C.* 166. Branchlets stout, flexuous, nodose, ashy-grey, conspicuously lenticellate, 2 lin. in diam. 1 ft. below the apex; internodes short. Leaves ternate or more often alternate, ovate or ovate-lanceolate, obtuse at the apex, sometimes shortly acuminate, obtuse and unequal at the base, $2\frac{3}{4}$–4 in. long, 1–2 in. broad, rather thinly coriaceous, glabrous, dull and finely wrinkled in a dried state; lateral nerves 4–5 on each side, rather oblique, anastomosing a considerable distance from the margin, slightly raised on both surfaces; petiole 3–8 lin. long. Heads axillary, subsessile, 5–6-flowered; axis about $1\frac{1}{4}$ lin. long, sockets irregularly saucer-shaped;

bract unilaterally developed from a saucer-shaped base, subtruncate, sparingly ciliate, $1\frac{1}{4}$ lin. long including the solid base, which is nearly $\frac{1}{2}$ lin. long, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{3}$–$\frac{3}{8}$ lin. long. Receptacle and calyx together narrowly campanulate, slightly constricted about the middle, nearly 2 lin. long. Calyx $1\frac{1}{8}$ lin. long, irregularly toothed, ciliate. Corolla about 1 in. long, purplish with a green band below the apex; tube split unilaterally, basal swelling 1–$1\frac{1}{4}$ lin. long; lobes erect, subspathulate-linear, $3\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, 2 lin. long, tapering upwards from a broad base, linear about the middle, slightly thickened towards the apex, tooth $\frac{1}{6}$ lin. long; anthers narrowly oblong, $\frac{7}{8}$ lin. long, $\frac{1}{5}$ lin. broad. Disc very distinctly lobed, about $\frac{1}{6}$ lin. high. Style skittle-shaped above, neck gradually broadened in the upper $\frac{3}{8}$ lin. into the base of the stigma.—Engl. & Prantl, Pflanzenfam. Nachtr. i. 133. *Odontella kilimandscharica*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Mozamb. Distr. German East Africa: Kilimanjaro; above Marangu, 6500 ft., *Volkens*, 1557 !

128. **L. Tanganyikæ,** *Engl. in Engl. Jahrb.* xl. 531. Branches stout, nearly 2 lin. in diam. 1 ft. below the apex, younger part slightly compressed, dark brown, older part terete, tawny, coarsely and densely lenticellate; internodes $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Leaves alternate, ovate-oblong or ovate, rounded at the apex, obtuse and unequal at the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly coriaceous, glabrous; lateral nerves 3–4 on each side, rather oblique, prominent on the upper surface, less distinct on the lower; petiole $1\frac{1}{2}$–3 lin. long. Heads axillary, sessile, several together, about 3-flowered; axis $1\frac{3}{4}$ lin. long, sockets very oblique; bract elongate-cupular, about 2 lin. long, slightly 2-lipped or not, thickened dorsally, thickening terminating in a horn about $\frac{1}{4}$ lin. long, inserted $\frac{3}{8}$–$\frac{1}{2}$ lin. below the apex, margin about $1\frac{1}{2}$ lin. long. Receptacle and calyx together tubular, 3 lin. long. Calyx slightly and irregularly toothed, 2–$2\frac{1}{4}$ lin. long, ciliate. Corolla $1\frac{3}{4}$ in. long in bud; tube subcylindric in the lower half, with a very slight basal swelling, gradually broadened from the middle upwards; lobes linear, $5\frac{1}{2}$ lin. long. Filaments broadened from the base to the middle, linear in the upper half, 3 lin. long, tooth $\frac{1}{4}$ lin. long; anthers linear, $1\frac{3}{4}$ lin. long. Disc distinctly lobed, $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part about $1\frac{3}{4}$ lin. long, neck about $1\frac{5}{8}$ lin. long, the upper $\frac{5}{8}$ lin. broadened into the base of the stigma.

Mozamb. Distr. German East Africa: Urundi; Kiriba Pass, 7800 ft., *Scott-Elliot*, 8342 !

129. **L. coronatus,** *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr.* i. 133. Leaves sessile, amplexicaul, suborbicular, $3\frac{1}{2}$–4 in. long, 4–$4\frac{3}{4}$ in. broad. Corolla ("calyx" of Van Tieghem) red, mottled with white, over 3 in. long, with a crown of 5 diverging appendages in bud.—*Acrostephanus coronatus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Lower Guinea. French Congo: valley of the Kuilu River; Niunvu, *Lecomte*.

Known to me only from Van Tieghem's brief description translated above. Van Tieghem does not state whether the corolla is glabrous or pilose, and the position of the species is therefore a little doubtful.

130. **L. Farmari,** *Sprague.* Branches slender, about $1\frac{1}{4}$ lin. in diam. 1 ft. below the apex, terete, smooth, ash-coloured; internodes $1\frac{3}{4}$–4 in. long. Leaves opposite or subopposite, ovate or lanceolate, obtuse at the apex, sometimes minutely apiculate, obtuse or rounded at the base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–$1\frac{2}{3}$ in. broad, thinly coriaceous, glabrous, nerves and veins raised on both surfaces; lateral nerves 4–6 on each side, oblique, anastomosing far from the margin; petiole $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long. Umbels axillary, solitary, about 9-flowered; peduncle 1–2 lin. long, terminated by a convex discoid expansion, about $1\frac{3}{8}$ lin. in diam., with a deep apical depression, outside which the flowers are arranged in a circle; pedicels $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract obliquely ovate-saucer-shaped, sparingly ciliolate, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Receptacle and calyx together campanulate or cupular, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Calyx subtruncate, ciliolate, $\frac{5}{8}$ lin. long. Corolla scarlet (*Farmar*), $1\frac{2}{3}$ in. long, with an ellipsoid depressed-truncate apical swelling in bud, crowned by 5 diverging triangular teeth, basal swelling ellipsoid, $2\frac{1}{4}$ lin. long; tube funnel-shaped above, split unilaterally; lobes reflexed, spathulate-linear, enlarged part $1\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad, much thickened at the apex, produced dorsally into a triangular appendage, $\frac{1}{3}$ lin. long. Filaments inserted $3\frac{1}{2}$ lin. below the apex of the corolla-lobes, involute through one circle, tapering upwards, $1\frac{7}{8}$ lin. long, tooth $\frac{1}{3}$ lin. long; anthers narrowly oblong, $\frac{7}{8}$ lin. long. Disc hardly lobed, $\frac{1}{6}$ lin. high. Style conspicuously skittle-shaped above, thickened part $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, neck $\frac{1}{2}$–$\frac{5}{8}$ lin. long, gradually thickened upwards into the base of the ellipsoid stigma.

Upper Guinea. Gold Coast, *Farmar*, 503!

131. **L. ogowensis,** *Engl. in Engl. Jahrb.* xx. 117, *t.* 2, *fig. F.* Young branches fairly slender, $1\frac{1}{4}$ lin. in diam. 9 in. below the apex, yellowish-grey, striate, glabrous, minutely and inconspicuously lenticellate, older branches $1\frac{1}{2}$–3 lin. in diam., brown, densely and conspicuously lenticellate; internodes 1–4 in. long. Leaves opposite or subopposite, broadly ovate, acute or obtuse at the apex, rounded or abruptly subcuneate at the base, $2\frac{1}{2}$–5 in. long, $1\frac{1}{2}$–$2\frac{3}{4}$ in. broad, coriaceous, sometimes thinly, glabrous; lateral nerves 2–4 on each side, obliquely ascending, slightly raised especially on the upper surface, anastomosing far from the margin; petiole $2\frac{1}{2}$–7 lin. long. Umbels axillary, fascicled, 4–6-flowered; peduncle about $2\frac{1}{2}$ lin. long; pedicels $\frac{3}{4}$–$1\frac{1}{4}$ lin. long; bract ovate-saucer-shaped, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. long. Calyx truncate or slightly lobed, sparingly ciliolate, 1–$1\frac{1}{2}$ lin. long, split irregularly by the expansion of the base of the corolla. Corolla $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, white with greenish lobes and base (*Engler*), truncate at the apex and 5-horned in bud, minutely papillate outside, appearing glabrous except under a high power, basal swelling ellipsoid, $2\frac{1}{2}$–3 lin. long; tube funnel-shaped above; lobes reflexed, linear, much thickened in the upper $2\frac{1}{2}$–$2\frac{3}{4}$ lin., horns $\frac{1}{4}$–$\frac{3}{4}$ lin.

long. Filaments inserted 4½ lin. below the apex of the corolla-lobes, involute, tapering upwards, 2½–3 lin. long, tooth ⅜ lin. long; anthers narrowly oblong, 1⅛–1⅜ lin. long. Disc slightly lobed, about ⅙ lin. high. Style conspicuously skittle-shaped above, thickened part 2½–3½ lin. long, neck ¾–1¼ lin. long; stigma ½–¾ lin. long.—Engl. & Prantl, Pflanzenfam. Nachtr. i. 133; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 44; Reliq. Dewevr. 201; De Wild. Miss. É. Laurent, 79; Études Fl. Bas- et Moyen-Congo, i. 237, ii. 124. *Acrostephanus ogowensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 749! 1414!

Lower Guinea. French Congo: Gaboon River, *Mann!* Ogowe River; Lambarene, *Buchholz!* Lower Congo: Banana District; Moanda, *Gillet*, 3235. Stanley Pool District; Kisantu, *Gillet*, 545! Lukolela, *Laurent!*

South Central. Belgian Congo: Equator District; Equatorville, *Dewèvre*, 646A; Monzambi, *Laurent*, 1381! Ubangi District, Imese, *Laurent!* Bangala District; Nouvelle-Anvers, *De Giorgi*, 5.

132. **L. dependens,** *Engl. in Engl. Jahrb.* xx. 117. A pendulous shrub, 4–10 ft. long. Internodes ½–1½ in. long. Leaves opposite, arcuate or nearly straight, linear-lanceolate, obtuse at the apex, narrowed to the base, 5–7½ in. long, 6–8 lin. broad, coriaceous, glabrous, glossy, deep green, penninerved; lateral nerves 4–5 on each side, very oblique, raised on the upper surface, less so on the lower; petiole 5–7 lin. long. Umbels axillary, ternate, 3–4-flowered; peduncle 2–2½ lin. long; pedicels ¾–1¼ lin. long; bract cupular, ½–⅝ lin. long. Receptacle and calyx together narrowly campanulate, 2 lin. long. Calyx 1–1⅛ lin. long, irregularly split by the basal expansion of the corolla. Corolla deep blood-red (*Welwitsch*), 1⅔ in. long, depressed-truncate in bud, glabrous outside, basal swelling ellipsoid, 2¾ lin. long; tube split unilaterally about 7 lin. down; lobes reflexed, spathulate-linear. Filaments inserted 4½ lin. below the apex of the corolla-lobes, involute, tapering upwards, 2¾ lin. long, tooth ¼–⅓ lin. long; anthers narrowly oblong, 1⅛ lin. long. Disc lobed, ¼ lin. high. Style skittle-shaped above, thickened part about 3 lin. long, broadest below the middle.—Hiern in Cat. Afr. Pl. Welw. i. 933. *L. pendulus*, Welw. ex Engl. l.c., not of Sieb. *Acrostephanus dependens*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Lower Guinea. Angola: Pungo Andongo; near Mutollo and at Candumba, on *Citrus* sp. and Leguminosæ, *Welwitsch*, 4851! Amboella; near Princeza Amelia, on *Berlinia* sp., *Gossweiler*, 3321! near Conselheiro Barja, *Gossweiler*, 3544!

Mozamb. Distr. North-west Rhodesia, on *Ochna* sp., *Kässner*, 2164!

133. **L. Kimuenzæ,** *De Wild. Études Fl. Bas- et Moyen-Congo*, i. 29, 237, *t.* 54. Branches stout, 2–3 lin. in diam., nodose, dark brown, glabrous, finely and densely lenticellate; internodes 1–3 in. long. Leaves opposite or subopposite, ovate, subacute at the apex, subcordate at the base, 3½–4¼ in. long, 1¾–2¾ in. broad, thinly coriaceous, glabrous, slightly glossy on the upper surface; lateral nerves about 3 on each side, oblique, slightly raised on both surfaces; petiole 3–4½ lin. long. Umbels axillary, fascicled, about 4-flowered; peduncle 1½–1¾ lin. long;

pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract obliquely cupular, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Receptacle and calyx together narrowly cupular or narrowly campanulate, nearly 2 lin. long. Calyx suberect, truncate, 1–$1\frac{1}{8}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, truncate in bud, glabrous outside, basal swelling ellipsoid, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long; tube split unilaterally; lobes reflexed, spathulate-linear. Filaments inserted 4 lin. below the apex of the corolla-lobes, involute through one circle, tapering upwards, $2\frac{1}{2}$ lin. long, tooth obtuse, $\frac{1}{3}$ lin. long; anthers narrowly oblong, 1 lin. long. Disc shortly lobed, $\frac{1}{8}$ lin. high. Style skittle-shaped, thickened part about 3 lin. long, neck $\frac{7}{8}$ lin. long, broadened into the base of the stigma in the upper $\frac{1}{2}$ lin.

Lower Guinea. Lower Congo: Stanley Pool District; Kimuenza, *Gillet*, 1665!

134. **L. mangheensis,** *De Wild. Miss. É. Laurent*, 77, *t.* 36. Branches terete, stout, 2–3 lin. in diam., glabrous, dark brown, densely lenticellate; internodes $1\frac{1}{2}$–$2\frac{1}{2}$ in. long. Leaves opposite, ovate-lanceolate, rounded at apex and base, 4–$5\frac{1}{2}$ in. long, $1\frac{3}{4}$–$2\frac{1}{3}$ in. broad, coriaceous, glabrous, dull; principal lateral nerves 2 on each side, very oblique, distinctly raised, especially on the upper surface, the upper pair arising about $\frac{1}{2}$ in. above the base, running subparallel to the midrib; petiole 5–6 lin. long. Umbels axillary, solitary, 2–4-flowered; peduncle 1–2 lin. long; pedicels 1–$1\frac{1}{4}$ lin. long; bract obliquely cupular, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{7}{16}$ lin. long. Receptacle and calyx together narrowly campanulate, $2\frac{1}{4}$ lin. long. Calyx ascending, truncate, $1\frac{1}{4}$ lin. long. Corolla over $1\frac{3}{4}$ in. long, truncate in bud, with an oblong apical swelling 2 lin. long, glabrous outside, basal swelling obovoid, 3–$3\frac{1}{2}$ lin. long; tube split unilaterally; lobes reflexed, spathulate-linear, 4 lin. long. Filaments inserted $\frac{1}{2}$ lin. below the base of the corolla-lobes, involute through one circle, tapering upwards, about $2\frac{1}{4}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{8}$ lin. long. Disc pentagonal, hardly lobed, $\frac{1}{8}$–$\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part 3 lin. long, neck $1\frac{1}{8}$ lin. long.

South Central. Belgian Congo: Kasai; Mange, on *Manihot Glaziovii*, Muell. Arg., *Laurent!*

135. **L. Poggei,** *Engl. in Engl. Jahrb.* xx. 116. Branchlets about $1\frac{3}{4}$ lin. in diam. 1 ft. below the apex, purplish, glabrous, finely and densely lenticellate; old bark with many horizontal and vertical cracks; internodes $1\frac{1}{2}$–3 in. long. Leaves opposite, ovate or ovate-lanceolate, rather shortly acuminate to an acute apex, cordate or subcordate at the base, 4–$5\frac{1}{2}$ in. long, 2–$2\frac{3}{4}$ in. broad, coriaceous, glabrous, dull, finely wrinkled on both surfaces in a dried state; lateral nerves 2–3 on each side, rather oblique, slightly raised on both surfaces, the upper or uppermost pair running subparallel to the midrib; petiole about $\frac{3}{4}$ in. long. Umbels axillary, 3–4-flowered; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; pedicels $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract obliquely cupular, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together narrowly campanulate, 2 lin. long. Calyx ascending, truncate, 1 lin.

long, split irregularly by the basal expansion of the corolla. Corolla rose-coloured, $1\frac{3}{4}$–2 in. long, basal swelling obovoid, $2\frac{1}{4}$ lin. long; tube split unilaterally; lobes reflexed, spathulate-linear, $4\frac{1}{4}$ lin. long. Filaments dark red, inserted $\frac{1}{2}$–$\frac{5}{8}$ lin. below the base of the corolla-lobes: anthers oblong, 1 lin. long. Style dark red.—Durand & Schinz, Études Fl. Congo, 240; De Wild. Études Fl. Bas- et Moyen-Congo, i. 30. *Acrostephanus Poggei*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

South Central. Belgian Congo: basin of the Kasai River, *Pogge*, 1347!

136. **L. Preussii,** *Engl. in Engl. Jahrb.* xx. 118, *t.* 3, *fig. A.* Branches up to 4 lin. in diam.; branchlets slender, brown or purplish-brown, finely striate, lenticellate, glabrous, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes 4–6 in. long. Leaves opposite, broadly ovate or elliptic, shortly and abruptly acuminate to a slightly recurved acute apex, subcordate at the base, $2\frac{1}{4}$–5 in. long, $1\frac{1}{2}$–3 in. broad, thinly coriaceous, glabrous; lateral nerves 2–4 on each side, obliquely ascending, slightly raised on the upper surface, prominent on the lower; petiole 2–3 lin. long. Heads axillary, fascicled, about 4-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; bract obliquely cupular, solid base about $\frac{1}{2}$ lin. long, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together shortly campanulate, $1\frac{1}{2}$ lin. long. Calyx irregularly lobed, $\frac{1}{2}$ lin. long. Corolla grey outside with red stripes, red inside (*Preuss*), or red and green (*Ledermann*), nearly 3 in. long in bud, apical swelling broadly 5-winged, basal swelling broadly ovoid, $3\frac{1}{2}$ lin. long, $2\frac{1}{2}$ lin. in diam., or oblong-ovoid; tube split unilaterally about 8 lin. down; lobes reflexed, broadly spathulate, $5\frac{1}{2}$–6 lin. long, upper part elliptic, 3 lin. long, $1\frac{3}{4}$–$1\frac{7}{8}$ lin. broad. Filaments inflexed, tapering slightly upwards, about 3 lin. long, tooth $\frac{3}{8}$–$\frac{1}{2}$ lin. long; anthers oblong, emarginate, $1\frac{1}{4}$ lin. long. Disc sunk, pentagonal, $\frac{1}{5}$ lin. high. Style skittle-shaped above, thickened part $3\frac{3}{4}$–4 lin. long, neck $\frac{1}{2}$ lin. long; stigma obovoid, $\frac{5}{8}$ lin. long.—*L. pachycaulis*, Engl. & Krause in Engl. Jahrb. xliii. 411. *Tapinanthus Preussii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Upper Guinea. Cameroons: north of Barombi, *Preuss*, 419! Bongaëli, near Great Batanga, *Ledermann*, 163! Bipinde, *Zenker*, 2365!

L. pachycaulis differs slightly from typical *L. Preussii* in the colour of the flowers and the shape of the basal swelling of the corolla, but the differences observed do not seem sufficient to warrant separation.

137. **L. alatus,** *De Wild. Études Fl. Katanga*, 175. Branchlets terete, glabrous, finely and very densely lenticellate, 1 lin. in diam. 4 in. below the apex; internodes 6–10 lin. long. Leaves opposite, elliptic-oblong or obovate-oblong, rounded at the apex, obtuse or cuneate at the base, $1\frac{1}{3}$–2 in. long, 7–$9\frac{1}{2}$ lin. broad, rigidly coriaceous, glabrous; nerves prominent, especially on the upper surface; lateral nerves 4–5 on each side, obliquely ascending, anastomosing very distinctly far from the margin; petiole $2\frac{1}{2}$–3 lin. long. Umbels axillary, solitary, 2–3-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels 1–$1\frac{1}{8}$ lin. long; bract ovate-cupular, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long.

Receptacle and calyx together campanulate, wide-mouthed, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Calyx truncate, patulous, $\frac{5}{8}$ lin. long. Corolla about $1\frac{3}{4}$ in. long, glabrous outside, apical swelling in bud oblong, 2 lin. long, narrowly 5-winged, basal swelling subglobose, $2\frac{1}{4}$ lin. long, 2 lin. in diam.; tube at first entire on the expansion of the corolla, and broadest about the middle, afterwards splitting unilaterally, and becoming funnel-shaped; lobes reflexed, spathulate-linear, $4\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, at first erect, connate round the style, afterwards separating, deflexed, tapering slightly upwards, $2\frac{3}{4}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{4}$ lin. long. Disc pentagonal, hardly lobed, about $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part about 3 lin. long, neck 1 lin. long, the lowest $\frac{3}{8}$ lin. narrower than the rest.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 498!

The flowers of *L. alatus* appear to be protandrous. When the flower expands the corolla-lobes are reflexed, the filaments remain connate in their upper part round the style, and the anthers open. The flower at this stage is regular. After a time the corolla-tube splits down unilaterally to the middle, and the filaments at the same time separate from one another and become deflexed.

138. **L. Pentagonia,** *DC. Mém.* vi. *t.* 8. Branchlets terete, rather slender, $1\frac{1}{4}$ lin. in diam. 1 ft. below the apex, greyish or greyish-brown; bark finely cracked longitudinally, inconspicuously lenticellate; internodes $\frac{1}{2}$–$2\frac{1}{2}$ in. long. Leaves opposite or subopposite, ovate or ovate-lanceolate, obtuse at the apex, obtuse or rounded at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, 8–17 lin. broad, coriaceous, glabrous, dull; lateral nerves 4–5 on each side, patulous, slightly raised on the upper surface, less distinct on the lower; petiole 2–6 lin. long. Heads axillary, fascicled, 4–6-flowered; peduncle 1 lin. long; bract obliquely cupular, dorsal margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long, ventral margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Receptacle and calyx together cupular, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Calyx truncate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Corolla nearly $1\frac{1}{4}$ in. long, glabrous outside, apical swelling in bud oblong-ellipsoid, rounded, 5-winged, 2 lin. long, basal swelling ellipsoid, $2\frac{3}{4}$ lin. long; tube split unilaterally about 6 lin. down; lobes reflexed, spathulate, 3 lin. long, $1\frac{1}{8}$ lin. broad. Filaments inserted $\frac{3}{4}$ lin. below the base of the corolla-lobes, deflexed, $2\frac{3}{4}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $\frac{7}{8}$ lin. long. Disc $\frac{1}{8}$ lin. high. Style skittle-shaped above, thickened part $3\frac{1}{2}$ lin. long, neck $\frac{1}{2}$–$\frac{5}{8}$ lin. long, slightly thickened in the middle; stigma ellipsoid or obovoid, $\frac{1}{2}$–$\frac{5}{8}$ lin. long.—DC. Prodr. iv. 303; Engl. in Engl. Jahrb. xx. 109. *Tapinanthus Pentagonia*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Upper Guinea. Senegal, *Perrottet & Leprieur*; on *Acacia* sp., *Roger!*

The leaves are represented as acute in De Candolle's figure. I have not seen the type, and have based my description mainly on Roger's specimen, which came from J. Gay's herbarium.

139. **L. senegalensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, i. 30. Branchlets dark brown, glabrous; internodes $\frac{1}{2}$–$1\frac{1}{3}$ in. long. Leaves opposite, ovate, obtuse at apex and base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{3}{4}$–2 in.

broad, coriaceous, glabrous, dull; lateral nerves 5–6 on each side, rather oblique, raised on both surfaces, especially the upper; petiole stout, $2\frac{1}{2}$–4 lin. long. Only detached flowers known. Receptacle and calyx together cupular or campanulate, 2 lin. long. Calyx truncate, irregularly split, $1\frac{1}{8}$ lin. long. Corolla $1\frac{1}{2}$ in. long in bud, glabrous outside, apical swelling oblong-ellipsoid, rounded, 3–$3\frac{1}{2}$ lin. long, basal swelling subglobose, $2\frac{1}{4}$ lin. long, $1\frac{3}{4}$–2 lin. in diam.; lobes oblanceolate, $\frac{7}{8}$–1 lin. broad. Filaments inserted $4\frac{1}{2}$ lin. below the apex of the corolla-lobes, about $2\frac{3}{4}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{4}$ lin. long. Disc pentagonal, $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part about $3\frac{1}{2}$ lin. long, neck hardly 1 lin. long.

Upper Guinea. Senegal, *Lecard*, 83! 84!

Very near *L. Pentagonia*, DC., from which it seems to differ in the dark brown branchlets, larger leaves and more elongated apical swelling of the corolla. De Wildeman states that the corolla-lobes are erect, but in view of the close relationship with *L. Pentagonia* this seems doubtful.

140. **L. guttatus,** *Sprague.* Branches stout, flexuous, $2\frac{1}{2}$–5 lin. in diam., brown, rather finely and densely lenticellate, lenticels elongated horizontally; branchlets 1–$1\frac{1}{2}$ lin. in diam., pale brown; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite or subopposite, lanceolate, obtuse at the apex, obtuse or cuneate at the base, $3\frac{1}{2}$–5 in. long, 10–18 lin. broad, thickly coriaceous, glabrous, penninerved; lateral nerves 4–5 on each side, very oblique, slightly raised on the upper surface, hardly visible on the lower, anastomosing far from the margin; petiole 3–6 lin. long. Umbels axillary and on the old wood, solitary or fascicled, 4-flowered; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, sockets cupular, $\frac{3}{8}$ lin. deep; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract ovate-cupular, dorsal margin $\frac{3}{4}$–$\frac{7}{8}$ lin. long, truncate or obtuse, ventral margin $\frac{3}{8}$–$\frac{7}{16}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long, pale green. Calyx truncate, $\frac{7}{8}$ lin. long. Corolla over $1\frac{1}{2}$ in. long, glabrous outside, reddish, densely spotted with white, apical swelling in bud oblong-ellipsoid, 5-ribbed, 2 lin. long, basal swelling obovoid-globose, 2 lin. long, about $1\frac{1}{2}$ lin. in diam.; tube split unilaterally 6–7 lin. down; lobes deep red, reflexed, subspathulate, $3\frac{1}{4}$–$3\frac{1}{2}$ lin. long, about $\frac{3}{4}$ lin. broad. Filaments inserted $\frac{1}{2}$–$\frac{3}{4}$ lin. below the base of the corolla-lobes, deflexed, $2\frac{1}{2}$ lin. long, tooth $\frac{1}{3}$ lin. long; anthers oblong-linear, $1\frac{3}{8}$ lin. long. Disc pentagonal, $\frac{1}{8}$ lin. high. Style skittle-shaped above, thickened part deep red, 3 lin. long, neck hardly $1\frac{1}{4}$ lin. long.

Mozamb. Distr. North-west Rhodesia: near Bwana Mkubwa, 4500 ft., *Rogers*, 8320! Mashonaland: Mazoe District, *Eyles*, 369!

The flowers are like those of *L. alatus*, De Wild., except that the apical swelling of the bud is not winged and that there appears to be only one stage in the expansion of the flower.

141. **L. syringifolius,** *Engl. in Engl. Jahrb.* xx. 115. Branchlets glabrous, internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite, ovate, acute at the apex, subcordate at the base, $1\frac{1}{2}$ in. long, 1 in. broad or less, very thinly coriaceous, glabrous; lateral nerves about 2 on each side, oblique,

slightly raised on both surfaces, the upper pair running subparallel to the midrib; petiole about 4 lin. long. Umbels 4-flowered; peduncle $1\frac{1}{2}$–2 lin. long; pedicels $\frac{1}{2}$ lin. long; bract obliquely cupular, distinctly umbonate, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate with a very wide mouth, 2 lin. long. Calyx truncate, ciliolate, 1 lin. long. Corolla $1\frac{3}{4}$–2 in. long, glabrous outside, apical swelling in bud ellipsoid-oblong, truncate, nearly 2 lin. long, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; tube split unilaterally; lobes reflexed, spathulate, $3\frac{1}{2}$ lin. long, upper enlarged part 2 lin. long, $\frac{3}{4}$ lin. broad. Filaments inserted about $\frac{1}{2}$ lin. below the base of the corolla-lobes, $2\frac{1}{2}$ lin. long, tapering upwards, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long. Disc distinctly lobed, $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part $3\frac{1}{4}$–$3\frac{1}{2}$ lin. long, neck $1\frac{1}{8}$ lin. long.—Pfl. Ost-Afr. C. 166. *Acrostephanus syringifolius*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Nile Land. Uganda: Ruwenzori, at 7000 ft., *Stuhlmann*, 2470!

142. **L. constrictiflorus,** *Engl. in Engl. Jahrb.* xx. 119, *t.* 3, *fig. B, excluding the Angola specimen.* Branches nodose, wrinkled in a dried state, brown or grey, densely lenticellate, $1\frac{1}{2}$ lin. in diam. 8 in. below the apex; branchlets smooth, glabrous, brown, slightly compressed; internodes $\frac{1}{3}$–$1\frac{1}{2}$ in. long. Leaves opposite, ovate to lanceolate, gradually narrowed to an obtuse or subacute apex, unequal and rounded at the base, more rarely obtuse or subcordate, 2–$4\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, thinly coriaceous, glabrous; lateral nerves about 3 on each side, very oblique, raised on both surfaces, the uppermost running subparallel to the midrib; petiole 3–$9\frac{1}{2}$ lin. long. Umbels axillary, fascicled, 4-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels about 1 lin. long; bract obliquely cupular, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, $1\frac{1}{2}$ lin. long. Calyx subtruncate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Corolla over $1\frac{3}{4}$ in. long, glabrous outside, apical swelling in bud rounded, basal swelling ellipsoid, $2\frac{1}{4}$ lin. long; tube at first entire on the expansion of the corolla, broadest about the middle, afterwards splitting unilaterally and becoming funnel-shaped; lobes reflexed, spathulate, acute, $3\frac{1}{2}$ lin. long, enlarged upper part lanceolate, $1\frac{3}{4}$ lin. long, nearly $\frac{3}{4}$ lin. broad. Filaments inserted $\frac{3}{4}$ lin. below the base of the corolla-lobes, slightly tapering upwards, 2 lin. long, at first connate round the style, afterwards separating, deflexed, tooth $\frac{1}{4}$ lin. long; anthers narrowly oblong, nearly 1 lin. long. Disc about $\frac{1}{6}$ lin. long. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck 1 lin. long.—Pfl. Ost-Afr. C. 166. *L. Pittospori* (*Pittosporæ*), Rendle in Journ. Linn. Soc. Bot. xxxvii. 205.

Nile Land. Uganda: Ruwenzori; Kivata, 8000 ft., *Scott-Elliot*, 7658! Wimi Valley, *Scott-Elliot*, 7885 bis! Ruchigga, on *Pittosporum abyssinicum*, Delile, *Bagshawe*, 445!

Mozamb. Distr. German East Africa: Karagwe; Bukoba, 3700 ft., *Stuhlmann*, 1526! 3974!

Pogge, 1322, quoted by Engler under *L. constrictiflorus*, apparently belongs to some other species. The material is insufficient for determination.

Var. *karaguensis*, Sprague. Corolla truncate in bud.

Mozamb. Distr. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 4019A! Mtagata, *Stuhlmann*, 3190!

143. **L. globiferus,** *A. Rich. Tent. Fl. Abyss.* i. 341. Branches stout, wrinkled, lenticellate, older ones up to 5 lin. in diam.; branchlets fairly slender, terete, smooth, buff-coloured, about 1 lin. in diam. 9 in. below the apex; internodes $\frac{1}{2}$–2 in. long. Leaves opposite or subopposite, varying from elliptic-oblong to oblanceolate, rounded or obtuse at the apex, cuneate or obtuse at the base, 1–3$\frac{1}{4}$ in. long, 5–15 lin. broad, thinly coriaceous, glabrous; lateral nerves about 4 on each side, obliquely ascending, anastomosing far from the margin, slightly raised, especially on the upper surface; petiole 1$\frac{1}{2}$–3 lin. long. Umbels axillary, fascicled, 4–6-flowered; peduncle 1–1$\frac{1}{2}$ lin. long; pedicels $\frac{1}{2}$–$\frac{5}{8}$ lin. long; bract ovate-cupular, slightly 2-lipped, dorsal margin $\frac{3}{4}$ lin. long, lateral margin $\frac{1}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, 1$\frac{1}{2}$ lin. long. Calyx irregularly split, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Corolla about 1$\frac{3}{4}$ in. long, apical swelling in bud rounded, 2 lin. long, basal swelling ellipsoid, 2$\frac{1}{2}$–3 lin. long, or subglobose; tube split unilaterally; lobes reflexed, spathulate, acute, 3$\frac{1}{2}$ lin. long, enlarged upper part lanceolate, 2 lin. long, $\frac{5}{8}$ lin. broad. Filaments inserted about $\frac{3}{4}$ lin. below the base of the corolla-lobes, involute, 2$\frac{1}{2}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers oblong-linear, 1$\frac{1}{8}$ lin. long. Disc hardly lobed, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part about 3 lin. long, neck 1 lin. long.—Engl. in Engl. Jahrb. xx. 109; Engl. Hochgebirgsfl. Trop. Afr. 197; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 149; Penzig in Atti Congr. Bot. 1892, 358. *L. congestus*, R. Br. in Salt, Abyss. App. 64, name only. *L. Lingelsheimii*, Pax in Engl. Jahrb. xxxix. 615. *Tapinanthus globiferus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Nile Land. Eritrea: Belta, 5000 ft., *Schweinfurth*, 1041; Geleb, 6300 ft., *Schweinfurth*, 1587; Acrur, 5600 ft., *Schweinfurth & Riva*, 718! Abyssinia: Begemeder and Dembea, *Schimper*, 1491! Agow Country; Gageros, on *Balsamodendron africanum*, Arn., *Schimper*, 2187! Shoa; Haro, 7000 ft., on *Rhamnus* sp., *Olea chrysophylla*, Lam., &c., *Rosen!*

Var. *bornuensis*, Sprague. Leaves mostly elliptic-oblong. Flowers considerably smaller than in the type. Receptacle and calyx together 1 lin. long. Calyx $\frac{1}{2}$ lin. long. Corolla under 1$\frac{1}{4}$ in. long, basal swelling subglobose, 1$\frac{1}{2}$ lin. in diam.; lobes about 3 lin. long. Anthers $\frac{7}{8}$ lin. long.

Upper Guinea. Northern Nigeria: Nupe, on *Anona* sp., *Barter*, 1126! on *Mimosa asperata*, Linn., *Barter*, 1149! Bornu, on *Acacia* spp. and a great variety of other trees, *Vogel*, 79! Bure, near Lake Chad, *Elliott*, 115!

Var. *salicifolius*, Sprague. Leaves linear-lanceolate or linear-oblanceolate, 2$\frac{1}{2}$–3$\frac{3}{4}$ in. long, 4–9 lin. broad. Pedicels about $\frac{3}{4}$ lin. long. Receptacle and calyx together 1$\frac{1}{2}$ lin. long. Corolla 1$\frac{1}{2}$–1$\frac{3}{4}$ in. long. Anthers 1$\frac{1}{4}$ lin. long.—*L. globiferus*, Pax in Engl. Jahrb. xxxix. 615, from description.

Nile Land. Abyssinia: Province of Tigre; Amba Harrer, 7300 ft., *Schimper*, 888! Memsach District; Gessat Errar, *Schimper*, 414! Amba Sea, *Schimper*, 567! Province of Amhara; Lake Tana, Mitraa, 6000 ft., on *Acacia* sp., *Rosen*; without precise locality, *Plowden!*

Differs from the type in the proportionately much narrower leaves.

Var. *verrucosus*, Sprague. Leaves varying from ovate-oblong or elliptic to lanceolate-oblong, rounded or obtuse at the apex, rounded or obtuse at the base, more rarely subcordate, $1\frac{1}{4}$–$4\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, rather thickly coriaceous. Receptacle and calyx together $1\frac{1}{8}$–$1\frac{3}{8}$ lin. long. Corolla $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; lobes $2\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad. Filaments $2\frac{1}{4}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $\frac{7}{8}$–1 lin. long. Thickened part of style 2–3 lin. long.—*L. verrucosus*, Engl. in Engl. Jahrb. xx. 120. *L. globiferus*, Schweinf. in Bull. Herb. Boiss. iv. App. ii. 149. *Tapinanthus verrucosus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Upper Guinea. Northern Nigeria: Katagum District, *Dalziel*, 204!

Nile Land. Eritrea: Bogos; Keren, *Steudner*, 178! Sudan: between Korosko and Berber, *Kotschy*, 376! near Wad Medina, on *Zizyphus mucronata*, Willd., *Broun*, 832! Atem River, on *Cratæva Roxburghii*, R. Br., *Broun*, 1128! Jur: Great Seriba Ghattas, *Schweinfurth*, 1485!

Also in Arabia. Differs from the type in the leaves, which are generally broadest below the middle instead of above, and more or less rounded at the base.

Schweinfurth in Bull. Herb. Boiss. iv. App. ii. 149, has reduced *L. arabicus*, Deflers, Voy. Yemen, 197, to *L. globiferus*. From the mention in Deflers's description, however, of oblique folds on the corolla-lobes and scales inside the tube, it is evident that *L. arabicus* belongs to the section *Tapinostemma*, as stated by Deflers.

144. **L. bangwensis,** *Engl. & Krause in Engl. Jahrb.* xliii. 407. Branches 4 lin. in diam. or less, glabrous, greyish or tawny, very densely lenticellate, branchlets smooth and brownish in a young state, $1\frac{3}{4}$ lin. in diam. 1 ft. below the apex; internodes $\frac{3}{4}$–$3\frac{1}{2}$ in. long. Leaves opposite, ovate, ovate-oblong or elliptic, acuminate or not, acute, obtuse or rounded at the apex, obtuse or rounded at the base, $2\frac{1}{2}$–7 in. long, 1–$4\frac{1}{2}$ in. broad, more or less coriaceous, glabrous; lateral nerves 3–5 on each side, raised on both surfaces; petiole 2–6 lin. long. Umbels axillary, fascicled, 7–8-flowered; flowers arranged in a circle below the slightly concave apical portion of the peduncle; peduncle $1\frac{1}{2}$–2 lin. long; pedicels $\frac{5}{8}$ lin. long; bract obliquely cupular or ovate-saucer-shaped, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Receptacle and calyx together cupular or suburceolate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long. Calyx minutely ciliolate, $\frac{3}{8}$–$\frac{5}{8}$ lin. long. Corolla about $1\frac{1}{2}$ in. long in bud, apical swelling ellipsoid, pentagonal, $1\frac{3}{4}$ lin. long, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. in diam., basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; tube eventually split unilaterally about 8 lin. down; lobes reflexed, spathulate, 3–$3\frac{1}{2}$ lin. long. Filaments tapering upwards, over $2\frac{1}{2}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers oblong, emarginate, 1 lin. long. Style skittle-shaped above, thickened part $2\frac{3}{4}$–3 lin. long, neck $\frac{1}{2}$–$\frac{3}{4}$ lin. long; stigma obovoid, $\frac{3}{8}$–$\frac{5}{8}$ lin. long.—*L. Belvisii*, Hook. f. in Hook. Niger Fl. 375; Engl. in Engl. Jahrb. xx. 108; Stapf in Johnston, Liberia, ii. 646; not of DC. *L. lanceolatus*, F. N. Williams in Bull. Herb. Boiss. 2me sér. vii. 93, not of Beauv.

Upper Guinea. Senegal, on *Adansonia digitata*, Linn., *Roger!* Gambia: Upper Baddibu District; Ballanghar, on *Mærua angolensis*, DC., *Lester*, 4! Bathurst Garden, on guava trees, *Lester*, 71! and without precise locality, *Mungo Park!* Sierra Leone: Bagroo River, *Mann*, 803! near the town of Sierra Leone, *Scott-Elliot*, 3916! on *Spondias mangifera*, Willd., *Barter!* on *Psidium pyriferum*, Linn., *Vogel*, 88! Sugarloaf Mountain, *Scott-Elliot*, 5783! near Regent, *Scott-Elliot*, 4016! Scarcies Valley; on the way to Kukuna, *Scott-Elliot*, 4720! French Guinea: by

rivers, near Farana, *Scott-Elliot*, 5343! Liberia: basin of the Sinoe River, *Whyte!* Grand Bassa, *Ansell!* on *Coffea liberica*, Hiern, *Persea gratissima*, Gærtn. f., &c., *Dinklage*, 1908! Gold Coast: Cape Coast Castle, *Vogel*, 45! Southern Nigeria: Abo, *Vogel*, 40! Cameroons: Bangwe, *Conrau*, 253! Great Batanga, *Dinklage*, 998!

145. **L. kisantuensis,** *De Wild. & Th. Dur. in Bull. Herb. Boiss. 2me sér.* i. 43. Branchlets brownish, finely lenticellate, glabrous; internodes about $1\frac{3}{4}$ in. long. Leaves opposite or subopposite, ovate-elliptic, obtuse or rounded at the apex, cordate at the base, 3–4 in. long, 2–$2\frac{3}{4}$ in. broad, thinly coriaceous, glabrous; lateral nerves about 3 on each side, arcuate-ascending, anastomosing far from the margin, slightly raised on both surfaces; petiole about 3 lin. long. Umbels axillary, solitary or geminate, 4-flowered; peduncle $1\frac{1}{2}$ lin. long, flattened at the apex between the sockets; pedicels about $\frac{1}{2}$ lin. long; bract obliquely cupular, dorsal margin $\frac{7}{8}$–1 lin. long, ventral margin $\frac{1}{2}$ lin. long Receptacle and calyx together narrowly campanulate, $1\frac{7}{8}$–2 lin. long. Calyx 1 lin. long. Corolla $1\frac{1}{2}$–$1\frac{2}{3}$ in. long in bud, apical swelling oblong, rounded-subtruncate, obtusely pentagonal, $1\frac{5}{8}$ lin. long, $1\frac{1}{4}$ lin. in diam., basal swelling obovoid, $2\frac{1}{2}$ lin. long; tube eventually split unilaterally about 8 lin. down; lobes reflexed, spathulate, acute, about $3\frac{1}{2}$ lin. long. Filaments tapering slightly upwards, $2\frac{1}{2}$ lin. long, tooth $\frac{1}{3}$ lin. long; anthers oblong, slightly emarginate, $\frac{7}{8}$ lin. long. Style skittle-shaped above, thickened part $2\frac{3}{4}$ lin. long, broadest below the middle, neck about $\frac{1}{2}$ lin. long; stigma oblong-obovoid, $\frac{1}{2}$ lin. long.

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 67!

146. **L. brazzavillensis,** *De Wild. in Comptes-rendus Soc. Bot. Belg.* xxxix. 102. Branchlets rather stout, nearly 2 lin. in diam. 8 in. below the apex, nodose, smooth, pale brown, glabrous; internodes 1–2 in. long. Leaves alternate, lanceolate, acute at the apex, rounded at the base, $4\frac{3}{4}$–6 in. long, $1\frac{3}{4}$–$2\frac{1}{4}$ in. broad, coriaceous, glabrous, dull, penninerved, margin slightly crispate; midrib slightly impressed on the upper surface, very prominent on the lower; lateral nerves numerous, indistinct on both surfaces, patulous, anastomosing far from the margin; petiole about 4 lin. long. Flowers known only in a detached state. Receptacle and calyx together narrowly campanulate, $1\frac{1}{2}$ lin. long. Calyx truncate, $\frac{7}{8}$ lin. long. Corolla about $1\frac{3}{4}$ in. long in bud, apical swelling oblong or ovoid-oblong, pentagonal, $1\frac{3}{4}$ lin. long, $1\frac{1}{4}$ lin. in diam., rounded at the apex, basal swelling obovoid, $2\frac{1}{2}$–3 lin. long; tube split unilaterally about 8 lin. down; lobes reflexed, spathulate, acute, $3\frac{1}{2}$ lin. long. Filaments slightly tapering upwards, 2 lin. long, tooth $\frac{1}{3}$ lin. long; anthers linear-oblong, slightly emarginate, $1\frac{1}{8}$ lin. long. Style skittle-shaped above, thickened part about $2\frac{1}{2}$ lin. long, neck $\frac{7}{8}$ lin. long; stigma ellipsoid, $\frac{7}{16}$ lin. long.—*L. crassicaulis*, Engl. in Comptes-rendus Soc. Bot. Belg. xxxix. 30, as to *Demeuse*, 119.

Lower Guinea. French Congo: Brazzaville, *Demeuse*, 119!

147. **L. lanceolatus,** *Beauv. Fl. Owar.* ii. 8, *t.* 64. Young branchlets slender, subangular, dark brown, glabrous, soon becoming terete and finely lenticellate, $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, older ones greyish or buff-coloured, finely and densely lenticellate; internodes $\frac{3}{4}$–4 in. long. Leaves opposite, subopposite or alternate, ovate, ovate-

oblong, elliptic or lanceolate, obtuse or rounded at the apex, cuneate, obtuse or rounded at the base, 2–4¾ in. long, ⅔–2¾ in. broad, chartaceous or thinly coriaceous, glabrous; lateral nerves about 4 on each side, rather oblique, anastomosing far from the margin, raised on both surfaces; petiole 2–5 lin. long. Umbels axillary, fascicled, 4–8-flowered; peduncle 1–1½ lin. long; pedicels ½–⅝ lin. long; bract ovate-cupular, dorsal margin ½–⅝ lin. long, ventral margin ⅕ lin. long. Receptacle and calyx together campanulate, 1–1⅜ lin. long. Calyx subtruncate, ciliolate, ½–⅝ lin. long. Corolla 1⅓–1½ in. long in bud, apical swelling oblong or ovoid-oblong, pentagonal, angles more or less ribbed, 1½–1¾ lin. long, ⅞ lin. in diam., basal swelling suborbicular or ellipsoid, 1¾–2½ lin. long; tube split unilaterally 6–7 lin. down; lobes reflexed, narrowly spathulate or linear-spathulate, 2½–3½ lin. long. Filaments deflexed, tapering upwards, about 2 lin. long, tooth ¼–⅜ lin. long; anthers oblong-linear, ⅞–1 lin. long, emarginate after dehiscence. Disc ⅛–⅙ lin. high. Style skittle-shaped above, thickened part 2½–2¾ lin. long, neck ⅜–½ lin. long; stigma narrowly obovoid or pear-shaped, ½–¾ lin. long.—*L. Belvisii*, DC. Prodr. iv. 303. *L. Kerstingii*, Engl. in Engl. Jahrb. xl. 534. *L. Winkleri*, Engl. l.c. 533. *L. Riggenbachii*, Engl. & Krause in Engl. Jahrb. xliii. 409.

Upper Guinea. Togo: various localities, 1000–2600 ft., *Seefried! Zech*, 294! *Kersting*, 108! 175! A 87! A 506! A 624! on *Blighia sapida*, Kon., *Kersting*, A 504! on *Sarcocephalus esculentus*, Afzel., *Baumann*, 287! Bismarckburg, *Büttner*, 152! Dahomey, *Newton!* Lagos: Lagos Island, on *Napoleona imperialis*, Beauv., *Barter*, 2229! *Moloney*, 20! Abeokuta, *Irving*, 67! Southern Nigeria: on the Niger River, *Baikie!* Northern Nigeria: Yola District, *Dalziel*, 216! Cameroons: Victoria, *Winkler*, 45A! 160! Duala, on *Acacia* sp., *Ledermann*, A.

North Central. Bagirmi: Iro, *Chevalier*, 8754! Krebedje, *Chevalier*, 5461! Eastern Chari: Snoussi Country, *Chevalier*, 7787!

Lower Guinea. French Congo: Tjecna, *Chevalier*, 9545!

Var. *corniculatus*, Sprague. Corolla truncate in bud, shortly 5-horned.

Upper Guinea. Togo: Banyatera, 800 ft., *Schröder*, 224!

Loranthus lanceolatus, Ruiz & Pav. (a native of Peru), belongs to *Phrygilanthus*, which is now treated as generically distinct from *Loranthus*; hence Beauvois's name for the above species need not be changed.

L. lanceolatus, Beauv., seems to occupy a position intermediate between *L. baugwensis* and *L. globiferus*: from the former it may be distinguished by the shape of the apical swelling of the corolla, and from the latter by the larger leaves.

148. **L. sessilifolius,** *Beauv. Fl. Owar.* ii. 8, *t.* 63. Branchlets slender, brown in a young state, about 1¼ lin. in diam. 1 ft. below the apex; internodes 1–1½ in. long. Leaves opposite, sessile, broadly ovate, obtuse or rounded at the apex, cordate at the base, 1–1½ in. long, ¾–1⅓ in. broad. In other respects apparently resembling the preceding species.—DC. Prodr. iv. 303. *Tapinanthus sessilifolius*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Upper Guinea. Koto (Kéta), *Beauvois.*

Hiern in Cat. Afr. Pl. Welw. i. 931 has identified with *L. sessilifolius*, Beauv., a plant of Southern Angola subsequently described as a new species, *L. glaucophyllus*, Engl. This has a pilose corolla, whereas the corolla of *L. sessilifolius*, Beauv., appears from the figure to be glabrous, as in *L. lanceolatus*.

149. **L. Warneckei,** *Engl. in Engl. Jahrb.* xl. 532. Young branchlets greyish-brown, rather slender, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, minutely pubescent, eventually becoming glabrous; internodes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long. Leaves opposite, sessile, broadly ovate or (*Engler*) ovate-lanceolate, obtuse or subacute at the apex, cordate at the base, $1\frac{1}{2}$–3 in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous; lateral nerves 3–4 on each side, strongly arcuate from a patulous base, anastomosing far from the margin, raised on both surfaces, veins slightly raised. Umbels axillary, solitary or fascicled, 8–12-flowered; peduncle $2\frac{1}{2}$ lin. long, much expanded at the apex; flowers inserted in a circle round the margin of the expansion below an apical depression; pedicels 1–$1\frac{1}{4}$ lin. long, minutely puberulous; bract ovate-cupular, truncate or emarginate-biapiculate, minutely puberulous, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long, puberulous. Calyx $\frac{5}{8}$ lin. long, subtruncate, ciliate, margin slightly and irregularly split. Corolla over $1\frac{1}{2}$ in. long in bud, shortly pilose outside, apical swelling ellipsoid-oblong, pentagonal, slightly contracted below the depressed-truncate apex, 2 lin. long, basal swelling ellipsoid, $2\frac{1}{2}$–3 lin. long; tube with 5 dark longitudinal lines, split unilaterally 7–8 lin. down; lobes reflexed, spathulate, $3\frac{1}{2}$ lin. long, much thickened at the apex, depressed-truncate with an outwardly directed triangular horizontal appendage $\frac{3}{8}$ lin. long. Filaments inflexed, tapering upwards, 2 lin. long, tooth obtuse, $\frac{3}{8}$ lin. long; anthers oblong-linear, $1\frac{1}{4}$ lin. long. Disc sunk, pentagonal, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck hardly 1 lin. long; stigma ellipsoid, $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Berry ovoid-globose, 3 lin. long, $2\frac{1}{2}$ lin. in diam., red.—De Wild. Pl. Nov. Herb. Hort. Then. t. 77.

Upper Guinea. Togo: near Lome, *Warnecke*, 36! on *Pithecolobium dulce*, Benth., *Busse*, 3255!

150. **L. truncatus,** *Engl. in Engl. Jahrb.* xx. 115. Young branchlets densely and minutely pilose, $\frac{7}{8}$–$1\frac{1}{4}$ lin. in diam. 6 in. below the apex; internodes about 10 lin. long. Leaves opposite, ovate or elliptic, rounded at the apex, rounded or subcordate at the base, 1–2 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. broad, thinly coriaceous, glabrous; lateral nerves 2–3 on each side, arcuate-ascending; petiole 2–3 lin. long. Umbels about 9-flowered; peduncle about $1\frac{1}{4}$ lin. long, densely papillate-pilose, much expanded at the apex; flowers arranged in a circle round the margin of the expansion below the slightly concave top of the peduncle; pedicels $\frac{1}{2}$ lin. long, papillate-pilose; bract ovate-cupular, truncate, papillate-pilose outside, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, $1\frac{3}{8}$ lin. long, papillate outside. Calyx $\frac{5}{8}$ lin. long, slightly toothed. Corolla $1\frac{1}{2}$ in. long in bud, truncate, puberulous outside, basal swelling ellipsoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long; lobes reflexed, subspathulate, $3\frac{1}{2}$ lin. long, apex inflexed, much thickened dorsally. Filaments about 2 lin. long, tooth $\frac{1}{3}$ lin. long.—*Acrostephanus truncatus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Upper Guinea. Sierra Leone, *Afzelius!* Gold Coast, *Krause*, 95!

151. **L. tschintschochensis,** *Engl. in Engl. Jahrb.* xx. 116. Branchlets slender, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes 2–4 in. long. Leaves opposite, ovate, acute, obtuse or rounded at the apex, rounded or cordate at the base, 3–4 in. long, 2–$2\frac{1}{2}$ in. broad, thinly coriaceous, glabrous; lateral nerves 4–5 on each side, patulous or oblique, anastomosing far from the margin, raised on both surfaces; petiole 2–4 lin. long. Umbels 4-flowered; peduncle $1\frac{1}{2}$–2 lin. long, minutely puberulous; pedicels inserted in cupular sockets, $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract shallowly ovate-cupular, minutely puberulous outside, ciliolate, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together cupular-suburceolate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, minutely puberulous. Calyx subtruncate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long. Corolla about $1\frac{2}{3}$ in. long in bud, truncate, minutely pilose outside, basal swelling obovoid, $2\frac{1}{2}$ lin. long; tube split unilaterally to the middle; lobes reflexed, spathulate, nearly 4 lin. long, $\frac{7}{8}$ lin. broad above, inflexed at the apex, much thickened dorsally. Filaments inserted about $\frac{1}{2}$ lin. below the base of the corolla-lobes, inflexed, tapering upwards, $2\frac{1}{2}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers oblong, $1\frac{1}{4}$ lin. long. Style skittle-shaped above, thickened part $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, neck $\frac{3}{4}$ lin. long; stigma pear-shaped, $\frac{5}{8}$ lin. long.—*Acrostephanus tschintschochensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Lower Guinea. French Congo: Loango; Chinchosho, *Soyaux*, 48!

152. **L. Buvumæ,** *Rendle in Journ. Linn. Soc.* xxxvii. 207. Adult branches greyish, slightly striate, glabrous, inconspicuously lenticellate; internodes 1–$2\frac{1}{2}$ in. long. Leaves opposite, oblong or ovate-oblong, acute at the apex, subcuneate at the base, $2\frac{1}{4}$–$4\frac{1}{2}$ in. long, 10–19 lin. broad, coriaceous, glabrous, dull and finely wrinkled in a dried state; lateral nerves about 3 on each side, oblique, fairly prominent; petiole 6–10 lin. long. Umbels axillary, solitary, 4-flowered; peduncle $1\frac{3}{4}$ lin. long, minutely pubescent; pedicels inserted in cupular sockets, 1 lin. long; bract shallowly and obliquely cupular, minutely pubescent outside, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Receptacle and calyx together campanulate with a wide mouth, constricted in the middle; receptacle 1 lin. long, $\frac{5}{8}$ lin. in diam. Calyx ascending, truncate, minutely pubescent outside, $\frac{3}{4}$ lin. long, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. in diam. at the mouth. Corolla nearly 2 in. long in bud, depressed-truncate, red, speckled with white, puberulous outside; tube split unilaterally not quite to the middle, basal swelling ellipsoid, 2 lin. long; lobes reflexed, subspathulate, 4 lin. long, $\frac{7}{8}$ lin. broad above, apex inflexed with an obtusely triangular ascending dorsal appendage about $\frac{3}{8}$ lin. long. Filaments inserted about $\frac{1}{2}$ lin. below the base of the corolla-lobes, inflexed, tapering upwards, $2\frac{3}{4}$ lin. long, tooth $\frac{1}{3}$ lin. long; anthers narrowly oblong, tapering slightly towards the apex, $1\frac{1}{8}$ lin. long. Disc $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part about $2\frac{3}{4}$ lin. long.

Nile Land. Uganda: Lake Victoria; Buvuma Island, *Bagshawe*, 628!

A specimen collected on Ukerewe Island, at Neuwied, 4000 ft. (*Conrads*

157 !), may belong to *L. Buvumæ*. The leaves, however, are rounded or obtuse at the base with patulous lateral nerves, and the pedicels are longer than in typical *L. Buvumæ*.

153. **L. Buchneri,** *Engl. in Engl. Jahrb.* xx. 114, *t.* 2, *fig. E.* Branchlets slender, dark, minutely pilose in a young state, afterwards becoming glabrous, hardly 1 lin. in diam. 9–12 in. below the apex; branches dark grey, finely and rather densely lenticellate; internodes 1–2¾ in. long. Leaves opposite or subopposite, ovate, obtuse or rounded at the apex, subcordate or cordate at the base, 1–4 in. long, ⅔–2½ in. broad, thinly coriaceous, glabrous, dark brown in a dried state; lateral nerves arcuate-ascending, anastomosing far from the margin, raised on the upper surface, less so on the lower, veins fairly prominent on the upper surface; petiole 2–4 lin. long. Umbels axillary, solitary, geminate or ternate, 3–4-flowered, minutely pilose; peduncle 1–1½ lin. long; pedicels ¾ lin. long; bract obliquely cupular, minutely ciliate, dorsal margin 1 lin. long, ventral margin ½ lin. long. Receptacle and calyx together campanulate, 1⅜–1⅞ lin. long. Calyx subtruncate or irregularly lobed, sparingly ciliate, ¾–⅞ lin. long. Corolla red, 1½–1⅔ in. long in bud, depressed-truncate, minutely and rather densely pilose outside; basal swelling subglobose or ellipsoid, 1¾–2 lin. long, 1¼–1¾ lin. in diam., remainder of tube 12–14 lin. long, split unilaterally 7–8 lin. down; lobes reflexed, spathulate, inflexed at the apex, much thickened at the outer angle. Filaments inserted 3½–4 lin. below the apex of the corolla-lobes, inflexed or involute, nearly 3 lin. long, tooth ⅜ lin. long; anthers narrowly oblong, 1 lin. long. Disc sunk, 5-lobed, ⅛ lin. high. Style skittle-shaped above, thickened part 2½–2¾ lin. long, neck ½–⅝ lin. long, broadened upwards and downwards; stigma narrowly obovoid, ½–⅝ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 931. *Acrostephanus Buchneri*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 268.

Lower Guinea. Angola: Ambriz; on the roots of a malvaceous plant, *Welwitsch*, 4842! on *Jasminum* sp., *Monteiro!* Loanda; between Cacuaco and Quipungondo, on *Pluchea Dioscoridis*, DC., *Gossweiler*, 1500!

Var. *Gossweileri*, Sprague. Branchlets buff-coloured, sometimes glabrous from an early stage. Leaves ovate-oblong or ovate, obtuse, rounded or cordate at the base, ¾–2 in. long, 5–16 lin. broad, coriaceous, pale brown or greenish-brown in a dried state, veins hardly visible. Anthers 1¼ lin. long.—*L. obtusilobus*, Engl. & Krause in Engl. Jahrb. xliii. 410. *L. gracilis*, Engl. & Krause, l.c. 411.

Lower Guinea. Angola: Loanda, *Gossweiler*, 149! on *Grewia* sp. and on *Phyllanthus* sp., *Gossweiler*, 473!

154. **L. mollissimus,** *Engl. in Engl. Jahrb.* xx. 119. Whole plant velvety-pubescent; branches rather stout, about 2 lin. in diam. 1 ft. below the apex; internodes ¾–4 in. long. Leaves opposite, sessile, ovate or ovate-oblong, obtuse or subacute at the apex, cordate at the base, 2¼–4 in. long, 1¼–2½ in. broad, coriaceous, lateral nerves inconspicuous. Heads axillary, fascicled, 4-flowered; peduncle 1¼–1½ lin. long; bract obliquely cupular, slightly 2-lipped, pubescent outside, dorsal margin 1 lin. long, lateral ⅜–½ lin. long, ventral ½–⅝ lin. long. Receptacle and calyx together campanulate, 1⅝–2 lin. long, pubescent outside. Calyx ¾–⅞ lin. long. Corolla scarlet, 1½–1¾ in. long in bud, pubescent outside,

apical swelling ellipsoid, terete, 2 lin. long, $1\frac{1}{8}$ lin. in diam.; tube split unilaterally $6\frac{1}{2}$–7 lin. down, basal swelling ellipsoid, 2–3 lin. long; lobes reflexed, linear-spathulate or narrowly spathulate, $3\frac{1}{2}$–4 lin. long. Filaments inserted just below the base of the corolla-lobes, inflexed, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, tooth $\frac{1}{4}$ lin. long; anthers narrowly oblong, slightly emarginate, $1\frac{1}{4}$ lin. long. Style skittle-shaped above, thickened part $2\frac{1}{2}$–3 lin. long, neck $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; stigma ellipsoid, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, papillæ not decurrent.—Hiern in Cat. Afr. Pl. Welw. i. 934; Schinz in Bull. Herb. Boiss. iv. App. iii. 54.

Lower Guinea. Angola: Bumbo; between Bruco and Chão da Chella, *Welwitsch*, 4877! Huilla; near the Monino, on *Eugenia* sp. and Sapotaceæ, *Welwitsch*, 4888! Mossamedes; Onkumbi, *Schinz*, 292!

155. **L. malacophyllus,** *Engl. & Krause in Engl. Jahrb.* xliii. 408. Branchlets minutely pilose, 2–$2\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes 1–4 in. long. Leaves opposite, sessile, ovate or ovate-oblong, obtuse at the apex, cordate, rounded or obtuse at the base, $3\frac{1}{4}$–$5\frac{3}{4}$ in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, thinly coriaceous, minutely pilose on both surfaces; lateral nerves arcuate-ascending, 3–4 on each side, raised on both surfaces; veins of the older leaves raised on both surfaces. Umbels axillary, fascicled, 4-flowered; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; pedicels $\frac{5}{8}$ lin. long; bract cupular with a small broadly ovate dorsal lobe, minutely pubescent outside, dorsal margin $\frac{1}{2}$–$\frac{3}{4}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long, minutely pubescent outside. Calyx subtruncate or slightly lobed, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, finally spreading and irregularly split. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long or more, minutely pubescent outside; tube split unilaterally 7–9 lin. down, basal swelling suborbicular or ovoid, 2–3 lin. long; lobes reflexed, linear-spathulate or narrowly spathulate, $3\frac{1}{2}$–4 lin. long. Filaments inflexed, $2\frac{1}{2}$ lin. long, tooth $\frac{1}{4}$ lin. long; anthers linear-oblong, $1\frac{1}{4}$ lin. long. Disc $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part $2\frac{3}{4}$–3 lin. long, neck 1 lin. long; stigma ovoid or ellipsoid, $\frac{1}{2}$–$\frac{5}{8}$ lin. long.—*L. Mechowii*, Engl. in Engl. Jahrb. xx. 118, as to *Welwitsch*, 4843; Hiern in Cat. Afr. Pl. Welw. i. 934.

Lower Guinea. Angola: Loanda; near Boa Vista, on *Adansonia digitata*, Linn., *Welwitsch*, 4843! *Gossweiler*, 1501! Muceques, near Loanda, on *Adansonia digitata*, Linn., *Gossweiler*, 18! and without precise locality, *Gossweiler*, 202!

156. **L. erianthus,** *Sprague.* Branchlets velvety-pubescent in a young state, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 8–10 in. below the apex; branches dark, inconspicuously lenticellate, glabrous; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves opposite or subopposite, subsessile, broadly ovate, rounded at the apex, slightly cordate at the base, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, 9–13 lin. broad, coriaceous, glabrous, subglaucous, margin slightly crispate; lateral nerves 3–4 on each side, arcuate-ascending, anastomosing far from the margin, raised on both surfaces; petiole up to $\frac{3}{4}$ lin. long, pilose. Heads axillary, solitary or fascicled, 4-flowered; peduncle villous, $\frac{3}{4}$–1 lin. long including the central column which separates the saucer-shaped sockets of the flowers; bract obliquely cupular, densely villous outside, solid base $\frac{1}{4}$ lin.

long, dorsal margin ascending, $\frac{3}{4}$–1 lin. long, ventral margin suberect, $\frac{3}{8}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{1}{4}$ lin. long. Calyx saucer-shaped, villous-ciliate, margin $\frac{1}{2}$ lin. long. Corolla about $1\frac{1}{2}$ in. long in bud, villous outside, apical swelling oblong-ellipsoid, 2 lin. long, subterete, rounded; tube split unilaterally about 6 lin. down, basal swelling subglobose, $1\frac{3}{4}$ lin. long, $1\frac{1}{2}$ lin. in diam.; lobes reflexed, spathulate, acute, $3\frac{1}{2}$ lin. long, enlarged upper part $2\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad. Filaments inserted $\frac{1}{2}$ lin. below the base of the corolla-lobes, deflexed, tapering upwards, 2 lin. long, tooth $\frac{1}{4}$ lin. long; anthers oblong, $1\frac{1}{8}$ lin. long. Disc pentagonal, $\frac{1}{4}$ lin. high, minutely pilose. Style skittle-shaped above, thickened part $2\frac{3}{4}$ lin. long, broadest below the middle, neck $\frac{7}{8}$ lin. long; stigma ellipsoid, $\frac{3}{8}$ lin. long.

Mozamb. Distr. North-west Rhodesia, at 4000 ft., *Rogers*, 8353!

Apparently allied to *L. glaucophyllus*, Engl., from which it differs in the villous corolla.

157. **L. Mechowii,** *Engl. in Engl. Jahrb.* xx. 118, *as to Mechow*, 43, 101. Branchlets densely rusty-pilose in a young state, 2 lin. in diam. 1 ft. below the apex; branches $2\frac{1}{2}$–$4\frac{1}{2}$ lin. in diam., glabrous, very finely lenticellate; internodes 1–$2\frac{1}{2}$ in. long. Leaves opposite, sessile or subsessile, ovate-oblong or elliptic, shortly acuminate to a subacute or apiculate apex, more rarely rounded, rounded or subcordate at the base, $2\frac{3}{4}$–4 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, coriaceous, glabrous, or puberulous on the nerves only, dull; lateral nerves about 4 on each side, arcuate-ascending, anastomosing far from the margin, slightly raised on the upper surface, prominent on the lower; petiole not exceeding $\frac{3}{4}$ lin. in length. Umbels axillary, fascicled, head-like, 4-flowered, minutely puberulous; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; pedicels inserted in cupular sockets, about $\frac{1}{4}$ lin. long; bract obliquely cupular, ciliate, umbonate at the base, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together campanulate, $1\frac{5}{8}$ lin. long. Calyx subtruncate, irregularly split, $\frac{7}{8}$–1 lin. long, ciliate, minutely puberulous outside. Corolla scarlet or purple, about $1\frac{1}{2}$ in. long in bud, shortly pilose outside, apical swelling oblong-ellipsoid, $1\frac{3}{4}$ lin. long, rounded, pentagonal; tube split unilaterally 7–$7\frac{1}{2}$ lin. down, basal swelling obovoid or subglobose, $1\frac{3}{4}$ lin. long; lobes reflexed, spathulate, acute, $3\frac{1}{2}$ lin. long, enlarged upper part $1\frac{3}{4}$ lin. long, $\frac{3}{4}$–$\frac{7}{8}$ lin. broad. Filaments inserted $\frac{1}{2}$ lin. below the base of the corolla-lobes, inflexed, tapering upwards, 2 lin. long, tooth $\frac{1}{4}$–$\frac{1}{3}$ lin. long; anthers oblong, $\frac{3}{4}$–1 lin. long. Disc $\frac{1}{7}$–$\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck about $\frac{3}{4}$ lin. long, thicker in the upper half; stigma ellipsoid, $\frac{3}{8}$–$\frac{1}{2}$ lin. long.—*L. Belvisii*, Hiern in Cat. Afr. Pl. Welw. i. 934, excl. syn., not of DC. *Tapinanthus Mechowii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Lower Guinea. Angola: Pungo Andongo, *Mechow*, 43! 101! Golungo Alto; among the Queta Mountains, on *Ficus Mucuso*, Welw., *Welwitsch*, 5279! between Sange and Bango, *Welwitsch*, 5280!

158. **L. glaucophyllus,** *Engl. in Engl. Jahrb.* xxxii. 129. Branchlets slender, greyish or tawny, finely lenticellate, about 1 lin. in diam.

10–12 in. below the apex; internodes $\frac{1}{2}$–$1\frac{3}{4}$ in. long. Leaves opposite sessile, broadly ovate, rounded at the apex, cordate at the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, 7–14 lin. broad, coriaceous, sometimes thinly, glabrous, more or less glaucous, margin cartilaginous; lateral nerves about 3 on each side, arcuate from a patulous base, anastomosing far from the margin, distinctly raised on the upper surface, less so on the lower. Umbels axillary, solitary or fascicled, 4-flowered; peduncle, pedicels and bracts shortly pubescent; peduncle about 1 lin. long; pedicels $\frac{5}{8}$ lin. long; bract ovate-cupular, or cupular with a small dorsal lobe, dorsal margin $\frac{3}{4}$–$\frac{7}{8}$ lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together campanulate, 1–$1\frac{1}{8}$ lin. long, shortly pubescent outside. Calyx subtruncate or shortly lobed, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Corolla $1\frac{1}{2}$ in. long in bud or rather less, shortly pilose outside, red, with green lobes, apical swelling oblong-ellipsoid, about 2 lin. long, rounded; tube split unilaterally about 7 lin. down, basal swelling subglobose or obovoid, 2–$2\frac{1}{2}$ lin. long; lobes reflexed, spathulate, acute, upper enlarged part $1\frac{3}{4}$–2 lin. long, $\frac{5}{8}$–$\frac{3}{4}$ lin. broad. Filaments inserted $\frac{3}{8}$ lin. below the base of the corolla-lobes, $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, tooth $\frac{1}{3}$–$\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck $\frac{7}{8}$ lin. long; stigma obovoid, $\frac{1}{3}$ lin. long. Berry ellipsoid, 3–$3\frac{1}{2}$ lin. long, pubescent, apical cup $\frac{3}{4}$ lin. long.—*L. sessilifolius*, Hiern in Cat. Afr. Pl. Welw. i. 932, not of Beauv. *L. Buchneri*, Engl. in Engl. Jahrb. xx. 114, as to Welwitsch, 4854.

Lower Guinea. Benguella: near the town of Benguella, on *Petalidium glandulosum*, S. Moore, *Welwitsch*, 4854! Bumbo: near Bruco, on *Eugenia* sp., *Welwitsch*, 4862! Chella Mountains, above Bruco, *Welwitsch*, 4863! Huilla: Lopollo Country, on *Parinarium Mobola*, Oliv., Combretaceæ and Proteaceæ, *Welwitsch*, 4865! 4866! 4867! without precise locality, *Antunes*, 88! Mossamedes, on *Combretum* sp., *Pearson*, 2743!

159. **L. namaquensis,** *Harv. in Harv. & Sond. Fl. Cap.* ii. 577. A shrublet, often branched from the base, 1–$2\frac{1}{2}$ ft. high. Young branchlets minutely pilose, brittle, older ones glabrous; branches greyish, buff-coloured or pale brown; internodes $\frac{1}{6}$–2 in. long. Leaves opposite, subopposite or alternate, shortly petioled (or, more rarely, sessile), ovate, elliptic, oblong, lanceolate or oblanceolate, subacute, obtuse or rounded at the apex, cuneate, obtuse or rounded at the base, $\frac{1}{2}$–$2\frac{3}{4}$ in. long, $\frac{1}{6}$–$1\frac{1}{3}$ in. broad, coriaceous, glabrous, more or less glaucous; lateral nerves anastomosing far from the margin, raised on the upper surface, less distinct on the lower; petiole up to 3 lin. long. Umbels axillary, solitary or fascicled, 3–4-flowered, minutely pilose; peduncle $\frac{3}{4}$–2 lin. long; pedicels $\frac{5}{8}$–1 lin. long; bract ovate-cupular, acute, sometimes 2-lipped, dorsal margin $\frac{7}{8}$–$1\frac{1}{4}$ lin. long, ventral margin $\frac{3}{8}$–$\frac{5}{8}$ lin. long, sometimes provided with 1 median or 2 lateral lobes. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{1}{2}$–2 lin. long. Calyx patulous, subtruncate or undulate-lobed, ciliate, $\frac{5}{8}$–$\frac{7}{8}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long in bud or more, minutely pilose outside, apical swelling oblong-ellipsoid, subtruncate or obtusely apiculate from a rounded apex, 2–$2\frac{1}{4}$ lin. long, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. in diam., obtusely pentagonal; tube split

unilaterally 7–8 lin. down, basal swelling usually ellipsoid, $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, $1\frac{3}{4}$–2 lin. in diam.; lobes reflexed, narrowly spathulate, 3–$4\frac{1}{2}$ lin. long. Filaments inserted $\frac{1}{2}$–$\frac{3}{4}$ lin. below the base of the corolla-lobes, inflexed, $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, tooth $\frac{1}{4}$–$\frac{1}{3}$ lin. long; anthers narrowly oblong or linear-oblong, truncate or very slightly emarginate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Disc $\frac{1}{5}$–$\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part $2\frac{3}{4}$–$3\frac{1}{4}$ lin. long, neck 1–$1\frac{1}{4}$ lin. long; stigma depressed-globose or obovoid, $\frac{3}{8}$ lin. long, $\frac{1}{2}$ lin. in diam.—Schinz in Bull. Herb. Boiss. iv. App. iii. 54; N. E. Br. in Kew Bulletin, 1909, 135; De Wild. Pl. Nov. Herb. Hort. Then. t. 78. *L. namaquensis*, var. *ligustrifolius*, Engl. in Engl. Jahrb. xx. 120. *L. Meyeri*, Presl, Bot. Bemerk. 76, name only; Engl. & Gilg in Warb. Kunene-Samb. Exped. 228; var. *ligustrifolius*. Hiern in Cat. Afr. Pl. Welw. i. 932; var. *inachabensis*, Engl. in Engl. Jahrb. xl. 535. *L. oleæfolius*, E. Meyer ex Harv. in Harv. & Sond. Fl. Cap. ii. 577, not of Cham. & Schlecht. *L. bumbensis*, Hiern in Cat. Afr. Pl. Welw. i. 933. *Tapinanthus namaquensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 267.

Lower Guinea. Angola: Benguella; between Benguella and the Catumbella River, on *Acacia etbaica*, Schweinf., *Welwitsch*, 4882! Mossamedes; in sandy places by the Bero River, on *Gossypium* or an allied genus, *Welwitsch*, 4858! near Cavalheiros, on *Cordia* sp., *Welwitsch*, 4859; by the banks of the Maiombo River, on *Mimosa* spp., &c., *Welwitsch*, 4860! on *Ximenia americana*, Linn., *Welwitsch*, 4861! on *Tamarix orientalis*, Forsk., *Welwitsch*, 4855! on the mountainous parts of Cazimba not far from the Maiombo River, on *Mimosa* spp., *Welwitsch*, 4876; near Pedra de Sal, on *Olacineæ*, *Welwitsch*, 4856! Bumbo; near Bumbo, on *Acacia* spp., *Welwitsch*, 4864! by the Coroca River, above Garganto do Diabo, 1000 ft., on *Acacia detinens*, Burch., *Baum*, 10! by the Kubango River, on *Salix subserrata*, Willd., *Gossweiler*, 1983! German South-west Africa: Amboland; Oshiheke, *Schinz*, 286! Omulonga, *Schinz*, 285! Omupanda, *Wulfhorst!* Onkumbe, *Schinz*, 290! Hereroland; Garubib, on *Tamarix* sp., *Schenck*, 427! *Lüderitz! Nels!* Pot Mine, *Fleck*, 71! 434! Kuisib Valley, *Fleck*, 682! Haikamchab, on *Acacia Giraffæ*, Willd., *A. albida*, Delile, *Tamarix*, *Euclea*, *Nicotiana*, &c., *Galpin & Pearson*, 7461! 7604! Windhoek, *Dinter*, 881!

Mozamb. Distr. Rhodesia: Victoria Falls, 3000 ft., on *Salix* sp., *Rogers*, 5391! 7225! Bechuanaland: Keria, on *Pluchea* sp., *Lugard*, 1! Ngamiland: Kwebe Hills, on *Acacia* spp., *Mrs. Lugard*, 228! Kobis to North Shaw Valley, *Baines!* Chansis, *Fleck*, 363A!

Also in S. Africa. *L. namaquensis*, as here understood, embraces a great variety of forms, some of which have been considered as distinct species or varieties by previous authors. *L. Meyeri*, var. *inachabensis*, Engler, is merely a narrow-leaved form of *namaquensis*; and var. *ligustrifolius*, Engl., is connected with the type by small-leaved forms from Bechuanaland and Ngamiland. *L. bumbensis*, Hiern, which at first sight seems distinct, is hardly separable from the large-leaved form of *namaquensis* collected by Rogers in Rhodesia. Any successful attempt at segregation would have to be based on a study of the living plants.

160. **L. quinquangulus,** *Engl. & Schinz ex Schinz, Pl. Menyharth.* 43. Young branchlets minutely pubescent or puberulous, older ones glabrous, pallid, rather densely lenticellate, lenticels rather inconspicuous; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves opposite, ovate or elliptic, rounded at the apex, obtuse or rounded at the base, $1\frac{1}{4}$–2 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. broad, coriaceous, glabrous; lateral nerves 2–4 on each side, rather oblique,

raised on the upper surface, less so on the lower; petiole rather slender, 2–4 lin. long, shortly pilose. Heads axillary, 4–5-flowered; peduncle stout, $1\frac{1}{4}$ lin. long, shortly pubescent, produced in the centre about $\frac{1}{2}$ lin. above the insertion of the flowers; flowers inserted inside the spreading margin, which is $\frac{1}{4}$–$\frac{1}{3}$ lin. broad; bract cupular with a deltoid dorsal lobe, shortly pubescent outside, solid base about $\frac{3}{8}$ lin. long, dorsal margin $1\frac{1}{4}$ lin. long, ventral margin $\frac{3}{4}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{1}{2}$ lin. long; receptacle $\frac{3}{4}$–$\frac{7}{8}$ lin. long, lower half glabrous, upper half minutely papillate. Calyx patulous, subtruncate, ciliolate, $\frac{7}{8}$ lin. long. Corolla about $1\frac{3}{4}$ in. long in bud, very shortly pilose outside, apical swelling oblong, pentagonal, rounded, 2–$2\frac{1}{4}$ lin. long, angles ribbed; tube split unilaterally about 8 lin. down, basal swelling subglobose, $1\frac{3}{4}$–2 lin. in diam.; lobes reflexed, subspathulate, $4\frac{1}{4}$ lin. long, enlarged upper part $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, 1 lin. broad. Filaments inserted $\frac{1}{2}$ lin. below the base of the corolla-lobes, deflexed, $2\frac{1}{2}$ lin. long, tooth $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{2}$ lin. long. Disc pentagonal, shortly lobed, $\frac{1}{6}$ lin. high, lobes papillate. Style skittle-shaped above, thickened part $2\frac{3}{4}$ lin. long, neck $1\frac{1}{4}$ lin. long, thicker in the upper half; stigma subglobose, $\frac{3}{8}$ lin. in diam.—Engl. in Engl. Jahrb. xl. 534.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Boruma, Nhaondue, on *Combretum* spp., *Menyharth*, 615!

Var. *pedicellatus*, Sprague. Leaves broadly ovate, obovate, elliptic or suborbicular, subcuneate, obtuse or rounded at the base; petiole 1–4 lin. long. Umbels 4-flowered; peduncle about 1 lin. long; pedicels $\frac{1}{2}$ lin. long, shortly pilose; bract shallowly ovate-cupular, shortly pilose outside, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Basal swelling of the corolla ellipsoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long. Anthers $1\frac{3}{4}$ lin. long.—*L. zambesicus*, L. S. Gibbs in Journ. Linn. Soc. Bot. xxxvii. 467.

Mozamb. Distr. Rhodesia: Victoria Falls, *Miss Gibbs*, 140! *Allen*, 138!

Var. *pedicellatus* differs from the type in little but the presence of a distinct pedicel and the shape of the bract, and it may be found impossible to maintain it when further material comes to hand.

161. **L. Thonningii,** *Schum. & Thonn. Beskr. Guin. Pl.* 179. Branches weak, terete, slightly scabrous. Leaves opposite, very shortly petioled, ovate, often cordate at the base, 3–4 in. long, entire, glossy, rather fleshy, nerves obscure. Umbels axillary, solitary, 8–12-flowered, the flowers arranged in a circle; peduncle short; pedicels very short. Receptacle "subrotund," glabrous. Calyx entire (rarely 5-crenate). Corolla tubular, almost 2 in. long, purple; tube narrow, slightly dilated in the middle, unilaterally split above, basal swelling subglobose; lobes reflexed, linear. Filaments inserted below the corolla-lobes, involute; anthers reflexed, oblong, compressed. Style skittle-shaped above; stigma subcapitate. Berry globose, the size of a common pea, scarlet, glabrous. Seed solitary, obovoid.

Upper Guinea. Gold Coast: common on various trees, *Thonning*.

The type of *L. Thonningii*, Schum. & Thonn., cannot now be found. According to Schumacher it is apparently allied to *L. sessilifolius*, Beauv. I suspect that it

may be identical with *L. bangwensis*, Engl. & Krause. *L. Thonningii*, DC. Prodr. iv. 303, is a synonym of *L. incanus*, Schum. & Thonn. It was omitted from the Index Kewensis under the impression that it was identical with Schumacher and Thonning's species of the same name.

162. **L. Molleri,** *Engl. in Engl. Jahrb.* xx. 120. Branches fairly stout, about 2 lin. in diam. 1 ft. below the apex, tawny, shortly pilose with minute simple hairs and larger rusty branched hairs, finely and inconspicuously lenticellate; internodes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long. Leaves opposite or subopposite, ovate-oblong, oblong or lanceolate, subacute, obtuse or rounded at the apex, subcuneate or obtuse at the base, $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly coriaceous, puberulous on the nerves, otherwise nearly glabrous; lateral nerves 4–5 on each side, arcuate-ascending, anastomosing far from the margin, conspicuously raised on the upper surface, less so on the lower; petiole 4–5 lin. long, shortly rusty-pilose in a young state, finally more or less glabrescent. Umbels axillary, solitary, about 8-flowered; peduncle and pedicels rusty-pubescent; peduncle very stout, 1–$1\frac{1}{2}$ lin. long; pedicels fairly slender, about 2 lin. long; bract ovate or elliptic from a saucer-shaped base, rusty-pilose outside, subcucullate, umbonate, umbo rather flattened, dorsal margin $\frac{3}{4}$ lin. long, bent forwards, ventral margin $\frac{1}{6}$ lin. long. Flowers very obliquely inserted. Receptacle and calyx together campanulate, very wide-mouthed, $1\frac{1}{8}$–$1\frac{1}{2}$ lin. long, rusty-pilose outside. Calyx patulous or spreading, $\frac{1}{4}$–$\frac{3}{8}$ lin. long; intramarginal ring $\frac{1}{8}$ lin. high, glabrous. Corolla orange-yellow, $1\frac{3}{4}$ in. long or less, rusty-pilose outside with long slightly branched hairs and very short simple hairs, slightly constricted in bud about 3 lin. below the apex; tube split unilaterally 6–8 lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear, 4 lin. long. Filaments inserted at the base of the corolla-lobes, inflexed, tapering from the base to the middle, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, tooth rounded, $\frac{1}{8}$ lin. long, $\frac{1}{4}$ lin. broad; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc pentagonal, 5-lobed, $\frac{1}{4}$–$\frac{1}{3}$ lin. high. Style skittle-shaped above, thickened part 3 lin. long, broadest above the middle, neck $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long; stigma subglobose, $\frac{1}{3}$ lin. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 934.

Lower Guinea. Angola: Pungo Andongo; Calemba Island, in the Cuanza River, *Welwitsch*, 4845!

163. **L. bulawayensis,** *Engl. in Engl. Jahrb.* xl. 536. Young branchlets puberulous, older ones stout, wrinkled, glabrous; internodes 6–10 lin. long. Leaves subopposite, ovate, ovate-elliptic or ovate-lanceolate, obtuse or subacute at the apex, obtuse or subcuneate at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 6–13 lin. long, thinly coriaceous, glabrous; lateral nerves oblique, 2–3 on each side of the midrib; petiole 3–5 lin. long, channelled and pubescent above, puberulous below. Umbels axillary, solitary or fascicled, 3–4-flowered; peduncle, pedicels and bract puberulous; peduncle $\frac{3}{4}$–$1\frac{1}{4}$ lin. long; pedicels $\frac{3}{4}$–1 lin. long, stout; bract ovate-saucer-shaped, umbonate above the middle, minutely ciliate, dorsal margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle and calyx together cupular or suburceolate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Calyx

shortly 5-toothed, minutely ciliate, $\frac{1}{4}$–$\frac{3}{8}$ lin. long; intramarginal ring $\frac{1}{8}$ lin. high. Corolla $1\frac{1}{4}$ in. long, minutely and sparingly pilose outside; tube split unilaterally 6 lin. down, basal swelling ellipsoid, $2\frac{1}{4}$ lin. long, 5-grooved; lobes sublanceolate-linear, $4\frac{1}{2}$ lin. long, coherent above, thickly keeled, the upper $2\frac{1}{2}$ lin. with a hard inner layer. Filaments deflexed, 3 lin. long including the tooth, tapering upwards, tooth $\frac{1}{6}$–$\frac{1}{5}$ lin. long; anthers linear, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Disc pentagonal, $\frac{1}{5}$ lin. high. Style skittle-shaped above, thickened part $2\frac{3}{4}$–3 lin. long, neck $1\frac{3}{8}$ lin. long; stigma ellipsoid or subglobose, over $\frac{3}{8}$ lin. in diam.—*L. kraussianus*, L. S. Gibbs in Journ. Linn. Soc. Bot. xxxvii. 467, not of Meisn.

Mozamb. Distr. Rhodesia: Buluwayo, on *Combretum* spp., *Marloth*, 3378! Matoppo Hills, *Miss Gibbs*, 274!

164. **L. Fuellebornii,** *Engl. in Engl. Jahrb.* xxx. 304. Branchlets slender, 1 lin. in diam. 9 in. below the apex, at first smooth, dark brown, soon becoming rather densely and finely lenticellate; internodes 4–10 lin. long. Leaves alternate, ovate-oblong or elliptic-oblong, obtuse or rounded at the apex, sometimes minutely apiculate, obtuse at the base, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, 7–14 lin. broad, thinly coriaceous, glabrous; lateral nerves 2 on each side, very oblique, slightly raised on both surfaces; petiole 2–5 lin. long, slightly winged. Umbels axillary, solitary or geminate, 2–3-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels $\frac{3}{4}$ lin. long, glabrous; bract cupular, dorsal margin $\frac{5}{8}$ lin. long, lateral $\frac{3}{8}$ lin. long, ventral margin nearly $\frac{1}{2}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; receptacle cupular, $\frac{7}{8}$–1 lin. long, $\frac{3}{4}$–$\frac{7}{8}$ lin. in diam. at the apex. Calyx patulous, $\frac{7}{8}$ lin. long, lobed to the middle; lobes rounded. Corolla about $1\frac{3}{4}$ in. long, glabrous outside; tube split unilaterally about 8 lin. down, basal swelling ellipsoid or subglobose, $1\frac{3}{4}$–2 lin. long, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. in diam.; lobes erect, lanceolate-linear, acute, $3\frac{3}{4}$–4 lin. long, hardly $\frac{1}{2}$ lin. broad, hooked on the inner surface at the apex. Filaments inserted at or slightly above the base of the corolla-lobes, deflexed, tapering upwards, 2 lin. long, stout, tooth $\frac{1}{4}$ lin. long; anthers oblong-linear, $1\frac{1}{4}$ lin. long. Disc obtusely pentagonal, shortly 5-lobed, $\frac{1}{6}$ lin. high. Style thickened into the base, skittle-shaped above, thickened part 2 lin. long, broadest below the middle, neck $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, thickened above into the base of the stigma; stigma subglobose, $\frac{1}{3}$ lin. in diam.

Mozamb. Distr. German East Africa: Northern Nyasaland, *Goetze!*

165. **L. Gœtzei,** *Sprague*. Young branchlets stout, blackish, subangular owing to compression of the internodes, finely lenticellate towards the base. Branches very stout, about 3 lin. in diam. 6 in. below the apex, nodose, brownish, very coarsely and densely lenticellate, lenticels rusty-brown; internodes about 3 lin. long. Leaves alternate, oblanceolate, straight or subfalcate, obtuse or rounded at the apex, often apiculate, long-cuneate into the base, $1\frac{1}{2}$–3 in. long, 5–12 lin. broad, rigidly coriaceous, glabrous, dull, very finely wrinkled on both surfaces in a dried state; lateral nerves 2–3 on each side, very oblique, very slightly raised on both surfaces; petiole 3–5 lin. long. Umbels

axillary, fascicled, 3–6-flowered; peduncle stout, 1–1½ lin. long, glabrous; pedicels ¾ lin. long, glabrous; bract ovate-cupular, dorsal margin ¾–⅞ lin. long, truncate, umbonate, umbo much flattened, ventral margin ¼ lin. long. Receptacle and calyx together narrowly campanulate, 2⅛ lin. long. Calyx ascending, ⅞ lin. long, irregularly split. Corolla 1½ in. long in bud or more, glabrous outside, madder-red, constricted part of the tube yellow, upper part of the lobes violet (*Goetze*); basal swelling subglobose; lobes linear, subacute, about 4 lin. long, nearly ½ lin. broad, hooked on the inner surface at the apex. Filaments tapering upwards, 2½ lin. long, tooth ¼ lin. long; anthers oblong-linear, rounded-subtruncate, 1¼ lin. long; connective slightly exceeding the cells. Disc deeply 5-lobed, ⅓ lin. high, lobes deltoid. Style skittle-shaped above, thickened part 3–3¼ lin. long, neck 1¼ lin. long, upper half thickened into the base of the stigma; stigma depressed-globose, concave at the apex, ⅓–⅜ lin. in diam.—*L. Sadebeckii*, Engl. in Engl. Jahrb. xxx. 304, not of Engl. in Engl. Jahrb. xx. 122.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Range in Ussangu; Tikurugwa Mountain, 8000 ft., on *Protea* sp., *Goetze*, 989!

According to Goetze, the leaf of *L. Gœtzei* resembles that of its host in form and colour.

166. **L. Œhleri,** *Engl. in Engl. Jahrb.* xl. 526. Branches pale brown, about 1¼ lin. in diam. 6 in. below the apex, 2½ lin. in diam. 1 ft. below the apex, rather finely lenticellate; internodes 5–10 lin. long. Leaves subsessile, obovate-oblong, obtuse at the apex, often apiculate, cuneate into the base, 7–15 lin. long, 3–6 lin. broad, coriaceous, glabrous, 3–5-nerved from shortly above the base; nerves inconspicuous on the upper surface, rather more distinct on the lower; petiole ½–¾ lin. long. Heads subsessile, axillary, 3–4-flowered; axis ⅞ lin. long; bract shortly and obliquely cupular, ¾ lin. long dorsally. Receptacle and calyx together 2 lin. long. Calyx irregularly lobed. Corolla yellowish-red, about 1½ in. long, glabrous outside; tube split unilaterally about 8 lin. down, basal swelling subglobose, about 1¼ lin. in diam.; lobes erect, linear, acute, 4½ lin. long, 7/16 lin. broad, slightly hooked on the inner surface at the apex. Filaments inserted shortly above the base of the corolla-lobes, inflexed, slightly tapering upwards, 2¼ lin. long, thickened towards the apex, grooved on the inner surface, tooth ⅛ lin. long; anthers linear, 1¼ lin. long. Style skittle-shaped above, thickened part about 2½ lin. long, neck 1½ lin. long; stigma subglobose. Berry narrowly obovoid, 3 lin. long, coarsely tubercled.

Mozamb. Distr. German East Africa: Masai Steppe, *Oehler*, 43!

L. Œhleri was referred by Engler to the section *Inflati*, in which it occupied an isolated position. It appears to be allied to *L. sansibarensis*, Engl., with which it agrees in the 3–5-nerved leaves, toothed filaments and tubercled fruits.

167. **L. sansibarensis,** *Engl. in Engl. Jahrb.* xx. 121. Young branches blackish, glabrous, 1½–1¾ lin. in diam. 1 ft. below the apex, older ones greyish, densely lenticellate, more or less nodose; internodes

½–3 in. long. Leaves subopposite or alternate, ovate, elliptic or suborbicular, subacute, obtuse or rounded at the apex, rounded or obtuse at the base, 1¾–3½ in. long, 1–2¼ in. broad, coriaceous, usually thin, glabrous; lateral nerves raised on both surfaces, 2–3 on each side of the midrib, the upper ones running nearly to the apex of the leaf; petiole 2–5 lin. long. Heads axillary, fascicled, 2–3-flowered; peduncle 1 lin. long; bract obliquely cupular, umbonate, minutely ciliolate, dorsal margin ⅝–⅞ lin. long, including a triangular acute lobe, which is ⅙–¼ lin. long, ventral margin nearly ½ lin. long. Receptacle and calyx together narrowly campanulate, wide-mouthed, slightly constricted about the middle, 1¾ lin. long. Calyx patulous, irregularly split, ¾–⅞ lin. long. Buds constricted below the apex of the corolla-tube and above the base of the lobes. Corolla 1½ in. long or less, glabrous outside; tube split unilaterally 5–6 lin. down, basal swelling ellipsoid, 2–2¾ lin. long; lobes erect, linear, slightly broadened upwards, 3¾ lin. long, upper part with a hard inner layer. Filaments inflexed, 2½–2¾ lin. long, tapering slightly upwards, stout, broadly grooved on the inner surface, tooth ⅛–¼ lin. long; anthers linear, ⅞–1⅛ lin. long. Disc 5-lobed, ¼ lin. high. Style skittle-shaped above, thickened part 2 lin. long, neck 1 lin. long; stigma ⅓ lin. in diam. Berry red, verrucose.—*L. Sadebeckii*, Engl. in Engl. Jahrb. xx. 122, t. 3, fig. C; l.c. xxviii. 385. *L. Volkensii*, Engl. l.c. xx. 110. *L. crassissimus*, Engl. l.c. 122, as to *Stuhlmann*, ser. i. 776; Engl. Pfl. Ost-Afr. C. t. 14, figs. E–G. *L. viridizonatus*, Werth, Veg. Ins. Sansibar, 87. *Odontella Volkensii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Nile Land. British East Africa: Witu; Kau, *Thomas*, 151! between Mombasa and Takaunga, *Whyte!* Nyika Country, near Mombasa, *Wakefield*, 2! Taita; Voi River, *Hildebrandt*, 2502! Machakos, *Pospichal!*

Mozamb. Distr. Zanzibar, *Hildebrandt*, 1031! *Stuhlmann*, i. 776! on *Citrus Aurantium*, Linn., *Busse*, 1138! *Stuhlmann*, i. 772! on *Citrus medica*, Linn., *Bojer!* German East Africa: near Sonjo, *Merker*, 436! Pare Mountains, *Trotha*, 294! Usambara; Mombo, *Zimmerman*, 949! *Engler*, 3275! Simbili, 2600 ft., *Holst*, 2365! Doda, *Holst*, 2970! Tanga, *Volkens*, 183! coast opposite Zanzibar, *Forbes!* Ruaha River, 2300 ft., *Goetze*, 475! Portuguese East Africa: Lower Shire District, Morambala Mountain, 3500 ft., *Kirk!*

L. sansibarensis exhibits considerable variation in the shape of the leaves, and some of its forms have been considered distinct species. *L. Volkensii*, Engl., differs from typical *sansibarensis* in having thicker leaves. It is probably only a form of *L. sansibarensis*, but this cannot be decided until fully developed flowers are known. The type specimens bear only very young flower-buds.

L. crassissimus, Engl. in Engl. Jahrb. xx. 122, is a mixture of *L. Kayseri* and *L. sansibarensis*.

168. **L. sakarensis,** *Engl. in Engl. Jahrb.* xl. 538. Branchlets slender, about 1 lin. in diam. 6 in. below the apex, glabrous, the youngest parts dark, soon becoming paler, minutely and densely lenticellate; branches 1½–2 lin. in diam., very densely lenticellate; internodes 5–14 lin. long. Leaves alternate, lanceolate or ovate-oblong, obtuse at the apex (more rarely elliptic, rounded at the apex), subcuneate or obtuse at the base, straight or slightly curved, 2½–4 in. long,

$1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, thinly coriaceous, glabrous; lateral nerves about 3 on each side, very oblique, raised on both surfaces; reticulation more or less visible on both surfaces; petiole $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Heads axillary, solitary or geminate, sessile, 2–3-flowered; axis about 1 lin. long; flowers inserted in very oblique sockets; bract obliquely cupular, sparingly ciliate, dorsal margin $1\frac{1}{4}$ lin. long, thickened in the lower third, ventral margin $\frac{7}{8}$ lin. long. Receptacle and calyx together obconical-campanulate, $2\frac{3}{4}$–3 lin. long. Calyx suberect, $2\frac{1}{4}$ lin. long, split unilaterally, irregularly toothed, sparingly ciliate. Corolla nearly $2\frac{1}{4}$ in. long, glabrous outside; tube slightly curved below, basal swelling unilateral, boat-shaped in outline, 4–5 lin. long, neck about 4 lin. long, upper part of tube cylindric-funnel-shaped; lobes erect, linear, acute, $5\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, upper part with a hard inner layer. Filaments 3 lin. long, tapering slightly upwards, stout, grooved on the inner surface, the uppermost $\frac{3}{4}$ lin. much thickened, tooth $\frac{1}{4}$ lin. long; anthers linear, $1\frac{1}{3}$ lin. long. Disc shortly lobed, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, neck $1\frac{3}{4}$–2 lin. long; stigma subglobose, $\frac{1}{3}$ lin. in diam., concave at the apex.

Mozamb. Distr. German East Africa: Usambara; Sakare, 4300 ft., *Engler*, 943A!

169. **L. laciniatus,** *Engl. Pfl. Ost-Afr. C.* 166. Young branchlets subangular, glabrous, older ones terete, greyish, coarsely and densely lenticellate, about $1\frac{1}{2}$ lin. in diam. 10 in. below the apex; internodes $\frac{1}{2}$–1 in. long. Leaves alternate. ovate or ovate-oblong, obtuse at the apex, rounded or obtuse at the base, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, coriaceous, glabrous; lateral nerves 3–4 on each side, anastomosing far from the margin, hardly visible or inconspicuous on the upper surface, more evident on the lower; petiole 3–5 lin. long, slightly winged. Heads axillary, fascicled, 3-flowered; peduncle $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract cupular, 2-lipped, minutely ciliate, umbonate, dorsal margin $\frac{3}{4}$ lin. long, lateral margin $\frac{1}{4}$ lin. long, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{3}{4}$ lin. long. Calyx 1 lin. long, irregularly split by the basal expansion of the corolla. Corolla over $1\frac{1}{4}$ in. long, glabrous outside; tube split unilaterally about 6 lin. down, basal swelling ellipsoid-globose, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear, $3\frac{1}{2}$ lin. long, upper part with a hard inner layer. Filaments inserted almost at the base of the corolla-lobes, inflexed, tapering upwards, 2 lin. long, thickened towards the apex, tooth $\frac{1}{8}$ lin. long; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc lobed, $\frac{1}{6}$ lin. high. Style slightly skittle-shaped above; stigma subglobose, $\frac{3}{8}$ lin. in diam.

Mozamb. Distr. German East Africa: Kilimanjaro; above Kilema, 8000 ft., *Volkens*, 1818!

170. **L. Keudelii,** *Engl. in Engl. Jahrb.* xl. 538. Branches long, rather slender, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, glabrous, pallid, very densely and rather coarsely lenticellate; internodes $\frac{1}{4}$–1 in. long. Leaves ovate or elliptic, obtuse or rounded at the apex, rounded or obtuse at the base, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, rather thinly

coriaceous, glabrous, finely reticulate on the upper surface; lateral nerves about 3 on each side, arcuate-ascending, distinctly raised on the upper surface, less so on the lower; petiole $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Heads axillary, fascicled, sessile or subsessile, 3–4-flowered; axis $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract obliquely cupular, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, ciliolate. Receptacle and calyx together obconic-campanulate, $2\frac{1}{8}$ lin. long. Calyx suberect, $1\frac{1}{2}$ lin. long, split unilaterally by the basal expansion of the corolla, rather regularly lobed, ciliate with rusty hairs; lobes narrowly triangular. Corolla 1–$1\frac{1}{4}$ in. long, glabrous outside; basal swelling ellipsoid, $2\frac{1}{4}$ lin. long, $1\frac{1}{4}$ lin. in diam., remainder of tube cylindric-funnel-shaped; lobes erect, linear, acuminate to an acute apex, $3\frac{1}{2}$ lin. long, $\frac{3}{8}$ lin. in diam., upper part with a hard inner layer. Filaments $1\frac{1}{2}$ lin. long, tapering upwards, grooved on the inner surface, thickened towards the apex, tooth $\frac{1}{6}$ lin. long; anthers linear, $1\frac{1}{4}$ lin. long. Disc shortly lobed, $\frac{1}{5}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck $1\frac{1}{4}$ lin. long, uppermost $\frac{1}{4}$ lin. thickened into the base of the stigma; stigma broadly ovoid, rounded at the apex, $\frac{3}{8}$ lin. long.

Mozamb. Distr. German East Africa: Usambara; Wilhelmstal, *Keudel*, 616G!

Uhlig, 837, from Mbalu, West Usambara, resembles *L. Keudelii* in its leaves, and is not unlike *L. Holtzii* in its flowers. I suspect that it represents an undescribed species.

171. **L. elegantulus,** *Engl. in Engl. Jahrb.* xx. 121. Branchlets slender, glabrous, somewhat nodose, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. about 1 ft. below the apex; internodes 3–9 lin. long. Leaves alternate, ovate-oblong, obtuse at both apex and base, 1–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–1 in. broad, chartaceous, glabrous; lateral nerves 2–3 on each side, slightly raised on both surfaces; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Heads axillary, solitary or 2–3 together, 2–3-flowered; peduncle $\frac{3}{4}$–$\frac{7}{8}$ lin. long; bract cupular or shortly boat-shaped, ciliate, umbonate, hardly $\frac{3}{4}$ lin. long, dorsal margin $\frac{1}{2}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together narrowly campanulate, wide-mouthed, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long; receptacle cupular, $\frac{5}{8}$ lin. long. Calyx patulous, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, slightly lobed, ciliolate, irregularly split. Corolla 1–$1\frac{1}{3}$ in. long, glabrous outside; tube split unilaterally 4–5 lin. down, basal swelling subglobose, $1\frac{1}{2}$ lin. in diam.; lobes erect, subspathulate-linear, $3\frac{1}{2}$ lin. long. Filaments inserted $\frac{1}{4}$ lin. above the base of the corolla-lobes, nearly 2 lin. long, tooth $\frac{1}{6}$ lin. long; anthers linear, $\frac{7}{8}$–$1\frac{1}{8}$ lin. long. Disc lobed, $\frac{1}{6}$–$\frac{1}{8}$ lin. high. Style skittle-shaped above, thickened part $1\frac{1}{2}$ lin. long, neck 1 lin. long; stigma depressed-globose, $\frac{1}{4}$ lin. long, $\frac{1}{3}$ lin. in diam. Berry tubercled.—Pfl. Ost-Afr. C. 166, t. 17, fig. A.

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, 5000 ft., *Holst*, 9071!

172. **L. Holtzii,** *Engl. in Engl. Jahrb.* xl. 526. A fairly large bush. Branches 1–$1\frac{1}{2}$ ft. long, rather slender, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, youngest parts smooth, dark, older parts pale olive-green, more or less lenticellate; internodes $\frac{1}{3}$–$1\frac{1}{2}$ in. long. Leaves alternate,

lanceolate, obtuse at the apex (more rarely elliptic, rounded at the apex), obtuse or subcuneate at the base, 2–3¼ in. long, 1–1¾ in. broad, thinly coriaceous, glabrous, dull, slightly rough in a dried state, reticulation more or less visible, especially on the upper surface; lateral nerves about 3 on each side, rather oblique, raised on both surfaces; petiole 2–4 lin. long. Heads sessile, 2–4-flowered; axis ½–⅞ lin. long; bract obliquely cupular, about ¾ lin. long, ciliolate. Receptacle and calyx together narrowly campanulate, 1¾–2 lin. long; receptacle verrucose on the upper half. Calyx irregularly split and lobed, about 1 lin. long, ciliolate. Corolla red, about 1 in. long, glabrous outside; tube split unilaterally, basal swelling ellipsoid, 1½ lin. long; lobes erect, oblanceolate-linear, acute, 2¾ lin. long, ⅜ lin. broad, upper part with a hard inner layer. Filaments 1⅝ lin. long, tapering upwards, grooved on the inner surface, much thickened towards the apex, tooth ⅙ lin. long; anthers linear, ⅝ lin. long. Disc shortly lobed, ⅕ lin. high. Style slightly skittle-shaped above, neck ¾ lin. long.

Mozamb. Distr. German East Africa: Usambara; Sakare, 4000 ft., *Engler*, 939A! *Buchwald*, 677!

L. Holtzii was placed by Engler in the section *Inflati*. It seems, however, to be closely allied to *L. sakarensis*, which occurs in the same locality.

173. **L. sambesiacus,** *Engl. & Schinz ex Schinz, Pl. Menyharth.* 43. Young branchlets olive-green, glabrous, older ones greyish-brown, deeply wrinkled longitudinally in a dried state, inconspicuously lenticellate, about 1 lin. in diam. 3 in. below the apex; internodes 3–7 lin. long. Leaves opposite or alternate, straight or more rarely subfalcate, linear-lanceolate, acute at the apex, attenuate into the base, 2½–3 in. long, 2½–5 lin. broad, rigidly coriaceous, glabrous, olive-green in a dried state; lateral nerves very oblique, slightly raised on the upper surface, not visible on the lower; petiole 1–2 lin. long. Umbels axillary, solitary, 4–5-flowered, glabrous; peduncle 1–1⅜ lin. long, very stout, constricted in the middle; pedicels inserted in very shallow sockets, broadened into the apex and base, 1–1½ lin. long; bract saucer-shaped with a transversely oblong rounded dorsal lobe, dorsal margin 7/16–½ lin. long, more or less thickened, ventral margin ⅛ lin. long. Receptacle and calyx together campanulate, 1¼ lin. long, glabrous. Calyx patulous, ¼ lin. long, very shallowly lobed, ciliolate; intramarginal ring 1/12 lin. high. Corolla about 1¾ in. long, glabrous outside; tube split unilaterally, basal swelling ellipsoid, 2½–3 lin. long; lobes separating from one another and curved outwards in their lower part before the expansion of the corolla, afterwards erect, sublanceolate-linear, 4½ lin. long, upper part boat-shaped, obtusely keeled, 2¼–2½ lin. long, under ⅝ lin. broad, with a hard inner layer sharply demarcated at the base. Filaments tapering upwards from a broad base, 2½ lin. long, nearly ½ lin. broad at the base, much contracted above, ⅓ lin. broad in the uppermost ½–⅝ lin., slightly thickened near the apex, tooth ⅛ lin. long; anthers linear, 1½ lin. long. Disc shortly lobed, ⅓ lin. high. Style conspicuously skittle-shaped above, thickened part 3 lin. long, broadest below the middle, abruptly contracted

into the neck, neck $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long; stigma depressed-globose, distinctly bilobed.—Engl. in Engl. Jahrb. xl. 536.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Nhaondue, near Boruma, *Menyharth*, 939!

174. **L. nyasicus,** *Baker & Sprague.* Branchlets subtended at the base by several reduced leaves, $1\frac{1}{2}$–6 in. long, much compressed, nodose, glabrous, finely striate and dark in a dried state; internodes $\frac{3}{4}$–$2\frac{1}{2}$ in. long. Branches fairly stout, 2–3 lin. in diam., dark brown, longitudinally wrinkled in a dried state, rather densely and inconspicuously lenticellate, lenticels elongating to form small longitudinal cracks. Leaves opposite or subopposite, narrowly elliptic-oblong or lanceolate, rounded or obtuse at the apex, rounded at the base (more rarely obtuse), $1\frac{1}{3}$–$3\frac{1}{4}$ in. long, 9–15 lin. broad, coriaceous, glabrous, faintly and finely reticulate, especially on the upper surface; lateral nerves about 3 on each side, very oblique, slightly raised on both surfaces; petiole 1–5 lin. long. Umbels axillary, solitary, about 8-flowered, glabrous; peduncle $3\frac{1}{2}$–4 lin. long; pedicels about 3 lin. long; bract unilaterally developed, broadly ovate or quadrangular from a disc-shaped or saucer-shaped base, truncate or subtruncate, umbonate, dorsal margin $\frac{5}{8}$ lin. long, ventral margin spreading or patulous, $\frac{1}{6}$ lin. long. Receptacle and calyx together suburceolate, about $1\frac{1}{4}$ lin. long. Calyx suberect, $\frac{1}{4}$ lin. long, very shallowly lobed; intramarginal ring $\frac{1}{8}$ lin. high. Corolla about $1\frac{3}{4}$ in. long, glabrous outside; tube split unilaterally 6–$6\frac{1}{2}$ lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear, acute, $4\frac{1}{2}$ lin. long, upper part boat-shaped, linear-lanceolate seen from within, $2\frac{3}{8}$ lin. long, $\frac{1}{2}$ lin. broad, strongly keeled outside, with a hard inner layer sharply demarcated at the base. Filaments inserted about the base of the corolla-lobes, deflexed, tapering upwards, $2\frac{3}{4}$ lin. long, tooth $\frac{1}{6}$ lin. long; anthers linear, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long, connective slightly exceeding the cells. Disc shortly lobed, $\frac{3}{8}$ lin. high. Style slightly thickened into the base, skittle-shaped above, thickened part $2\frac{1}{2}$–3 lin. long, neck $1\frac{1}{4}$ lin. long; stigma depressed-globose, not distinctly lobed.

Mozamb. Distr. British Central Africa: Nyasaland, *Buchanan*, 1090! Namasi, *Cameron*, 8!

175. **L. polygonifolius,** *Engl. in Comptes-rendus Soc. Bot. Belg*, xxxix. 29. Branchlets slender, hardly 1 lin. in diam. 5 in. below the apex, dark, glabrous; internodes 5–15 lin. long, the upper compressed. Leaves opposite, lanceolate, slightly apiculate from an obtuse apex, rounded or obtuse at the base, $2\frac{3}{4}$–$3\frac{3}{4}$ in. long, 10–15 lin. broad, chartaceous, glabrous, dark brown in a dried state, finely reticulate on both surfaces; lateral nerves 5–6 on each side, patulous, anastomosing far from the margin, slightly raised on both surfaces; petiole 3–$4\frac{1}{2}$ lin. long. Umbels axillary, solitary, 4–6-flowered, glabrous; peduncle stout, $\frac{3}{4}$–2 lin. long; pedicels 2–$2\frac{1}{2}$ lin. long; bract narrowly triangular from a saucer-shaped base, dorsal margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long, umbonate or thickened, ventral margin $\frac{1}{6}$ lin. long. Receptacle and calyx together campanulate, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Calyx 5-lobed, $\frac{1}{2}$ lin. long; lobes triangular, acute;

intramarginal ring $\frac{1}{8}$ lin. high. Corolla yellow, about $2\frac{1}{6}$ in. long, glabrous outside, apical swelling strongly 5-winged in bud; tube split unilaterally 6 lin. down, basal swelling oblong-ovoid, 3–$3\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear seen from within, $4\frac{3}{4}$ lin. long, upper part ship-shaped, $2\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, $\frac{3}{4}$ lin. deep, with a hard inner layer sharply demarcated below. Filaments red, inserted at the base of the corolla-lobes, deflexed, tapering upwards from a broad base, $2\frac{1}{2}$ lin. long, nearly $\frac{1}{2}$ lin. broad at the base, tooth $\frac{1}{8}$ lin. long; anthers brownish, linear, $1\frac{1}{2}$ lin. long. Disc shortly 5-lobed, $\frac{1}{3}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, broadest below the middle, neck $1\frac{3}{8}$ lin. long, the lowest $\frac{3}{8}$–$\frac{1}{2}$ lin. narrower than the remainder; stigma subglobose, not distinctly lobed.—De Wild. & Th. Dur. Reliq. Dewevr. 201.

South Central. Belgian Congo: Bangala District, *Dewèvre*, 875!

176. **L. celtidifolius,** *Engl. in Engl. Jahrb.* xx. 123, *t.* 3, *fig. D, not of Willd.* Young branchlets and leaves very minutely and sparingly rusty-pilose, soon becoming glabrous. Branchlets lenticellate from a young state, soon becoming very densely lenticellate, at first blackish, afterwards greyish, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam. about 9 in. below the apex; internodes $\frac{1}{4}$–$1\frac{3}{4}$ in. long. Leaves opposite or subopposite, ovate-oblong or (more rarely) ovate, obtuse or rounded at the apex, obtuse at the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 9–17 lin. broad, coriaceous, glabrous; lateral nerves 2–3 on each side, obliquely ascending, not distinctly anastomosing, raised on the upper surface, less so on the lower; petiole 3–7 lin. long. Umbels axillary, solitary or ternate, 9–13-flowered; peduncle, pedicels and bract minutely rusty-pilose; peduncle stout, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long; pedicels $1\frac{1}{2}$–2 lin. long; bract ovate-saucer-shaped, obtuse, strongly umbonate, ciliate, dorsal margin $\frac{1}{2}$ lin. long, ventral margin $\frac{1}{6}$ lin. long. Receptacle and calyx together suburceolate-cupular, 1 lin. long, minutely puberulous. Calyx $\frac{1}{12}$–$\frac{1}{8}$ lin. long; intramarginal ring $\frac{1}{12}$ lin. high. Corolla $1\frac{1}{4}$–$1\frac{1}{3}$ in. long, minutely puberulous outside, especially towards the base, apical swelling of the bud strongly 5-keeled, $1\frac{1}{2}$ lin. long; tube split unilaterally 5–$5\frac{1}{2}$ lin. down, basal swelling depressed-globose, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. in diam.; lobes erect, spathulate-linear, $3\frac{1}{2}$ lin. long, upper part boat-shaped, $1\frac{5}{8}$ lin. long, $\frac{7}{16}$ lin. broad, $\frac{1}{3}$ lin. deep, linear-lanceolate seen from within, with a hard inner layer sharply demarcated below. Filaments inserted slightly above the base of the corolla-lobes, deflexed, tapering upwards, about 2 lin. long, tooth rounded, $\frac{1}{16}$ lin. long; anthers oblong-linear, $\frac{5}{8}$ lin. long. Disc $\frac{1}{4}$ lin. high, conspicuously exceeding the calyx. Style skittle-shaped above, thickened part $2\frac{1}{4}$ lin. long, neck $\frac{3}{4}$ lin. long; stigma ellipsoid, $\frac{1}{3}$ lin. long.—Pfl. Ost-Afr. C. 167.

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Hildebrandt*, 1225! *Kirk! Kuntze!*

L. celtidifolius, Willd., is a synonym of *L. incanus*, Schum. & Thonn.

177. **L. aurantiacus,** *Engl. in Engl. Jahrb.* xx. 124, *not of A. Cunn.* Branchlets dark and puberulous in a young state, greyish when adult, about $1\frac{1}{4}$ lin. in diam. 6 in. below the apex, rather densely

lenticellate, lenticels appearing at an early stage; internodes $\frac{1}{2}$–2 in. long. Leaves opposite or subopposite, ovate-oblong or oblong, obtuse at the apex, rounded or subcuneate at the base, $1\frac{3}{4}$–3 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, coriaceous, glabrous; lateral nerves 2–4 on each side, obliquely ascending, anastomosing rather indistinctly, slightly raised on both surfaces; petiole channelled, 3–6 lin. long. Umbels axillary, solitary or ternate, 10–12-flowered, rusty-pubescent; peduncle about $1\frac{3}{4}$ lin. long; pedicels 2–$2\frac{1}{2}$ lin. long; bract saucer-shaped, with a shortly ovate dorsal lobe, rusty-pubescent outside, umbonate, dorsal margin $\frac{1}{2}$ lin. long, ventral margin $\frac{1}{6}$ lin. long. Receptacle and calyx together suburceolate-cupular, $1\frac{1}{8}$ lin. long, rather densely or sparingly rusty-pubescent. Calyx $\frac{1}{8}$–$\frac{1}{4}$ lin. long; intramarginal ring $\frac{1}{10}$–$\frac{1}{6}$ lin. high. Corolla over $1\frac{1}{2}$ in. long, pubescent or puberulous outside, apical swelling of the bud strongly 5-keeled, $1\frac{3}{4}$ lin. long; tube split unilaterally $6\frac{1}{2}$–$7\frac{1}{2}$ lin. down, basal swelling broadly ellipsoid or ovoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long; lobes erect, spathulate-linear, $3\frac{1}{2}$–4 lin. long, upper part boat-shaped, $1\frac{3}{4}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, $\frac{5}{8}$–$\frac{3}{4}$ lin. deep, linear-lanceolate seen from within, hard inner layer very sharply demarcated below. Filaments inserted at the base of the corolla-lobes, inflexed or subinvolute, tapering upwards, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, tooth $\frac{1}{6}$ lin. long; anthers narrowly oblong, $\frac{7}{8}$ lin. long, connective not exceeding the cells. Disc $\frac{1}{4}$–$\frac{1}{3}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck $\frac{7}{8}$ lin. long; stigma ellipsoid, $\frac{3}{8}$ lin. long.—Pfl. Ost-Afr. C. 167, t. 14, figs. A–D; Glied. Veg. Usamb. 26.

Mozamb. Distr. German East Africa: Tanga, *Heinsen*, 102! Amboni, *Holst*, 2890! Bagamoyo, *Stuhlmann*, 137!

Typical *L. aurantiacus*, Engl., as represented by *Holst*, 2890, has ovate-oblong leaves, rounded or very obtuse at the base, and a pubescent corolla; whereas *Heinsen*, 102, has oblong leaves, subcuneate into the base, and a minutely puberulous corolla. In the last-mentioned character it agrees with *L. celtidifolius*, but I have referred it to *L. aurantiacus* on account of the shape of the corolla-lobes.

L. aurantiacus, A. Cunn. (a native of Australia), has been reduced by Bentham, Fl. Austr. iii. 394, to *L. pendulus*, Sieb.

178. **L. Cecilæ,** *N. E. Br. in Kew Bulletin*, 1906, 168. Branches elongated, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, rather pallid, shortly pilose; internodes $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Leaves opposite, ovate, obtuse or rounded at the apex, cordate or subcordate at the base, 7–17 lin. long, 5–11 lin. broad, coriaceous, glabrous, glaucous, bluish-green in a living state; lateral nerves about 3 on each side, obliquely arcuate, raised on the upper surface, rather indistinct on the lower; petiole $1\frac{1}{2}$–3 lin. long, shortly rusty-pilose. Umbels axillary, solitary, 4–7-flowered; peduncle and pedicels minutely pilose; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels $\frac{3}{4}$ lin. long; bract ovate-saucer-shaped, rounded, minutely pubescent outside, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle and calyx together cupular, 1 lin. long, minutely and densely pubescent outside. Calyx $\frac{1}{8}$–$\frac{1}{6}$ lin. long; intramarginal ring $\frac{1}{12}$ lin. high, glabrous. Corolla under $1\frac{1}{2}$ in. long, finely pilose outside with spreading hairs, apical swelling of the bud oblong-ellipsoid, pentagonal, $1\frac{3}{4}$ lin. long, $1\frac{1}{8}$ lin. in diam., rounded at the apex, angles ribbed; tube split 9 lin.

down, basal swelling subglobose, 5-grooved, $1\frac{1}{2}$ lin. in diam.; lobes erect, subspathulate-linear, acute, $2\frac{1}{2}$–3 lin. long, upper part boat-shaped, $1\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, $\frac{1}{3}$ lin. deep, hard inner layer sharply demarcated below. Filaments deflexed, tapering upwards from a much-thickened base, over $2\frac{1}{4}$ lin. long, tooth $\frac{1}{6}$ lin. long; anthers linear-oblong, truncate, just over 1 lin. long. Disc pentagonal, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part 2 lin. long, broadest below the middle, neck $1\frac{1}{8}$ lin. long; stigma subglobose, $\frac{1}{3}$–$\frac{3}{8}$ lin. in diam.

Mozamb. Distr. Rhodesia: Matabeleland; near Buluwayo waterworks, *Hon. Mrs. Evelyn Cecil*, 96!

Var. *Buchananii*, Sprague. Leaves suborbicular or very broadly ovate, $1\frac{1}{2}$–2 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad. Umbels many-flowered. Corolla-lobes hardly keeled.

Mozamb. Distr. British Central Africa: Nyasaland; Blantyre, very common, *Buchanan*, 133!

Var. *Buchananii* might equally well be regarded as the type of a distinct species. Having regard to the scanty material, however, it has seemed best to treat it as a variety of *L. Cecilæ*.

L. aurantiacus, var. *parviflorus*, Engl. ex Schinz, Pl. Menyharth. 42, name only, was based on a specimen gathered by Menyharth (938) near Boroma on the Lower Zambesi. It is possibly identical with *L. Cecilæ*, var. *Buchananii*, but the material extant is insufficient for determination.

179. **L. dichrous,** *Engl. in Engl. Jahrb.* xx. 123. Young branchlets densely rusty-pilose with short curly hairs; branches slender, about 1 lin. in diam. 1 ft. below the apex, pallid, glabrous, nodose, densely lenticellate; internodes $\frac{1}{6}$–2 in. long. Leaves subopposite or alternate, lanceolate or elliptic-oblong, obtuse or rounded at the apex, cuneate into the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 7–12 lin. broad, chartaceous, minutely rusty-pilose, especially on the lower surface, or glabrescent; lateral nerves 3–4 on each side, obliquely ascending, anastomosing far from the margin, rather prominent on the upper surface, inconspicuous on the lower; petiole 2–4 lin. long. Umbels axillary, solitary, geminate or ternate, 6–10-flowered; peduncle, pedicels and bract shortly rusty-pilose; peduncle 1–$1\frac{3}{4}$ lin. long; pedicels $\frac{3}{4}$ lin. long; bract narrowly ovate from a saucer-shaped base, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{6}$–$\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, 1 lin. long, densely rusty-pubescent outside. Calyx ascending, $\frac{1}{3}$ lin. long, slightly lobed; intramarginal ring very small. Corolla orange, except the upper part of the lobes, which is purplish-red (*Zenker*), about 1 in. long, shortly and densely rusty-pilose outside, apical swelling of the bud ovoid-oblong, acute, pentagonal, $1\frac{3}{4}$ lin. long; tube split unilaterally, basal swelling ellipsoid, $1\frac{3}{8}$ lin. long; lobes erect, lanceolate-linear, slightly contracted in the middle, acute, about $3\frac{1}{2}$ lin. long, upper part shallowly boat-shaped, $1\frac{5}{8}$ lin. long, $\frac{3}{8}$ lin. broad, oblong-lanceolate seen from within, hard inner layer sharply demarcated below. Filaments tapering upwards, 2 lin. long, tooth oblong, very obtuse, $\frac{1}{6}$ lin. long; anthers oblong-linear, $\frac{3}{4}$ lin. long. Disc $\frac{1}{7}$ lin. high, not distinctly lobed. Style skittle-shaped above, thickened part $2\frac{3}{4}$ lin. long, neck $\frac{5}{8}$ lin. long.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 363!

180. **L. blantyreanus**, *Engl. in Engl. Jahrb.* xl. 537. Young branchlets rusty- or fulvous-pubescent, about 1 lin. in diam. 3–4 in. below the apex, nodose; branches stout, longitudinally wrinkled, glabrous, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. in diam., finely and inconspicuously lenticellate; internodes $\frac{1}{4}$–$1\frac{1}{4}$ in. long. Leaves opposite or alternate, ovate-oblong, obtuse at both ends (those at the base of the branchlets obovate, rounded at the apex, cuneate into the base), 1–2 in. long, $\frac{1}{2}$–1 in. broad, coriaceous, glabrous; lateral nerves 3–4 on each side, rather oblique, raised on the upper surface, not visible or hardly visible on the lower; petiole shortly pilose, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Umbels axillary, solitary, about 9–10-flowered; peduncle, pedicels and bract shortly and rather densely pilose; peduncle $1\frac{1}{2}$–2 lin. long; pedicels $1\frac{1}{2}$–2 lin. long; bract ovate from a saucer-shaped base, ciliolate, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin patulous, hardly $\frac{1}{4}$ lin. long. Receptacle and calyx together cupular, $1\frac{1}{4}$ lin. long, puberulous. Calyx suberect, shortly 5-toothed, $\frac{1}{6}$–$\frac{1}{4}$ lin. long; intramarginal ring under $\frac{1}{8}$ lin. high. Corolla $1\frac{1}{2}$–$1\frac{2}{3}$ in. long, shortly pilose outside, apical swelling of the bud oblong, obtuse, pentagonal, $2\frac{1}{2}$ lin. long, with grooved faces; tube split unilaterally $6\frac{1}{2}$–$7\frac{1}{2}$ lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear, acute, 4–$4\frac{1}{4}$ lin. long, upper part very shallowly boat-shaped, 2–$2\frac{1}{8}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, oblong-lanceolate seen from within, hard inner layer sharply demarcated below. Filaments inserted at the base of the corolla-lobes, deflexed, stout, tapering from a broad base, $2\frac{1}{2}$ lin. long, uppermost $\frac{1}{4}$ lin. thickened, tooth $\frac{1}{6}$ lin. long; anthers oblong-linear, $1\frac{1}{2}$ lin. long. Disc pentagonal, very thick, $\frac{1}{4}$–$\frac{1}{3}$ lin. high, shortly lobed. Style skittle-shaped above, thickened part $2\frac{3}{4}$ lin. long, broadest below the middle, neck $1\frac{3}{8}$ lin. long, the uppermost $\frac{1}{4}$ lin. thickened into the base of the stigma; stigma subglobose, with a minute apical depression.

Mozamb. Distr. British Central Africa: Nyasaland; Blantyre, *Buchanan in Herb. Wood*, 6983! Shire Highlands; Mandala, *Scott-Elliot*, 8560! and without precise locality, *Buchanan*, 51!

181. **L. Schweinfurthii,** *Engl. in Engl. Jahrb.* xx. 124. Branchlets pallid, shortly pubescent, about $1\frac{1}{2}$ lin. in diam. 6 in. below the apex; branches stout, wrinkled, glabrous; internodes $\frac{3}{4}$–2 in. long. Leaves opposite or subopposite, broadly ovate, obtuse or rounded at the apex, subcuneate, rounded or cordate at the base, $2\frac{1}{4}$–3 in. long, $1\frac{1}{4}$–$2\frac{3}{4}$ in. broad, coriaceous, glabrous; lateral nerves 3–5 on each side, patulous, raised on both surfaces; petiole 3–7 lin. long, puberulous. Umbels axillary, solitary, 9–10-flowered; peduncle, pedicels and bract pubescent; peduncle 2–$2\frac{1}{2}$ lin. long; pedicels 1–$1\frac{1}{2}$ lin. long; bract ovate-saucer-shaped, dorsal margin $\frac{5}{8}$–$\frac{3}{4}$ lin. long, ventral margin hardly $\frac{1}{4}$ lin. long. Receptacle and calyx together cupular, 1–$1\frac{1}{8}$ lin. long, nearly glabrous outside. Calyx $\frac{1}{8}$ lin. long, ciliate; intramarginal ring $\frac{1}{12}$–$\frac{1}{10}$ lin. high. Corolla under $1\frac{1}{2}$ in. long, shortly pilose outside, apical swelling of the bud oblong-ellipsoid, $2\frac{1}{4}$ lin. long, pentagonal, with grooved faces; tube split unilaterally about 5 lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, spathulate, $4\frac{1}{2}$ lin. long,

upper part shallowly boat-shaped, acute, $2\frac{1}{2}$ lin. long, $\frac{11}{16}$ lin. broad, hard inner layer sharply demarcated below. Filaments inserted at the base of the corolla-lobes, deflexed, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, tapering upwards, thickened near the apex, with a narrow dark band about $\frac{1}{8}$ lin. long $\frac{1}{8}$ lin. below the apex, tooth $\frac{1}{4}$ lin. long; anthers linear, truncate, $1\frac{1}{2}$ lin. long, connective produced beyond the cells. Disc $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, neck $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long; stigma ovoid, $\frac{3}{8}$ lin. long.—Engl. Pfl. Ost-Afr. C. 167.

Nile Land. Jur: Great Seriba Ghattas, on *Ficus platyphylla*, Delile, *Schweinfurth*, 1381 ! 1425A !

Mozamb. Distr. German East Africa: Bukumbi, on Lake Victoria, *Stuhlmann*, 820 !

182. **L. Keilii,** *Engl. & Krause in Engl. Jahrb.* xliii. 409. Young branchlets dark, at first shortly rusty-pilose, soon becoming inconspicuously puberulous, about $1\frac{1}{4}$ lin. in diam. 6 in. below the apex, nodose; branches rather stout, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. in diam., pallid, glabrous, densely lenticellate, lenticels rusty-brown; internodes 4–13 lin. long. Leaves alternate, mostly lanceolate (more rarely linear-lanceolate or elliptic-oblong), straight or subfalcate, obtuse or rounded at the apex, cuneate or subcuneate into the base, $1\frac{1}{2}$–3 in. long, 7–12 lin. broad, rigidly coriaceous, glabrous; lateral nerves 2–4 on each side, very oblique, raised on both surfaces; petiole 3–4 lin. long, shortly rusty-pilose. Umbels axillary, solitary, 9–12-flowered; peduncle, pedicels and bract shortly rusty-pilose; peduncle about $3\frac{1}{2}$ lin. long; pedicels $2\frac{1}{4}$ lin. long; bract ovate or elliptic from a saucer-shaped base, dorsal margin $\frac{1}{2}$ lin. long, ventral margin patulous, hardly $\frac{1}{4}$ lin. long. Receptacle and calyx together cupular, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long, slightly constricted below the apex, very minutely papillate outside. Calyx shallowly lobed, about $\frac{1}{4}$ lin. long, ciliolate; intramarginal ring $\frac{1}{8}$ lin. high. Corolla reddish-brown and yellow (*Engler*), about $1\frac{3}{4}$ in. long, puberulous outside, apical swelling oblong, $2\frac{1}{2}$ lin. long; tube split unilaterally about 8 lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, lanceolate-linear, acute, 5 lin. long, upper part shallowly boat-shaped, $2\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, hard inner layer sharply demarcated below. Filaments inserted at the base of the corolla-lobes, about $2\frac{3}{4}$ lin. long, darker and slightly thickened towards the apex, tooth $\frac{1}{6}$ lin. long; anthers oblong-linear, $1\frac{1}{2}$ lin. long. Disc pentagonal, shortly 5-lobed, $\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part 3–$3\frac{1}{4}$ lin. long, neck nearly $1\frac{1}{2}$ lin. long; stigma ellipsoid, $\frac{1}{3}$ lin. long.

Mozamb. Distr. German East Africa: Usumbura; near Kamata, 2500 ft., *Keil*, 212 !

183. **L. Carsonii,** *Baker & Sprague.* Branches elongated, about $2\frac{1}{2}$ ft. long, $1\frac{3}{8}$ lin. in diam. 1 ft. below the apex, hardly 2 lin. in diam. 2 ft. below the apex, younger parts and branchlets densely rusty-pubescent, older parts glabrescent, brownish, inconspicuously lenticellate; internodes $\frac{1}{2}$–$2\frac{1}{2}$ in. long. Leaves opposite or subopposite, linear-lanceolate, obtuse at the apex, attenuate into the base, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $2\frac{1}{2}$–

10 lin. broad, coriaceous, glabrous; lateral nerves about 4 on each side, very oblique, raised on the upper surface, slightly raised or hardly visible on the lower; petiole $1\frac{1}{2}$–3 lin. long, rusty-pubescent. Umbels axillary, solitary, subsessile, many-flowered; axis rusty-pubescent, $1\frac{1}{2}$–2 lin. long; pedicels $\frac{5}{8}$–$\frac{3}{4}$ lin. long, rusty-pubescent; bract ovate-elliptic from a cupular base, ciliate, dorsal margin $\frac{1}{2}$ lin. long, umbonate, ventral margin $\frac{1}{6}$ lin. long. Receptacle and calyx together cupular or subcampanulate, $\frac{7}{8}$ lin. long, rusty-puberulous outside. Calyx suberect or patulous, $\frac{1}{4}$ lin. long, shortly 5-toothed; intramarginal ring $\frac{1}{12}$ lin. high. Corolla $1\frac{1}{6}$–$1\frac{1}{4}$ in. long, shortly rusty-pilose outside, apical swelling of the bud oblong, pentagonal, $1\frac{3}{4}$ lin. long, faces slightly grooved; tube split unilaterally about $5\frac{1}{2}$ lin. down, basal swelling subglobose, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. in diam.; lobes erect, spathulate, acute, $3\frac{1}{4}$ lin. long, upper part shallowly boat-shaped, $1\frac{1}{2}$ lin. long, $\frac{3}{8}$–$\frac{7}{16}$ lin. broad, oblong-lanceolate seen from within, hard inner layer sharply demarcated below. Filaments inserted slightly above the base of the corolla-lobes, deflexed, $1\frac{3}{4}$ lin. long, tapering upwards, thickened in the uppermost $\frac{1}{4}$ lin., tooth $\frac{1}{8}$ lin. long; anthers oblong-linear, $\frac{7}{8}$ lin. long. Disc pentagonal, stout, $\frac{1}{6}$ lin. high, shortly lobed. Style skittle-shaped above, thickened part $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long, neck $\frac{7}{8}$ lin. long; stigma subglobose, about $\frac{1}{4}$ lin. in diam.

Mozamb. Distr. British Central Africa: Urungu; Fwambo, *Carson!*

184. **L. Pungu,** *De Wild. Études Fl. Katanga*, 175, *t.* 40, *figs.* 1–5. Branches pubescent, about $1\frac{1}{2}$ lin. in diam. 6 in. below the apex; internodes 1–$1\frac{1}{2}$ in. long. Leaves opposite or alternate, elliptic-oblong or lanceolate, rounded at the apex, cuneate into the base, 3–$4\frac{1}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, rusty-puberulous chiefly along the midrib on the lower surface, otherwise glabrous; midrib raised on both surfaces; lateral nerves about 6 on each side, prominent on the upper surface, slightly raised on the lower, very distinctly anastomosing far from the margin; petiole $2\frac{1}{2}$–3 lin. long. Umbels axillary, solitary, 15–20-flowered; peduncle $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, shortly pilose; pedicels inserted in ciliate sockets, shortly and densely rusty-pilose, $\frac{7}{8}$ lin. long; bract ovate from a cupular base, rusty-pilose outside, umbonate, ciliate, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together cupular or campanulate, $\frac{7}{8}$ lin. long, rusty-pubescent outside. Calyx $\frac{1}{3}$ lin. long, 5-toothed, ciliate; intramarginal ring $\frac{1}{16}$ lin. high. Corolla $1\frac{1}{4}$–$1\frac{1}{3}$ in. long, finely pilose outside, apical swelling slight, oblong, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long, obtusely pentagonal; tube split unilaterally about $6\frac{1}{2}$ lin. down, basal swelling globose, about 1 lin. in diam.; lobes erect, spathulate, acute, $2\frac{3}{4}$ lin. long, upper part oblong-lanceolate, $1\frac{1}{2}$ lin. long, $\frac{7}{16}$ lin. broad, hard inner layer sharply demarcated below. Filaments inserted about the base of the corolla-lobes, deflexed, $1\frac{1}{2}$ lin. long, tapering upwards, thickened towards the apex, tooth about $\frac{1}{10}$ lin. long; anthers linear-oblong, $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Disc pentagonal, stout, shortly lobed, $\frac{1}{7}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{4}$ lin. long, neck $\frac{3}{4}$–$\frac{7}{8}$ lin. long; stigma subglobose, about $\frac{1}{3}$ lin. in diam., with a minute apical depression.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 388!

185. **L. uhehensis,** *Engl. in Engl. Jahrb.* xxviii. 382. Branchlets patulous, rather stout, $1\frac{1}{2}$ lin. in diam. 6 in. below the apex, rusty-tomentellous; branches $2–2\frac{1}{2}$ lin. in diam., striate, younger parts rusty-tomentellous; internodes $\frac{3}{4}–2$ in. long. Leaves subopposite or alternate, lanceolate, acute or obtuse at the apex, obtuse at the base, $2\frac{1}{2}–4$ in. long, 10–15 lin. broad, coriaceous, glabrescent on the upper surface, more or less scurfy-pubescent on the nerves below; midrib prominent on the lower surface; lateral nerves 5-6 on each side, arcuate-ascending, anastomosing far from the margin, raised on both surfaces; petiole rusty-tomentellous, 6–10 lin. long. Umbels axillary, solitary, about 13–15-flowered; peduncle $2\frac{1}{2}–3$ lin. long, rusty-pilose, especially round the sockets of the pedicels; pedicels and bract densely rusty-pilose with branched hairs; pedicels about 2 lin. long; bract erect, arcuate-boat-shaped, $1\frac{3}{4}$ lin. long, $\frac{1}{2}–\frac{5}{8}$ lin. deep, dorsal margin $1\frac{1}{4}$ lin. long, ventral margin patulous, $\frac{1}{4}$ lin. long. Receptacle and calyx together subcampanulate, $1\frac{1}{8}$ lin. long, densely rusty-pubescent outside. Calyx $\frac{3}{8}$ lin. long, shallowly lobed, densely ciliate with branched hairs; intramarginal ring about $\frac{1}{12}$ lin. high. Corolla about $1\frac{2}{3}$ in. long, densely clothed with rusty much-branched hairs; tube split unilaterally about $6\frac{1}{2}$ lin. down, basal swelling ovoid, 2 lin. long; lobes erect, spathulate, $4\frac{1}{2}$ lin. long, upper part boat-shaped, $2\frac{1}{8}$ lin. long, $\frac{5}{8}$ lin. broad, oblong-lanceolate seen from within, hard inner layer rather sharply demarcated below. Filaments inserted at the base of the corolla-lobes, deflexed, tapering upwards, 3 lin. long, the uppermost $\frac{1}{4}$ lin. thickened and darker than the rest, tooth about $\frac{1}{8}$ lin. long; anthers linear-oblong, $1–1\frac{1}{8}$ lin. long. Disc pentagonal, very shortly lobed, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part about $3\frac{1}{4}$ lin. long, neck 1 lin. long; stigma subglobose, $\frac{3}{8}–\frac{7}{16}$ lin. in diam.

Mozamb. Distr. German East Africa: Uhehe; Uchungwe Mountains, near Dabagga, 6500 ft., *Goetze*, 641!

186. **L. villosiflorus,** *Engl. in Engl. Jahrb.* xx. 125, *as to Welwitsch*, 4890. Branchlets, petioles and inflorescence shortly rusty-villous; branchlets short, nodose, tawny or brownish, about $1\frac{1}{4}$ lin. in diam. 5 in. below the apex; branches greyish-brown, glabrous, finely and inconspicuously lenticellate, $1\frac{1}{2}–2\frac{1}{4}$ lin. in diam.; internodes $\frac{1}{4}–1\frac{1}{4}$ in. long. Leaves opposite or subopposite, lanceolate-oblong, or more rarely ovate-oblong, obtuse or rounded at the apex, cuneate into the base, $1–2\frac{3}{4}$ in. long, 4–12 lin. broad, coriaceous, glabrous or nearly so; lateral nerves 2–3 on each side, oblique, raised on the upper surface, inconspicuous on the lower; petiole 2–4 lin. long, shortly rusty-villous especially on the upper surface. Umbels axillary, solitary, about 15–18-flowered; peduncle $2\frac{1}{4}$ lin. long; pedicels $1\frac{1}{4}–1\frac{1}{2}$ lin. long; bract ovate-saucer-shaped, dorsal margin $\frac{5}{8}$ lin. long, strongly umbonate, ventral margin $\frac{1}{6}$ lin. long. Receptacle and calyx together cupular, $\frac{7}{8}$ lin. long, lower half densely pilose outside with long downwardly-directed hairs, upper half shortly pilose. Calyx $\frac{1}{6}$ lin. long, ciliate; intramarginal ring $\frac{1}{10}$ lin. high. Corolla 13–14 lin. long, sparingly villous outside; tube split unilaterally 4–5 lin. down, basal swelling ellipsoid, $1\frac{1}{2}$ lin.

long, $1\frac{1}{4}$ lin. in diam.; lobes erect, spathulate, acute, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, upper part shallowly boat-shaped, $1\frac{5}{8}$ lin. long, $\frac{7}{16}$ lin. broad, hard inner layer sharply demarcated below. Filaments inserted about the base of the corolla-lobes, deflexed, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, tapering upwards, the uppermost $\frac{1}{4}$ lin. slightly thickened, tooth $\frac{1}{10}$ lin. long; anthers oblong-linear, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, connective slightly exceeding the cells. Disc lobed, $\frac{1}{6}$–$\frac{1}{4}$ lin. high. Style skittle-shaped above, thickened part $1\frac{3}{4}$–2 lin. long, neck $\frac{5}{8}$–$\frac{3}{4}$ lin. long, slightly swollen in the middle; stigma subglobose or ellipsoid, $\frac{1}{4}$–$\frac{3}{8}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 935, partly.

Lower Guinea. Angola: Huilla; in the Monino forests, on *Ficus* sp. and other trees, *Welwitsch*, 4889! 4890!

Welwitsch, 4891 and 4892, which were quoted by Engler under *L. villosiflorus*, belong to *L. Terminaliæ*, Engl. & Gilg. The original description of *L. villosiflorus* seems to have been drawn up mainly from *Welwitsch*, 4890.

187. **L. Terminaliæ,** *Engl. & Gilg in Warb. Kunene-Samb. Exped.* 228. Branchlets rusty-tomentellous, finely striate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. 5–6 in. below the apex; branches rather stout, up to 3 lin. in diam., longitudinally wrinkled, puberulous or glabrous, lenticellate; internodes $\frac{1}{3}$–$1\frac{3}{4}$ in. long. Leaves opposite or subopposite, ovate or elliptic (the lower ones on each branchlet obovate-elliptic), obtuse or rounded at the apex, broadly cuneate into the base, $1\frac{1}{3}$–3 in. long, 1–$1\frac{3}{4}$ in. broad, coriaceous, softly pubescent or puberulous; midrib and lateral nerves more or less rusty-tomentellous or pubescent; lateral nerves 3–4 on each side, obliquely arcuate, anastomosing far from the margin, prominent on the upper surface, slightly raised on the lower; petiole 3–8 lin. long, rusty-pubescent or puberulous. Umbels axillary, solitary, 3–5-flowered; peduncle, pedicels and bract rusty-tomentellous or tomentose; peduncle $1\frac{3}{4}$–$2\frac{1}{2}$ lin. long; pedicels $1\frac{1}{2}$ lin. long; bract ovate-oblong from a saucer-shaped base, dorsal margin $1\frac{1}{2}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together shortly campanulate, constricted above the middle, $1\frac{1}{2}$ lin. long, rusty-tomentose. Calyx $\frac{1}{2}$–$\frac{3}{4}$ lin. long, lobed. Corolla orange-red or scarlet, 2 in. long or a little less, villous-tomentose outside with rusty branched hairs; tube split unilaterally 7–8 lin. down, basal swelling ellipsoid, 3–$3\frac{1}{2}$ lin. long; lobes erect, spathulate-linear, acute, 6 lin. long, upper part narrowly boat-shaped, 3 lin. long, $\frac{5}{8}$ lin. broad, oblong-lanceolate seen from within, hard inner layer sharply demarcated below. Filaments inserted above the base of the corolla-lobes, deflexed, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long, tapering upwards, tooth $\frac{1}{8}$–$\frac{1}{4}$ lin. long; anthers linear, $1\frac{3}{4}$ lin. long, connective exceeding the cells. Disc acutely 5-lobed, $\frac{1}{4}$ lin. high or more. Style skittle-shaped above, thickened part $2\frac{1}{2}$–3 lin. long, neck $1\frac{1}{2}$ lin. long; stigma ellipsoid, $\frac{1}{2}$ lin. long or more.—*L. villosiflorus*, Engl. in Engl. Jahrb. xx. 125, as to *Welwitsch*, 4891, 4892; Hiern in Cat. Afr. Pl. Welw. i. 935, partly.

Lower Guinea. Angola: Huilla; between Nene and Lopollo, on *Combretaceæ*, &c., *Welwitsch*, 4892! east of Lopollo, on *Parinarium Mobola*, Oliv., *Welwitsch*, 4891! Amboella; between Ungombekike and the Kuito River, 4000 ft., on *Terminalia* sp., *Baum*, 519!

Hiern (l.c.) suspected that *L. villosiflorus*, Engl., might consist of two distinct species, but regarded *Welwitsch*, 4891 and 4892, as *L. villosiflorus* proper, whereas Engler's description of the shape of the leaves and length of the corolla was evidently drawn up from *Welwitsch*, 4890.

188. **L. dekindtianus,** *Engl. in Engl. Jahrb.* xxxii. 129. Young branchlets fulvous-tomentose in a dried state, very nodose, $1\frac{1}{4}$–2 in. long, internodes 3–4 lin. long; branches pallid, pubescent or puberulous, eventually glabrous, nodose, $1\frac{1}{2}$ lin. in diam. 6 in. below the apex, internodes 3–10 lin. long. Leaves opposite or subopposite, ovate-oblong or elliptic-oblong, obtuse at apex and base, 10–15 lin. long, $3\frac{1}{2}$–7 lin. broad, coarsely pubescent on both surfaces, finely and indistinctly reticulate, 3-nerved at the base, the remaining lateral nerves patulous; petiole 1–$1\frac{1}{2}$ lin. long. Umbels axillary, solitary, subsessile, 1–2-flowered; peduncle, pedicels and bract villous; peduncle $\frac{3}{8}$ lin. long; pedicels $\frac{3}{8}$–$\frac{5}{8}$ lin. long; bract erect, very unilateral, very concave, elliptic in outline, dorsal margin $\frac{3}{4}$ lin. long, ventral margin spreading, $\frac{1}{8}$ lin. long. Receptacle and calyx together campanulate, wide-mouthed, $1\frac{1}{4}$ lin. long, densely villous outside. Calyx patulous, distinctly 5-lobed, $\frac{1}{2}$ lin. long, long-ciliate; lobes subdeltoid; intramarginal ring $\frac{1}{16}$–$\frac{1}{12}$ lin. high. Corolla purple, nearly $1\frac{1}{2}$ in. long, densely villous outside; tube split unilaterally about $6\frac{1}{2}$ lin. down, basal swelling subglobose, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam.; lobes erect, subspathulate-linear, 4 lin. long, $\frac{7}{16}$ lin. broad, the upper part with a hard inner layer. Filaments inserted $\frac{1}{4}$–$\frac{3}{8}$ lin. above the base of the corolla-lobes, deflexed, $2\frac{1}{4}$ lin. long, tapering upwards, the uppermost $\frac{3}{8}$ lin. thickened, darker than the rest, tooth stout, rounded, hardly $\frac{1}{8}$ lin. long; anthers oblong-linear, $1\frac{1}{8}$ lin. long. Disc $\frac{1}{4}$ lin. high, lobed to the middle. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck $1\frac{1}{4}$ lin. long, the upper half thickened into the base of the stigma; stigma ellipsoid, $\frac{7}{16}$ lin. long.

Lower Guinea. Angola: Huilla; Keputu Mountain, 5900 ft., *Dekindt*, 60!

In the key, on p. 272, line 10, *L. dekindtianus* is by mistake stated to have 1–2-flowered heads; this should be 1–2-flowered umbels.

189. **L. tambermensis,** *Engl. & Krause in Engl. Jahrb.* xliii. 402. Branchlets short, spreading or patulous, fulvous-tomentellous, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. in diam. 4 in. below the apex; branches at first pubescent, afterwards glabrous, longitudinally wrinkled, pale brown, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. in diam., inconspicuously lenticellate; internodes 4–15 lin. long. Leaves opposite or subopposite, ovate-oblong or elliptic, obtuse or rounded at the apex, obtuse or subcuneate at the base, 1–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–1 in. broad, thinly but firmly coriaceous, finely pubescent on both surfaces, the upper surface eventually more or less glabrescent, rather irregularly nerved; lateral nerves 4–5 on each side, rather oblique, slightly raised, especially on the upper surface; petiole 3–6 lin. long, densely pubescent. Umbels axillary, solitary, 3–7-flowered; peduncle, pedicels and bract densely pubescent; peduncle $1\frac{1}{2}$–4 lin. long; pedicels 2–3 lin. long; bract unilaterally developed from a flat, saucer-shaped or cupular base, elliptic or ovate in outline, very concave, dorsal margin 1–$1\frac{1}{4}$ lin. long, ventral

margin spreading or ascending, $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Receptacle and calyx together cupular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, rusty-tomentellous. Calyx $\frac{3}{8}$–$\frac{1}{2}$ lin. long, lobed; intramarginal ring $\frac{1}{8}$–$\frac{1}{6}$ lin. high. Corolla yellow, about $1\frac{1}{2}$ in. long, villous-tomentose outside; tube split unilaterally 6–$6\frac{1}{2}$ lin. down, basal swelling oblong-ovoid, $2\frac{1}{2}$–3 lin. long; lobes erect, spathulate-linear, subacute, $4\frac{3}{4}$ lin. long $\frac{3}{4}$ lin. broad, the upper part with a hard inner layer sharply demarcated below. Filaments inserted at the base of the corolla-lobes, deflexed, $2\frac{1}{2}$ lin. long, tapering upwards, thickened in the uppermost $\frac{3}{8}$ lin., tooth $\frac{1}{5}$ lin. long; anthers oblong-linear, $1\frac{1}{3}$ lin. long. Disc $\frac{1}{4}$ lin. high, 5-lobed nearly to the middle. Style skittle-shaped above, thickened part $2\frac{3}{4}$–3 lin. long, neck $1\frac{1}{4}$ lin. long; stigma ellipsoid, nearly $\frac{1}{2}$ lin. long, with a minute apical depression.

Upper Guinea. Togo: near Tamberma, 1000 ft., *Kersting*, A 502! Northern Nigeria: Yola District, on *Anogeissus leiocarpa*, Guill. & Perr., *Dalziel*, 214!

Very near *L. heteromorphus*, A. Rich., with which it may have to be united when further material comes to hand.

190. **L. heteromorphus,** *A. Rich. Tent. Fl. Abyss.* i. 340. Branchlets short, spreading or patulous, fulvous- or rusty-tomentose in a young state, afterwards pubescent; branches stout, 2–$2\frac{1}{2}$ lin. in diam. 6 in. below the apex, at first pubescent, soon becoming glabrous, longitudinally wrinkled and cracked in a dried state; internodes $\frac{1}{4}$–$2\frac{1}{2}$ in. long. Leaves opposite, ovate, ovate-oblong, elliptic-oblong or lanceolate, acute, obtuse or rounded at the apex, obtuse at the base, $1\frac{3}{4}$–$5\frac{1}{2}$ in. long, 8–17 lin. broad, coriaceous, tomentose or tomentellous in a young state, when adult coarsely pubescent or finally glabrescent; lateral nerves 4–5 on each side, raised on the upper surface, less so on the lower; petiole 3–5 lin. long. Umbels axillary, solitary, 2–9-flowered; peduncle, pedicels and bract rusty-tomentellous; peduncle 1–3 lin. long; pedicels $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; bract erect, narrowly ovate from a saucer-shaped base, concave, 1–$1\frac{1}{2}$ lin. long, ventral margin $\frac{1}{8}$–$\frac{1}{6}$ lin. long. Receptacle and calyx together cupular, slightly constricted below the apex, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, rusty-pubescent. Calyx $\frac{1}{6}$–$\frac{1}{4}$ lin. long, 5-toothed, ciliate, teeth triangular; intramarginal ring $\frac{1}{10}$–$\frac{1}{8}$ lin. high. Corolla $1\frac{3}{4}$–2 in. long, villous-tomentose outside with red multicellular little-branched hairs; tube split unilaterally about 5 lin. down, basal swelling ellipsoid or oblong-ellipsoid, 3–$3\frac{1}{4}$ lin. long; lobes erect, spathulate-linear, 5–$5\frac{1}{2}$ lin. long, the upper part with a hard inner layer sharply demarcated below. Filaments inserted at the base of the corolla-lobes, deflexed, 3 lin. long, tapering upwards, tooth $\frac{1}{8}$–$\frac{1}{4}$ lin. long; anthers linear, $1\frac{3}{8}$–$1\frac{3}{4}$ lin. long. Disc pentagonal, $\frac{1}{4}$–$\frac{1}{3}$ lin. high, slightly 5-lobed. Style skittle-shaped above, thickened part $3\frac{1}{2}$–4 lin. long, neck $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; stigma depressed-globose, $\frac{3}{8}$–$\frac{1}{2}$ lin. in diam.—Engl. in Engl. Jahrb. xx. 109; Pax in Engl. Jahrb. xxxix. 616. *L. regularis*, Schweinf. in Bull. Herb. Boiss. iv. App. ii. 148, partly.

Nile Land. Eritrea: Adi-Qomoschio, in East Dembelas, 6000 ft., *Schweinfurth*, 182! near Keren, *Beccari*, 51! Abyssinia: Tigre; Adowa, *Schimper*, 747; Semen; Jaja, *Schimper*, 406; Begemeder; valley of the River Reb, *Steudner!* Tacazze River, *Petit*, 341!

191. **L. musozensis,** *Rendle in Journ. Linn. Soc. Bot.* xxxvii. 204. Young branchlets shortly tomentose; branches greyish, inconspicuously lenticellate; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves subopposite, broadly ovate, obtuse or rounded at the apex, rounded or subtruncate at the base, $1\frac{3}{4}$–3 in. long, $1\frac{1}{4}$–2 in. broad, coriaceous, rather thick, coarsely pubescent with branched hairs on both surfaces, penninerved; lateral nerves slightly raised on both surfaces; petiole 5–6 lin. long. Umbels axillary, solitary, about 16-flowered; peduncle, pedicels and bract densely rusty-pubescent; peduncle shortly clavate, 2–$2\frac{3}{4}$ lin. long; pedicels $1\frac{1}{2}$–2 lin. long; bract ovate from a flat or slightly saucer-shaped base, dorsal margin $\frac{7}{8}$ lin. long, ventral margin $\frac{1}{5}$–$\frac{1}{4}$ lin. long. Receptacle and calyx together shortly campanulate, $1\frac{1}{4}$ lin. long, rusty-tomentose. Calyx $\frac{3}{8}$ lin. long, shortly toothed; intramarginal ring $\frac{1}{6}$ lin. high. Corolla $1\frac{3}{4}$ in. long, villous-tomentose outside with shortly branched hairs; tube split unilaterally about $7\frac{1}{2}$ lin. down, basal swelling ellipsoid, $2\frac{1}{2}$ lin. long; lobes erect, subspathulate-linear, $4\frac{1}{2}$ lin. long, the upper part boat-shaped, $2\frac{1}{2}$ lin. long, $\frac{5}{8}$ lin. broad, $\frac{7}{16}$ lin. deep, oblong-lanceolate seen from within, hard inner layer sharply demarcated below. Filaments inserted about the base of the corolla-lobes, deflexed, $2\frac{1}{4}$ lin. long, slightly tapering upwards, thickened in the uppermost $\frac{1}{3}$ lin., tooth $\frac{1}{6}$ lin. long; anthers linear, $1\frac{5}{8}$–$1\frac{3}{4}$ lin. long. Disc pentagonal, stout, $\frac{1}{4}$ lin. high, hardly lobed. Style skittle-shaped above, thickened part about $2\frac{3}{4}$ lin. long, neck $1\frac{5}{8}$ lin. long; stigma subglobose, $\frac{1}{3}$ lin. in diam.

Nile Land. Uganda: Musozi, on the bark-cloth fig, *Bagshawe,* 134!

Very closely allied to *L. heteromorphus*, A. Rich.

192. **L. gabonensis,** *Engl. in Engl. Jahrb.* xx. 127, *t.* 3, *fig. E.* Branchlets slender, glabrous, drying blackish, internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves opposite, lanceolate, obtuse or rounded at the apex, obtuse at the base, $2\frac{1}{2}$–4 in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glossy, very finely wrinkled and dark brown in a dried state; lateral nerves indistinct; petiole 4–5 lin. long, narrowly winged. Umbels axillary, ternate, about 6-flowered; peduncle 2 lin. long; pedicels 3–$3\frac{1}{2}$ lin. long; bract ovate from a saucer-shaped base, acute or narrowly truncate, minutely ciliolate, dorsal margin $\frac{3}{4}$ lin. long, strongly umbonate on the lower part, ventral margin patulous, $\frac{1}{6}$ lin. long. Receptacle $\frac{3}{4}$ lin. long. Calyx ascending, truncate, ciliolate, $\frac{1}{2}$ lin. long. Corolla over $1\frac{3}{4}$ in. long, truncate in bud; tube about $11\frac{1}{2}$ lin. long, the lowermost 3 lin. slightly swollen; lobes $10\frac{3}{4}$ lin. long, subspathulate above, thickened and shoulder-shaped at the apex. Filaments inserted $1\frac{1}{4}$ lin. above the base of the corolla-lobes, $8\frac{1}{4}$ lin. long, flattened, slightly tapering upwards, glabrous, tooth subulate, $\frac{1}{2}$ lin. long; anthers oblong, 1 lin. long, about $\frac{1}{3}$ lin. broad, emarginate at the apex. Disc annular, hardly lobed, $\frac{1}{6}$ lin. high.—*Stephaniscus gabonensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 261.

Lower Guinea. Gaboon: Munda District; Sibange Farm, *Soyaux,* 305!

Tessmann, 736, from the Bebar District, Spanish Guinea, probably belongs to *L. gabonensis*. It has larger, less coriaceous leaves than the type, and the lateral nerves are more distinct.

L. Lecomtei, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 132 (*Stephaniscus Lecomtei*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 261; Bull. Mus. Hist. Nat. Par. i. 165), from Cape Lopez, is allied to *L. gabonensis*, according to Van Tieghem. It is said to differ from *L. gabonensis* in having longer peduncles and flowers one-third shorter. I have not seen a specimen.

193. **L. micrantherus,** *Engl. in Comptes-rendus Soc. Bot. Belg.* xxxix. 28. Branchlets slender, glabrous, finely striate, drying brown, internodes 1½–3 in. long. Leaves opposite, ovate or ovate-oblong, acuminate to the acute or obtuse apex, rounded or obtuse at the base, 3½–5 in. long, 1½–2 in. broad, thinly coriaceous, glabrous, dull, not wrinkled; lateral nerves distinct on both surfaces; petiole 1½–5 lin. long. Umbels axillary, ternate, 5–8-flowered; peduncle 1½–2 lin. long; pedicels 2½–4 lin. long; bract elliptic from a saucer-shaped base, strongly umbonate, dorsal margin ⅝ lin. long, ventral margin patulous, ⅙ lin. long. Receptacle ¾ lin. long. Calyx suberect, ⅜–½ lin. long. Corolla yellow and red, hardly 1¾ in. long, truncate in bud; tube about 11½ lin. long, the lowermost 2–2½ lin. slightly swollen; lobes 9 lin. long, subspathulate above, thickened and shoulder-shaped at the apex. Filaments inserted about 1 lin. above the insertion of the corolla-lobes, 6½–6¾ lin. long, tooth ⅜–½ lin. long; anthers narrowly oblong, ¾–⅞ lin. long. Disc ¼ lin. high or less, slightly lobed.—*L. Tessmannii*, Engl. & Krause in Engl. Jahrb. xliii. 405.

Lower Guinea. Spanish Guinea: Fang District; near Bianemajong, 1500 ft., *Tessmann*, B 98! Lower Congo: Cataracts District; near Ngo-Muila and on the banks of the Mangola River, *Dupuis!*

Mann, 889, from the Bagru River, Sierra Leone, probably belongs to *L. micrantherus*, but further material is required for confirmation.

194. **L. pariflorus,** *Engl. in Engl. Jahrb.* xx. 127. Branchlets slender, finely striate, glabrous, internodes ¾–2 in. long. Leaves opposite, lanceolate or oblong-lanceolate, subacute at the apex, cuneate into the base, 2½–4½ in. long, ⅔–1½ in. broad, thinly coriaceous, glabrous, drying brown, dull; lateral nerves 5–6 on each side, arcuate, anastomosing far from the margin; petiole 3–5 lin. long. Umbels ternate, about 12-flowered; peduncle 7–10 lin. long; pedicels 2½–3 lin. long; bract shortly ovate-cupular, ciliate, dorsal margin ½ lin. long, slightly umbonate below, ventral margin ⅛–⅙ lin. long. Receptacle ½–⅝ lin. long. Calyx slightly and irregularly lobed, ciliate, ¼ lin. long. Corolla 9–9½ lin. long, tetragonal in bud; tube 3½ lin. long, split unilaterally, with a narrow line of papillæ running down from each sinus; lobes spathulate-linear, 5½–6 lin. long, upper enlarged part boat-shaped, 1⅛ lin. long, ⅜ lin. broad, oblong-oblanceolate seen from within. Filaments inserted at the base of the corolla-lobes, 4½ lin. long, slightly tapering upwards, tooth ¼ lin. long; anthers narrowly oblong, ⅞ lin. long, ¼–⅓ lin. broad. Disc annular, not lobed, ⅛ lin. high.—*Ischnanthus pariflorus*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Upper Guinea. French Guinea: between Timbo and Taroenna, *Chevalier*, 12322! Sierra Leone: Bagru River, *Mann*, 823!

195. **L. luluensis,** *Engl. in Engl. Jahrb.* xx. 128, *t.* 3, *fig. F.* Glabrous. Internodes about 2 in. long. Leaves oblong, apparently acuminate to the apex, obtuse at the base, about 4 in. long and 2 in. broad, coriaceous, dull; lateral nerves 3–4 on each side, spreading, anastomosing far from the margin; petiole 3–5 lin. long. Umbels 12–19-flowered; peduncle 8–10 lin. long; pedicels $3\frac{1}{2}$–4 lin. long; bract ovate-cupular, truncate or retuse, very slightly umbonate on the lower half, dorsal margin nearly $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Calyx cupular, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, irregularly 4-lobed; intramarginal ring small. Corolla about $9\frac{1}{2}$ lin. long, red, broadened in the lower third, upper quarter clavate in bud; lobes subspathulate-linear. Filaments 5 lin. long, tapering upwards, tooth $\frac{3}{8}$ lin. long; anthers oblong-linear, $1\frac{1}{4}$–$1\frac{3}{8}$ lin. long; connective rounded or subtruncate, produced $\frac{1}{8}$ lin. above the cells. Disc tetragonal, hardly lobed, $\frac{1}{8}$ lin. high.—*Ischnanthus luluensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

South Central. Belgian Congo: Lulua River, *Pogge,* 1404!

196. **L. Lecardii,** *Engl. in Engl. Jahrb.* xx. 128. Branchlets slender, glabrous, blackish in a young state, pallid in the adult state; internodes 1–$1\frac{1}{2}$ in. long. Leaves opposite, elliptic-lanceolate or elliptic, obtuse or rounded at the apex, often apiculate, cuneate into the base, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, 7–11 lin. broad, thinly coriaceous, glabrous; lateral nerves oblique, slightly raised on both surfaces; petiole $1\frac{1}{2}$–2 lin. long. Umbels 5–9-flowered; peduncle 4–5 lin. long; pedicels $1\frac{1}{2}$–2 lin. long; bract narrowly ovate from a saucer-shaped base, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{8}$ lin. long. Receptacle $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Calyx truncate, $\frac{1}{8}$ lin. long. Corolla 1 in. long, tetragonal in bud, slightly enlarged above and below, angles ribbed, formed by the midribs of the corolla-leaves; lobes broadly V-shaped in transverse section. Filaments inserted $3\frac{3}{4}$ lin. above the base of the corolla, linear, 5 lin. long, grooved, much thickened at the base, produced $\frac{1}{6}$ lin. above the insertion of the tooth, tooth slightly bifid, over $\frac{3}{8}$ lin. long; anthers linear, 3 lin. long; connective rounded, produced beyond the cells. Disc $\frac{1}{4}$ lin. high, circular, not lobed.—*Ischnanthus Lecardii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Upper Guinea. Senegambia, Lécard, 180! 193!

In *L. Lecardii* the angles of the bud correspond to the midribs of the corolla-leaves; in the other species belonging to section *Ischnanthus* the angles correspond to the lines of junction of the corolla-leaves.

197. **L. heckmannianus,** *Engl. in Engl. Jahrb.* xxviii. 384. Young parts densely pilose; adult branchlets nodose, greyish, puberulous or eventually glabrous; flowering branchlets axillary, short, leafy, perulate at the base. Leaves opposite, oblong or oblong-ovate, rather obtuse at the apex, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–1 in. broad, margin somewhat undulate, midrib prominent on the lower surface only; petiole $\frac{3}{4}$ lin. long; leaves of the flowering branchlets subsessile, 3–8 lin. long, 3–$3\frac{1}{2}$ lin. broad, pilose on both surfaces, the lowermost smallest, suborbicular,

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1911.

the middle ones elliptic, obtuse, the uppermost ones largest, ovate-oblong, acute. Umbels axillary, solitary, 2–3-flowered; peduncle pilose, $\frac{3}{4}$ lin. long; pedicels pilose, $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bract equalling the receptacle and calyx, broadly ovate-cupular, pilose outside, ciliate, dorsal margin 1 lin. long, erect, not umbonate, ventral margin hardly $\frac{1}{8}$ lin. long. Receptacle about $\frac{3}{4}$ lin. long. Calyx truncate, long-ciliate, $\frac{1}{6}$–$\frac{1}{5}$ lin. long. Corolla yellow, tinged with red towards the apex, $1\frac{1}{4}$ in. long, tetragonal in bud, subacute, narrowly 4-winged, wings ciliate; tube about 3 lin. long; lobes about 1 in. long, linear, acute. Filaments over 6 lin. long in bud, much flattened, expanded at the place of insertion into a circular disc with free papillate margins, tooth $\frac{1}{6}$ lin. long; anthers linear, 5 lin. long, $\frac{1}{3}$ lin. broad, emarginate, the lobes exceeding the connective. Disc $\frac{1}{4}$ lin. high, glandular-papillate.

Mozamb. Distr. German East Africa: Uhehe; hilly laterite plateau at Mbigiri, 4300 ft., *Goetze*, 509!

A very distinct species, characterised by the short flowering shoots, perulate at the base, and the ciliate angles of the corolla in bud.

198. **L. triplinervius,** *Baker & Sprague.* Branchlets slender, glabrous, densely lenticellate, purplish-brown or pallid. Leaves opposite, subsessile or shortly petioled, lanceolate or elliptic-lanceolate, straight or subarcuate, very obtuse or subacute at the apex, cuneate at the base, $1\frac{1}{4}$-$1\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, chartaceous, glabrous, distinctly 3-nerved from shortly above the base; petiole 1 lin. long or less, glabrous. Umbels solitary, 4–6-flowered; peduncle $\frac{3}{4}$–1 lin. long, glabrous; pedicels $1\frac{1}{2}$ lin. long, glabrous; bract elliptic-cupular, ciliate, glabrous outside, dorsal margin $\frac{5}{8}$ lin. long, umbonate on the lower half, ventral margin $\frac{1}{8}$–$\frac{1}{6}$ lin long. Receptacle nearly $\frac{1}{2}$ lin. long. Calyx subtruncate, ciliate, $\frac{1}{6}$ lin. long. Corolla pale green, under $\frac{1}{2}$ in. long, tetragonal in bud; tube $1\frac{1}{2}$ lin. long; lobes linear, broadened upwards, $3\frac{1}{2}$ lin. long. Filaments inserted at the base of the corolla-lobes, just over 2 lin. long, linear, tooth $\frac{1}{16}$–$\frac{1}{12}$ lin. long; anthers linear, $1\frac{3}{8}$ lin. long. Disc slightly and obtusely 4-lobed, $\frac{1}{5}$ lin. high.—*L. Holstii*, Engl. Pfl. Ost-Afr. C. 167, partly, not of Engl. Jahrb. xx. 126.

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Kirk! Holtz*, 553! *Stuhlmann*, 7614! 7666! 7667! 7673! 7790!

199. **L. Holstii,** *Engl. in Engl. Jahrb.* xx. 126. Young branchlets and petioles rusty-pilose with spreading hairs. Leaves opposite, lanceolate or ovate, acuminate, acute at the apex, obtuse, rounded or subcordate at the base, $1\frac{1}{4}$–2 in. long, $\frac{1}{2}$–$\frac{5}{6}$ in. broad, chartaceous, blade glabrous except the midrib, which is rusty-pilose on the lower surface, at least in a young state, penninerved, margin crispate; lateral nerves patulous, slightly raised on both surfaces; petiole 2–$4\frac{1}{2}$ lin. long, rusty-pilose. Umbels solitary, 12–26-flowered; peduncle $2\frac{1}{2}$–4 lin. long, rusty-pilose; pedicels $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, shortly pilose or very minutely and sparingly papillate; bract ovate-cupular or lanceolate-cupular, with or without a distinct ventral lobe, densely or sparingly pilose outside, thickly keeled, or conspicuously umbonate on the lower half, dorsal margin $\frac{1}{2}$–1 lin. long,

ventral margin $\frac{1}{6}$–$\frac{3}{8}$ lin. long. Receptacle $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Calyx ascending, $\frac{3}{8}$–$1\frac{1}{8}$ lin. long, shortly or deeply lobed. Corolla $10\frac{1}{2}$–$11\frac{1}{2}$ lin. long, tetragonal in bud, obtuse, with a distinct swelling $2\frac{1}{2}$–3 lin. above the base, slightly enlarged above; tube $2\frac{1}{2}$ lin. long, split unilaterally about $1\frac{1}{2}$ lin. down, with a dense band of papillæ below each sinus; lobes linear, slightly broadened upwards, $8\frac{1}{2}$–9 lin. long, reflexed above the middle. Filaments inserted at the base of the corolla-lobes, 6–7 lin. long, tapering upwards, grooved towards the base, glabrous, tooth $\frac{1}{20}$–$\frac{1}{12}$ lin. long; anthers linear, $1\frac{5}{8}$ lin. long. Disc acutely lobed, $\frac{1}{4}$–$\frac{1}{2}$ lin. high, minutely and densely papillate.—Engl. Pfl. Ost-Afr. C. t. 15, figs. A–D. *L. crispulomarginatus*, Engl. in Engl. Jahrb. xl. 529. *Englerina Holstii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 257.

Mozamb. Distr. German East Africa: Usambara; Mlalo, 4800 ft., *Holst*, 325! 2424! Kwai, *Eick*, 128! 398! *Albers*, 182! Wilhelmstal, 4300 ft., *Keudel in Herb. Amani*, 616 II.! Wuga, *Engler*, 1126! Kwa Mshusa, 5000 ft., *Holst*, 8934!

200. **L. ramulosus,** *Sprague*. Much branched, branchlets short, minutely puberulous in a young state, afterwards glabrous. Leaves opposite, suborbicular, elliptic, elliptic-oblong or lanceolate, obtuse or subacute at the apex, obtuse or rounded at the base, 3–12 lin. long, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. broad, thinly coriaceous, glabrous; lateral nerves very oblique, 2–3 on each side; petiole $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Umbels solitary, 4-flowered; peduncle 1–$1\frac{1}{4}$ lin. long, glabrous except at the apex; pedicels 1–$1\frac{1}{4}$ lin. long, tetragonal, glabrous, inserted in shallow ciliate sockets. Bract equalling the receptacle and calyx, narrowly ovate-cupular, ciliate, sparingly pilose outside, dorsal margin $\frac{3}{4}$ lin. long, ventral margin $\frac{1}{5}$ lin. long. Receptacle $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Calyx subtruncate, ciliate, $\frac{1}{8}$–$\frac{1}{6}$ lin. long. Corolla 10–$10\frac{1}{2}$ lin. long, tetragonal in bud; tube oblong, $2\frac{1}{8}$ lin. long, not split unilaterally, with a thin line of papillæ running down from each sinus; lobes $8\frac{1}{4}$ lin. long, linear, broadened upwards, reflexed less than $\frac{1}{3}$ of the way up. Filaments inserted at the base of the corolla-lobes, 4–$4\frac{1}{4}$ lin. long, tapering upwards, much broadened into the base, slightly grooved below, minutely papillate at the base, tooth subulate, $\frac{3}{8}$–$\frac{1}{2}$ lin. long; anthers linear, 3–$3\frac{1}{2}$ lin. long. Disc slightly 4-lobed, $\frac{1}{6}$ lin. high.

Nile Land. British East Africa: between Mombasa and Takaunga, *Whyte!* between Mombasa and Lamu, *Whyte!*

201. **L. kagehensis,** *Engl. in Engl. Jahrb.* xx. 129, *t.* 3, *fig. G.* Branchlets very slender, young ones minutely puberulous. Leaves opposite, elliptic-lanceolate, acute or subacute at the apex, cuneate or obtuse at the base, 1–$1\frac{1}{4}$ in. long, $4\frac{1}{2}$–7 lin. broad, chartaceous, midrib minutely puberulous on the lower surface in a young state, blade otherwise glabrous, nervation pinnate; petiole 1–$1\frac{1}{2}$ lin. long, minutely puberulous. Umbels solitary, axillary or terminating abbreviated axillary shoots, 4-flowered; peduncle $\frac{3}{4}$–$1\frac{1}{2}$ lin. long, minutely and sparingly puberulous; pedicels 2 lin. long, similarly puberulous; bract shortly and irregularly ovate-cupular, ciliate, minutely puberulous outside, dorsal margin $\frac{3}{8}$ lin. long, ventral margin $\frac{1}{12}$–$\frac{1}{8}$ lin. long. Receptacle $\frac{5}{8}$ lin. long. Calyx $\frac{1}{8}$–$\frac{1}{6}$ lin. long, subtruncate or slightly lobed, ciliate. Corolla

under 1 in. long, tetragonal in bud; tube oblong-ellipsoid, $2\frac{3}{8}$ lin. long, with a narrow line of papillæ running down $\frac{3}{4}$ lin. from each sinus; lobes $8\frac{1}{2}$ lin. long, linear, slightly broadened upwards, much broadened into the base. Filaments inserted at the base of the corolla-lobes, about 6 lin. long, tapering upwards, grooved below, minutely papillate at the base, tooth subacute, $\frac{1}{8}$–$\frac{1}{4}$ lin. long; anthers linear, $1\frac{7}{8}$ lin. long. Disc $\frac{1}{4}$ lin. high.—Pfl. Ost-Afr. C. 167. *Ischnanthus kagehensis*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Mozamb. Distr. German East Africa: Kagehi, on Lake Victoria Nyanza, *Fischer*, 537! Unyamwezi; Urambo, *Hannington!* Mpapua District; west of Irangi, *Stuhlmann*, 4227!

202. **L. schubotzianus,** *Engl. & Krause in Engl. Jahrb.* xliii. 311. Young branchlets puberulous with rusty hairs, soon becoming glabrous, striate, $1\frac{1}{4}$ lin. in diam. 9 in. below the apex; internodes $1\frac{1}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite, lanceolate or linear-lanceolate, acuminate to the very acute apex, cuneate into the base, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, $\frac{1}{4}$–1 in. broad, thinly coriaceous, glabrous, dark brown in a dried state; lateral nerves 3–4 on each side, very oblique, running subparallel to the midrib, raised on both surfaces; petiole about $1\frac{1}{2}$ lin. long. Umbels solitary, 4–5-flowered; peduncle $1\frac{1}{2}$–2 lin. long; pedicels $2\frac{1}{2}$–3 lin. long; bract obliquely cupular, slightly umbonate, dorsal margin 1–$1\frac{1}{2}$ lin. long, ventral margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Receptacle $1\frac{1}{4}$ lin. long. Calyx cylindric, $1\frac{1}{2}$ lin. long, slightly lobed, ciliate. Corolla orange-coloured, over 1 in. long; tube about 6 lin. long, glandular within; lobes spreading or slightly reflexed, lanceolate-linear, acute, 7 lin. long. Filaments inserted 1 lin. above the base of the corolla-lobes, $3\frac{1}{2}$ lin. long, tapering upwards, tooth $\frac{3}{8}$ lin. long; anthers linear, 2 lin. long. Disc $\frac{1}{3}$–$\frac{3}{8}$ lin. long, shortly lobed.

Mozamb. Distr. German East Africa: Ruanda District; Kissenye, near Bugoye, 7600 ft., *Mildbraed*, 1436!

203. **L. woodfordioides,** *Schweinf. in Hoehnel, Disc. Lakes Rud. Stef.* ii. 355. Young branchlets slender, about 1 lin. in diam. 1 ft. below the apex, glabrous, finely lenticellate. Leaves opposite, lanceolate or linear-lanceolate, acuminate to the subacute apex, obtuse or rounded at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $2\frac{1}{2}$–7 lin. broad, thinly coriaceous, minutely and sparingly puberulous on the upper surface in a young state, soon becoming glabrous, margin not crispate; lateral nerves very oblique, running nearly parallel to the midrib; petiole $1\frac{1}{2}$–4 lin. long, not winged. Umbels solitary, 4–5-flowered or more; peduncle $\frac{1}{2}$–$1\frac{1}{2}$ lin. long; pedicels $1\frac{3}{4}$–2 lin. long; bract elliptic-cupular, truncate or rounded, broadly umbonate, umbo much flattened, horned above or not, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{6}$–$\frac{1}{5}$ lin. long. Receptacle $\frac{5}{8}$ lin. long. Calyx patulous or spreading, $\frac{1}{6}$–$\frac{1}{4}$ lin. long, irregularly lobed; intramarginal ring present. Corolla about $11\frac{1}{2}$ lin. long, lower part much inflated, silvery grey, upper part narrower, clavate in bud, dark red; tube 5–$5\frac{1}{2}$ lin. long, glandular inside, split unilaterally nearly to the base; lobes reflexed, narrowly spathulate, much broadened into the base, $6\frac{1}{2}$ lin. long, apical enlargement $1\frac{1}{2}$ lin. long, nearly $\frac{3}{4}$ lin. broad. Filaments inserted 1 lin. above

the base of the corolla-lobes, tapering upwards, 4 lin. long, tooth subulate, ½ lin. long; anthers narrowly oblong, 1⅛ lin. long, connective hardly produced above the cells. Disc ⅜–½ lin. high.—Engl. in Engl. Jahrb. xx. 126. *L. Ruspolii*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 132, name only. *Ischnanthus woodfordioides*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Nile Land. Somaliland: Galla Highlands; between Biddume and Alyke, *Riva*, 1212! Sidamo, *Ellenbeck*, 1733! 1772! 1773! Uganda: Lamuru, *Scheffler*, 298! first and second day's marches from Nandi, *Whyte!* Nandi, *Scott-Elliot*, 7046! British East Africa, *Elliott!* Guasso Narok, 6500 ft., *von Hoehnel*, 39!

The umbels on Whyte's, Elliott's, and Scott-Elliot's specimens are about 10-flowered. The above description is mainly from Scheffler's specimen.

204. **L. Ehlersii,** *Schweinf. in Hoehnel, Disc. Lakes Rud. Stef.* ii. 355. Young branchlets glabrous, adult ones conspicuously lenticellate. Leaves opposite, ovate, acuminate or lanceolate, obtuse or subacute at the apex, rounded or subcordate at the base, 1¾–4 in. long, ⅔–2 in. broad, thinly coriaceous, glabrous, margin crispate; lateral nerves oblique, 4–5 on each side; petiole 2–11 lin. long, narrowly winged, wing crispate. Umbels solitary, 12-flowered or more; peduncle 2–2½ lin. long; pedicels 1⅜–1¾ lin. long, glabrous; bract elliptic-cupular, dorsal margin ⅝ lin. long, umbonate, umbo horned at the apex or not, ventral margin ⅛–⅙ lin. long. Receptacle ½ lin. long. Calyx ascending, ½–⅝ lin. long, irregularly 2–4-lobed, incisions about ¼ lin. deep. Corolla crimson, tetragonal in bud, clavate above, 9 lin. long; tube 3½–3¾ lin. long, split unilaterally; lobes 5½–6 lin. long, spathulate, broadened into the base. Filaments inserted ⅝–¾ lin. above the base of the corolla-lobes, 3½–3¾ lin. long, tooth subulate, ½ lin. long; anthers oblong, ⅞ lin. long, ⅜ lin. broad. Disc more or less lobed, ⅕–¼ lin. high. Stigma ⅜ lin. in diam.—Engl. in Engl. Jahrb. xx. 126. *Ischnanthus Ehlersii*, Van Tiegh. in Bull. Soc. Bot. France, xlii. 260.

Mozamb. Distr. German East Africa: Kilimanjaro; at 4500 ft., *Johnston*, 189! at Marangu, 5000 ft., *Volkens*, 262! 1421! southern slopes, at 6500 ft., *von Hoehnel!*

205. **L. lukwangulensis,** *Engl. in Engl. Jahrb.* xxviii. 383. Young branchlets rusty-pilose, quickly becoming glabrous. Branches 1½ lin. in diam. 1 ft. below the apex, rather coarsely and densely lenticellate; internodes ¾–1¼ in. long. Leaves opposite, ovate-lanceolate, long-acuminate, subacute, obtuse at the base, 1¼–2¾ in. long, ½–1¼ in. broad, coriaceous, finely reticulate on both surfaces, margin finely crispate; lateral nerves 2–3 on each side, rather obliquely arcuate; petiole 1–2 lin. long, slightly winged. Umbels solitary, about 7-flowered, sparingly rusty-puberulous in a young state; peduncle 1½–1¾ lin. long; pedicels 2½–3 lin. long at the time of fruiting; bract ovate-cupular, 1¼ lin. long. Fully developed flowers not known. Berries obovoid, 3½ lin. long, 2½ lin. in diam., bright red.

Mozamb. Distr. German East Africa: Uluguru; Lukwangule Plateau, 8000 ft., on species of *Lobelia*, &c., *Goetze*, 301!

L. lukwangulensis was founded on incomplete material, fully developed flowers not being known; it is apparently near *L. Ehlersii*, Schweinf.

206. **L. muerensis,** *Engl. in Engl. Jahrb.* xl. 529. Young branchlets rusty-tomentellous, soon becoming glabrous. Branches rugose, rather densely lenticellate, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. in diam. 1 ft. below the apex. Leaves opposite, lanceolate or ovate-lanceolate, acuminate to the obtuse apex, obtuse at the base, 2–$3\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, coriaceous, nearly glabrous, nerves raised on both surfaces, midrib puberulous on the lower surface; lateral nerves 4–5 on each side, obliquely arcuate, anastomosing not very far from the margin; petiole 2–3 lin. long, puberulous. Umbels solitary, 6–9-flowered; peduncle, pedicels and bract rusty-tomentellous; peduncle stout, 1–$1\frac{1}{2}$ lin. long; pedicels $1\frac{1}{2}$–2 lin. long; bract obliquely cupular, ciliolate, distinctly umbonate on the lower half, dorsal margin $\frac{3}{4}$ lin. long, ventral margin over $\frac{3}{8}$ lin. long. Receptacle $\frac{3}{4}$–$\frac{7}{8}$ lin. long, slightly constricted at the apex. Calyx cupular, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, subtruncate, irregularly split, ciliate. Corolla 1–$1\frac{1}{4}$ in. long, quadrangular in the lower two-thirds and clavate above in bud, angles ciliolate; tube $6\frac{1}{2}$–7 lin. long, very slightly inflated in the lower half, glandular within, split unilaterally below the middle; lobes erect, narrowly spathulate, $6\frac{1}{2}$–7 lin. long, slightly broadened into the base, apical enlargement 2 lin. long, $\frac{3}{4}$ lin. broad. Filaments inserted about $\frac{3}{4}$ lin. above the base of the corolla-lobes, tapering slightly upwards, 4 lin. long, tooth subulate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long; anthers narrowly oblong, $1\frac{1}{2}$ lin. long, bicuspidate at the apex. Disc $\frac{3}{8}$–$\frac{1}{2}$ lin. high, lobes broadly subulate, longer than the tube.

Mozamb. Distr. German East Africa: Lindi District; Muera Plateau, about 2000 ft., *Busse*, 2868!

Braun, 1165, from Cheminda Bakary-Rondo, quoted by Engler under *L. muerensis*, seems distinct.

207. **L. tenuifolius,** *Engl. in Engl. Jahrb.* xxx. 302. Branchlets patent or patulous, sparingly puberulous. Branches slender, under 1 lin. in diam. 1 ft. below the apex; internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Leaves lanceolate or elliptic-lanceolate, shortly acuminate to the obtuse apex, cuneate or obtuse at the base, $1\frac{1}{4}$–2 in. long, 5–7 lin. broad, thinly papery, glabrous, pale green; lateral nerves about 4 on each side, slightly raised on both surfaces, the lower ones oblique, the upper ones patulous; petiole 1–$2\frac{1}{2}$ lin. long. Umbels solitary, 3–6-flowered; peduncle 1–$1\frac{1}{2}$ lin. long; pedicels 2–$2\frac{1}{2}$ lin. long; bract ovate-cupular, hardly $\frac{1}{2}$ lin. long. Receptacle $\frac{1}{2}$ lin. long. Calyx spreading, $\frac{1}{6}$ lin. long. Corolla about $1\frac{1}{4}$ in. long; tube $6\frac{1}{2}$–7 lin. long, inflated, dark blue-violet, glandular within; lobes erect, linear-spathulate, broadened into the base, subacute, $8\frac{1}{2}$–9 lin. long, dark red, apical enlargement 2–$2\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad. Filaments inserted about $\frac{3}{4}$ lin. above the base of the corolla-lobes, $5\frac{1}{2}$ lin. long, tapering upwards, tooth $\frac{5}{8}$ lin. long; anthers oblong-linear, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long, truncate. Disc $\frac{3}{8}$ lin. high, shortly lobed, lobes half as long as the tube.

Mozamb. Distr. German East Africa: Langenburg District; Livingstone Range, in ravines on Yawiri Mountain, about 5600 ft., *Goetze*, 1194! British

Central Africa: Nyasaland; near Mount Masisi, 4000 ft., *McClounie*, 127! (peduncle and pedicels stouter than in the type).

208. **L. inæquilaterus,** *Engl. in Engl. Jahrb.* xxviii. 384. Young branchlets rusty-pilose, patulous. Branches tawny, rather densely lenticellate, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes $1\frac{1}{4}$–$2\frac{1}{4}$ in. long. Leaves ovate to lanceolate, caudate-acuminate to the acute or obtuse apex, obtuse or cuneate and more or less unequal at the base, $1\frac{3}{4}$–6 in. long, 1–$1\frac{3}{4}$ in. broad, chartaceous or thinly coriaceous, glabrous; lateral nerves 4–6 on each side, slightly raised on both surfaces, patulous or rather oblique, anastomosing far from the margin; petiole 2–3 lin. long. Umbels solitary, several- or many-flowered; peduncle $\frac{1}{2}$–1 lin. long; pedicels 3–4 lin. long; bract obliquely cupular, $\frac{3}{4}$ lin. long. Receptacle $\frac{5}{8}$ lin. long. Calyx ascending, $\frac{3}{8}$ lin. long, irregularly lobed. Corolla about $1\frac{1}{4}$ in. long, dirty red; tube 4–$5\frac{1}{2}$ lin. long, inflated, glandular within, split unilaterally below the middle; lobes reflexed, spathulate-linear, subacute, broadened into the base, 9–10 lin. long. Filaments inserted $1\frac{1}{2}$ lin. above the base of the corolla-lobes, $6\frac{1}{2}$ lin. long, tapering upwards, tooth $\frac{5}{8}$ lin. long; anthers linear, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long; connective produced beyond the cells, rounded. Disc $\frac{5}{8}$ lin. high, lobes about as long as the tube.

Mozamb. Distr. German East Africa: Mrogoro District; Uluguru Mountains, Rubwe, 3600 ft., *Stuhlmann*, 9043! Kibungo, 4600 ft., *Stuhlmann*, 8909! Nghweme, 5300 ft., *Stuhlmann*, 8815! Kifuru, 5000 ft., *Stuhlmann*, 9070! 9074! British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte!*

209. **L. Swynnertonii,** *Sprague.* Branchlets glabrous from an early stage, brown, longitudinally wrinkled in a dried state, about $1\frac{1}{2}$ lin. in diam. 6 in. below the apex; branches greyish-brown, lenticellate, the lenticels extending to form small transverse cracks; internodes of the branchlets $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Leaves opposite, ovate, acuminate to the acute apex, obtuse or rounded at the base, $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous, dull; margin of young leaves slightly crinkled in a dried state; nerves slightly raised on both surfaces; lateral nerves 4–6 on each side, oblique or patulous; petiole 3–4 lin. long. Umbels axillary, solitary, 8–13-flowered; peduncle $1\frac{1}{2}$–5 lin. long; pedicels 3–4 lin. long; bract shortly ovate or oblong from a saucer-shaped base, rounded or emarginate, ciliolate, broadly umbonate, dorsal margin $\frac{3}{4}$ lin. long, ventral margin hardly $\frac{1}{4}$ lin. long. Receptacle $\frac{3}{4}$ lin. long. Calyx ascending, $\frac{5}{8}$ lin. long, slightly lobed, sparingly ciliolate. Corolla 10 lin. long; tube slightly constricted above an oblong-ellipsoid basal portion which is 2–$2\frac{1}{4}$ lin. long, split unilaterally above; lobes slightly reflexed, $5\frac{1}{2}$ lin. long, tapering from the base to the middle, slightly enlarged in a spathulate manner above the middle, $\frac{5}{8}$ lin. broad at the base, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad in the upper part, commonly cohering above in pairs. Stamens inserted about $\frac{1}{2}$ lin. above the base of the corolla-lobes; adnate part of the filament very densely glandular for the lower two-thirds, free part tapering upwards, $2\frac{1}{2}$–3 lin. long to the insertion of the tooth, produced $\frac{1}{4}$ lin. above it, tooth narrowly triangular, acute, $\frac{1}{4}$–$\frac{3}{8}$ lin. long;

anthers oblong-linear, 1–1½ lin. long, minutely bicuspidate at the apex Disc ¼ lin. high, shortly lobed. Berry narrowly obovoid, 2½–3 lin. long.

Mozamb. Distr. Portuguese East Africa: Gazaland; Chirinda, on *Vernonia podocoma*, Sch. Bip., *Swynnerton*, 141!

210. **L. Adolfi-Friderici,** *Engl. & Krause in Engl. Jahrb.* xliii. 312. Branches slender, 1–1½ lin. in diam. 1 ft. below the apex, rich brown, densely lenticellate, glabrous, bearing short lateral spreading branchlets. Leaves opposite, those on the lateral branchlets elliptic, acuminate, 14–16 lin. long, 7–8 lin. broad, the others lanceolate or linear-lanceolate, long-acuminate to the acute or subacute apex, cuneate, obtuse or nearly rounded at the base, 1¼–4½ in. long, ½–1¼ in. broad, thinly coriaceous, glabrous, lateral nerves slightly raised on both surfaces or rather indistinct on the lower, margin slightly crispate; petiole 2–4 lin. long. Umbels solitary, many-flowered; peduncle stout, ¾–1 lin. long; pedicels 2½–4 lin. long; bract ovate from a saucer-shaped base, truncate, broadly umbonate, umbo much flattened, dorsal margin ⅝–¾ lin. long, ventral margin hardly ¼ lin. long. Receptacle ¾–⅞ lin. long. Calyx erect, subtruncate, ¼–⅜ lin. long, ciliolate; intramarginal ring present. Corolla 9½–11½ lin. long, lower part much inflated, slaty grey, upper part narrower, clavate in bud, blood-red; tube 4–5 lin. long, glandular inside, split unilaterally nearly to the base; lobes reflexed, narrowly spathulate, much broadened into the base, 5½–6½ lin. long, apical enlargement 1½ lin. long, ⅝ lin. broad. Filaments inserted ½–¾ lin. above the base of the corolla-lobes, tapering upwards, 3½–4 lin. long, tooth subulate, ⅜–½ lin. long; anthers narrowly oblong, 1⅛ lin. long, connective not produced above the cells. Disc 1⅛ lin. high, lobes broadly subulate.

Mozamb. Distr. German East Africa: Ruanda District; Rugege Forest, *Mildbraed*, 875! 902!

211. **L. Bagshawei,** *Rendle in Journ. Linn. Soc. Bot.* xxxvii. 206. Branchlets brownish, lenticellate, glabrous, internodes ¾–1¼ in. long. Leaves opposite, linear-lanceolate, acuminate to the apex, cuneate into the base, 2–4 in. long, 6–10 lin. broad, chartaceous, glabrous; lateral nerves 6 or more on each side, slightly raised on both surfaces; petiole 2–2½ lin. long. Umbels solitary, about 9-flowered; peduncle about 1 lin. long, very stout; pedicels 1 lin. long; bract shortly ovate from a saucer-shaped base, ciliolate, dorsal margin ⅜–½ lin. long, ventral margin ¼ lin. long. Receptacle ⅝ lin. long. Calyx erect, truncate, hardly ¼ lin. long, ciliolate. Corolla red, 6–6½ lin. long, lower half quadrangular, upper half subclavate in bud; tube 2–2¼ lin. long, ½–⅝ lin. in diam., quadrangular, glandular inside; lobes erect, subspathulate-linear, broadened into the base, 4–4¼ lin. long, ⅜ lin. broad above or rather more. Filaments inserted ¾–1 lin. above the base of the corolla-lobes, tapering upwards, 2½–2¾ lin. long, tooth subulate from a broad base, ¼–⅓ lin. long; anthers elliptic-oblong, just over ½ lin. long; connective slightly emarginate, hardly exceeding the cells. Disc ⅜ lin. high.

Nile Land. Uganda: Ruchigga, *Bagshawe*, 401!

212. **L. tschertscherensis,** *Pax in Engl. Jahrb.* xxxix. 616. Glabrous. Branches slender. Leaves opposite, narrowly lanceolate, acuminate to the subacute apex, acute at the base, $2\frac{1}{2}$–$2\frac{3}{4}$ in. long, 7 lin. broad, thinly coriaceous, lateral nerves inconspicuous, very slightly raised on both surfaces, oblique or patulous, midrib distinct. Umbels solitary, subsessile, 10-flowered or more; pedicels very short; bract cupular, truncate. Receptacle $\frac{5}{8}$ lin. long. Calyx erect, $\frac{1}{4}$–$\frac{3}{8}$ lin. long, irregularly denticulate and ciliolate. Corolla nearly 10 lin. long, rose-lilac and blue; tube sparingly glandular inside, split unilaterally nearly to the base; lobes subspathulate-linear. Filaments tapering upwards, $4\frac{1}{2}$ lin. long, tooth subulate, nearly $\frac{1}{2}$ lin. long; anthers narrowly oblong, $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; connective slightly produced above the cells, truncate or subretuse. Disc $\frac{3}{8}$–$\frac{1}{2}$ lin. high, lobes papillate.

Nile Land. Abyssinia: Tschertscher; Kuni, 8000 ft., *Rosen!*

Apparently a distinct species. Differs from *L. woodfordioides,* Schweinf., in the less oblique lateral nerves of the leaf. I have seen only a fragment of the type.

213. **L. rugegensis,** *Engl. & Krause in Engl. Jahrb.* xliii. 313. Branchlets slender, glabrous, pale brown, 1 lin. in diam. or less 1 ft. below the apex, older branches rather conspicuously lenticellate. Leaves opposite, ovate-lanceolate or lanceolate, acutely acuminate, obtuse or more or less rounded at the base, $1\frac{1}{2}$–$3\frac{1}{4}$ in. long, 6–13 lin. broad, thinly coriaceous, glabrous; lateral nerves numerous, slightly raised on both surfaces; petiole $1\frac{1}{2}$–3 lin. long. Umbels solitary, 11–16-flowered; peduncle 2–$2\frac{1}{2}$ lin. long; pedicels 1–2 lin. long; bract broadly elliptic from a saucer-shaped base, very concave, strongly umbonate, dorsal margin $\frac{5}{8}$ lin. long, ventral margin patulous, $\frac{1}{6}$ lin. long. Receptacle $\frac{3}{4}$ lin. long. Calyx erect, $\frac{1}{6}$–$\frac{1}{4}$ lin. long, hardly lobed, ciliolate. Corolla brick-red, about 6 lin. long; tube cylindric, about $2\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. in diam., slightly split unilaterally, sparingly glandular inside; lobes erect, spathulate, slightly broadened into the base, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long, nearly $\frac{1}{2}$ lin. broad above. Filaments inserted $\frac{3}{8}$–$\frac{1}{2}$ lin. above the base of the corolla-lobes, tapering slightly upwards, $2\frac{1}{2}$ lin. long, tooth subulate from a broad base, $\frac{1}{4}$–$\frac{1}{3}$ lin. long; anthers elliptic-oblong, $\frac{1}{2}$ lin. long or rather more; connective produced beyond the cells, rounded. Disc $\frac{3}{8}$ lin. high, densely papillate. Berry red, obovoid, 3 lin. long, $1\frac{1}{2}$–2 lin. in diam.

Mozamb. Distr. German East Africa: Ruanda District; Rugege Forest, *Mildbraed,* 911!

Allied to *L. Bagshawei*, from which it differs in the obtuse or nearly rounded base of the leaf and the distinctly spathulate corolla-lobes.

214. **L. viminalis,** *Engl. & Krause in Engl. Jahrb.* xliii. 314. Branchlets slender, glabrous, lenticellate; lenticels small, numerous; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves linear-lanceolate, long-acuminate to the acute apex, cuneate into the base, 3–$4\frac{1}{2}$ in. long, 5–9 lin. broad, thinly coriaceous, glabrous; lateral nerves 6–9 on each side, slightly raised on both surfaces; petiole 2–$3\frac{1}{2}$ lin. long. Umbels 4–6-flowered. Normally developed flowers not known.

Mozamb. Distr. German East Africa: Ruanda District; Rugege Forest, *Mildbraed*, 1043!

Probably a distinct species, but the single flower extant is abnormal. Similar abnormal flowers occur in *L. Ehlersii* and *L. woodfordioides.* They are much thicker and shorter than the normally developed flowers, and generally contain insects or their larvæ.

215. **L. kwaiensis,** *Engl. in Engl. Jahrb.* xl. 522. Branches sparingly lenticellate, nearly $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex; internodes $\frac{3}{4}$–2 in. long. Leaves opposite, ovate-lanceolate or lanceolate, shortly acuminate to the acute apex, obtuse or subcuneate at the base, $3\frac{1}{2}$–$4\frac{3}{4}$ in. long, 1–2 in. broad, thinly coriaceous, glabrous, dull, pale brown and finely wrinkled on both surfaces in a dried state; lateral nerves 5–7 on each side, patent or patulous, strongly arcuate, anastomosing far from the margin, slightly raised on the upper surface, very inconspicuous on the lower; petiole 1–$1\frac{1}{2}$ lin. long. Heads axillary, subsessile, several together, 2–3-flowered; peduncle 1–$1\frac{1}{4}$ lin. long including the cupular sockets in which the bracts are inserted, sockets $\frac{5}{8}$–$\frac{3}{4}$ lin. in diam.; bract cupular, $1\frac{1}{4}$ lin. long, slightly and irregularly toothed, sparingly ciliolate, umbonate. Receptacle $\frac{3}{4}$ lin. long. Calyx tubular, $1\frac{5}{8}$ lin. long, slightly toothed, ciliolate. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, slender, slightly broadened upwards; tube 11–12 lin. long, split unilaterally about 4 lin. down; lobes erect, linear-oblanceolate, 8–9 lin. long, broadened into the base. Filaments inserted 1–$1\frac{1}{2}$ lin. above the base of the corolla-lobes, linear, 5 lin. long, slightly thickened above, broadened into the base, with numerous transverse grooves on the outer surface; anthers linear, $1\frac{1}{2}$ lin. long, truncate. Disc 4-lobed, about $\frac{1}{6}$ lin. high.

Mozamb. Distr. German East Africa: Usambara; between Kwai and Gare, 5000–5300 ft., *Engler*, 2230!

2. **VISCUM,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 213.

Flowers monœcious or diœcious. Calyx absent or represented by a mere rim. Corolla regular. Male flower trimerous or tetramerous:—Receptacle more or less hollowed. Corolla polypetalous, but usually appearing gamopetalous owing to the absence of demarcation between the petals and the receptacular tube; petals more or less triangular. Anthers sessile near the base of the petals. Cells numerous, dehiscing introrsely by pores. Female flower:—Corolla superior, polypetalous; petals 3–4, deciduous or persistent. Ovary inferior; style short or none; stigma thick, cushion-shaped. Berry crowned by the petals or not. Seed albuminous; embryos 1–3, terete.—Green leafy or, at first sight, leafless shrubs, parasitic on other plants. Branches usually much forked, jointed at the nodes; internodes often compressed, angled or not. Leaves opposite, well developed or represented by small scales. Inflorescences axillary, or axillary and terminal, consisting of solitary or fascicled flowers or cymules; cymules peduncled or sessile, 3–9-flowered, with the flowers in one plane. Flowers small, inconspicuous, green, yellow or white. Berries red, orange, yellow or white.

Species about 60, all Old World, mostly natives of warm regions.

Each axillary branch, of whatever order, has a pair of small scale-leaves at its very base. These scale-leaves, which are placed transversely with respect to the subtending leaf, are also found at the base of each axillary inflorescence.

Each cymule and, as a rule, each solitary flower is subtended at its base by a peduncled or sessile pair of bracts (*bracteal cup*).

*PLOIONIXIA.—Leaves not all scale-like.

Berry warted; inflorescences sessile.
- Berry with a deeply lobed bracteal cup, lobes acute or subacute . . . . . 1. *V. Holstii.*
- Berry with a shallowly lobed bracteal cup, lobes rounded . . . . . 2. *V. tuberculatum.*

Berry smooth; inflorescences peduncled or subsessile.
- Petals persistent in fruit . . . . . 4. *V. nervosum.*
- Petals deciduous.
  - Upper internodes conspicuously flattened, tapering from apex to base . . . . . 5. *V. decurrens.*
  - Upper internodes not conspicuously flattened.
    - Leaves 1–4 in. long.
      - Female cymules 5–7-flowered (Eastern species) . . . . . 6. *V. Fischeri.*
      - Female cymules 3–5-flowered (Western species).
        - Berry ellipsoid; leaves rounded at the apex, $1\frac{1}{2}$ times as long as their breadth . . . . . 7. *V. congolense.*
        - Berry obovoid; leaves narrowed to an obtuse or acute apex, twice as long as their breadth . . . . . 8. *V. grandifolium.*
        - Berry ovoid; leaves narrowed to an obtuse or subacute apex, $2\frac{1}{2}$ times as long as their breadth . . . 10. *V. Zenkeri.*
    - Leaves $\frac{1}{4}$–$\frac{2}{3}$ in. long.
      - Branchlets very stout, subterete . . 11. *V. Macowani.*
      - Branchlets fairly slender, sharply 6-ribbed.
        - Leaves broadly ovate, rounded at the base . . . . . 12. *V. rotundifolium.*
        - Leaves ovate-oblong or elliptic-oblong, obtuse at the base . . . . 13. *V. tricostatum.*

Imperfectly known species of this section . . { 3. *V. longiarticulatum.* 9. *V. Gilletii.*

**ASPIDIXIA.—Leaves all scale-like.

Internodes conspicuously flattened, tape-like.
- Berries sessile.
  - Bracteal cup closely surrounding the base of the ellipsoid berry . . . . . 14. *V. combreticola.*
  - Ends of the bracteal cup not touching the base of the ovoid berry . . . . . 15. *V. ugandense.*
- Berries pedicelled.
  - Internodes broad, much contracted at the apex 16. *V. Engleri.*
  - Internodes narrow, hardly contracted at the apex . . . . . 17. *V. shirense.*

Internodes subterete or slightly compressed, or only the upper ones distinctly flattened.

Berries pedicelled.
Berries smooth.
Upper internodes conspicuously compressed.
Branchlets stout; internodes up to $\frac{3}{4}$ in. long . . . . . 18. *V. Schimperi.*
Branchlets slender; internodes up to 1 in. long . . . . . 19. *V. Gœtzei.*
Upper internodes not conspicuously compressed.
Berries ellipsoid; margin of bracts not scarious . . . . . 20. *V. Hildebrandtii.*
Berries globose; margin of bracts scarious 21. *V. Bagshawei.*
Berries warted . . . . . 22. *V. verrucosum.*
Berries sessile.
Branchlets very slender, less than $\frac{1}{2}$ lin. in diam. near the apex . . . . . 23. *V. tenue.*
Branchlets stout.
Berry subglobose, smooth . . . . 24. *V. capense.*
Berry ellipsoid-oblong, finely warted . . 25. *V. Menyharthii.*
Imperfectly known species of this section . . 26. *V. matabelense.*

1. **V. Holstii,** *Engl. in Engl. Jahrb.* xx. 132. Stem terete, about 3 lin. in diam. 10 in. below the apex of the branchlets, very finely ribbed in a dried state, greyish-brown, glabrous, internodes up to $1\frac{1}{2}$ in. long; younger branches and branchlets distinctly ribbed; internodes of the branchlets 5–10 lin. long, the uppermost one or two distinctly compressed, strongly 6–8-ribbed, with 1 rib on each edge and 2–3 on each face. Leaves broadly obovate or suborbicular, rounded at the apex, rather abruptly contracted into a cuneate base, 7–12 lin. long, 4–9 lin. broad, minutely crenulate, coriaceous, glabrous, inconspicuously 3-nerved from the base (sometimes with 2 additional less distinct lateral nerves); petiole $\frac{1}{2}$–1 lin. long. Inflorescences axillary, sessile, fascicled or solitary. Flowers monœcious, tetramerous, the female solitary, the male 2–3 together in each bracteal cup. Male inflorescence: Bracteal cup boat-shaped, 1 lin. long, $\frac{7}{8}$ lin. high including the lobes, $\frac{5}{8}$ lin. high in the middle; lobes ascending, ovate, ciliate from within. Flower narrowly obovoid-oblong in bud, $1\frac{1}{8}$ lin. long. Female inflorescence: Bracteal cup $\frac{7}{8}$ lin. high including the lobes, $\frac{1}{2}$ lin. high in the middle; lobes ovate, ciliate from within. Flower-bud $1\frac{1}{4}$ lin. long. Receptacle $\frac{5}{8}$ lin. long. Petals ovate-oblong, $\frac{1}{2}$–$\frac{5}{8}$ lin. long in bud. Style $\frac{1}{4}$ lin. long. Berry oblong-ellipsoid, $2\frac{1}{2}$ lin. long, coarsely and densely warted; subtending bracteal cup nearly $1\frac{1}{4}$ lin. high, lobes ascending, triangular-ovate, acute or subacute, $\frac{7}{8}$ lin. long.—Pfl. Ost-Afr. C. 167; Engl. & Prantl, Pflanzenfam. Nachtr. i. 140.

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, 5000 ft., *Holst*, 9143!

Viscum Holstii seems to differ from *V. tuberculatum* in little but the shape of the bracteal cup. In the somewhat scanty material of *V. Holstii* available for examination I have found that the number of bracteal cups in each axil varies from one to five, and that each cup bears either a solitary female flower or 2–3 male flowers. If this arrangement of the male and female flowers in separate bracteal

cups should prove to be constant, it will serve as an additional character by which to distinguish the species from *V. tuberculatum*.

In *V. tuberculatum* each bracteal cup contains either a solitary female flower or three flowers of which the central is male and the two lateral female.

2. **V. tuberculatum,** *A. Rich. Tent. Fl. Abyss.* i. 338. Stem terete or subterete, $2\frac{1}{2}$–3 lin. in diam. 1 ft. below the apex of the branchlets, nearly smooth or more or less ribbed in a dried state, greenish-yellow, tawny or brownish, glabrous, internodes up to 2 in. long; younger branches and branchlets distinctly ribbed; internodes of the branchlets 5–15 lin. long, the uppermost two or three distinctly compressed, strongly 6–8-ribbed, with 1 rib on each edge and 2–3 on each face. Leaves obovate or elliptic, more rarely suborbicular, rounded at the apex, rather abruptly contracted into a cuneate or subcuneate base, 6–18 lin. long, $3\frac{1}{2}$–$11\frac{1}{2}$ lin. broad, entire or minutely crenulate especially in a young state, coriaceous, glabrous, 3- or 5-nerved from the base, nerves raised on the upper surface, less so on the lower; petiole $\frac{1}{2}$–1 lin. long. Inflorescences axillary, sessile, fascicled or solitary. Flowers monœcious, tetramerous, each bracteal cup containing either a single female flower or three flowers of which the central is male and the two lateral female. Bisexual inflorescence: Bracteal cup boat-shaped, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. high, margin horizontal or nearly so, ciliate from within. Male flower obovoid in bud, $1\frac{1}{4}$ lin. long. Petals ovate, $\frac{5}{8}$ lin. long. Female inflorescence: Bracteal cup $\frac{1}{2}$–$\frac{5}{8}$ lin. high including the lobes, $\frac{3}{8}$ lin. high in the middle, lobes semicircular, ciliate from within. Female flower $1\frac{3}{8}$–$1\frac{5}{8}$ lin. long. Receptacle $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Petals yellow, ovate-oblong, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Style $\frac{1}{6}$–$\frac{1}{4}$ lin. long. Berry orange or red, ellipsoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, more or less warted, especially in a young state; subtending bracteal cup hardly 1 lin. high, very shallowly lobed, lobes rounded.—Oliv. in Trans. Linn. Soc. xxix. 81, t. 45; Engl. in Engl. Jahrb. xx. 131; Hochgebirgsfl. Trop. Afr. 198; Pfl. Ost-Afr. C. 167; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 152; Hiern in Cat. Afr. Pl. Welw. i. 935; Rendle in Journ. Linn. Soc. Bot. xxxvii. 208; Van Tiegh. in Bull. Soc. Bot. France, xliii. 190. *V. Stuhlmanni*, Engl. in Engl. Jahrb. xx. 132; Pfl. Ost-Afr. C. 167. *V. tarchonanthum*, Welw. ex Van Tiegh. in Bull. Soc. Bot. France, xliii. 190, name only. *V. Camporum*, Engl. & Krause in Engl. Jahrb. xliii. 315.

Nile Land. Eritrea: various localities, 5000–6500 ft., *Schweinfurth & Riva*, 1058! *Schweinfurth*, 976, 1225, 1286, 1485, 1601. Abyssinia: Bellaka and Aman-Eski, 7000 ft., *Schimper*, 471; Addi Dschoa, at the foot of Semayata Mountain, 8000 ft., *Schimper*, 468; Shoa, *Petit;* and without precise locality, *Plowden!* Uganda: near Mulema, *Bagshawe*, 332! 342; Kidung Ndogo, 6000–7000 ft., *Scott-Elliot*, 6401! Toro; near the mouth of the Mpanga River, 3500 ft., *Bagshawe*, 1154! Eastern Ankole, 4500 ft., *Dawe*, 381! Equatorial East Africa, *Gregory!*

Lower Guinea. Angola: Huilla; in elevated parts of the Chella Mountains, near Mumpulla, on *Tarchonanthus camphoratus*, Linn., *Welwitsch*, 4868! in the Catumba forests, *Welwitsch*, 4869!

Mozamb. Distr. German East Africa: Karagwe; by the Kagera River, *Bagshawe*, 178! Bukoba; Itara, *Mildbraed*, 159! Usui, 4500 ft., *Speke & Grant*, 143! Uzinja; Kimoani Plateau, 4600 ft., *Stuhlmann*, 1410!

In East Africa *V. tuberculatum* has been found on a great variety of hosts, including *Gymnosporia senegalensis*, Loes., *Rhus glaucescens*, A. Rich., and *Terminalia Brownei*, Fres.

3. **V. longiarticulatum,** *Engl. in Engl. Jahrb.* xl. 540. Internodes of the ultimate branchlets $1\frac{1}{3}$–2 in. long, much flattened, finely ribbed on the faces, broadened from below upwards, $1\frac{1}{8}$–$1\frac{3}{8}$ lin. broad shortly below the apex, then slightly narrowed again; lower branches terete, internodes $2\frac{1}{4}$–3 in. long. Leaves very shortly petioled, elongate-oblong or lanceolate-oblong, usually subfalcate, acutely apiculate or more or less rounded at the apex, cuneate into the base, 2–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–1 in. broad, thinly coriaceous, glabrous, 3- or 5-nerved from the base; nerves distinctly raised on the upper surface, less evident on the lower, the three middle ones running to the apex of the leaf, the two outer much less distinct; petiole $\frac{3}{4}$–$1\frac{1}{2}$ lin. long. Inflorescences axillary, sessile or subsessile, solitary or fascicled. Flowers tetramerous, 1, 3, or 5 in each axil, the female solitary in each bracteal cup. Female flower: Bracteal cup subsessile, $\frac{7}{8}$ lin. high including the lobes; lobes erect, ovate, obtuse, $\frac{1}{3}$ lin. high, margins ascending, diverging at right angles or less. Receptacle cupular, $\frac{5}{8}$ lin. long, very finely tubercled in the upper part. Calyx present as a mere rim inside which the petals are inserted. Petals deltoid, obtuse or subacute, over $\frac{1}{2}$ lin. long, $\frac{7}{16}$–$\frac{1}{2}$ lin. broad at the base. Style shortly pyramidal, $\frac{1}{5}$ lin. long.

Mozamb. Distr. German East Africa: Eastern Usambara; Amani, 3100 ft., *Warnecke*, 374!

The above description has been adapted in large part from Engler's, owing to the scanty material available for examination at the time of writing.

4. **V. nervosum,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* i. 338. Usually greenish-yellow in a dried state. Main stem terete; branchlets angular, ribbed, the ultimate ones compressed, about $\frac{3}{4}$ lin. broad towards the apex, slightly tapering downwards. Leaves subsessile or shortly petioled, elliptic or ovate-elliptic, obtuse or rounded at the apex, more rarely subacute or acute, especially in a young state, rather abruptly contracted into the base, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, 4–15 lin. broad, coriaceous, glabrous, distinctly 3–5-nerved, finely reticulate, dull; nerves more or less raised, especially on the upper surface; petiole $\frac{1}{2}$–1 lin. long. Cymules axillary, solitary or one on each side of an axillary branch, peduncled, 3-flowered; flowers monœcious, tetramerous, either all of the same sex or male and female together in the same cymule. Peduncles $\frac{1}{2}$–$1\frac{1}{2}$ lin. long, those of the male or mixed cymules rather shorter than those of the female. Bracteal cup boat-shaped, $\frac{5}{8}$–1 lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, minutely ciliate. Male flower ellipsoid or obovoid in bud, $\frac{7}{8}$–1 lin. long, solid base $\frac{1}{12}$–$\frac{1}{3}$ lin. long. Receptacular tube $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Petals deltoid-ovate or ovate, $\frac{1}{2}$ lin. long, $\frac{7}{16}$–$\frac{1}{2}$ lin. broad at the base. Anthers inserted about the base of the petals, obtusely trigonous, elliptic or suborbicular in outline, $\frac{1}{2}$ lin. long, $\frac{3}{8}$–$\frac{7}{16}$ lin. broad. Female flower: Receptacle subclavate, $\frac{7}{8}$ lin. long, $\frac{3}{8}$ lin. in diam., slightly verruculose or smooth, rapidly becoming ellipsoid-oblong and then ellipsoid after

pollination. Petals slightly patulous, oblong-ovate, about $\frac{3}{8}$ lin. long, $\frac{1}{3}$ lin. broad. Stigma projecting $\frac{1}{4}$ lin. above the insertion of the petals. Berry ellipsoid or ovoid, 2 lin. long, smooth, crowned by the persistent petals.—Engl. Hochgebirgsfl. Trop. Afr. 198; Engl. Jahrb. xx. 131; Pfl. Ost-Afr. C. 167; Schweinf. in Bull. Herb. Boiss. ix. App. ii. 152; Van Tiegh. in Bull. Soc. Bot. France, xliii. 190. *V. murchisonianum*, Schweinf. ex Baker in Journ. Bot. 1882, 245, in obs., name only.

Nile Land. Eritrea: various localities, 5000–6500 ft., on *Olea chrysophylla*, Lam., and *Loranthus Acaciæ*, Zucc., *Schweinfurth*, 976, 1286, 1485, 1601; *Schweinfurth & Riva*, 1225! Bogos, *Steudner*, 187. Abyssinia: Semen; Abbena, *Steudner*, 181! Tiel Woha, *Steudner*, 182; on mountain slopes towards the Worrhey, 5000 ft., *Schimper*, 678! Schahagenni, *Schimper*, 211! British East Africa, *Elliott*, 351!

Mozamb. Distr. German East Africa: Muoa, *Holst*, 3102!

Also in Natal (*Gerrard*, 1651, *Wood*, 3864, 4145).

Var. *angustifolium*, Sprague. Leaves elliptic-lanceolate, lanceolate or oblanceolate, narrowed to an apiculate acute or more rarely obtuse apex, cuneate into the base, $\frac{2}{3}$–$1\frac{3}{4}$ in. long, 3–9 lin. broad.—*V. minutiflorum*, Engl. & Krause in Engl. Jahrb. xliii. 315.

Nile Land. Eritrea: near Keren, *Beccari*, 62!

Lower Guinea. Island of St. Thomas, *Mann!*

South Central. Belgian Congo: Songolo, between Irumu and Mawambi, *Mildbraed*, 3006!

The above variety is founded on Beccari, 62, which Engler, Hochgebirgsfl. Trop. Afr. 198, has quoted under *V. nervosum*.

Mildbraed, 3006, the type of *V. minutiflorum*, does not seem to differ except in the slightly smaller and narrower leaves; and Mann's St. Thomas specimen, which at first sight appeared to represent an undescribed species, also seems referable to var. *angustifolium*.

Var. *nyanzense*, Sprague. Leaves narrowly obovate-elliptic or rhomboid-elliptic, rounded or obtuse at the apex, cuneate into the base, 1–$2\frac{1}{2}$ in. long, 7–12 lin. broad. Berry white.—*V. nyanzense*, Rendle in Journ. Linn. Soc. Bot. xxxvii. 208.

Nile Land. Uganda, *Scott-Elliot*, 7180! Buvuma Island, in Lake Victoria, *Bagshawe*, 654! *Johnston!*

Mozamb. Distr. German East Africa: Usambara; Derema, *Scheffler*, 111!

V. nervosum is closely allied to *V. triflorum*, DC. Prodr. iv. 279, a native of Mauritius and Réunion, which may be distinguished by its globose berry. The leaves of *V. triflorum* have the main nerves raised, just as in *V. nervosum*. The Madagascar plant included as *V. triflorum* in Engler's key to the African and Mascarene species of *Viscum* (Engl. Jahrb. xx. 131) is said to differ from *V. nervosum* in the nerves not being raised, and is probably a distinct species represented in the Kew herbarium by Baron, 3625 and 3880.

5. **V. decurrens,** *Baker & Sprague.* Main stem terete, about 2 lin. in diam. 9–15 in. below the apex of the branchlets; branches two-angled, more or less compressed; branchlets much compressed, with linear internodes, tapering slightly from apex to base; internodes 1–$2\frac{1}{4}$ in. long. Leaves subsessile, narrowly obovate or obovate-oblong to oblanceolate, rounded at the apex, narrowly cuneate into the base, $\frac{3}{4}$–2 in. long, 4–10 lin. broad, coriaceous, glabrous, distinctly 3- or 5-nerved, finely reticulate, slightly glossy; petiole up to 1 lin. long.

Cymules axillary and terminal, solitary or ternate, peduncled, 3-flowered, flowers monœcious, tetramerous, all of one sex in the same cyme. Male cymule: Peduncle about $1\frac{3}{4}$ lin. long or less, produced nearly $\frac{1}{4}$ lin. beyond the bracteal cup. Bracteal cup boat-shaped, $1\frac{1}{4}$ lin. long, subapiculate at both ends. Flower-bud ellipsoid, $\frac{3}{4}$ lin. long. Flower $\frac{7}{8}$ lin. long, solid base $\frac{1}{6}$ lin. long. Receptacular tube about $\frac{1}{6}$ lin. long. Petals ovate, about $\frac{1}{2}$ lin. long, $\frac{3}{8}$–$\frac{1}{2}$ lin. broad. Anthers suborbicular, $\frac{1}{4}$ lin. in diam., or elliptic, $\frac{3}{8}$ lin. long, $\frac{1}{4}$ lin. broad. Female cymule: Peduncle 2–3 lin. long, more or less produced above the bracteal cup. Bracteal cup minutely ciliate, acute at both ends, finally becoming crescent-shaped. Receptacle subcylindric, slightly narrowed into the base, $\frac{3}{4}$ lin. long, hardly $\frac{1}{2}$ lin. in diam., or compressed, $\frac{1}{2}$ lin. broad, $\frac{3}{8}$ lin. deep, smooth. Petals ovate-oblong or deltoid-ovate, $\frac{1}{3}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad. Stigma projecting $\frac{1}{8}$–$\frac{1}{7}$ lin. above the insertion of the petals. Young berry oblong-ellipsoid.—*V. obscurum*, var. *decurrens*, Engl. in Engl. Jahrb. xx. 132; De Wild. Études Fl. Bas- et Moyen-Congo, i. 30, 237.

Upper Guinea. Lagos: Eppah, on Guttiferæ, *Barter*, 3314! Southern Nigeria: by the Old Calabar River, on *Symphonia globulifera*, Linn. f., *Mann*, 2278!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Dinklage*, 574! by the Gaboon River, on *Symphonia globulifera*, Linn. f., *Mann*, 984! Lower Congo: near Leopoldville, *Gillet!*

V. decurrens has been hitherto regarded as a variety of *V. obscurum*, Thunb. (a native of South Africa), with which it has little in common. *V. obscurum* has a sessile inflorescence and long-pedicelled berries.

6. **V. Fischeri,** *Engl. in Engl. Jahrb.* xx. 132. Brownish in a dried state. Branches subterete or obtusely quadrangular, grooved, $\frac{3}{4}$–1 lin. in diam. 4–6 in. below the apex, the uppermost internodes slightly compressed; internodes 1–$2\frac{1}{4}$ in. long. Leaves narrowly oblong or obovate-oblong, rounded at the apex, cuneate into the base, 1–2 in. long, 5–9 lin. broad, coriaceous, glabrous, distinctly 3-nerved, finely wrinkled and slightly glossy in a dried state; petiole $1\frac{1}{4}$–$2\frac{1}{2}$ lin. long. Cymules axillary and terminal, solitary or ternate, peduncled, 5–7-flowered; flowers diœcious, tetramerous. Male plant not known. Female plant: Peduncle 2–3 lin. long, stout, produced beyond the bracteal cup. Bracteal cup at first boat-shaped, $1\frac{1}{3}$ lin. long, minutely ciliolate, afterwards crescent-shaped owing to the ends being deflexed. Flower $1\frac{5}{8}$ lin. long. Receptacle oblong, very slightly narrowed downwards, somewhat compressed, 1–$1\frac{1}{8}$ lin. long, wrinkled in a dried state, soon becoming ellipsoid after pollination. Petals slightly patulous, ovate, $\frac{5}{8}$ lin. long, $\frac{3}{8}$–$\frac{7}{16}$ lin. broad, deciduous. Stigma projecting $\frac{3}{8}$ lin. above the insertion of the petals. Young berry ellipsoid or ovoid, $2\frac{1}{2}$ lin. long, apex broadly depressed-truncate, crowned by the persistent stigma.—Engl. Pfl. Ost-Afr. C. 167.

Nile Land. British East Africa: near Nairobi, *Linton*, 225!

Mozamb. Distr. German East Africa: Ligaijo, *Fischer*, 568!

7. **V. congolense,** *De Wild. in Bull. Herb. Boiss.* 2^{me} *sér.* i. 44. Branches subterete, 1½–2½ lin. in diam., slightly ribbed in a dried state; branchlets slender, hexagonal, 1–1¼ lin. in diam. 1 ft. below the apex; internodes ½–3 in. long. Leaves elliptic or ovate-elliptic, rounded or very obtuse at the apex, abruptly and shortly cuneate into the base, 1–3 in. long, ⅔–2 in. broad, coriaceous, glabrous, 3-nerved from the base; nerves slightly but distinctly raised on the upper surface, less distinct on the lower; petiole 1–2½ lin. long. Cymules axillary, solitary or fascicled, peduncled, 3–5-flowered; flowers diœcious (*Bates*), tetramerous. Male cymule: Peduncle rather stout, broadened into the base, ¾–1½ lin. long, produced ¼–⅜ lin. beyond the bracteal cup. Bracteal cup crescent-shaped in outline, 1½–2 lin. long; bracts ovate or broadly ovate, obtuse, ⅝–¾ lin. long, glandular-ciliolate; pedicels ½ lin. long. Flower-bud ellipsoid, subacute, 1¼ lin. long. Receptacular tube ¾–⅞ lin. long. Petals subequal, deltoid-ovate, acute or subacute, ⅞ lin. long, ¾–⅞ lin. broad at the base, the two outer separated ⅛–1/7 lin. from each other at the apex. Anthers of two sizes, the smaller broadly elliptic, ½–⅞ lin. long, the larger elliptic-oblong, ¾–1⅛ lin. long. Female cymule: Peduncle 1–1½ lin. long, slightly broadened at the base, produced ¼–⅜ lin. beyond the bracteal cup. Bracteal cup at first boat-shaped, afterwards crescent-shaped in outline, 1⅜–1⅞ lin. long; bracts ovate, obtuse, or, more rarely, acute, ⅝ lin. long, glandular-ciliolate; pedicels about ½ lin. long. Receptacle subcylindric or more or less broadened upwards, 1–1⅛ lin. long. Calyx present as a mere rim, inside which the petals are inserted. Petals ovate, obtuse or subacute, ¾–⅞ lin. long, ½–¾ lin. broad. Style compressed-tetragonal, nearly ½ lin. long including the stigma. Berry shortly pedicelled, ellipsoid, 3–3½ lin. long, 2–2¼ lin. in diam., smooth, translucent; pedicel about ½ lin. long.—Miss. É. Laurent, 79. *V. Staudtii,* Engl. in Engl. Jahrb. xl. 541.

Upper Guinea. Cameroons: Great Batanga, *Bates,* 320! *Ledermann,* 238! Lolodorf, *Staudt,* 352! 425!

Lower Guinea. Lower Congo: Kisantu, *Gillet,* 382! 573.

South Central. Belgian Congo: Aruwimi District; Barumbu, *Laurent;* Kasai District; Mange, *Laurent.*

Staudt, 352, quoted by Engler (l.c.) under *V. grandifolium* evidently belongs to *V. congolense.*

8. **V. grandifolium,** *Engl. in Engl. Jahrb.* xl. 540. Branches terete or subterete, 1½–2¼ lin. in diam., slightly ribbed in a dried state; branchlets slender, at first hexagonal, soon becoming subterete, finely ribbed, about 1¼ lin. in diam. 1 ft. below the apex; internodes ½–2½ in. long. Leaves elliptic or ovate, oblique or not, narrowed or shortly acuminate to an obtuse or acute apex, cuneate into the base, 2–3½ in. long, 1–1¾ in. broad, coriaceous, glabrous, 3-nerved from the base, margin crispate in a dried state; nerves slightly but distinctly raised on the upper surface, usually less distinct on the lower except towards the base, where they are prominent; petiole 1½–3 lin. long. Cymules axillary, peduncled; flowers diœcious, tetramerous. Male cymules solitary or geminate, 5–6-flowered. Peduncle rather stout, slightly

broadened into the base, $\frac{5}{8}$–1 lin. long, produced $\frac{3}{8}$–$\frac{1}{2}$ lin. beyond the bracteal cup. Bracteal cup at first boat-shaped, $2\frac{5}{8}$ lin. long, each half becoming much depressed when the outermost flowers develop bracts $1\frac{1}{4}$ lin. long, lower part very concave, ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, minutely glandular-ciliolate, upper part flat, $\frac{3}{8}$–$\frac{1}{2}$ lin. long; pedicels $\frac{1}{4}$ lin. long. Flower-bud compressed, obtuse. Receptacular tube $\frac{3}{4}$ lin. long. Petals unequal, deltoid-ovate, $\frac{5}{8}$ lin. long, the two outer separated $\frac{1}{5}$ lin. from each other at the apex, subacute, $\frac{5}{8}$ lin. broad, the two inner very obtuse, $\frac{7}{8}$ lin. broad. Anthers broadly elliptic, of two sizes, the smaller about $\frac{1}{2}$ lin. long, the larger $\frac{5}{8}$–$\frac{7}{8}$ lin. long. Female cymules solitary, 3- or 5-flowered. Peduncle $1\frac{1}{2}$–2 lin. long, broadened at the base, produced $\frac{1}{4}$–$\frac{3}{8}$ lin. beyond the bracteal cup. Bracteal cup at first boat-shaped, 2–$2\frac{1}{8}$ lin. long, each half becoming much depressed when the outermost flowers develop; bracts ovate, subacute, $\frac{3}{4}$ lin. long, densely glandular-ciliolate; pedicels $\frac{3}{4}$ lin. long. Receptacle subcylindric, $\frac{3}{4}$ lin. long, Calyx present as a mere rim, inside which the petals are inserted. Petals white (*Kalbreyer*), subequal, ovate-oblong, $\frac{7}{8}$–1 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, the two outer separated $\frac{1}{8}$ lin. at the apex. Style compressed-tetragonal, $\frac{1}{2}$ lin. long including the stigma. Berry white (*Kalbreyer*), pedicelled, obovoid, broadly truncate at the apex, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, smooth; pedicel $\frac{3}{4}$ lin. long.

Upper Guinea. Cameroons: Victoria, *Winkler*, 23A! near Neu-Tegel, *Winkler*, 159! 216A! Mopanja, 2600–3000 ft., *Kalbreyer*, 103! Bipinde, *Zenker*, 3196!

The male inflorescence of *V. grandifolium* has been described from Winkler, 159. The other specimens quoted are female.

9. **V. Gilletii,** *De Wild. in Bull. Herb. Boiss.* 2*me sér.* i. 44. Branches subterete, $1\frac{1}{2}$ lin. in diam. near the base, slightly ribbed in a dried state; branchlets and younger parts of the branches slender, hexagonal, 1–$1\frac{1}{4}$ lin. in diam. 1 ft. below the apex; internodes $\frac{1}{3}$–3 in. long. Leaves oblong-elliptic or elliptic, narrowed or shortly acuminate to an obtuse or subacute apex, cuneate into the base, 2–4 in. long, 1–$1\frac{1}{2}$ in. broad, coriaceous, glabrous, 3-nerved from the base; nerves slightly but distinctly raised on the upper surface, less distinct on the lower; petiole 3–5 in. long. Cymules axillary, peduncled; flowers dicœcious, tetramerous. Male cymules solitary or ternate, 3–5-flowered. Peduncle $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, produced $\frac{1}{6}$–$\frac{1}{3}$ lin. beyond the bracteal cup. Bracteal cup boat-shaped, depressed at both ends, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long; bracts broadly ovate, obtuse, $\frac{5}{8}$ lin. long, glandular-ciliolate; pedicels $\frac{1}{4}$ lin. long. Flower-bud obtuse. Receptacular tube $\frac{5}{8}$ lin. long. Petals unequal, deltoid-ovate, $\frac{3}{4}$ lin. long, about $\frac{3}{4}$ lin. broad, the two outer subacute, separated $\frac{1}{5}$ lin. from each other at the apex, the two inner truncate. Anthers of two sizes, the smaller elliptic, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, the larger elliptic-oblong, $\frac{7}{8}$ lin. long. Female flowers and berry unknown.

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 485! 1256!

10. **V. Zenkeri,** *Engl. in Engl. Jahrb.* xl. 540. Branches subterete, about 2 lin. in diam., ribbed in a dried state; branchlets slender,

at first hexagonal, soon becoming 8-ribbed, 1–1¼ lin. in diam. 1 ft. below the apex; internodes ½–3 in. long. Leaves lanceolate or elliptic-lanceolate, more or less falcate, narrowed to an obtuse or subacute apex (more rarely rounded at the apex), cuneate into the base, 1¾–4 in. long, ⅔–1½ in. broad, coriaceous, glabrous, 3-nerved from the base, margin crispate in a dried state; nerves slightly but distinctly raised on the upper surface, less distinct on the lower; petiole 1–2½ lin. long. Cymules axillary, solitary or ternate, peduncled, 3–5-flowered; flowers diœcious, tetramerous. Male cymule not known. Female cymule: Peduncle 1¾–2 lin. long, broadened at the base, produced ⅓–⅜ lin. beyond the bracteal cup. Bracteal cup at first boat-shaped, 1½ lin. long, each half becoming depressed when the outermost flowers develop; bracts broadly ovate, obtuse, ½ lin. long, glandular-ciliolate; pedicels about ½ lin. long. Receptacle slightly broadened upwards, 1–1⅛ lin. long. Calyx present as a mere rim, inside which the petals are inserted. Petals ovate-oblong, obtuse, ¾–⅞ lin. long, ⅜–$\frac{7}{16}$ lin. broad, thickened along the middle on the outer surface. Style compressed-tetragonal, ½ lin. long including the stigma. Berry pedicelled, ovoid, 3–3½ lin. long, smooth; pedicel ¾ lin. long.

Upper Guinea. Cameroons: Bipindi, *Zenker*, 925!

11. **V. Macowani,** *Engl. in Engl. Jahrb.* xix. 131. A small globose much-branched shrub, rather scabrous in all its parts. Branches terete, stout, slightly wrinkled in a dried state, 1½–2 lin. in diam. 5–6 in. below the apex of the branchlets; branchlets subtetragonal, slightly compressed; internodes 3–7 lin. long. Leaves sessile, oblong, obtuse, slightly apiculate or subacute at the apex, slightly narrowed into the base, 3½–5½ lin. long, 1¾–3 lin. broad, thick, fleshy, densely papillate on both surfaces, margin rough with numerous minute hyaline papilla-like teeth; nerves hardly visible. Cymules axillary, fascicled, 3-flowered, composed of a central male and two lateral female flowers; transverse pair of scale-leaves in each axil triangular, subacuminate, ⅜ lin. long, ⅜ lin. broad at the base; peduncle ⅜–½ lin. long, not produced beyond the bracteal cup. Bracteal cup deeply lobed, minutely papillate outside; lobes ascending, ovate-oblong, acute, ⅝ lin. long, glandular-ciliate. Flowers monœcious, tetramerous. Male flower: Receptacle obconical, ⅝ lin. long, hardly ⅝ lin. in diam. at the apex; tube ¼ lin. long. Petals deltoid, $\frac{7}{16}$ lin. long, ⅜ lin. broad at the base, papillate, marked off from the receptacle by a distinct groove on the outer surface. Anthers of two sizes, the smaller suborbicular, hardly ¼ lin. in diam., the larger elliptic-oblong, ⅓–⅜ lin. long. Female flower: Receptacle ⅝ lin. long including the pedicel. Petals ovate-oblong, ⅓–⅜ lin. long, papillate. Stigma projecting ⅙ lin. above the insertion of the petals. Berry pedicelled, reddish, ellipsoid, 2½ lin. long; pedicel about ⅜ lin. long.—Schinz in Bull. Herb. Boiss. iv. App. iii. 55.

Lower Guinea. German South-west Africa: Great Namaqualand; Ubib, on *Acacia albida*, Del., *Gürich*, 13; Rehoboth, *Fleck*, 119! 316A.

The above description has been drawn up mainly from Fleck, 119. I have not seen the type specimen.

12. **V. rotundifolium,** *Linn. f. Suppl.* 426. A small much-branched shrub, glabrous or nearly glabrous in all its vegetative parts. Stem terete, 2–2¼ lin. in diam. ½–1 ft. below the apex of the branchlets; older branches 8- or 12-ribbed, younger branches and branchlets hexagonal, the uppermost branchlets slightly compressed; internodes 2–18 lin. long. Leaves sessile or subsessile, broadly ovate (or more rarely suborbicular), acute or apiculate at the apex, rounded at the base, 2½–6 lin. long, 1½–4 lin. broad, thickly coriaceous, obscurely 3-nerved, brown or blackish in a dried state, margin cartilaginous. Cymules axillary, solitary or fascicled, 3-flowered, usually composed of a central male and two lateral female flowers, more rarely of three female flowers; peduncle ½–1⅛ lin. long, produced $\frac{1}{10}$–⅛ lin. or less beyond the bracteal cup. Bracteal cup distinctly lobed, 1⅛–1⅜ lin. long; lobes ascending, ovate or ovate-oblong, apiculate or subacute, ⅝–¾ lin. long, glandular-ciliolate. Flowers monœcious, tetramerous. Male flowers: Receptacle and pedicel together obconical, ¾ lin. long; pedicel about ⅜ lin. long; receptacular tube ¼–⅓ lin. long. Petals marked off from the receptacle by a distinct groove on the outer surface, ovate or ovate-deltoid, slightly unequal, ½–⅝ lin. long, ⅜–½ lin. broad, the two outer separated ⅙ lin. from each other at the apex. Anthers elliptic, ¼–⅜ lin. long. Female flower: Receptacle and pedicel together 1¼–1⅜ lin. long; pedicel ½–⅝ lin. long. Petals ovate or ovate-oblong, acute, ⅓–⅜ lin. long. Stigma projecting ⅛–⅙ lin. above the insertion of the petals. Berry pedicelled, red, orange or yellow, ellipsoid, 2½ lin. long; pedicel ¾–1 lin. long.—Thunb. Prodr. 31; Fl. Cap. ed. Schult. 154; DC. Prodr. iv. 279; Harv. in Harv. & Sond. Fl. Cap. ii. 580; Engl. in Engl. Jahrb. xx. 131; Schinz in Bull. Herb. Boiss. iv. App. iii. 55; Van Tiegh. in Bull. Soc. Bot. France, xliii. 190.

Lower Guinea. German South-west Africa: Hereroland; Okahandja, *Dinter*, 291!

Also in South Africa.

13. **V. tricostatum,** *E. Meyer in Drège, Zwei Pfl. Documente*, 94, 229, *name only*.. A globose much-branched shrub, glabrous in all its vegetative parts. Stem terete, about 2¼ lin. in diam. 16 in. below the apex of the branchlets; older branches 8- or 12-ribbed, younger branches and branchlets hexagonal, the uppermost internodes slightly compressed; internodes 4–16 lin. long. Leaves subsessile, spreading, ovate-oblong, elliptic-oblong or lanceolate-oblong, very acute or apiculate at the apex, obtuse or acute at the base, 4–7½ lin. long, 1¼–3½ lin. broad, coriaceous, 3-nerved, green or brownish in a dried state, margin cartilaginous. Cymules axillary, solitary or fascicled, 3-flowered, usually composed of a central male and two lateral female flowers, more rarely of three female flowers; peduncle ½–⅝ lin. long, produced ⅛ lin. or less beyond the bracteal cup. Bracteal cup distinctly lobed, ⅞–1¼ lin. long; lobes ascending, ovate or ovate-oblong, acute or subacute, ½–⅝ lin. long, minutely glandular-ciliolate. Flowers monœcious, tetramerous. Male flower: Receptacle and pedicel together

obconical, $\frac{5}{8}$ lin. long; pedicel about $\frac{3}{8}$ lin. long; receptacular tube about $\frac{1}{4}$ lin. long. Petals marked off from the receptacle by a distinct groove on the outer surface, subequal, ovate, obtuse, about $\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad. Anthers elliptic, $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Female flower: Receptacle and pedicel together about $1\frac{1}{8}$ lin. long; pedicel about $\frac{1}{2}$ lin. long. Petals shortly ovate-oblong, obtuse or rounded, $\frac{3}{8}$–$\frac{7}{16}$ lin. long, $\frac{1}{3}$–$\frac{3}{8}$ lin. broad. Stigma projecting $\frac{1}{6}$–$\frac{1}{5}$ lin. above the insertion of the petals. Berry pedicelled, orange-red (*Dinter*), ellipsoid, $1\frac{3}{4}$–2 lin. long; pedicel 1 lin. long.—Harv. in Harv. & Sond. Fl. Cap. ii. 580; Engl. in Engl. Jahrb. xx. 131; Van Tiegh. in Bull. Soc. Bot. France, xliii. 190.

Lower Guinea. German South-west Africa: Hereroland; Okahandja, 4000 ft., on *Zizyphus mucronata*, Willd., *Dinter*, 287!

Also in South Africa, where it is parasitic on *Salix* sp.¶

Closely allied to the preceding, from which it differs in the more slender elongated branches and the shape of the leaves. According to Harvey (l.c.) the pedicel of the berry is 2 lin. long.

14. **V. combreticola,** *Engl. in Engl. Jahrb.* xl. 542 (*V. combreticolum*). A much-branched shrub, 1–$1\frac{1}{2}$ ft. high. Stem terete, $3\frac{1}{2}$–4 lin. in diam. at the base, brown and slightly glossy in a dried state. Branches and branchlets conspicuously flattened, ribbed in a dried state; internodes broadly linear, tape-like, broadest in their upper part, slightly contracted at the apex, slightly tapering into the base, $\frac{2}{3}$–$2\frac{3}{4}$ in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, those of the main branches much thickened along the middle. Flowers diœcious, tetramerous. Male inflorescences axillary, composed of 1–5 3-flowered cymules, each of which is borne by a bracteal cup. Bracteal cup subtended by a pair of bracts at the base, sessile, boat-shaped, $1\frac{3}{4}$ lin. long; lobes ascending, rounded or obtuse, 1 lin. long, glandular-ciliolate; pedicel (solid base of flower) hardly $\frac{1}{2}$ lin. long. Receptacular tube $\frac{3}{8}$ lin. long. Petals alternately deltoid and deltoid-ovate, $\frac{3}{4}$ lin. long, about $\frac{3}{4}$ lin. broad. Anthers trigonous with a convex outer surface, elliptic in outline, $\frac{5}{8}$–$\frac{11}{16}$ lin. long, $\frac{7}{16}$ lin. broad. Female inflorescences axillary, composed of 1 or 3 flowers, each of which is borne by a bracteal cup. Bracteal cup conspicuously 2-lobed, 1 lin. high; lobes $\frac{5}{8}$ lin. long, rounded, glandular-ciliolate, exceeding the receptacle at the time of expansion of the flower. Receptacle shortly and broadly obovoid, $\frac{5}{8}$ lin. long. Petals triangular, over $\frac{1}{2}$ lin. long, $\frac{7}{16}$–$\frac{1}{2}$ lin. broad, deciduous. Style broadly conical, $\frac{1}{5}$ lin. long; stigma projecting $\frac{1}{3}$ lin. above the insertion of the petals. Berry ellipsoid, $2\frac{1}{2}$ lin. long, smooth or slightly warted.—*V. dichotomum*, Harv. in Harv. & Sond. Fl. Cap. ii. 581, as to the Magaliesberg specimens, excluding synonyms; De Wild. Pl. Nov. Herb. Hort. Then. t. 89, excluding synonyms; not of D. Don.

Mozamb. Distr. Rhodesia: Batoka country, *Kirk!* Mazoe District; Iron Mask Hill, at 5000 ft., *Eyles*, 456!

Also in the Transvaal.

Viscum dichotomum, Harv. (l.c.), included two distinct species, *V. anceps*, E. Meyer, and *V. combreticola*, Engl. *V. anceps* may be distinguished from *V. com-*

breticola by its shorter internodes and pedicelled berries, which are usually conspicuously warted. It is a native of Transkei, Tembuland, Pondoland and Natal.

Two other African species, *V. ugandense*, Sprague, and *V. Engleri*, Van Tiegh., have been confused with *V. dichotomum*, Don. The four African species which have been referred to *V. dichotomum* differ from it in the nature of their berries and in being diœcious.

V. dichotomum, D. Don, which has been reduced to *V. articulatum*, Burm. f., by Hook. fil. Fl. Brit. Ind. v. 226, is a monœcious species, native of India, Malaya, Indo-China and China. Each bracteal cup bears either a solitary female flower or a 3-flowered cymule, of which the central flower is female and the two lateral male.

The Australian and Polynesian material referred to *V. articulatum* by Seem. Fl. Vitien. 120, Benth. Fl. Austr. iii. 396, and others, differs from that species in having persistent petals and belongs to several species of the genus *Korthalsella*. According to Engler in Engl. & Prantl, Pflanzenfam. Nachtr. i. 138, *Korthalsella* differs from *Viscum* in having 2-celled anthers, which dehisce by two longitudinal slits.

15. **V. ugandense,** *Sprague.* A much-branched shrub. Branches and branchlets conspicuously flattened, ribbed in a dried state; internodes varying from linear to oblanceolate, tape-like, broadest in their upper part, slightly contracted at the apex, slightly tapering into the base, $\frac{2}{3}$–2 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, those of the main branches much thickened along the middle. Flowers diœcious, tetramerous. Male inflorescences composed of 3 3-flowered (more rarely 2-flowered) cymules, each of which is borne by a bracteal cup. Bracteal cups sessile, broadly trough-shaped, $1\frac{3}{4}$ lin. long, $\frac{7}{8}$ lin. broad; lobes patulous, rounded, $\frac{7}{8}$ lin. long; solid base of flower $\frac{1}{8}$ lin. long. Receptacular tube $\frac{5}{8}$ lin. long. Petals deltoid-ovate, $\frac{5}{8}$ lin. long, $\frac{9}{16}$–$\frac{11}{16}$ lin. broad, slightly recurved at the apex. Anthers elliptic-oblong in outline, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{3}{8}$ lin. broad. Female inflorescences composed of 1 or 3 flowers, each of which is borne by a bracteal cup. Bracteal cup conspicuously 2-lobed, $\frac{7}{8}$–1 lin. high; lobes ascending or suberect, $\frac{1}{2}$ lin. long, exceeding or subequal to the receptacle at the time of expansion of the flower. Receptacle obovoid-oblong, $\frac{5}{8}$ lin. long. Petals $\frac{5}{8}$ lin. long, deciduous, alternately narrowly triangular, acute, $\frac{3}{8}$ lin. broad, and deltoid-ovate, $\frac{1}{2}$ lin. broad. Stigma subsessile, projecting $\frac{1}{6}$–$\frac{1}{4}$ lin. above the insertion of the petals. Berry sessile, broadly ovoid, 3 lin. long, smooth.—*V. dichotomum*, Engl. Pfl. Ost-Afr. C. 167; Rendle in Journ. Linn. Soc. xxxvii. 207; not of D. Don.

Nile Land. Uganda: Butumbi, 6200 ft., *Stuhlmann*, 2179! Toro District, at 4500 ft., on *Albizzia Brownii*, Walp., *Dawe*, 473! near Fort Portal, 5000 ft., *Bagshawe*, 1094! Ruchigga, *Bagshawe*, 433!

The type of *V. ugandense* is *Dawe*, 473, from which the description of the female inflorescence and fruit has been drawn up. The male inflorescence has been described from *Bagshawe*, 1094, which comes from the same district and is apparently conspecific. In the diœcious leafless species of *Viscum*, it is often very difficult to determine a male specimen, as the specific characters reside chiefly in the berry and female inflorescence.

16. **V. Engleri,** *Van Tiegh. in Bull. Soc. Bot. France*, xliii. 190. A much-branched bushy shrub, hanging down 6 ft. or more from the

branches of trees. Branches and branchlets conspicuously flattened, ribbed in a dried state; internodes varying from obovate-oblong to oblanceolate-linear, tape-like, broadest in the upper part, abruptly contracted at the apex, tapering into the base, $\frac{1}{2}$–$3\frac{1}{2}$ in. long, 2–$6\frac{1}{2}$ lin. broad, those of the main branches thickened along the middle. Flowers diœcious, tetramerous. Male inflorescences consisting of 1 or 3 3-flowered cymules, each of which is borne by a bracteal cup. Bracteal cup shortly peduncled, broadly trough-shaped, $1\frac{1}{4}$ lin. long, $\frac{5}{8}$ lin. broad; lobes spreading, rounded, $\frac{1}{2}$–$\frac{5}{8}$ lin. long; solid base of flower $\frac{1}{4}$ lin. long. Receptacular tube $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Petals deltoid-ovate, $\frac{5}{8}$–$\frac{7}{8}$ lin. long. Anthers broadly ovate or elliptic in outline, $\frac{1}{3}$–$\frac{3}{8}$ lin. long, $\frac{1}{5}$–$\frac{3}{8}$ lin. broad. Female inflorescences composed of 1 or 2 flowers, each of which is borne by a bracteal cup. Bracteal cup conspicuously 2-lobed, $\frac{7}{8}$–1 lin. high including the peduncle; lobes ascending, $\frac{3}{8}$–$\frac{1}{2}$ lin. long, greatly exceeded by the receptacle at the time of expansion of the flower. Receptacle and pedicel together $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long, tapering to the base. Petals yellow or greenish, deltoid-ovate, obtuse or rounded, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, $\frac{5}{8}$–$\frac{3}{4}$ lin. broad. Style about $\frac{1}{4}$ lin. long; stigma projecting $\frac{1}{3}$–$\frac{3}{8}$ lin. above the insertion of the petals. Berry pedicelled, oblong-ellipsoid or oblong-ovoid, 3–$3\frac{1}{2}$ lin. long, slightly warted; pedicel $\frac{3}{4}$ lin. long.—*V. dichotomum*, var. *elegans*, Engl. in Engl. Jahrb. xx. 133; Pfl. Ost-Afr. C. 167, t. 19, figs. A–G. *V. elegans*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. 140; Engl. in Engl. Jahrb. xxviii. 385.

Mozamb. Distr. German East Africa: Usambara; Sakare, 4300 ft., *Engler*, 947A! Wilhelmsthal, 5000 ft., on *Albizzia* sp., *Uhlig*, 1503! *Busse*, 353! Silai, *Holst*, 2300! Lutindi, *Holst*, 3293! Muohu, on *Acacia* sp., *Buchwald*, 32! Usagara Mountains, *Kirk!* Uhehe; Mufindi, 6000 ft., on *Euphorbia* sp., *Goetze*, 757!

17. **V. shirense,** *Sprague.* A much-branched shrub. Stem terete, about $2\frac{1}{2}$ lin. in diam. $1\frac{1}{2}$ ft. below the apex of the branchlets. Branches and branchlets conspicuously flattened, ribbed in a dried state; internodes broadly linear or oblanceolate-linear, more rarely oblong, tape-like, broadest in their upper part, little or not at all contracted at the apex, more or less tapering into the base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, 1–$2\frac{1}{4}$ lin. broad, those of the main branches much thickened along the middle. Flowers diœcious, tetramerous. Male inflorescence: Flowers solitary, sessile. Bud ellipsoid, $1\frac{1}{4}$ lin. long, solid base $\frac{1}{4}$ lin. long. Receptacular tube $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Petals deltoid-ovate, $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Anthers obtusely trigonous, elliptic in outline, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, $\frac{3}{8}$ lin. broad. Female inflorescences consisting of 1 or 3 flowers, which are usually unprovided with bracteal cups. Bracteal cup, when present, embracing only the base of the receptacle at the time of expansion of the flower, sessile, bilobed, $\frac{1}{2}$–$\frac{5}{8}$ lin. high, $\frac{5}{8}$ lin. long; lobes ascending, very obtuse, $\frac{3}{8}$ lin. long. Receptacle and pedicel together obovoid-oblong, $\frac{7}{8}$–1 lin. long, $\frac{5}{8}$ lin. broad. Petals yellowish-green, oblong-ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{3}{8}$–$\frac{1}{2}$ lin. broad, deciduous. Style distinct, short, thick, compressed-quadrangular; stigma projecting $\frac{3}{8}$–$\frac{1}{2}$ lin. above the insertion of the petals. Young berry pedicelled, orange-red, ovoid.—*V. anceps*, Engl. in Engl. Jahrb. xxx. 305, not of E. Meyer.

Mozamb. Distr. German East Africa: Unyika ; near Manyames Dorf, 5000 ft., *Goetze*, 1441 ! British Central Africa: Nyasaland; Mount Malosa, 4000–6000 ft., *Whyte!* near Mambane, 4000 ft., *Kirk!* Portuguese East Africa: Gazaland ; Mossurize District, Mafusi, 3500 ft., *Johnson*, 166 ! Mount Maruma, 3500 ft., on *Albizzia*, &c., *Swynnerton*, 1085 !

V. anceps, E. Meyer, bears a strong resemblance to *V. shirense*, from which it may be distinguished by the shorter internodes, distinctly contracted at the apex, and the warted berries, each of which is borne by a bracteal cup.

18. **V. Schimperi,** *Engl. in Engl. Jahrb.* xx. 132. A small much-branched shrub, yellowish-green in a dried state. Stem subterete. Branches and branchlets stout, more or less compressed, ribbed in a dried state; internodes oblong or oblong-linear, slightly tapering to the base, 2–9 lin. long, $\frac{3}{4}$–$1\frac{3}{4}$ lin. broad, the uppermost ones conspicuously compressed. Flowers diœcious, tetramerous. Male plant unknown. Female plant: Flowers solitary or 3 together, or 2, one of each side of an axillary branch, either with or without a bracteal cup. Bracteal cup two-lobed, much shorter than the receptacle at the time of expansion of the flower, $\frac{7}{8}$ lin. high ; lobes ascending, rounded, $\frac{3}{8}$ lin. long, sparingly ciliolate. Receptacle and pedicel together obovoid-oblong, hardly $\frac{3}{4}$ lin. long, $\frac{5}{8}$ lin. in diam. at the apex, smooth. Petals broadly ovate, $\frac{1}{2}$ lin. long, $\frac{3}{8}$ lin. broad or more, deciduous. Stigma projecting $\frac{1}{3}$ lin. above the insertion of the petals. Berry pedicelled, subglobose, smooth, $2\frac{1}{2}$ lin. long, 2 lin. in diam. ; pedicel about $\frac{1}{2}$ lin. long.—Pax in Engl. Jahrb. xxxix. 616. *V. tœnioides*, A. Rich. Tent. Fl. Abyss. i. 339, not of Comm. *V. tœnioides*, Engl. Hochgebirgsfl. Trop. Afr. 198; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 152. *V. semiplanum*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. ii. 140. *Aspidixia semiplana*, Van Tiegh. in Bull. Soc. Bot. France, xliii. 193.

Nile Land. Eritrea: Mensa; below Gheleb, 5600 ft., on *Loranthus Acaciæ*, Zucc., *Schweinfurth*, 1288 ! 1620; Asraou Ferry, north of Aidereso, 4600 ft., *Schweinfurth & Riva*, 671 ! Addi Conzi, near Acrur, 6300 ft., *Schweinfurth & Riva*, 1162 ! Abyssinia: Kolla Region ; near Harre Schoa, 6300 ft., on *Acacia* sp., *Schimper*, 667 ! valley of the Tacazze River, at Addi-Maria, near Derakka, on *Eugenia owariensis*, Beauv., *Quartin Dillon.* Amhara ; Mitraa, 6000 ft., on *Acacia*, &c., *Rosen.*

Viscum tœnioides, Comm. (a native of the Mascarene Islands), has been transferred to the genus *Korthalsella* by Engler in Engl. & Prantl, Pflanzenfam. Nachtr. i. 138.

19. **V. Gœtzei,** *Engl. in Engl. Jahrb.* xxx. 304. A much-branched shrub. Branches elongated, subterete, internodes 9–14 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. ; branchlets rather slender, internodes compressed, slightly tapering into the base, 4–12 lin. long, $\frac{3}{4}$–1 lin. in diam. Flowers diœcious, tetramerous or, more rarely, trimerous. Male inflorescence: Flowers geminate, each subtended at the base by a pair of bracts. Bud $1\frac{1}{4}$ lin. long, solid base about $\frac{1}{4}$ lin. long. Receptacular tube nearly $\frac{1}{2}$ lin. long. Petals deltoid-ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{5}{8}$–$\frac{7}{8}$ lin. broad. Anthers alternately large and small, elliptic or elliptic-oblong in outline, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad. Female inflorescence: Flowers solitary, or geminate, each subtended by a pair of bracts. Receptacle and pedicel

together $\frac{7}{8}$–1 lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, slightly narrowed into the base. Petals ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, deciduous. Style broadly conical, $\frac{1}{4}$ lin. long; stigma projecting $\frac{1}{3}$–$\frac{3}{8}$ lin. above the insertion of the petals. Berry pedicelled, ellipsoid, 2 lin. long, smooth; pedicel $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Ussangu; on the northern slope of Lipanye Mountain, at 7500 ft., on *Loranthus* sp., *Goetze*, 1273!

20. **V. Hildebrandtii,** *Engl. in Engl. Jahrb.* xx. 133. Branches terete, glabrous, 1–1$\frac{1}{2}$ lin. in diam., much wrinkled in a dried state, internodes 2–3 in. long; branchlets slightly compressed, minutely papillate, internodes $\frac{1}{4}$–1$\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad. Flowers tetramerous. Male inflorescence not known. Female inflorescence: Flowers solitary or ternate, each borne in a shortly peduncled bracteal cup. Bracteal cup at the time of fruiting $\frac{7}{8}$ lin. high, 1$\frac{1}{4}$ lin. long, $\frac{5}{8}$ lin. broad, very shallowly lobed; peduncle $\frac{1}{2}$–$\frac{5}{8}$ lin. long. Berry conspicuously pedicelled, red, ellipsoid, smooth, 2$\frac{1}{2}$ lin. long; stigma projecting $\frac{3}{8}$ lin. above the apex of the berry; pedicel $\frac{7}{8}$–1 lin. long.—Engl. Pfl. Ost-Afr. C. 167.

Nile Land. British East Africa: Taita; Ndi Mountain, on *Acacia* sp., *Hildebrandt*, 2568!

21. **V. Bagshawei,** *Rendle in Journ. Linn. Soc.* xxxvii. 208. A much-branched shrub. Stem terete, about 3 lin. in diam. 1$\frac{1}{2}$ ft. below the apex of the branchlets; branches subterete, longitudinally wrinkled in a dried state; branchlets slightly compressed, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad near the apex; internodes $\frac{1}{3}$–1$\frac{1}{4}$ in. long. Flowers dicœcious, tetramerous or trimerous. Male plant unknown. Female plant: Flowers solitary or 2–3 together, with or without bracteal cups. Bracteal cup, when present, rather more than half as long as the receptacle at the time of expansion of the flower, shortly lobed, $\frac{7}{8}$ lin. high; lobes slightly ascending, rounded, $\frac{1}{2}$ lin. long, margin scarious. Receptacle obovoid-oblong, $\frac{7}{8}$ lin. long, nearly $\frac{3}{4}$ lin. broad at the apex. Petals deltoid-ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad, deciduous. Style shortly conical, $\frac{1}{4}$–$\frac{1}{3}$ lin. long; stigma projecting $\frac{3}{8}$ lin. above the insertion of the petals. Berry shortly pedicelled, yellow, subglobose, smooth, about 2$\frac{1}{2}$ lin. in diam.; pedicel about $\frac{1}{2}$ lin. long.

Nile Land. Uganda: near Mulema, on *Acacia* sp., *Bagshawe*, 333! near the Kafu River, *Bagshawe*, 957! Toro District; near the mouth of the Mpanga River, 3000 ft., *Bagshawe*, 1156! Busoga District; Jinja, 3900 ft., *Brown*, 82!

Mozamb. Distr. German East Africa: Kenshambi, by the Kagera River, *Mildbraed*, 292!

Brown's specimen differs from the type in having more elongated branches and red berries.

22. **V. verrucosum,** *Harv. in Harv. & Sond. Fl. Cap.* ii. 581. A much-branched shrub. Stem terete, about 2$\frac{3}{4}$ lin. in diam. 1$\frac{1}{2}$ ft. below the apex of the branchlets; branches subterete, longitudinally wrinkled in a dried state; branchlets slightly compressed, about $\frac{5}{8}$ lin. broad near the apex; internodes $\frac{1}{4}$–1$\frac{1}{2}$ in. long. Flowers dicœcious, tetramerous. Male inflorescence consisting of 1–3 sessile flowers, or of a 3-flowered

cymule, borne in a bracteal cup, or of a central 3-flowered cymule and 1–2 flowers on each side. Bracteal cup broadly trough-shaped, $\frac{5}{8}$ lin. high, $1\frac{3}{8}$ lin. long, $\frac{5}{8}$ lin. broad; lobes slightly ascending, rounded, nearly $\frac{3}{4}$ lin. long, margin scarious. Solid base of flower $\frac{1}{3}$–$\frac{3}{8}$ lin. long. Receptacular tube hardly $\frac{3}{4}$ lin. long. Petals deltoid-ovate, $\frac{5}{8}$–$\frac{3}{4}$ lin. long, $\frac{11}{16}$–1 lin. broad at the base. Anthers trigonous, elliptic-oblong in outline, $\frac{3}{8}$–$\frac{1}{2}$ lin. broad. Female inflorescence consisting of 1–3 flowers, with or without bracteal cups. Bracteal cup, when present, embracing only the base of the receptacle. Receptacle and pedicel together $\frac{7}{8}$ lin. long, obovoid; receptacle coarsely and densely warted; pedicel $\frac{1}{3}$–$\frac{3}{8}$ lin. long. Style tetragonal, $\frac{1}{3}$–$\frac{3}{8}$ lin. long; stigma projecting $\frac{7}{16}$ lin. above the insertion of the petals. Berry conspicuously pedicelled, yellow, subglobose, $2\frac{1}{2}$ lin. in diam., coarsely and densely warted; pedicel about $\frac{3}{4}$ lin. long.—Engl. in Engl. Jahrb. xx. 131; Engl. Jahrb. xxviii. 385.

Nile Land. Uganda: Unyoro; Kibero, on Lake Albert, 2500 ft., *Bagshawe*, 913!

Mozamb. Distr. German East Africa: Uhehe; near Lula, about 4000 ft., *Goetze*, 505! Rhodesia: Buluwayo, 4500 ft., *Eyles*, 1139!

Also in the Transvaal and Natal.

The Rhodesian plant is typical *V. verrucosum*. Those from Uganda and German East Africa have less warted fruits, and seem in some respects intermediate between *V. verrucosum* and *V. Bagshawei*.

23. **V. tenue**, *Engl. in Engl. Jahrb.* xx. 133. Much branched. Branches terete, 1–$1\frac{1}{2}$ lin. in diam. 9 in. below the apex; branchlets slender, subterete, grooved in a dried state, less than $\frac{1}{2}$ lin. in diam. near the apex; internodes $\frac{1}{2}$–$1\frac{3}{4}$ in. long. Flowers diœcious, tetramerous. Male plant unknown. Female plant: Flowers solitary or 2–3 together, 1 central and 1–2 lateral, the solitary or central flower either without a bracteal cup or inserted in a two-lipped antero-posterior cup which is half as long as the receptacle at the time of expansion of the flower. Receptacle obovoid, $\frac{5}{8}$ lin. long, $\frac{5}{8}$ lin. broad at the apex, smooth. Petals golden-yellow, broadly ovate or ovate-oblong, $\frac{5}{8}$ lin. long, $\frac{1}{3}$–$\frac{7}{16}$ lin. broad, deciduous. Stigma projecting $\frac{3}{8}$ lin. above the insertion of the petals. Young berry sessile, ellipsoid, smooth.—Pfl. Ost-Afr. C. 167, t. 19, figs. H–L. *Aspidixia tenuis*, Van Tiegh. in Bull. Soc. Bot. France, xliii. 193.

Mozamb. Distr. German East Africa: Usambara; at Bangarra, near Lutindi, 5000 ft., parasitic on *Loranthus Schelei*, Engl., *Holst*, 3302A! Usambara, *Buchwald*, 455! coast opposite Zanzibar Island, *Kirk!*

24. **V. capense,** *Linn. f. Suppl.* 426. A densely branched shrub. Stem terete, about $2\frac{1}{2}$ lin. in diam. near the base; branches and branchlets conspicuously nodose; branches very numerous, spreading, longitudinally wrinkled in a dried state; branchlets obtusely tetragonal; internodes 2–8 lin. long. the uppermost slightly compressed, Scale-leaves spreading or at length more or less deflexed, deltoid, acute or apiculate, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Lateral scale-leaves broadly subulate, $\frac{1}{3}$–$\frac{3}{8}$ lin. long. Flowers diœcious, tetramerous. Male inflorescence consisting of

1 or 3 flowers, each of which is borne by a bracteal cup. Bracteal cup very shortly peduncled, deeply 2-lobed; lobes diverging at rather less than a right angle, broadly boat-shaped, acuminate or apiculate, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, $\frac{7}{16}$–$\frac{1}{2}$ lin. broad, minutely ciliate; peduncle about $\frac{1}{6}$ lin. long. Petals broadly ovate, $\frac{3}{4}$ lin. long, $\frac{5}{8}$ lin. broad. Female inflorescence consisting of 1–3 flowers, each of which is borne by a bracteal cup. Bracteal cup transverse, very deeply 2-lobed; lobes diverging at less than a right angle, shortly and broadly boat-shaped, $\frac{5}{8}$ lin. long, $\frac{7}{16}$ lin. broad, $\frac{1}{3}$ lin. deep, minutely ciliolate, equalling the receptacle at the time of expansion of the flower. Receptacle shortly subcylindric, slightly compressed, rounded at the base, $\frac{5}{8}$ lin. long, $\frac{5}{8}$ lin. broad at the apex. Petals narrowly triangular, $\frac{1}{2}$ lin. long, $\frac{3}{8}$ lin. broad at the base. Style broadly conical, $\frac{1}{6}$–$\frac{1}{4}$ lin. long; stigma projecting $\frac{3}{8}$ lin. above the insertion of the petals. Berry subglobose, about $1\frac{1}{2}$ lin. in diam.—Thunb. Fl. Cap. ed. Schult. 154; DC. Prodr. iv. 283; Harv. in Harv. & Sond. Fl. Cap. ii. 581, partly; Engl. in Engl. Jahrb. xix. 131; xx. 131; Schinz in Bull. Herb. Boiss. iv. App. iii. 55; Bolus & Wolley-Dod in Trans. S. Afr. Phil. Soc. xiv. 316. *Aspidixia capensis*, Van Tiegh. in Bull. Soc. Bot. France, xliii. 193.

Lower Guinea. German South-west Africa: Damaraland; Okombahe, *Gürich*, 5; Otyitambi, *Gürich*; Usakos, *Gürich*.

Also in South Africa. In German South-west Africa it is said to be usually parasitic on *Acacia albida*, Delile, and other *Mimoseæ*. In the Cape Peninsula, according to Bolus and Wolley-Dod, it is found on various low shrubs, chiefly *Rhus*, often at ground level.

All the male flowers examined were abnormal, having in their centre a mass apparently composed of the four anthers fused together.

Harvey, l.c., confused *V. continuum*, E. Meyer, with *V. capense*. *V. continuum* may be distinguished by its pedicelled berries and large rounded lateral scales, which are connate posticously.

25. **V. Menyharthii,** *Engl. & Schinz in Schinz, Pl. Menyharth.* 44. Branches stout, subterete, longitudinally wrinkled in a dried state, $1\frac{1}{2}$–2 lin. in diam.; branchlets more or less compressed; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Flowers dicœcious, tetramerous. Male plant unknown. Female plant: Flowers 2–3 together, or 4–5, one or both of the lateral flowers being replaced by a group of two, each flower borne by a 2-lobed bracteal cup. Bracteal cup slightly shorter than the receptacle at the time of expansion of the flower. Berry sessile, in a young state ellipsoid-oblong, slightly compressed, $2\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, finely warted; stigma projecting $\frac{3}{8}$–$\frac{1}{2}$ lin. above the scars of the petals.—*V. Menyhartii*, Engl. in Engl. Jahrb. xl. 541. *V. verrucosum*, L. S. Gibbs in Journ. Linn. Soc. xxxvii. 468, not of Harv.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; at Chindindi, near Boroma, on *Combretum* sp., *Menyharth !* Rhodesia: Matoppo Hills, on *Croton gratissimus*, Burch., *Miss Gibbs*, 16 !

26. **V. matabelense,** *Engl. in Engl. Jahrb.* xl. 542. A much-branched shrub about 3 ft. in diam. Branches subterete, longitudinally

wrinkled in a dried state, up to $2\frac{1}{2}$ lin. in diam.; internodes up to 3 in. long, the uppermost more or less compressed. Flowers diœcious, tetramerous. Male inflorescence consisting of 1–2 3-flowered cymules, each of which is borne by a bracteal cup. Bracteal cup shallowly trough-shaped, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, about $1\frac{1}{8}$ lin. broad, ciliate. Solid base of the flower $\frac{3}{8}$ lin. long. Receptacular tube about $\frac{3}{4}$ lin. long. Petals ovate-deltoid, $\frac{7}{8}$ lin. long, $\frac{7}{8}$–1 lin. broad. Anthers trigonous, elliptic or elliptic-oblong in outline, $\frac{7}{8}$ lin. long, $\frac{1}{2}$–$\frac{5}{8}$ lin. broad. Female plant not known.

Mozamb. Distr. Rhodesia: Matoppo Hills, about 5000 ft., *Engler*, 2846A!

V. matabelense may possibly prove to be the male plant of *V. Menyharthii*.

ORDER CXX. **SANTALACEÆ.** (By J. G. Baker and A. W. Hill.)

Flowers hermaphrodite or subdiœcious, regular, perianth simple, green or corolline, sometimes fleshy, adnate at the base to the ovary or the disk; lobes usually 4–5, valvate, with a tuft of hairs on the face. Stamens as many as the perianth-lobes, inserted at or below their base; anthers in the Tropical African genera with 2 parallel cells dehiscing longitudinally. Disk epigynous or perigynous, ovary inferior, 1-celled; ovules 2–3, pendulous from the apex of a free-central placenta; style short or cylindrical; stigma terminal, capitate or 2–3-lobed. Fruit indehiscent, dry or fleshy. Seed globose or ovoid; testa obsolete; albumen copious; embryo central, oblique; cotyledons usually subterete; radicle superior.—Herbs, shrubs or trees, often parasitic. Leaves usually alternate, entire, exstipulate. Inflorescence axillary or terminal. Flowers minute, usually greenish.

Species over 250, spread through the Temperate and Tropical regions of both hemispheres.

Flowers hermaphodite.
- Fruit dry . . . . . 1. THESIUM.
- Fruit succulent . . . . . 2. OSYRIDOCARPUS.

Flowers sub-diœcious . . . . . 3. OSYRIS.

1. **THESIUM**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 221.

Flowers hermaphrodite. Perianth-tube adnate to the ovary and forming a cup above; lobes usually 5, valvate, with a tuft of hairs on the face. Stamens 5, inserted at or below the base of the lobes; filaments short, slender; anthers ovoid or oblong, with 2 parallel cells dehiscing longitudinally. Epigynous disk inconspicuous. Ovary inferior; ovules 2–4, pendulous from the apex of a slender flexuose placenta; stigma capitate or obscurely 3-lobed. Fruit dry, globose, crowned with the persistent perianth. Seed similar in shape to the fruit; albumen fleshy; embryo central, usually oblique; radicle as long as or longer than the cotyledons.—Herbs or undershrubs, often parasites. Leaves in the Tropical African species linear, subulate or reduced to

scales. Inflorescence a terminal raceme or panicle with cymose branches, sometimes with leafy branches replacing the flowers in the axils of the bracteoles.

Species exceeding 100, two only American, the others inhabiting the temperate regions or mountains of the tropical zone of the Old World.

All the species here described belong to the section *Frisea* of this genus, and are distinguished by the tuft of hairs attaching the apex of the anther-cells to the perianth-lobes.

*Flowers usually axillary, single or in cymes, each with 2 (very rarely 3) bracteoles longer or shorter than the flowers.	
†Perianth-lobes with an apical beard of hairs. Leaves linear or linear-lanceolate.	
Leaves densely hispid-pilose or minutely serrulate on the margins.	
Leaves and stems densely hispid-pilose . .	1. *T. Schlechteri.*
Leaves minutely serrulate on margins . .	2. *T. megalocarpum.*
Leaves glabrous.	
Bracts longer than the flowers; bracteoles equal to or longer than the flowers.	
Prostrate herb with creeping rootstock .	3. *T. radicans.*
Erect subshrubs or herbs; stem more or less woody.	
Peduncles free.	
Flowers single in axils of bracts; leaves filiform	4. *T. whyteanum.*
Flowers usually in 2–3-flowered cymes; leaves flattened.	
Leaves glabrous	5. *T. Welwitschii.*
Leaves papillose	6. *T. brevibarbatum.*
Peduncles adnate partly to the bracts.	
Plants densely leafy; leaves narrowly linear.	
Bracteoles usually longer than the flowers; perianth about $\frac{1}{2}$ lin. long	7. *T. Schweinfurthii.*
Bracteoles about equal in length to the flowers; perianth 1–$1\frac{1}{4}$ lin. long.	
Leaves linear, flattened; beard of perianth-lobes dense . .	8. *T. dissitum.*
Leaves more or less acicular; beard of perianth-lobes slight . .	9. *T. mukense.*
Plants with scattered leaves.	
Pedicels shorter than the bracts.	
Perianth-lobes deeply hooded; fruits globose with faint ribs .	10. *T. palliolatum.*
Perianth-lobes with a small hood; fruits ovoid with thick ribs .	11. *T. gœtzeanum.*
Pedicels elongate, much longer than the bracts	12. *T. Dinteri.*
Bracts about equal in length to the flowers; bracteoles shorter than the flowers.	
Flowers arranged singly in bract axils; stems slender	13. *T. angolense.*

Flowers arranged in axillary cymes or singly; stems stout.
Stems 15–20 in. high; leaves small, distant 14. *T. multiramulosum.*
Stems 5–12 in. high; leaves conspicuous.
Anthers and style about $\frac{1}{8}$ lin. long; fruit globose . . . . . 15. *T. gracile.*
Anthers $\frac{1}{3}$ lin. long; style $\frac{3}{8}$ lin. long; fruit ovoid . . . . . 16. *T. resedoides.*

††Perianth-lobes beardless.
‡Leaves reduced to scales.
Flowers always single and sessile in axils of bracts.
Plants hairy . . . . . 17. *T. xerophyticum.*
Plants glabrous.
Bracts and bracteoles ovate, acute, keeled, 1–1$\frac{1}{2}$ lin. long.
Perianth over 3 lin. long . . . 18. *T. leucanthum.*
Perianth about $\frac{3}{4}$ lin. long . . . 19. *T. brachyanthum.*
Bracts and bracteoles minute.
Perianth-lobes ovate, $\frac{3}{8}$ lin. long, glabrous . . . . . 20. *T. subaphyllum.*
Perianth-lobes narrowly elliptic, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, with hairy margins . . 21. *T. andongense.*
Flowers usually in compressed axillary spikes.
Plants much branched from the base with numerous stems . . . . . 22. *T. tenuissimum.*
Plants with stout stems branching above.
Perianth elongate; lobes linear-lanceolate.
Anthers $\frac{1}{5}$ lin.; style 1$\frac{1}{4}$ lin. long . 23. *T. fimbriatum.*
Anthers $\frac{1}{10}$ lin.; style $\frac{5}{8}$ lin. long . 24. *T. Stuhlmannii.*
Perianth very short; lobes ovate . . 25. *T. masukense.*
Plants with stout wiry stems very seldom branched . . . . . 26. *T. filipes.*

‡‡Leaves $\frac{1}{4}$–1 in. long.
Leaves of main stem 1 in. long, fleshy; flowers terminal and lateral . . . . . 27. *T. rectangulum.*
Leaves $\frac{1}{2}$ in. long or less; flowers lateral.
Bracts and often bracteoles longer than flowers.
Inflorescences lax.
Leaves smooth; style shorter than anthers . . . . . 28. *T. ulugurense.*
Leaves scabrous; style longer than anthers . . . . . 29. *T. scabridulum.*
Inflorescences compressed.
Anthers $\frac{1}{10}$ lin.; style $\frac{1}{8}$ lin. long; fruit orange when dry . . . . 30. *T. kilimandscharicum.*
Anthers $\frac{1}{8}$ lin.; style $\frac{3}{8}$ lin. long; fruits dark brown . . . . . 31. *T. nigricans.*
Bracts leafy, longer than the flowers; bracteoles shorter than the flowers . . 32. *T. lineatum.*
Bracts and bracteoles shorter than the flowers.
Flowers sessile in axils of bracts . . 33. *T. ussanguense.*
Flowers pedunculate; bracts adnate to peduncles.

Branches long, slender; flowers single . 34. *T. fenarium.*
Branches corymbose; flowers usually in cymes . . . . . 35. *T. cymosum.*
**Flowers usually on long or short leafy or naked axillary branchlets with an involucre of bracteoles.
†Stems and leaves more or less hairy.
Peduncles naked, without bracteoles.
Fruits hairy . . . . . 36. *T. cinereum.*
Fruits glabrous.
Leaves and perianth-lobes with ciliate margins . . . . . 37. *T. viride.*
Leaves and perianth-lobes with glabrous margins . . . . . 38. *T. fulvum.*
Peduncles leafy.
Peduncles elongate, branched; leaves few . 39. *T. fastigiatum.*
Peduncles short, usually unbranched; leaves crowded.
Leaves and bracts subulate, acute, short.
Fruits setulose . . . . . 40. *T. strigulosum.*
Fruits glabrous, many-ribbed . . . 41. *T. fuscum.*
Leaves and bracts elongate, ovate-lanceolate, acuminate.
Leaves slightly sheathing at the base, 2–2½ lin. long; perianth-lobes narrow, hooded . . . . . 42. *T. pilosum.*
Leaves 1–1½ lin. long, not sheathing; perianth-lobes lanceolate . . . . 43. *T. lycopodioides.*
††Stems and leaves glabrous.
Peduncles naked, without leaves.
Bracts and bracteoles with ciliate margins . 44. *T. unyikense.*
Bracts and bracteoles with glabrous margins.
Stems square in section, not markedly grooved; perianth-lobes with papillose margins . . . . . 45. *T. tetragonum.*
Stems deeply grooved; perianth-lobes with glabrous margins . . . . . 46. *T. triste.*
Peduncles leafy.
Leaves of main branches linear, elongate or narrowly lanceolate.
Leaves narrowly lanceolate, acuminate; plant becoming black on drying . . . 47. *T. doloense.*
Leaves linear, acute; plant green when dried . . . . . 48. *T. equisetoides.*
Leaves everywhere reduced to scales.
Leaves and bracts subulate-lanceolate, acuminate . . . . . 49. *T. myriocladum.*
Leaves and bracts subulate, acute.
Peduncles short; plant turning black on drying . . . . . 50. *T. atrum.*
Peduncles elongate; plants green when dry.
Branches short, stiff; fruits ovoid, 1½ lin. long . . . . . 51. *T. lopollense.*
Branches elongate, flexuose; fruits globose-ovoid, 1 lin. long . . 52. *T. tamariscinum.*

1. **T. Schlechteri,** *A. W. Hill.* Subshrub with thick rhizome. Stems numerous, suberect or prostrate, branching above, 8–12 in. long, deeply grooved, ribs numerous, acute, papillose-pilose on the edges. Leaves linear-lanceolate, 4–5 lin. long, acute, keeled, membranous, margins and keel densely papillose-pilose. Flowers sessile, solitary in axils of leafy bracts; bracteoles 2, 2 lin. long. Perianth cylindric, $2\frac{3}{4}$ lin. long; lobes $1\frac{3}{4}$ lin. long, lanceolate, acute, hooded with decurrent apical beard, margins membranous, papillose. Filaments $\frac{3}{8}$ lin. long; anthers $\frac{1}{2}$ lin. long. Style 1 lin. long. Fruit ovoid, $1\frac{3}{4}$ lin. long, glabrous, with 10 prominent ribs.—*T. longirostre,* Schlechter ex A. W. Hill in Kew Bulletin, 1910, 186, not in Journ. Bot. 1897, 345.

Lower Guinea. German South-west Africa: Auas Mountains, near Windhoek, *Dinter,* 1504!

2. **T. megalocarpum,** *A. W. Hill in Kew Bulletin,* 1910, 341. Subshrub, 1 ft. or more high; stems numerous, branched, woody and covered with bark below, grooved and more or less quadrangular above, glabrous; branches erect, slender, grooved, leafy, 4–10 in. long. Leaves about $\frac{1}{2}$ in. long, linear-lanceolate, acute, keeled, erect or slightly curved, margins minutely serrulate. Inflorescences lax, terminating the leafy branches. Flowers stipitate in the axils of bracts or on short pedicels to which the bracts are adnate; bracts longer than the flower, 4–5 lin. long, linear-lanceolate, acute, sharply keeled, margins minutely serrulate; bracteoles 2, slightly shorter than the flowers, similar to the bracts. Perianth $1\frac{1}{2}$ lin. long; lobes $\frac{5}{8}$ lin. long, lanceolate, subacute, hooded, apex and margins bearded. Filaments $\frac{1}{7}$ lin. long; anthers $\frac{1}{4}$ lin. long. Style stout, $\frac{3}{4}$ lin. long. Fruit globose-ovoid, 2–$2\frac{1}{4}$ lin. long, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. broad, 10-ribbed, ribs and reticulations conspicuous; fruit-stalk swollen, $1\frac{1}{2}$ lin. long.

Lower Guinea. German South-west Africa: Hereroland; Waterbergplaat, *Dinter,* 585! Otavi, *Dinter,* 726! Grootfontein, *Dinter,* 912!

3. **T. radicans,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 235. Herb, annual? with elongated tap root and short prostrate stems. Stems 1–2 in. long, slightly hispid, much branched; branches crowded with leaves. Leaves narrowly elliptic, acute, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, hispid, minutely papillose along the margins. Flowers in axils of bracts on short free peduncles; bracts about equal in length to flowers; bracteoles $\frac{3}{4}$–1 lin. long. Perianth $\frac{1}{2}$ lin. long; lobes about $\frac{1}{4}$ lin. long, hooded with a few apical hairs, elliptic-ovate, subacute. Anthers $\frac{1}{8}$ lin. long, equal in length to filaments. Style $\frac{1}{8}$ lin. long. Fruit ovoid, $1\frac{1}{2}$ lin. long, 1–$1\frac{1}{4}$ lin. broad, smooth, ribs slight, reticulations not seen.—Engl. Hochgebirgsfl. Trop. Afr. 200.

Nile Land. Eritrea: near Saganeiti, 7200 ft., *Schweinfurth & Riva,* 795! Abyssinia: in meadows near the Maitra stream, west of Dagaber Church, 10500 ft., *Schimper,* 168! Urahut Province, *Schimper,* 609! Intjatkab, *Schimper,* 1130.

4. **T. whyteanum,** *Rendle in Trans. Linn. Soc. ser.* 2, *Bot.* iv. 42. Shrub, glabrous; branches slender, suberect, 12 in. long, leafless below,

leafy above, branching near the top. Leaves of primary branches channelled, 1 in. or more long, subterete, of secondary shorter, linear-subulate, plano-convex. Flowers solitary, axillary or single or paired on short branches; bracts and bracteoles similar to leaves, bracts much longer than the flowers, bracteoles about equal in length to the flowers. Perianth 1 lin. long; lobes involute, hooded at apex with a tuft of apical hairs continued about half-way down the margins. Anthers glabrous, about $\frac{1}{6}$ lin. long, inverted, hanging in the cavity of perianth. Style $\frac{1}{8}$ lin. long, with papillose swollen stigma. Fruit subglobose, 10-ribbed, the alternate ribs less pronounced, connected by irregular reticulations.—Engl. in Engl. Pfl. Ost-Afr. C. 168.

Mozamb. Distr. British Central Africa: Nyasaland; Mount Mlanji, 6000–8000 ft., *Whyte*, 45! *Adamson*, 373! between Mpata and the commencement of the Tanganyika plateau, 2000–3000 ft., *Whyte!*

5. **T. Welwitschii,** *Hiern in Welw. Cat. Afr. Pl.* i. 938. Undershrub, perennial, glabrous or nearly so. Rhizome horizontal with numerous erect stems; stems simple below, branched above, ribbed, angular. Leaves more or less pressed to stem, linear, acute or subacute, lower 8 lin. long, decurrent. Inflorescence paniculate, terminal, composed of small axillary cymes; bracts leafy; peduncles as long as or longer than the bracts; bracteoles shorter than the flowers. Perianth urceolate, $1\frac{1}{2}$ lin. long; lobes 1 lin. long, angular-ovate, subacute, hooded, margins and apex with downwardly-directed hairs. Anthers $\frac{3}{8}$ lin. long, equal in length to the filaments, pendent with dense tuft of attaching hairs. Style $\frac{1}{2}$ lin. long.

Lower Guinea. Angola: Huilla; in sandy wooded thickets in the Humpata Country, between Mumpulla and Neue, *Welwitsch*, 6435!

6. **T. brevibarbatum,** *Pilger in Engl. Jahrb.* xl. 57. Rhizome thick; stems many, short, woody below, 4–$4\frac{3}{4}$ in. high, much branched; branches short, erect or erect-spreading. Leaves linear-subulate, 3–5 lin. long, somewhat thick, apex acute, colourless, margin minutely papillate Flowers collected towards the apices of the branches, simple or in pairs in the axils of leafy bracts; bracts 2 lin. long, not adnate to the peduncles; bracteoles leafy, longer than the flowers. Perianth cyathiform, $1\frac{3}{4}$ lin. long; lobes broad, oval, obtuse, $\frac{3}{4}$ lin. long, apex thickened and slightly incurved, with short densely-packed hairs on the margin below the apex. Filaments short; anthers $\frac{1}{4}$ in. long. Style thick, short, scarcely exceeding base of lobes in length, $\frac{3}{8}$–$\frac{1}{2}$ lin. long.

Mozamb. Distr. Rhodesia: grassy steppe near Umtali, 3900 ft., *Engler*, 3176!

7. **T. Schweinfurthii,** *Engl. Pfl. Ost-Afr. C.* 168. Perennial herb about 9 in. high, with numerous erect spreading stems, much branched; branches elongate, 4-angled and deeply grooved. Leaves linear, acute or acuminate, with colourless apex, 5–10 lin. long, keeled. Inflorescences short, with terminal flower; lateral flowers in the axil of leafy bract; bracts $3\frac{1}{2}$–7 lin. long, adnate to the short peduncles;

bracteoles 2, $2\frac{1}{2}$–4 lin. long. Perianth $\frac{1}{2}$ lin. long; lobes deltoid, more or less $\frac{1}{4}$ lin. long, hooded with a few decurrent apical hairs. Anthers about $\frac{1}{6}$–$\frac{1}{7}$ lin. long. Style $\frac{1}{4}$ lin. long. Fruit globose or globose-ovoid, about 1 lin. in diam., with 5 main ribs and 5 intermediate usually bifurcating shortly above the base, reticulation well marked.—*T. Schweinfurthii*, Engl., var. *djurense*, Engl. Pfl. Ost-Afr. C. 168, partly.

Nile Land. Jur: by the Molmul River, *Schweinfurth*, 1909!

Mozamb. Distr. British Central Africa: Nyasaland; Zomba and vicinity, 2500–3500 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* and without precise locality, *Buchanan*, 1357 partly!

8. **T. dissitum,** *N. E. Br. in Kew Bulletin*, 1909, 137. Herb with erect leafy stems, 6 in. high, glabrous, branched above; branches short, erect. Leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long, narrowly linear, acute, keeled, incurved, erect. Inflorescence terminal, short, few-flowered, composed of 1–3-flowered cymes; cymes pedunculate, with adnate bracts; free portion of bracts 4–5 lin. long; bracteoles 2, 2 lin. long; flowers sessile, brownish-yellow. Perianth 1 lin. long; lobes $\frac{5}{8}$ lin. long, ovate-lanceolate, acute, slightly hooded with a small tuft of apical hairs. Filaments $\frac{1}{5}$ lin. long; anthers $\frac{1}{3}$ lin. long. Style $\frac{1}{4}$ lin. long. Fruit not seen.

Mozamb. Distr. Bechuanaland: in the Kalahari desert near Mamunwe, *Lugard*, 239!

9. **T. mukense,** *A. W. Hill in Kew Bulletin*, 1910, 186. Subshrub 16–20 in. high; stems numerous, erect, stout, much-branched; branches ascending, 5–7 in. long, deeply grooved. Leaves numerous, caducous on the older portions, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, linear, acute, more or less erect. Inflorescences few-flowered, forming short terminal racemes; flowers borne in axils of bracts with the peduncle partly adnate to the surface of the bract; bract leafy, 2–3 lin. long, longer than the flower; bracteoles 2, equal in length to or shorter than the flower. Perianth 1–$1\frac{1}{4}$ lin. long, urceolate; lobes $\frac{1}{2}$–$\frac{3}{4}$ lin. long, ovate-deltoid, subacute, hooded and with a dense tuft of hairs at the apex and upper part of margins. Filaments about $\frac{1}{4}$ lin. long; anthers $\frac{1}{4}$ lin. long, with a tuft of hairs behind, slightly pendulous. Style $\frac{1}{4}$ lin. long. Fruits not seen.

Nile Land. British East Africa: Muka, *Kässner*, 943! Ukamba, 5000–6000 ft., *Scott-Elliot*, 6407!

Mozamb. Distr. British Central Africa: Nyasaland, *Buchanan*, 45!

10. **T. palliolatum,** *A. W. Hill in Kew Bulletin*, 1910, 187. Herb 8 in. high, sparingly branched above; stems deeply grooved, lax. Leaves linear, strap-shaped or concave with distinct midrib, 4–6 lin. long, acute. Flowers shortly pedicellate, arranged singly or in 3-flowered cymes in the axils of leafy bracts, forming lax terminal inflorescences; bracts linear, concave, acute, 4 lin. long, adnate to the peduncle for about $\frac{1}{2}$ its length; bracteoles 2, $1\frac{1}{4}$ lin. long. Perianth $1\frac{1}{4}$ lin. long, campanulate; lobes $\frac{3}{4}$ lin. long, with elongated hooded apex about $\frac{1}{4}$ lin.

long, with a tuft of thick hairs at the base of the hood. Filaments $\frac{1}{5}$ lin. long; anthers $\frac{1}{8}$ lin. long. Style $\frac{3}{8}$ lin. long. Fruit globose, $\frac{3}{4}$ lin. in diam., with main ribs and delicate reticulations.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; *Kirk!*

This differs from other species in the elongated apical hood to the perianth-lobes with the thick hairs of the beard dependent from its base and in the minute anthers.

11. **T. gœtzeanum,** *Engl. in Engl. Jahrb.* xxx. 306. Subshrub. Caudex small, thick; stems erect, 10–12 in. long, numerous, branched, glaucous, longitudinally grooved. Leaves linear-lanceolate, apex cartilaginous, 7 lin. long, margins minutely serrulate, upper leaves and bracts 4–5 lin. long, strongly keeled. Bracts and bracteoles adnate to the pedicels; bracteoles 2–2$\frac{1}{2}$ lin. long. Perianth white, 1–2 lin. long; lobes triangular, elongate, obtuse, $\frac{3}{4}$–1 lin. long, margin inflexed, with a dense beard of long hairs at the apex and upper part of margins. Anthers $\frac{1}{4}$ lin. long, equal in length to the filaments. Style $\frac{3}{8}$ lin. long. Fruit ovoid, with thick prominent ribs, 1$\frac{3}{4}$–2 lin. long, 1$\frac{1}{4}$ lin. broad.—*T. Schweinfurthii*, var. *laxum*, Engl. Pfl. Ost-Afr. C. 168.

Mozamb. Distr. German East Africa: on grey laterite near Fingano villages, 5500 ft., *Goëtze*, 1379! Kilimanjaro; below Marangu, 3600 ft., *Volkens*, 2160! Steppe near Himo River, *Volkens*, 1745! near Njoro Lkatende, between Kilimanjaro and Meru, 4200 ft., *Uhlig*, 402! Rhodesia: Mashonaland; between Hartley and Gazama, 5000 ft., *Engler*, 3013! Matoppo Hills, 5000 ft., *Eyles*, 1146! Salisbury, *Marshall!*

The specimens collected by Uhlig differ somewhat from the others in being more dwarf with shorter bracts, which sometimes are slightly serrulate. The stems also are sometimes covered with minute incrustations.

12. **T. Dinteri,** *A. W. Hill in Kew Bulletin*, 1910, 341. Subshrub, 1–2 ft. high; stems numerous, erect, stout, branched; branches ascending, sinuous, lax, 9 in.–1 ft. long, angled and grooved. Leaves scattered, 2–6 lin. long, linear, with colourless acute tip, somewhat reflexed. Inflorescences lax, few-flowered; flowers borne in axils of bracts on elongated pedicels 3–7 lin. long, partly adnate to the surface of the bract; bract leafy, linear-lanceolate, acute, keeled, 3–4 lin. long; bracteoles 2, 1$\frac{1}{2}$ lin. long, shorter than the flowers. Perianth 1$\frac{1}{2}$ lin. long, orange when dry; lobes $\frac{3}{4}$ lin. long, lanceolate, obtuse, leathery, with strong dorsal rib, hooded with an apical beard of long hairs. Filaments $\frac{1}{4}$ lin. long; anthers $\frac{1}{3}$ lin. long. Style $\frac{1}{2}$ lin. long; stigma capitate. Fruits not seen mature.

Lower Guinea. German South-west Africa: Hereroland, Okaruse Kalk, *Dinter*, 641! Klein Huis, near Neitsar, *Dinter*, 784.

13. **T. angolense,** *Pilger in Engl. Jahrb.* xl. 58. Small subshrub; stems numerous, erect, everywhere much branched, 6 in. high, striate; branches short, erect-spreading. Leaves spreading or very much so, subulate, very acute, apex white, 5 lin. or less long. Flowers numerous, single in axils of bracts, 2 lin. long; bracteoles 2, $\frac{3}{4}$–1 lin. long. Perianth cyathiform, 1$\frac{1}{2}$ lin. long; lobes $\frac{3}{4}$ lin. long, narrowly ovate,

obtuse, apex densely bearded. Filaments $\frac{1}{4}$ lin. long; anthers $\frac{1}{5}$–$\frac{1}{4}$ lin. long. Style slender, exceeding the anthers in length, $\frac{3}{4}$ lin. long. Fruit globose, longitudinal ribs prominent with reticulate cross veins.

Lower Guinea. Angola: Gambos, *Newton*, 165!

14. **T. multiramulosum,** *Pilger in Engl. Jahrb.* xl. 57. Stems numerous, 15–20 in. high, erect, with primary and secondary branchlets; branches and branchlets erect-spreading, distant. Leaves distant, basal small, lanceolate-linear, scale-like, upper leaves larger, elongate-subulate, 5–7 lin. long. Cymes few-flowered distant, collected into narrow elongate panicles; bracts subulate, 1–1$\frac{1}{2}$ lin. long, partly adnate to the peduncles; bracteoles shorter than the flowers. Perianth cyathiform; lobes rectangular-oblong, obtuse, about $\frac{3}{4}$ lin. long, slightly hooded, hairy at the apex and margins. Filaments filiform, $\frac{1}{3}$–$\frac{1}{2}$ lin. long; anthers ellipsoid, $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Style reaching to the base of the perianth-lobes, $\frac{3}{4}$ lin. long.

Mozamb. Distr. Rhodesia: Tree-steppe, near Umtali, 3900 ft., *Engler*, 3138! 3146! Nyasaland: Shire Highlands, *Buchanan*, 47! Mandala, *Scott-Elliot*, 8446! Mungazi, *Kirk!* between Blantyre and Matope, 2500 ft., *Scott!*

15. **T. gracile,** *A. W. Hill in Kew Bulletin*, 1910, 185. Subshrub with several erect stems much branched above to form slender bushes 5 in.–1 ft. high; stems and branches angled and deeply grooved. Leaves linear or linear-lanceolate, with colourless acute tip, keeled, $\frac{1}{3}$–$\frac{1}{2}$ in. long, spreading. Inflorescences paniculate, compact, terminal; flowers white, shortly stalked, arranged in axillary 3- or more-flowered cymes; bracts narrowly ovate-lanceolate, concave, keeled, adnate about 1 lin., 4–5 lin. long; bracteoles 2, rather fleshy, 1 lin. long. Perianth yellow, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, globose, with erect lobes; lobes $\frac{1}{2}$ lin. long, ovate-deltoid, hooded with a beard of few stout hairs. Filaments and anthers scarcely $\frac{1}{8}$ lin. long. Style $\frac{1}{8}$–$\frac{1}{4}$ lin. long. Fruit globose, 1 lin. in diam., ribs and reticulations well shown.

Mozamb. Distr. Portuguese East Africa: Gazaland; Umswirizwi flats, 1100 ft., *Swynnerton*, 310! Mozambique: Zonoe Manica, 2500 ft., *Johnson*, 255! British Central Africa: Rhodesia; Sebakwe, 4000 ft., *Eyles*, 85!

16. **T. resedoides,** *A. W. Hill in Kew Bulletin*, 1910, 187. Herb or subshrub, perennial, forming low bushes; rootstock woody; stems erect, 6–8 in. high, bearing spreading branches 2–4 in. long, angled and grooved. Leaves distant, spreading, 3–4 lin. long, subulate, acute, with colourless tips. Inflorescences in simple or compound spikes or racemes; flowers either single and sessile in the axils of bracts or borne in short 3-flowered axillary cymes; bracts lanceolate, acute, equal in length or $\frac{1}{2}$ as long again as flower, sessile on axis or adnate to the peduncle; bracteoles springing from the bract-axil, shorter than the flower. Perianth white, about 1$\frac{1}{4}$ lin. long; lobes elliptic-ovate, obtuse, $\frac{3}{4}$ lin. long, apex hooded and with upper part of margin densely bearded. Filaments $\frac{1}{5}$ lin. long; anthers about $\frac{1}{3}$ lin. long. Style $\frac{3}{8}$ lin. long. Fruit ovoid, 1$\frac{1}{2}$ lin. long, 1 lin. broad, immature, ribs obscure.—*Thesium*

Welwitschii, Baum in Kunene-Samb. Exped. 230, not of Hiern in Cat. Afr. Pl. Welw. i. 938.

Lower Guinea. Angola: by the River Chitanda, on sandy ground between quartz rocks, *Baum*, 152!

This species has been wrongly attributed to *T. Welwitschii*, Hiern, from which it differs very markedly.

17. **T. xerophyticum,** *A. W. Hill in Kew Bulletin*, 1910, 342. Subshrub, 1 ft. or more high; stems numerous, more or less erect, stout, grooved, minutely pilose, much-branched; branches more or less horizontal, stout, grooved, minutely pilose, 1–2 in. long. Leaves numerous, reduced to subulate or broadly ovate acute scales, $\frac{1}{2}$–1 lin. long, tips usually brown. Flowers sessile, axillary on the lateral branches; bracts triangular-ovate, acute, $\frac{3}{4}$ lin. long, minutely pilose; bracteoles 2, similar to and slightly smaller than the bracts, boat-shaped in both cases with dry brown tips. Perianth $\frac{1}{2}$ lin. long; lobes $\frac{1}{4}$ lin. long, ovate, hooded, hairy outside, margins sinuous-undulate, unfolded, tips generally brown. Filament $\frac{1}{5}$ lin. long; anthers $\frac{1}{4}$ lin. long. Style minute. Fruits ovoid, about $1\frac{1}{4}$ lin. long, 1 lin. broad, minutely pilose and with ten well-marked ribs.

Lower Guinea. German South-west Africa: Hereroland; Windhoek, *Dinter*, 270! Hoffmung Farm, *Dinter*, 964.

18. **T. leucanthum,** *Gilg in Baum, Kunene-Samb. Exped.* 230. Low subshrub; branches erect, springing from thick root, up to 1 ft. high, very much branched above; branchlets erect, very smooth with deep longitudinal grooves. Leaves absent or almost absent, reduced to scales, $\frac{1}{2}$ lin. long. Flowers towards the apices of the branches, disposed in 4–6 lax or more or less dense spikes, sessile, white, enclosed with few lanceolate acuminate bracts $\frac{3}{4}$–1 lin. long at the base. Perianth $3\frac{1}{2}$–4 lin. long; lobes about $2\frac{1}{2}$ lin. long, linear or narrowly linear, subacute, hooded, with few hairs on margins. Anthers about $\frac{1}{4}$ lin. long, carried up to nearly the top of the segments on long filaments. Style elongate filiform.

Lower Guinea. Angola: by the River Chitanda, near Kassinga, 4200 ft., scattered on swampy ground, *Baum*, 218!

19. **T. brachyanthum,** *Baker in Kew Bulletin*, 1910, 182. Stems about 1 ft. long, erect, glabrous, winged towards the base; branches numerous, slender, erect, deeply sulcate. Leaves reduced to ovate acute scales 1–$1\frac{1}{2}$ lin. long, membranous and with stout keel. Flowers in long lax terminal spikes; bracts and bracteoles ovate, acute, 1–$1\frac{1}{2}$ lin. long, membranous, keeled. Perianth about $\frac{3}{4}$ lin. long; lobes $\frac{1}{2}$ lin. long, elliptic-ovate, subacute, glabrous. Anthers $\frac{1}{4}$ lin. long. Style nearly $\frac{1}{2}$ lin. long. Fruit turbinate, $1\frac{1}{2}$ lin. long, with prominent ribs and transverse reticulations.

Mozamb. Distr. British Central Africa: Nyasaland; Fort Hill, Tanganyika Plateau, *Whyte!*

A distinct species with bare deeply sulcate stems and reduced membranous thickly

keeled leaves and bracts; it differs from *T. subaphyllum*, Engl., to which it appears to be allied, more especially in the bracts and bracteoles and the elongated inflorescences.

20. **T. subaphyllum,** *Engl. Pfl. Ost-Afr. C.* 168. Annual?; stem elongate, 1½–2 ft. long, with deep longitudinal grooves, branched from the middle; branches erect, compressed. Leaves reduced to small lanceolate acute scales. Flowers in spikes at the ends of the branches; bracts and bracteoles small, lanceolate. Perianth ⅞ lin. long; lobes ⅜ lin. long, oblong-triangular, somewhat obtuse, margins slightly inflexed and papillose near the base. Anthers ¼ lin. long. Style ½ lin. long; stigma capitate. Fruit ovoid, with reticulate veins between nerves.

Nile Land. Somaliland; Gobbo Duaya, *Riva*, 1485!

Mozamb. Distr. German East Africa: Himo Hill, Kilimanjaro, 3000 ft., *Volkens*, 1712! British Central Africa: Nyika Plateau, 6000–7000 ft., *Whyte!*

21. **T. andongense,** *Hiern in Cat. Afr. Pl. Welw.* i. 937. Annual, virgately much branched, nearly glabrous, 3–4 ft. high; stems and branches conspicuously angled and ribbed, angles in lower part widened to form foliaceous wings. Leaves at the base 2, opposite, linear, above reduced to minute scales. Flowers nearly sessile in the axils of scale-like bracts, arranged in slender spicate racemes; bracts and bracteoles 2 or 3, ⅓–½ lin. long. Perianth 1¼ lin. long; lobes narrowly elliptic, subacute, ½–⅝ lin. long, with a few hairs on the margin. Filaments ¼ lin. long; anthers ⅜ lin. long. Style ¾ lin. long. Fruit globose, 1¼ lin. in diam., ribs not prominent, reticulations well marked.

Lower Guinea. Angola: Pungo Andongo; in thin bushy, sandy, rocky forest near Mopopo, not far from the River Cuanza, *Welwitsch*, 6434!

It is possible that Gossweiler, 983, without flowers or fruits, from the forests of Mudobo, near Catambi, may belong to this species; the native name is given as *lucangi*, and it is said to have medicinal properties of use in stomach disorders.

22. **T. tenuissimum,** *Hook. f. in Journ. Linn. Soc.* vi. 19, *and* vii. 214. Annual?; rootstock woody with numerous erect or spreading stems, 4–8 in. high; stems slender, much branched, grooved. Leaves reduced to minute scales. Inflorescences terminal, racemose or composed of numerous compact axillary branches; bracts and bracteoles ovate, acute, keeled, about 1½ lin. long, bracteoles rather longer than the bracts. Perianth 1½ lin. long; lobes ovate-elliptic, subacute, margins inflexed, slightly papillose, ⅞–1 lin. long. Filaments ⅜–½ lin. long; anthers ¼ lin. long. Style 1¼ lin. long. Fruit globose-ovoid, 1 lin. long, with well marked ribs.—Engl. Hochgebirgsfl. Trop. Afr. 200.

Upper Guinea. Cameroons: Cameroon Mountain, 8000–9000 ft. *Mann*, 1223! 1961! *Johnston*, 24! *Weberbauer*, 6! *Preuss*, 789! Fernando Po: Clarence Peak, 9000 ft., *Mann*, 595!

Preuss, 709, is a small and rather weedy specimen, but appears to agree with Mann's specimens. *T. tenuissimum* shows considerable resemblance to *T. Stuhlmannii*, and *T. fimbriatum*.

23. **T. fimbriatum,** *A. W. Hill in Kew Bulletin,* 1910, 184. Annual?; stem erect, 9–12 in. high, branching above to form a fairly dense bush; stems angled; branches grooved, more or less erect. Leaves of main stem few, scale-like. Inflorescences on short leafy axillary branches, somewhat compact; bracts and bracteoles $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, broadly ovate, acuminate, keeled, margins fringed or ciliate. Perianth $1\frac{3}{4}$ lin. long; lobes $1\frac{1}{4}$ lin. long, linear-elliptic, margins inflexed, hairy. Filaments $\frac{3}{4}$ lin. long; anthers $\frac{1}{6}$–$\frac{1}{5}$ lin. long. Style $1\frac{1}{4}$ lin. long; stigma capitate. Fruit globose-ovoid, about $\frac{3}{4}$ lin. long, with 10 or more well marked ribs.

Mozamb. Distr. British Central Africa: Nyasaland; between Kondowe and Karonga 2000–6000 ft., *Whyte,* 321 partly!

Closely related to *T. Stuhlmannii,* but differs in its more bushy habit with more delicate branches, in the ovate acuminate ciliate bracts and in the long linear-elliptic perianth-segments.

24. **T. Stuhlmannii,** *Engl. in Pfl. Ost-Afr. C.* 168. Undershrub, perennial; rhizome thick with numerous stout erect stems; stems grooved, angular, 6 in. to a foot or more high, branching above; branches erect, simple, bearing numerous short dense axillary inflorescences. Leaves few, reduced to ovate-lanceolate acute scales, about 1 lin. long, sharply keeled. Flowers crowded on short compact leafy axillary branches; bracts and bracteoles ovate, acute, margins membranous, glabrous or slightly fringed, sharply keeled, 1–$1\frac{1}{2}$ lin. long. Perianth $\frac{7}{8}$–1 lin. long; lobes $\frac{3}{4}$ lin. long, linear-lanceolate, subacute, margin inflexed with a few hairs near the base. Filaments $\frac{1}{5}$–$\frac{3}{8}$ lin. long; anthers $\frac{1}{10}$ lin. long. Style $\frac{5}{8}$ lin. long. Fruit shortly ovoid, $\frac{3}{4}$ lin. long, ribs and nerves fine and sharp, secondary nerves mainly vertical.

Nile Land. British East Africa: Kitui in Ukamba, *Hildebrandt,* 2829! Muka, *Kässner,* 909!

Mozamb. Distr. German East Africa: Karagwe; Itolio, *Stuhlmann,* 934! British Central Africa; Nyasaland; between Kondowe and Karonga, *Whyte,* 321 partly!

A specimen collected by Gossweiler, 2833, near the source of the rivulet Campulua, Angola, resembles *T. Stuhlmannii,* Engl., but is a more wiry plant, with long slender sparingly forked branches, and bracts smaller than those of *T. Stuhlmannii.* In the absence of flowers the species cannot be described.

25. **T. masukense,** *Baker in Kew Bulletin,* 1910, 186. Subshrub; stems slender, wiry, erect, glabrous, sulcate, winged below, about 1 ft. high; branches few, erect. Leaves reduced to subulate acute scales, keeled, about $\frac{1}{2}$ lin. long. Flowers borne on short compact leafy axillary branches or on terminal spikes in the axils of bracts; bracts and bracteoles equal in length, about I lin. long, narrowly ovate, acute, keeled, with membranous slightly ciliate edges. Perianth about $\frac{5}{8}$ lin. long; lobes $\frac{3}{8}$ lin. long, ovate, subacute, hooded, glabrous. Anthers $\frac{1}{10}$ lin. long. Style $\frac{1}{4}$ lin. long. Fruit globose, about $\frac{3}{4}$ lin. in diam., with thin well-marked ribs and distinct cross veins.

Mozamb. Distr. British Central Africa: Nyasaland; Masuku plateau, 6500–7000 ft., *Whyte!*

This species resembles *T. Stuhlmannii*, Engl., in habit, especially in the short leafy axillary inflorescences, but it differs in the very small perianth.

26. **T. filipes,** *A. W. Hill in Kew Bulletin*, 1910, 184. Annual?; rootstock short, woody; stems erect, filiform, unbranched or very rarely with one or two branches, 2–2½ ft. long, quadrangular, grooved. Leaves minute, scale-like, distant. Flowers arranged in a terminal spike, 1–3 in axils of bracts; bracteoles numerous, imbricate, ovate, acute, keeled, with margins membranous and fimbriate. Perianth 1 lin. long; lobes ¾–⅞ lin. long, linear, acute, margins slightly inflexed, hairy. Filaments ½ lin. long; anthers ¼ lin. long. Style ½–¾ lin. long. Fruit not seen.

Lower Guinea. Lower Congo: Dolo, *Schlecter*, 12810!

A long wiry plant, leaves few, reduced to scales; the flowers, with the relatively long perianth-lobes and the anthers borne on long filaments, are similar to those of *T. Stuhlmannii*, Engl.

27. **T. rectangulum,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 936. Herb, annual, erect, glaucescent, 1–1½ ft. high, branched like a broom; branches numerous, acutely angled or somewhat winged. Leaves of the main stem towards base ¾–1¼ in. long, linear, thick, acute; leaves on branches 1½–2 lin. long, linear-lanceolate, acute, adpressed. Flowers whitish, terminal or sessile in the axils of bracts; bracts and two bracteoles of lateral flowers about equal in length to the flowers, margins slightly ciliolate. Perianth campanulate-cylindric, 1½ lin. long; lobes ⅝ lin. long, ovate-lanceolate, hooded, glabrous. Filaments ⅕ lin. long; anthers about ⅓ lin. long. Style 2⅛ lin. long. Fruit globose, 1 lin. in diam., with 5 prominent ribs and 5 intermediate less conspicuous ribs and transverse reticulations.

Lower Guinea. Angola: Huilla; in thickets and hilly hot places near Lopollo, also in wooded meadows near Catumba, *Welwitsch*, 6436!

28. **T. ulugurense,** *Engl. in Engl. Jahrb.* xxviii. 385. Herb; stems many, strongly branched, 9–12 in. long; branches 4–6 in. long, flexible, smooth. Leaves spreading, narrowly linear, apex cartilaginous, ½–¾ lin. long, ½ lin. broad. Flowers shortly pedicellate in axils of bracts about 3–4 lin. long, slightly adnate to pedicels; bracteoles 1½–2½ lin. long, longer than the flowers. Perianth ¾ lin. long; lobes 3–4, ½ lin. long, oblong, obtuse, hooded, glabrous. Anthers very small, about ⅛ lin. long, subrotund. Style not exceeding the anthers in height, about ⅓ lin. long; stigma capitate. Fruit ovoid, smooth, 1 lin. long.

Mozamb. Distr. German East Africa: Central Uluguru; Lukwangula plateau, at the upper edge of high woods, 7500 ft., *Stuhlmann*, 9206! in meadows, 7800 ft., *Goetze*, 256.

This species very closely resembles *T. nigricans*, Rendle, and it seems not unlikely that with more complete material it may be found that *T. ulugurense* cannot be maintained as a distinct species.

29. **T. scabridulum,** *A. W. Hill.* Subshrub about 6 in. high; lower branches straggling and spreading, upper ascending, grooved, scabrous. Leaves on the older branches distant, 4½–7 lin. long, on the younger branches numerous, 3½–5 lin. long, linear-lanceolate, acute, keeled, scabrous. Inflorescence racemose; flowers solitary in the axils of the bracts; bracts leafy, partly adnate to the pedicels, about 3½ lin. long; bracteoles 2, equal in length to or slightly longer than the flowers. Perianth yellowish (*Swynnerton*), 1¾ lin. long, smooth; lobes ¾ lin. long, narrowly ovate-lanceolate, slightly hooded, margins undulate, inflexed. Anthers and filaments of equal length, ¼ lin. long. Style ¾ lin. long, exceeding the anthers. Fruit immature, ovoid, with inconspicuous reticulations.

Mozamb. Distr. Rhodesia: Melsetter, 6000 ft., *Swynnerton*, 2124!

"A large straggling herb with small yellowish flowers" (*Swynnerton*).

30. **T. kilimandscharicum,** *Engl. in Abhandl. Preuss. Akad. Wiss.* ii. (1891), 200. Herb or subshrub, perennial (?) with tap root; stems numerous, decumbent or more or less erect, 4–10 in. long, forming a densely branched undershrub; branches densely leafy. Leaves 2½–3½ lin. long, linear, cartilaginous, acute, concave, more or less curved. Flowers sessile or very shortly pedicellate, borne on compressed 3-flowered cymes on short leafy branches in the axils of leafy bracts; bracteoles rather longer than the flower. Perianth white or yellowish, about ½ lin. long, divided nearly to the base into lobes scarcely ½ lin. long, ovate, obtuse, glabrous. Anthers and filaments about $\frac{1}{10}$ lin. long, filaments inserted at the base of the perianth. Style ⅛ lin. long. Fruit orange when dry, shortly ovoid, 1 lin. long, ¾ lin. broad, ribs and veins only slightly marked.—*T. rungwense,* Engl. in Engl. Jahrb. xxx. 307. *T. kilimandscharicum,* var. *erectum,* Engl. in Abhandl. Preuss. Akad. Wiss. ii. (1891), 200.

Mozamb. Distr. German East Africa: Kilimanjaro, 9000–15000 ft., various localities, *Johnston,* 27! 50! *Meyer,* 248! *Uhlig,* 195! *Volkens,* 952! 1821! 1871! German Nyassaland; Rungwe Mountain, 9500 ft., *Goetze,* 1156!

31. **T. nigricans,** *Rendle in Trans. Linn. Soc. ser.* ii. *Bot.* iv. 41. Low shrub, much-branched; branches slender, spreading. Leaves linear, plano-convex, mucronate, smooth, ⅓–¾ in. long, margins sub-scabrous. Flowers 4–5 in the axils of bracts or at ends of small leafy axillary branches, shortly pedicellate; axillary bract and two bracteoles similar to leaves; bracteoles about equal in length to the flowers or longer. Perianth campanulate, ¾ lin. long; lobes 4–5, ⅓–½ lin. long, slightly spreading, elliptic, ovate, subacute, glabrous, apex inflexed. Anthers ⅛ lin. long; filaments slightly longer. Style ⅜ lin. long; stigma capitate. Fruit ovoid, 1 lin. long, ⅔ lin. broad, with 8–10 ribs and a few oblique reticulations.

Mozamb. Distr. British Central Africa: Nyasaland; Mount Milanji, 6000–9000 ft., *Whyte,* 42! *McClounie,* 39! *Adamson,* 335! 337! Zomba, *Whyte.*

Turns black on drying.

32. **T. lineatum,** *Linn. f. Suppl.* 162. Shrub about 4 ft. high; stems stiff, erect, branching above; branches somewhat spreading, stiff, hard, deeply grooved with numerous ridges. Leaves linear, acute or apiculate, keeled, $\frac{1}{3}$ 1 in. long, leathery, narrowing into a very short hard persistent petiole. Flowers solitary, shortly pedicellate in the axils of leafy bracts; bracteoles 2, $\frac{3}{4}$ lin. long. Perianth green, urceolate, $1\frac{1}{4}$ lin. long; lobes $\frac{3}{4}$ lin. long, triangular-ovate, hooded, slightly fleshy. Filaments about $\frac{1}{3}$ lin. long; anthers $\frac{1}{3}$ lin. long. Style $\frac{1}{2}$ lin. long. Fruit ovoid, $\frac{1}{4}$ in. long, 2 lin. broad, with longitudinal grooves and slight ribs.—E. Meyer in Drége, Zwei Pfl. Documente, 226; Thunb. Diss. Thesium, 5, and Fl. Cap. ed. Schult. 210; DC. Prodr. xiv. 654, partly. *T. ephedroides,* A. W. Hill in Kew Bulletin, 1910, 183.

Lower Guinea. German South-west Africa: Kubub Mountains, 5350 ft., *Range*, 65! Hereroland, Spitzkopje, *Dinter*, 64!

Also in Great Namaqualand and South Africa.

33. **T. ussanguense,** *Engl. in Engl. Jahrb.* xxx. 305.. Caudex thick; stems numerous, erect, $4\frac{3}{4}$–6 in. long, acute-angled. Scale-leaves numerous, covering the base of the branches, $\frac{1}{8}$–$\frac{1}{5}$ in. long; leaves linear-lanceolate, acuminate, apex white, recurved, edges pallid and minutely ciliolate, $\frac{1}{5}$–$\frac{1}{3}$ in. long, numerous; bracteoles similar to the leaves, shorter than the flowers, $\frac{1}{5}$ in. long. Perianth white, $\frac{1}{3}$ in. long; lobes $\frac{1}{8}$ in. long, equal in length to the tube, linear, obtuse, concave, pilose on margins and inner side, covering the stamens. Filaments 1 lin. long; anthers oblong, $\frac{1}{24}$ in. long. Style slender, nearly equal in length to the perianth; stigma capitate.

Mozamb. Distr. German East Africa: Northern slopes of Lipanye, Kinga (Livingstone) Range, 7200 ft., *Goetze*, 1264! Karagwe; Weranyange, 5000 ft., *Scott-Elliot*, 8149! Portuguese East Afriea: Namuli, in Makua Country, *Last!*

34. **T. fenarium,** *A. W. Hill in Kew Bulletin*, 1910, 184. Herb or subshrub, perennial (?); rhizome slender, horizontal, bearing numerous erect stems; stems 8 in. to 1 ft. or more high, slender, wiry, much-branched, deeply grooved. Leaves near the base ovate-lanceolate, subacute, keeled, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long; upper leaves linear, acute, midrib well marked, keeled, $2\frac{1}{2}$ lin. long, spreading. Flowers sparsely produced either singly or in cymes on axillary peduncles; bracts like leaves, partly adnate to the peduncles; peduncles elongate, $2\frac{1}{2}$ lin. or more long; bracteoles about equal in length to the flower. Perianth $1\frac{1}{4}$ lin. long; lobes $\frac{3}{4}$ lin. long, ovate, subacute, with hairs at the margin near the base. Anthers and filaments each $\frac{1}{4}$ lin. long. Style $\frac{3}{4}$ lin. long. Fruit ovoid, $1\frac{1}{2}$ lin. long, with 5 prominent and 5 smaller intermediate ribs, reticulations not conspicuous.

Mozamb. Distr. British Central Africa: Nyasaland, *Buchanan,* 104! 1357, partly! Mount Sotchi, *Scott-Elliot,* 8541!

35. **T. cymosum,** *A. W. Hill in Kew Bulletin*, 1910, 183. Herb, perennial, about 6 in. high, with horizontal underground rhizome; stems erect, few, simple below, branching above to form a compact more or less

corymbose plant, 4-angled, strongly ribbed. Leaves at the base reduced to scales, above narrowly-elliptic, acute, with a prominent midrib, $2\frac{1}{2}$–3 lin. long. Flowers either single or in 3-flowered cymes in the axils of leafy bracts forming short simple or compound inflorescences at the ends of branches; bracts partly adnate to the pedicels, $1\frac{3}{4}$ lin. long; bracteoles 2, $1\frac{1}{4}$ lin. long, shorter than the flowers. Perianth $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; lobes $1\frac{1}{8}$ lin. long, ovate-deltoid, hooded, glabrous or minutely ciliolate on margins. Filaments and anthers about $\frac{3}{8}$ lin. long. Style $\frac{3}{4}$–$\frac{7}{8}$ lin. long. Fruit ovoid, about $1\frac{1}{4}$ lin. long, with 5 definite ribs and conspicuous reticulations.

Mozamb. Distr. British Central Africa: Nyasaland; near the foot of Tshiradzura (Chiradzulu) Mountain, *Kirk!* top of Mount Zomba, *Buchanan*, 122 Chikala, 2000 ft., *Purves*, 25!

36. **T. cinereum,** *A. W. Hill in Kew Bulletin*, 1910, 182. Perennial herb, densely covered with hairs and ashen-grey in colour; rootstock much branched; stems procumbent, rounded, grooved, 6 in. to 1 ft. long, crowded with filiform axillary branches or peduncles; branches leafless, terminated by a flower and often bearing leafy branches from the axils of bracteoles, secondary leafy branches in the bract-axils also occur. Leaves subulate, acute, 1–$2\frac{1}{2}$ lin. long, hairy on the back. Cymes 1–3-flowered, axillary; peduncles naked, 1–4 lin. long; flowers with an involucre of linear-subulate bracteoles. Perianth green outside and densely hairy, white inside, 1 lin. long; lobes $\frac{1}{2}$–$\frac{5}{8}$ lin. long, margins membranous and with hairs near the base, margins and apex inflexed. Anthers about $\frac{1}{4}$ lin. long. Style $\frac{1}{10}$ lin. long. Fruits globose-ovoid, about 1 lin. in diam., densely hairy, with well-marked vertical and transverse reticulations.

Lower Guinea. Angola: Malange District, near Saba Onatunga, in company of perennial Leguminosæ, *Gossweiler*, 1115!

37. **T. viride,** *A. W. Hill in Kew Bulletin*, 1910, 238. Perennial; rootstock woody; stems erect, branched or unbranched, 10–14 in. high, ciliate or glabrous below, glabrous or subglabrous above, grooved; branches long vegetative or short flowering. Leaves subulate, acute, about 1 lin. long, adpressed, ciliate or subglabrous on the back. Inflorescences irregular branched axillary cymes, usually borne on a long peduncle; bracts and bracteoles forming an involucre, ovate or subulate, apiculate or acuminate, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Perianth 1–$1\frac{1}{8}$ lin. long, brownish-white (*Ledermann*); lobes $\frac{3}{4}$ lin. long, narrowly ovate, hooded, slightly hairy at the margins, margins more or less fused together above. Anthers and filaments $\frac{1}{6}$ lin. long. Style about $\frac{7}{8}$ lin. long. Fruit globose-ovoid, about 1 lin. long, with 10 ribs of equal size and transverse reticulations.

Upper Guinea. Northern Nigeria: Katagum District; in dry bush, *Dalziel*, 416! Cameroons: Sagdsche, *Ledermann*, 3742!

38. **T. fulvum,** *A. W. Hill in Kew Bulletin*, 1910, 185. A sub-shrub, perennial (?), whole plant fuscous, covered with short hairs; stems erect, grooved, 10–15 in. high, with numerous lateral branches

$\frac{3}{4}$–4 in. long. Leaves distant, ovate-lanceolate, acute or subacute, subulate, acute or acuminate, 1 lin. to $\frac{1}{2}$ lin. long, hairy on back. Flowers terminal on naked axillary peduncles, flowering branches often borne in the axils of bracteoles; bracteoles forming an involucre, ovate, acuminate, hairy, about $\frac{1}{2}$ lin. long. Perianth $\frac{5}{8}$ lin. long; lobes $\frac{3}{8}$ lin. long, linear, subacute, edges infolded, hairy on the outside. Anthers about $\frac{1}{5}$ lin. long. Style about $\frac{1}{2}$ lin. long. Fruit globose, hairy, $\frac{3}{4}$ lin. in diam., with well-marked ribs and intermediate reticulations.

North Central. Eastern Chari: Ndelli, *Chevalier*, 7672!

39. **T. fastigiatum,** *A. W. Hill in Kew Bulletin*, 1910, 183. Perennial; rootstock thick, woody, bearing numerous erect stems about 1 ft. high, grooved, densely clothed with more or less erect branches; stems and branches minutely puberulous; branches $1\frac{1}{4}$–2 in. long, one or two in the leaf-axils. Stem-leaves ovate or elliptic-lanceolate, apiculate, $2\frac{1}{2}$ lin. long or less, leaves of branches subulate, acute, or acuminate, about 1 lin. long, minutely puberulous on the back and margins or subglabrous. Flowers terminal or subterminal on the axillary branches, with an involucre of subulate bracteoles. Perianth $1\frac{1}{4}$ lin. long; lobes $\frac{5}{8}$ lin. long, linear-lanceolate, hooded, with infolded margins, glabrous. Anthers $\frac{1}{4}$ lin. long. Style $\frac{3}{4}$ lin. long. Fruit ovoid, about 1 lin. long, with 5 prominent main ribs, intermediate less definite, reticulation well marked.

Mozamb. Distr. Portuguese East Africa: on a ridge at the back of Mendwe Chujala-Yala, *Johnson*, 316!

The roots are said by Archdeacon W. P. Johnson to be used for fish traps.

40. **T. strigulosum,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 936. A perennial herb, covered with short rigid hairs; stems prostrate or ascending, setulose-hirsute, 6–12 in. long, wiry, branching mainly below; branches slender, elongate. Leaves subulate, acute, $\frac{3}{4}$–1 lin. long. Flowers arranged in long terminal spikes, nearly sessile in the axils of bracts; bracts shorter than the flowers; bracteoles subulate, acuminate, forming an involucre. Perianth about 1 lin. long, yellowish; lobes $\frac{1}{2}$ lin. long, deltoid, ovate, puberulous outside, glabrous within. Stamens with very short filaments; anthers $\frac{1}{4}$ lin. long. Style $\frac{3}{4}$ lin. long. Fruit globose, immature, setulose, with well-marked ribs.

Lower Guinea. Angola: Pungo Andongo; in rocky thickets near Condo, *Welwitsch*, 6432! Loanda; Kiambella, on the left bank of the Quanza River near Kitush, *Gossweiler*, 1113!

41. **T. fuscum,** *A. W. Hill in Kew Bulletin*, 1910, 185. Subshrub; rootstock unknown; stem erect, much branched above, about 1 ft. high, minutely pilose, reddish brown, round in section; branches slightly grooved. Leaves subulate, acute, $\frac{3}{4}$–1 lin. long, minutely pilose on the back. Flowers borne on short branched compact axillary branches, covered with pilose imbricating broadly ovate acuminate bracts and bracteoles, 1 lin. long, Perianth $1\frac{1}{2}$ lin. long, hairy outside; lobes $\frac{3}{4}$ lin. long, elliptic-ovate, hooded, glabrous, margins inflexed. Anthers

and filaments about $\frac{1}{3}$ lin. long. Style 1–$1\frac{1}{4}$ lin. long. Fruit globose-ovoid, minutely pilose, orange-brown when young in dry state, $1\frac{1}{4}$ lin. long, 1 lin. broad, ribs well marked, 12 or more owing to the reticulations between the ribs being arranged vertically.

Lower Guinea. Angola, *Gossweiler*, 4209B !

42. **T. pilosum,** *A. W. Hill in Kew Bulletin*, 1910, 187. Perennial dwarf subshrub; rootstock woody; stems erect, unbranched or branched near the base, 3–4 in. long, densely pilose. Leaves ovate-lanceolate, acuminate, hairy on the back and margins, about 2–$2\frac{1}{2}$ lin. long, slightly amplexicaul towards the base. Flowers nearly sessile or on short peduncles in the axils of the bracts; bracteoles linear-lanceolate, acuminate, $1\frac{1}{2}$ lin. long, forming a small involucre. Perianth $1\frac{1}{4}$ lin. long, hairy outside; lobes $\frac{7}{8}$ lin. long, narrowly ovate-lanceolate, hooded, margins slightly inflexed and membranous, glabrous within. Filaments $\frac{1}{4}$ lin. long; anthers $\frac{3}{8}$ lin. long. Style 1 lin. long. Fruit immature.

Lower Guinea. Angola, *Gossweiler*, 4209C !

43. **T. lycopodioides,** *Gilg in Baum, Kunene-Samb. Exped.* 229. A low subshrub; branches about 1 ft. long, very much divaricately branched, prostrate, very densely hispid-pilose. Leaves few on elongated branches, very densely placed on short floriferous branches, very narrowly imbricate, lanceolate or linear-lanceolate, acuminate and even apiculate, about $\frac{3}{4}$ lin. long, sessile, slightly decurrent, glabrous above, rather densely hispid-pilose below especially near the base. Flowers generally solitary at the apices of the branches, almost entirely covered by numerous much imbricated leaves. Perianth white, about 1 lin. long; lobes $\frac{1}{2}$ lin. long, lanceolate, acute or subacute, dorsally hispid-pilose. Anthers sessile or subsessile, inserted at the base of the perianth-lobes. Style filiform, $\frac{3}{4}$ lin. long; stigma scarcely dilated. Fruit not seen.

Lower Guinea. Angola: on stony ground at the edge of a wood between Kulei and Kutsi, 4200 ft., *Baum*, 879 !

This species is very close to *T. strigulosum*, Welw., and the examination of a fuller suite of specimens may show the two species to be identical. *T. lycopodioides*, however, can be distinguished from *T. strigulosum* by the short densely leafy branches and by the shorter and less distant leaves on the main stems. Gossweiler's 1113 from Kiamballa, placed under *T. strigulosum*, seems to be somewhat intermediate between the two species, though it can be more clearly placed with Welwitsch's specimen.

44. **T. unyikense,** *Engl. in Engl. Jahrb.* xxx. 306. Rootstock small, thick, erect; stems many, much-branched, longitudinally grooved, 12 in. long; branches $1\frac{1}{2}$ to $2\frac{1}{4}$ in. long, ascending at an acute angle, bearing 1–5 flowers, often irregularly cymose. Leaves 1–$1\frac{1}{2}$ lin. long. Bracts smaller than leaves, triangular, acute, ciliolate. Perianth white, $1\frac{1}{4}$ lin. long; lobes triangular-elongate, obtuse, $\frac{5}{8}$ lin. long, margins inflexed, membranous, glabrous. Anthers about $\frac{1}{3}$ lin. long. Style about 1 lin. long. Fruit ovoid, $1\frac{3}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, distinctly 10-nerved and with prominent reticulations between the nerves.

Mozamb. Distr. German East Africa: Unyika in Miwaira, 5500 ft., *Goetze*, 1377 !

According to Engler's description the perianth-segments are hairy on the margins, but this was not found to be the case in the specimens examined.

A specimen collected by the Rev. F. A. Rogers (8504) at Chilanga, N.W. Rhodesia, is closely allied to, and may be identical with, *T. unyikense*, but it shows some difference in its globose fruits. It is also similar to *T. triste* from Angola, but differs particularly in the ciliate leaf-margins.

45. **T. tetragonum,** *A. W. Hill in Kew Bulletin*, 1910, 237. A perennial with erect stems 6–7 in. high; stems more or less square in section, not markedly grooved, glabrous. Leaves near the base of the stems triangular-ovate acute brown scales $1\frac{1}{2}$ lin. long, passing into the ovate-lanceolate acute glabrous bracts 1–$1\frac{1}{2}$ lin. long. Flowers borne in short irregularly cymose inflorescences in the axils of the bracts; main peduncle leafless, $\frac{1}{3}$–$\frac{1}{2}$ in. long; bracteoles forming a small involucre to the flower. Perianth $1\frac{1}{8}$–$1\frac{1}{4}$ lin. long; lobes $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ovate-lanceolate, hooded, margins inflexed, membranous, slightly papillose, bearing a few hairs at the level of the anthers. Anthers almost sessile, $\frac{1}{4}$ lin. long. Style $\frac{7}{8}$ lin. long. Fruit $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, globose-ovoid, with 10 or more thick prominent main ribs, the intermediate ribs being often divided.

Lower Guinea. Angola: *Gossweiler*, 4209A !

46. **T. triste,** *A. W. Hill in Kew Bulletin*, 1910, 238. Perennial shrublet; rootstock woody; stems erect, wiry, glabrous, covered at the base with densely imbricate scale-leaves; scale-leaves broadly ovate, acute, with membranous edges; stems deeply grooved, 7–10 in. long, green, bearing short axillary inflorescences. Leaves ovate-lanceolate, acute, 2–3 lin. long, spreading. Flowers borne singly on naked axillary peduncles, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, to which the leafy bracts are slightly adnate; sometimes on axillary inflorescences from axils of bracteoles; bracteoles 3–4, forming small floral involucre, 1–$1\frac{1}{2}$ lin. long. Perianth green outside, whitish within, $1\frac{3}{4}$ lin. long; lobes $\frac{7}{8}$ lin. long, ovate-lanceolate, slightly hooded, glabrous. Filaments $\frac{1}{2}$ lin. long; anthers $\frac{3}{8}$–$\frac{2}{5}$ lin. long. Style $1\frac{1}{2}$ lin. long. Fruit unknown.

Lower Guinea. Angola: Mndobua forest, near Malange, *Gossweiler*, 1114!

In a note to the specimens Gossweiler says that stems and branches are apparently deciduous.

47. **T. doloense,** *Pilger in Engl. Jahrb.* xl. 58. Subshrub, turning black on drying; stem slender, erect, smooth, subterete, sulcate, 1 ft. high, unbranched below; branches scarcely or but little branched, spreading or erect-spreading, short, 1–2 in. long, distant, bearing short strongly curved side twigs ending in a flower. Leaves 3–$4\frac{1}{2}$ lin. long, narrowly subulate, somewhat thick, with colourless acuminate apex. Flowers terminal on compressed linear-lanceolate scale-bearing branchlets distantly placed on the stems; scale-leaves narrow, tubular, urceolate; bracteoles acuminate. Perianth $\frac{3}{4}$ lin. long; lobes ovate-lanceolate, acute,

smooth, $\frac{3}{8}$–$\frac{1}{2}$ lin. long. Anthers $\frac{1}{5}$ lin. long; filaments about $\frac{1}{4}$ lin. long. Style slender, $\frac{1}{2}$ lin. long; stigma small, capitate. Fruit small, globose-ovoid, 1 lin. long, longitudinal ribs rather thick but little prominent, transverse scarcely conspicuous.

Lower Guinea. Lower Congo: Dolo, *Schlechter*, 12454!

48. **T. equisetoides,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 937. A perennial herb, minutely puberulous, nearly glabrescent; rootstock thick, woody, with numerous prostrate stems; stems much branched, slender, whip-like. Leaves of the main stems elongate, linear, acute or acuminate, fleshy, $\frac{1}{2}$–$\frac{3}{4}$ in. long, curved; leaves of the branches subulate, acute, about 1 lin. long. Flowers at the ends of elongated slender branches with an involucre of subulate acuminate bracteoles. Perianth $1\frac{1}{4}$ lin. long, cylindrical; lobes $\frac{3}{4}$ lin. long, lanceolate, obtuse, glabrous, with apex and membranous margins narrowly inflexed. Anthers about $\frac{1}{6}$ lin. long. Style 1 lin. long. Fruit ovoid, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, with ribs and transverse reticulations fairly prominent.

Lower Guinea. Angola: Pungo Andongo; in sandy wooded places near Cazella and bank of River Catele, *Welwitsch*, 6433!

49. **T. myriocladum,** *Baker in Kew Bulletin*, 1910, 186. Stems short, rigid, woody, much branched from the base, with numerous short spreading glabrous final branchlets 1–3 lin. long. Leaves reduced to lanceolate acuminate scales about $\frac{3}{4}$ lin. long. Flowers usually solitary at the ends of the final branchlets; bracts and bracteoles linear-lanceolate, acuminate, about $\frac{1}{2}$ lin. long, forming an involucre at the base of the flower, margin minutely ciliolate or subglabrous. Perianth 1 lin. long; lobes ovate-lanceolate, $\frac{5}{8}$ lin. long, glabrous, hooded, with inflexed margins. Anthers $\frac{1}{4}$ lin. long. Style $\frac{5}{8}$ lin. long. Fruit not seen.

Mozamb. Distr. Rhodesia: Batoka highlands, *Kirk!*

The whole plant is blackish-brown when dried.

50. **T. atrum,** *A. W. Hill in Kew Bulletin*, 1910, 182. A perennial undershrub; rootstock woody; stems numerous, prostrate, stout, woody, 1 ft. or more long, with ascending branches, becoming black when dried, all younger parts green when fresh; branches 4–6 in. long, with numerous long and short lateral branches. Leaves scale-like, orbicular-ovate, subacute, $\frac{1}{2}$ lin. long, fleshy, margins minutely ciliolate. Flowers terminating short leafy axillary branches; bracts and bracteoles orbicular-ovate, apiculate, minutely ciliolate, about $\frac{1}{2}$ lin. long, forming an involucre. Perianth white, $\frac{7}{8}$ lin. long; lobes $\frac{1}{2}$ lin. long, ovate, subacute, glabrous, slightly hooded, margins membranous, slightly papillose. Anthers and filaments $\frac{1}{5}$ lin. long. Style $\frac{1}{2}$ lin. long. Fruit black when dry, globose-ovoid, $1\frac{1}{4}$ lin. long, 1 lin. broad, ribs and veins not prominent.

Lower Guinea. Angola: Suassingua, *Gossweiler*, 2713!

A distinct species, resembling *T. doloense*, Pilger, in turning black on drying, but distinguished by the small orbicular-ovate leaves and bracts with ciliolate margins.

51. **T. lopollense,** *Hiern in Cat. Afr. Pl. Welw.* i. 937. A perennial herb; rootstock rather thick, woody; stems numerous, spreading, 2–8 in. long, much-branched. Leaves scale-like, subulate or lanceolate-subulate, acute or acuminate, concave, about 1 lin. long. Flowers terminating the branches of short axillary leafy shoots; bracteoles 4 or 5, broadly ovate, acuminate, ciliolate, 1 lin. long, forming a small involucre to the flower. Perianth cylindrical, $1\frac{1}{8}$ lin. long; lobes $\frac{1}{2}$ lin. long, lanceolate, obtuse with an incurved apiculus, margins slightly incurved, papillose. Anthers $\frac{1}{4}$ lin. long; filaments $\frac{1}{4}$ lin. long. Style $\frac{3}{4}$ lin. long; stigma capitate. Fruit ovoid, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, 5 primary ribs prominent, the 5 intermediate ones and the transverse reticulations well developed.

Lower Guinea. Angola: Huilla; in pastures near Lopollo, among the bushes, &c., *Welwitsch*, 6437!

52. **T. tamariscinum,** *A. W. Hill in Kew Bulletin*, 1910, 188. Undershrub, perennial (?); stems glabrous, slender above, flexuose, prostrate or suberect, 8 in. to $1\frac{1}{2}$ ft. long, grooved, much-branched; vegetative branches more or less filiform. Leaves reduced to ovate acute scales, $\frac{1}{2}$ lin. or less long, distant. Flowers solitary at the ends of short leafy branches, $\frac{1}{4}$–$1\frac{1}{2}$ in. long, with a small involucre of ovate acute or acuminate bracteoles about $\frac{3}{8}$ lin. long. Perianth $\frac{3}{4}$ lin. long; lobes $\frac{1}{2}$ lin. long, narrowly ovate, hooded, margins inflexed, minutely ciliolate towards the base. Anthers and filaments $\frac{1}{8}$ lin. long. Style $\frac{1}{2}$ lin. long; stigma capitate. Fruit globose-ovoid, about 1 lin. long, with 5 main ribs and intermediate reticulations.

Mozamb. Distr. British Central Africa: Nyasaland; between Kondowe and Karongu, 2000–6000 ft., *Whyte!* Nyika plateau, 6000–7000 ft., *Whyte*, 168!

2. OSYRIDICARPOS, A.DC.; Benth. et Hook. f. Gen. Pl. iii. 222.

Flowers hermaphrodite. Perianth adnate to the ovary and produced above into a cylindrical tube; lobes 5, valvate, with a tuft of hairs on the face. Stamens 5, inserted below the lobes; filaments short, slender; anthers ovoid, with 2 parallel cells dehiscing longitudinally. Disk indistinct. Ovary inferior; ovules 2–3, pendulous from the tip of a flexuose filiform central placenta; stigma obscurely lobed. Drupe globose, crowned with the persistent perianth.—Undershrubs, with long slender sarmentose sulcate branchlets. Leaves alternate, shortly petioled, oblong or lanceolate, triplinerved. Flowers in terminal racemes produced down into the axils of the leaves, small, green; bracteoles minute.

Species 5, the other in South Africa, all very closely allied to one another.

Leaves oblong or lanceolate.
- Lobes of the perianth $\frac{1}{2}$–$\frac{1}{3}$ the length of the tube . 1. *O. schimperianus.*
- Lobes of the perianth $\frac{1}{4}$ the length of the tube.
  - Leaves pubescent, $\frac{1}{2}$–$\frac{3}{4}$ in. long . . . . 2. *O. scandens.*
  - Leaves glabrous, 1–2 in. long . . . . 3. *O. Kirkii.*

Leaves linear . . . . . 4. *O. linearifolius.*

1. **O. schimperianus,** *A.DC. in DC. Prodr.* xiv. 635. An undershrub; branchlets long, slender, green, glabrous, sarmentose, sulcate. Leaves shortly petioled, lanceolate, rather thick, dull dark green and glabrous on both surfaces, the lower $\frac{1}{2}$–1 in. long, $\frac{1}{6}$ in. broad, the upper growing gradually smaller. Flowers in terminal racemes produced down into the axils of the upper leaves, 1–3 from a node on a short erecto-patent peduncle; bracteoles lanceolate, minute. Perianth green, $\frac{1}{6}$ in. long; lobes oblong, whitish, $\frac{1}{2}$–$\frac{1}{3}$ the length of the tube.—Engl. Hochgebirgsfl. Trop. Afr. 199; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 152; Oliv. in Hook. Ic. Pl. t. 1443, partly. *Thesium schimperianum*, Hochst. ex A. Rich. Fl. Abyss. ii. 235.

Nile Land. Eritrea: around Acrur, 6000 ft., *Schweinfurth & Riva*, 1034! Mogod Valley, 4500 ft., *Schweinfurth & Riva*, 1605! Keren, *Steudner*, 1367! Abyssinia: Mount Sholoda, *Schimper*, 404! *Hildebrandt*, 672! *Beccari*, 212. British East Africa: Uganda; Eldama Ravine and Mau, 7000–7500 ft., *Whyte!* Lykipia, *Von Höhnel*.

2. **O. scandens,** *Engl. Jahrb.* xix. *Beibl.* 47, 29. An undershrub; branchlets long, green, sulcate, slender, pubescent towards the tip. Leaves shortly petioled, oblong, $\frac{1}{2}$–$\frac{3}{4}$ in. long by half as broad, obtuse with a mucro, narrowed to the base, comparatively thin, dull green and pubescent on both surfaces, 3–5-nerved. Flowers solitary in the axils of the upper leaves on short erecto-patent pubescent pedicels; bracts minute, ovate or lanceolate. Perianth $\frac{1}{4}$ in. long above the ovary; lobes ovate, $\frac{1}{4}$ the length of the tube.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 3500 ft., *Volkens*, 1723!

3. **O. Kirkii,** *Engl. Jahrb.* xix. *Beibl.* 47, 30. An undershrub; branchlets long, slender, sarmentose, conspicuously sulcate, green, glabrous. Leaves shortly petioled, oblong-lanceolate, acute, moderately thick, dark green, glabrous, triplinerved, the lower 1–2 in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, the upper growing gradually shorter. Flowers in long terminal racemes produced down into the axils of the upper leaves; pedicels short, erecto-patent, mostly 1-flowered; bracts minute, lanceolate. Perianth green, $\frac{1}{4}$ in. long; lobes ovate, whitish, $\frac{1}{4}$ the length of the tube. Berry globose, the size of a pea.—*O. schimperianus*, Oliv. in Hook. Ic. Pl. t. 1443, partly.

Mozamb. Distr. German East Africa: Usagara; Mlali, *Stuhlmann*, 200. British Central Africa: Nyasaland; between Shibisa (Chikwawa) and Tschinmuzo, 2000–4000 ft., *Kirk!*

4. **O. linearifolius,** *Engl. Jahrb.* xxviii. 385. A shrub 6–7 ft. high; branches long, virgate, longitudinally sulcate. Leaves linear, $\frac{3}{4}$–1 in. long, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, slightly narrowed to the base, obtuse, with a cartilaginous apiculus. Flowers 3–7 in lax cymes; bracts lanceolate; pedicels shorter than the flowers. Perianth-lobe deltoid. Anthers sessile at the base of the lobes. Style as long as the turbinate ovary.

Mozamb. Distr. German East Africa: Central Uluguru, *Stuhlmann*, 919 *Goetze*, 310.

Var. *Gœtzei*, Engl. Jahrb. xxx. 305. A climbing shrub 20–25 ft. high. Cymes very divaricate, 3–15-flowered; bracts linear-lanceolate.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Mountains 7500–8000 ft., *Goetze*, 1253.

3. **OSYRIS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 227.

Flowers subdiœcious. Perianth-tube in the male flowers very short and solid, in the female entirely adnate to the ovary; lobes 3–4, deltoid, valvate, with a tuft of hairs on the face. Stamens 3–4, attached to the base of the lobes; filaments rather thick; anther-cells subparallel, dehiscing longitudinally. Disk flat, angled between the stamens. Ovary inferior; ovules 2–4, pendulous from a short central placenta; style short or long; stigma 3–4-fid. Fruit globose, succulent, crowned with the persistent perianth-lobes; albumen fleshy; embryo straight or rather curved.—Glabrous shrubs. Leaves alternate, narrow or broad. Flowers small, axillary; bracts solitary, minute.

Species 9, spread through Southern Europe, India, and the whole of Africa.

Leaves oblong.
- Leaves 1–3 in. long.
  - Bracts linear . . . . . 1. *O. rigidissima.*
  - Bracts lanceolate . . . . . 2. *O. abyssinica.*
- Leaves $\frac{1}{6}$ in. long . . . . . 3. *O. parvifolia.*

Leaves lanceolate . . . . . 4. *O. tenuifolia.*

1. **O. rigidissima,** *Engl. Hochgebirgsfl. Trop. Afr.* 199. A shrub 6 ft. high, with thick branchlets. Leaves shortly and broadly petioled, oblong, $1\frac{1}{2}$ in. long, above $\frac{1}{2}$ in. broad, very rigid, very acute, turning brown when dried except the white midrib. Peduncles axillary, nearly $\frac{1}{2}$ in. long; male many-flowered; bracts linear as long as the subglobose buds. Perianth-lobes broadly ovate, under 1 lin. long.

Nile Land. Somaliland: near Maid, 4500-5500 ft., *Hildebrandt*, 1539.

2. **O. abyssinica,** *Hochst. in Flora*, 1841, i. *Intell.* 22 (*name only*). A much-branched shrub 6–8 ft. high, glabrous in all its parts. Leaves shortly petioled, oblong, 1–3 in. long, mucronate, narrowed to the base, rigidly coriaceous, glaucous, the veins (except the midrib) immersed and almost invisible. Male flowers in shortly peduncled axillary umbellate cymes; bracts minute, lanceolate; pedicels larger than the flowers. Buds globose, $\frac{1}{2}$ lin. in diam. Perianth-lobes 3, ovate. Female flowers usually solitary. Berry oblong, scarlet, the size of a small pea.—A. Rich. Tent. Fl. Abyss., ii. 236; A.DC. in DC. Prodr. xiv. 633; Engl. Hochgebirgsfl. Trop. Afr. 199; Schinz in Bull. Herb. Boiss. iv. App. iii. 55; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 152; Hiern in Cat. Afr. Pl. Welw. i. 938. *O. compressa*, Engl. Jahrb. xxx. 305, not of A.DC. *Fusanus alternifolia*, R. Br. in Salt, Abyss. App. lxiii. (name only).

Nile Land. Eritrea: near Saganeiti, *Schweinfurth & Riva*, 859! 976

Aidereso, *Schweinfurth & Riva*, 1421! Abyssinia: Mount Sholoda, *Schimper*, 281! Ankober, *Roth!* Gondar, *Steudner*, 1272! and without precise locality, *Schimper*, 235! *Petit!* Somaliland: near Maid, *Hildebrandt*, 1539A; Gabadir Plain, *Swayne!* British East Africa: Muka, *Kässner*, 925!

Lower Guinea. Angola: Huilla; subtemperate region, *Welwitsch*, 6438! German South-west Africa: Hereroland, *Nels;* Amboland, *Schinz*, 293.

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, *Holst*, 8932! Kinga (Livingstone) Mountains, 6200 ft., *Goetze*, 1269! British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 159! Shire Highlands, *Buchanan*, 92! Kalahari Region, *Fleck*, 317A, 318A, 572.

Also in Arabia and South Africa.

3. **O. parvifolia**, *Baker*. A shrub about 4 ft. high; branchlets terete, angular and grooved, spreading or erect-patent, minutely puberulous. Leaves shortly petioled, obovate-oblong or oblong, 4–5 lin. long, mucronate, narrowed to the base, very rigid, turning brown when dried, the veins (except the midrib) invisible, minutely puberulous. Male flowers in shortly peduncled axillary, usually 3-flowered, cymes; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long, minutely puberulous; bracts ovate, minute. Perianth green, urceolate, $\frac{1}{2}$–$\frac{3}{4}$ lin. long; lobes 3, broadly ovate. Anthers transversely elliptic; style minute. Female flowers and fruit unknown.

Nile Land. Abyssinia: Domak, Efat, *Roth*, 84!

4. **O. tenuifolia**, *Engl. Pfl. Ost-Afr. C.* 167. A much-branched shrub, glabrous in all its parts. Leaves thin, spreading, lanceolate, very shortly petioled. Peduncles axillary, solitary; bracts 2, lanceolate, minute. Perianth turbinate; lobes deltoid, rather shorter than the tube.

Mozamb. Distr. German East Africa: Kilimanjaro, *Volkens*, 232, 1732, *Merker;* Usambara; Kwai, *Busse*, 384, *Albers*, 123; Msulu, *Albers*, 220.

ORDER CXXI. **BALANOPHOREÆ.** (By W. Botting Hemsley.)

Flowers small or minute, unisexual, or very rarely hermaphrodite, numerous, borne in involucrate unisexual or bisexual heads, or in dense simple or branched unisexual or bisexual fleshy inflorescences, often called spadices. Male flowers relatively large, naked or furnished with a more or less perfect perianth; lobes 3–8, equal and valvate, or unequal in length and degree of attachment to the staminal column. Stamens 3–6, or more, free and of the same number and opposite to the perianth-lobes, or united in a column; anthers 2- or many-celled, variously dehiscing; pollen globose. Female flowers usually exceedingly small, often more than 10,000 in a head, naked or with an adnate perianth; limb small, sometimes almost obsolete, truncate or obscurely toothed, sometimes oblique, sometimes tubular above the ovary and variously lobed. Ovary cylindrical, ovoid or globose, 1-celled (in the African members of the family); style long, filiform, or stigma sessile. Ovule solitary, pendulous, developing late, described as naked or with a single coat or reduced to the embryo-sac, anatropous or semi-anatropous.

Fruit compound, fleshy, with immersed coriaceous or crustaceous achenes, or the carpels themselves fleshy and crowded but not consolidated. Seed filling the cell, globose or oblong, albuminous; testa exceedingly thin. Embryo microscopic, central or lateral, undivided. —Herbs parasitic on the roots of trees and shrubs, dwarf, fleshy, perennial or flowering only once, destitute of chlorophyll, but usually brightly or brilliantly coloured. Caudex tuberous, irregularly lobed and bearing branched inflorescences, or emitting branched cylindrical rhizomes bearing unbranched inflorescences. Leaves reduced to scales, usually densely imbricated. Inflorescences usually emerging from a more or less distinct ring of scales termed a volva.

About 15 genera and 50 species of this order have been described and they are widely, though not generally, distributed in tropical and subtropical regions. With regard to the delimitation of the genera of the *Balanophoreæ*, a critical examination of the accumulated material in herbaria would probably lead to some alterations. For example, apart from the presence or absence of a perianth in the female flowers, some of the species referred to *Balanophora* differ less from the species of one section of *Thonningia* than the species of the two sections of *Thonningia* differ from each other. But it would be rash to attempt a new classification of some of the genera without reference to the others.

The nature of the parasitism of the African members, at least, of the *Balanophoreæ* is peculiar, and although it was mentioned by Sir Joseph Hooker in *Lindley's Vegetable Kingdom*, ed. 3 (1853), 89, and more recently by others, including Prof. H. Lecomte, it is by no means a matter of general knowledge, and consequently deserves a few words of explanation here. Of the processes of germination and subsequent development little has been observed, but apparently the tissues of the parasite do not enter the system of the host; no sinkers being formed. The seed germinates on the surface of the roots of the host and developes a tuberous growth into which the host itself pushes new roots, which convey the nutriment required by the parasite. This phenomenon offers a field of interesting investigation.

Tuber thick and irregularly-lobed, not emitting cylindrical rhizomes. Inflorescences much-branched. Stamens free, of the same number and opposite the perianth-lobes, included; anthers globose, many-celled, dehiscing by pores. Stigma sessile, large, discoid	1. SARCOPHYTE.
Tuber emitting cylindrical branched rhizomes, bearing pedunculate, or sessile, involucrate heads of flowers. Stamens united in a column, exceeding the usually imperfect perianth; anthers linear, usually 2-celled, dehiscing longitudinally. Style long, capillary . .	2. THONNINGIA.

1. SARCOPHYTE, Sparrm.; Benth. et Hook. f. Gen. Pl. iii. 234.

Flowers fleshy, unisexual, diœcious; inflorescence branched, scaly at the base only. Male flowers racemose-paniculate. Perianth 2–4-partite, mostly 3-partite; lobes equal, valvate. Stamens free, of the same number and opposite the perianth-lobes; anthers globose, many-celled, dehiscing by pores; pollen globose. Female flowers capitate-paniculate, destitute of perianth, crowded, free from each other (connate in the lower part, *Eichler*). Ovary more or less immersed in the fleshy naked

receptacle, 1-celled (tricarpellary, *Eichler*); stigma large, sessile, discoid; ovules 3, pendulous. "Fruit similar to the ovary though slightly larger; epicarp fleshy; endocarp hard, the carpels of the separate flowers crowded, but not consolidated as in a truly compound fruit. Seed filling the cavity; albumen large-celled; embryo very small, central."—Herb parasitic on the roots of various *Mimoseæ*, &c., forming a large irregularly lobed tuber, bearing erect fleshy branched bracteate inflorescences, scaly at the base only. Volva annular, coriaceous, 2–3 lin. long. Whole plant deep crimson, emitting a very unpleasant odour resembling putrid fish.—*Ichthyosma*, Schlecht. in Linnæa, ii. 671, t. 8; iii. 194.

1. **S. sanguinea,** *Sparrm. in Kongl. Vet. Akad. Handl. Stockh.* xxvii. (1776), 300, *t.* 7. Glabrous in all parts. Tuber irregularly lobed, verrucose, 2–5 in. in diam., or probably sometimes larger. Male inflorescence usually taller and looser than the female and sometimes exceeding a foot in height; in the tropical specimens seen consisting of a main axis about $\frac{3}{4}$ in. thick, scaly at the base and bearing numerous lateral racemes $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, arising in the axils of lanceolate bracts from $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Male flowers crowded, very shortly pedicellate, ebracteolate, about 3 lin. in diam. Perianth-lobes 2–4, usually 3, thick, fleshy, cucullate, 1–$1\frac{1}{2}$ lin. in diam., enclosing the opposite stamens. Female inflorescence (described from extra-tropical specimens) capitate-paniculate, very dense, subglobose or oblong, 3–9 in. high, branched to the third or fourth degree. Heads crowded, globose, 4–6 lin. in diam., very shortly pedunculate, destitute of involucre. Female flowers very densely crowded, $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam., destitute of perianth, free from each other. Ovary immersed in the fleshy naked receptacle; style none; stigma discoid, of the same diameter as the flower.—Hook. f. in Trans. Linn. Soc. xxii. t. 1, fig. C; Eichler in DC. Prodr. xvii. 127. *Ichthyosma Wehdemanni*, Schlecht. in Linnæa, ii. 671, t. 8.

Nile Land. British East Africa: Kibwezi, damp, low forest at about 3300 feet, on the roots of a thorn-tree; inflorescence deep red, *Scheffler*, 361! *Scott-Elliot*, 6293!

Also in extratropical South Africa.

It is a little doubtful whether the Uganda perfect male specimens are of the same species as the extra-tropical plant, which appears to have a much more compoundly branched male inflorescence. But as Engler (*Pfl. Ost-Afr. C.* 168) refers Zanzibar and Kilimanjaro specimens to *S. sanguinea*, he has been provisionally followed here.

2. THONNINGIA, Vahl; Benth. et Hook. f. Gen. Pl. iii. 236.

Flowers unisexual, arranged in involucrate unisexual or bisexual heads, similar to those of many of the *Cynaroideæ*, sessile. Heads solitary, pedunculate or sessile. Scales of the involucre rigid, in several or many series. Male flowers relatively few and large, in separate heads or in one or more circumferential series in the bisexual heads. Perianth of usually 3–5 lobes unequal in length and degree of attachment to the staminal column; sometimes regular or only slightly oblique; some-

times obsolete. Stamens 3–5, or perhaps sometimes more, united in a column; anthers normally 2-celled, sometimes imperfect, or more or less embedded in the column, dehiscing longitudinally; cells sometimes irregular in number, length and height; pollen subglobose. Receptacle usually bracteolate. Female flowers very small and very numerous, occupying the whole head or surrounded by one or more series of male flowers, often exceeding 10,000 in a head. Perianth adherent, produced in a cylindrical tube above the ovary, 2–5-lobed; lobes unequal, forming an oblique limb, or equal or almost obsolete. Ovary inferior, 1-celled, cylindrical; style exserted, about the same length as the ovary, filiform or capillary; ovule solitary. Fruit compound, fleshy, highly coloured, strongly resembling a strawberry in external appearance, sometimes as much as 2 in. in diam. Seed imperfectly known; not present in any of the specimens examined.—Herbs parasitic on the roots of trees or shrubs, perennial, forming tubers at the points of attachment to the host and emitting more or less branched cylindrical usually hairy rhizomes, bearing sessile or more or less pedunculate flower heads; fleshy or coriaceous, destitute of chlorophyll, but brightly or brilliantly coloured. Leaves none. Peduncles densely clothed with imbricating rigid sharp-pointed scales. Heads solitary; involucral scales similar to and continuous with those on the peduncles.

Species 6, all endemic.

Thonningia, excluding *T. malagasica*, Fawcett (*Trans. Linn. Soc. ser.* 2, *Bot.* ii. 239, *t.* 36) is restricted to tropical Africa. The floral structure of the Madagascar plant is so different that a revision of the whole order would probably lead to giving it generic rank. In some respects the flowers are more like those of some of the species placed in *Balanophora* itself; the males having a regular perianth enclosing the staminal column, and the females being destitute of a style which is a conspicuous feature in *Thonningia*.

Eichler, in *DC. Prodr.* xvii. 141, describes the male flowers of *Thonningia* as pedicellate; but as some of the lobes of the imperfect perianth are sometimes given off near the base of this axis, or are easily detached to its base, it seems more consistent to treat it as a part of the staminal column.

Hitherto botanists, with the exception of Prof. Lecomte, the author of *T. sessilis*, have referred all the specimens of *Thonningia* that have come under their observation to the original *T. sanguinea*. Thus in Engler (*Pfl. Ost-Afr. C.* 169) and Durand (*Sylloge Floræ Congolanæ*, 476) and in the herbaria consulted all the specimens were under this name; but excellent specimens in alcohol at Kew, collected by Monteiro in Angola, and by Dawe in Uganda, at once suggested plurality of species, which was confirmed by examination. Mrs. Talbot's excellent coloured drawings at the British Museum, the only ones seen, were a great help, though unfortunately the specimens drawn were attacked by insects before being put into spirit and the male flowers, especially, almost entirely destroyed. Possibly segregation has been carried too far; but it was considered better to err in this direction rather than confuse two species under one name. Complete specimens of both sexes are much needed. The tubers of most of the species are unknown, and no information concerning the host-plant is forthcoming. Ripe seed is wanting in all the specimens examined, except the doubtful *T. malagasica*.

We are indebted to Dr. A. B. Rendle for facilities for comparing the British Museum material with that at Kew.

Flower-heads unisexual.
  Flower-heads subglobose.
    Involucral-scales acute, not acuminate.
      Peduncles $\frac{1}{2}$–3 in. long . . . . . 1. *T. sanguinea.*
      Peduncles $\frac{1}{4}$–$\frac{1}{2}$ in. long . . . . . 2. *T. dubia.*
    Involucral-scales acuminate, very acute . . . 3. *T. ugandensis.*
  Flower-heads ovoid.
    Involucral-scales elongate-acuminate . . . 4. *T. elegans.*
Flower-heads bisexual. Peduncles very short or obsolete.
    Male perianth deficient. Female perianth inflated 5. *T. sessilis.*
    Male perianth present. Female perianth very narrow, cylindrical . . . . . 6. *T. angolensis.*

1. **T. sanguinea,** *Vahl in Danske Selsk. Skrifter*, vi. 125, *t.* 6. Tuber only seen in a young condition, 9–12 lin. in diam. Rhizomes branched, 2–3 lin. in diam. in a dried state, more or less pubescent. Volva obscure. Peduncles $\frac{1}{2}$–3 in. long. Scales of the peduncle thick, ovate-lanceolate, increasing in size upwards, 2–6 lin. long, keeled, obscurely serrulate, glabrous outside, hairy inside at the base, scarcely acute. Scales of the involucre similar but larger, except the innermost ones, the longest about 9 lin. long. Flower-heads unisexual, $\frac{3}{4}$–$1\frac{1}{4}$ in. in diam.; male smaller and more numerous than the female. Male flowers about 50 in a head, seated on a flat or slightly convex receptacle and interspersed with small subulate or filiform bracteoles 4–8 lin. long. Perianth variable, irregular, imperfect, 2–6-lobed but usually 3-lobed; lobes of unequal length and degree of attachment to the staminal-column, linear, 1–3 lin. long, acute, erect. Anthers 3–6, about as long as the perianth (and pedicel?), at first consolidated, at length separating (?). Fema e flowers very numerous, 1–$1\frac{1}{2}$ lin. long. Perianth (and ovary) equal or slightly longer or shorter than the style, tubular above the ovary, mouth obscurely and irregularly toothed.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 907! Gold Coast: Aquapim, *Thonning!* Aburi, *Leslie!* Ashanti, *Cummins*, 192! Lagos: Yoruba, *Millson*, 145! Northern Nigeria: near Mount Purdy, *Barter!* Nigeria, *Talbot!*

Lower Guinea. Cameroons: Bipinde, *Zenker*, 1737! Lower Congo: Kinchassa, *Schlechter*, 12803!

The definition of this and of the following proposed species is by no means complete and satisfactory, and can only be regarded as suggestive and provisional. Of the Talbot drawings, those numbered 707, 725 and 726 probably represent *T. sanguinea*, although the involucral scales are pale in colour, and more acuminate in shape than those of any of the herbarium specimens referred here.

2. **T. dubia,** *Hemsl.* Tuber not seen. Rhizomes cylindrical, 2–3 lin. in diam., obscurely pubescent. Volva short, truncate with a more or less broken margin. Peduncles contiguous, $\frac{1}{4}$–$\frac{1}{2}$ in. long, or undeveloped; scales triangular-ovate, 2–4 lin. long, subobtuse. Scales of the involucre multiseriate, ovate-lanceolate to nearly linear, up to 1 in. long, hardly acute, irregularly finely serrulate. Flower-heads unisexual, the male apparently as large as the female, 1–$1\frac{1}{2}$ in. in diam.; male receptacle convex, 5–6 lin. in diam.; female receptacle hemispherical.

Male flowers about 50 to the head, 5–6 lin. long, interspersed with subulate bracteoles 1–1½ lin. long; perianth-tube about 2 lin. long; lobes usually 4, linear, about as long as the tube, erect, equal or unequal in length; staminal column clavate; anther-cells 2–3 lin. long, dehiscing longitudinally. Female flowers very numerous, very slender, 1–1½ lin. long; ovary about as long as the exserted style, usually distinctly 3-toothed, teeth acute, unequal.

Lower Guinea. Cameroons: Cameroon Mountain, 5000 ft., *Kalbreyer*, 105!

Perhaps not specifically distinct from *T. sanguinea*, but the larger flower-heads with relatively longer involucral scales, the more fully developed perianth of the male flowers and other slight differences seem to justify separation.

3. **T. ugandensis,** *Hemsl.* Tuber and rhizomes wanting. Volva about ½ in. deep, almost truncate or irregularly lobed; lobes broad, rounded. Peduncles ½–2½ in. long, slender; scales thick, ovate, 3–5 lin. long, lower ones somewhat obtuse, keeled, slightly hairy at the base inside. Scales of the involucre continuous with those of the peduncles, similar but larger and very acute, longest 1 in., obscurely serrulate. Flower-heads unisexual; male ¾ in., female 1½ in. in diam., globose or subglobose; receptacle 4–9 lin. in diam. Male flowers 40–50 in a head, interspersed with filiform bracteoles, 6–8 lin. long; perianth more or less adnate to the staminal column; lobes 3, or rarely 4, linear, acute, of unequal length and attachment; staminal column only slightly overtopping the longest perianth-lobes; anthers usually 5, confluent, dehiscing longitudinally. Female flowers exceedingly numerous, sometimes more than 10,000 in a head, 1–2 lin. long, but mostly about 1½ lin. long; perianth about twice as long as the free style; tube almost capillary, but relatively thick and fleshy in the outermost flowers, which are nearly as long as the innermost scales of the involucre; limb obscurely dentate; bracteoles none.—"*T. sanguinea*," M. T. Dawe, Report on a Botanical Mission through the forest districts of Buddu and the White Nile Province of Uganda, 1906, 55.

Nile Land. Uganda: Entebbe, common in forest, brilliant red, *Dawe*, 1904!

Excellent specimens of inflorescences in alcohol.

Careful counting of the number of female flowers in a head of average size gave a total of 10,808; but, judging from superficial comparisons, this number is at least equalled in other species.

4. **T. elegans,** *Hemsl.* Tuber absent. Rhizomes cylindrical, about 3 lin. in diam., pubescent. Volva well developed, with broad irregular lobes. Peduncles ½–1¼ in. long; scales thick, glabrous on both sides, lower ones obtuse. Scales of the involucre lanceolate or oblong-lanceolate, the longest 1–1¼ in. long, acuminate, very acute, intermediate, thin, narrow-oblong or almost linear, innermost quite small. Flower-heads ovoid, unisexual; male only present, 1–1¼ in. long, 5–10 lin. in diam.; receptacle convex, 3–5 lin. in diam. Male flowers 50, or more, in a head, interspersed with small bracteoles, 7–9 lin. long; perianth more or less adnate to about the middle of the staminal column; lobes usually 3, linear, acute, unequal, 1–2 lin. long. Staminal column clavate; anther-cells elongated, subequal.

Upper Guinea. Gold Coast: Aburi, *Johnson*, 521!

The Talbot drawing numbered 475 is referred to this species. An unnumbered drawing of a specimen in fruit may be this or *T. sanguinea*.

5. **T. sessilis,** *Lecomte in Journ. de Bot.* x. 229–235, *t.* 1. Tuber 1–4 in. in diam. Rhizome solitary, hairy, 2–3 lin. in diam. Peduncles none or very short, not scaly. Scales of the involucre multiseriate, glabrous, ovate, acute, outermost and innermost small, not more than a line long, intermediate 4–5 lin. long. Flower-heads spherical, about 1 in. in diam., bisexual; receptacle subglobose, constricted at the base, 7–8 lin. in diam. Male flowers relatively very few, in one or more series outside of the female flowers, destitute of a perianth (?), reduced to flattened clavate bodies $2\frac{1}{2}$ lin. long; anther-cells 4–8, linear, more or less curved, unequal in length, dehiscing longitudinally. Female flowers very numerous, 1–2 lin. long; perianth tubular, inflated, 4–5-lobed; lobes deltoid, obtuse; style clavate, papillose, about as long as the perianth; ovary linear, almost equalling the perianth; ovule none, 1, 2 or 3 free embryo-sacs being formed in the tissue of the carpel. Fruit an achene crowned by the withered perianth. Seed without integument, reduced to albumen surrounding a nearly spherical embryo, seated in the centre of the upper part of the albumen.

Lower Guinea. French Congo: humid forest on the River Loukamba, an affluent of the Kouilou, *Lecomte*.

Description compiled from Professor Lecomte's account of the plant, which is evidently allied to *T. angolensis*, Hemsl., differing in the smaller flower-heads, relatively small male flowers and the much more highly developed perianth of the female flowers.

6. **T. angolensis,** *Hemsl.* Tuber not seen. Rhizomes branching, 3–5 lin. thick, densely tomentose, bearing numerous, almost crowded flower-heads. Volva distinct, truncate or obscurely lobed. Peduncles $\frac{1}{4}$–$1\frac{3}{4}$ in. long, numerous, contiguous, constricted below the flower-heads; scales thick, ovate, 3–4 lin. long, subacute, very hairy on the covered surfaces. Scales of the involucre similar but larger and glabrous on both sides, longest 9–10 lin. long, intermediate scarious, mostly very broad at the base, abruptly acute, innermost very small, 1–3-toothed at the apex. Flower-heads spherical, $\frac{3}{4}$–$1\frac{1}{4}$ in. in diam., bisexual, "rose-coloured" (*Monteiro*); receptacle hemispherical or almost spherical by constriction at the base. Male flowers in one or more circumferential series, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Perianth of usually 3 linear acute unequal lobes, the free part $\frac{1}{2}$–2 lin. long, the longest about half the length of the staminal column. Anther-cells 1–5. Female flowers very numerous, 1–$1\frac{1}{4}$ lin. long; ovary longer than the style.—"*T. sanguinea*," Monteiro, Angola and the River Congo, i. 198.

Lower Guinea. Angola: Bembe, *Monteiro!*

It is quite probable that this may prove to be the same as *T. sessilis*, Lecomte, in spite of slight described differences in both male and female flowers. The length of peduncle varies considerably on the same rhizome and contiguous flower-heads. Although tubers are wanting, Monteiro's specimens are otherwise excellent and ample in other respects, and they are preserved in alcohol.

ORDER CXXII. **EUPHORBIACEÆ.** (By N. E. Brown, J. Hutchinson and D. Prain.)

Flowers monœcious or dicecious, usually regular. Perianth occasionally absent in one or both sexes, usually small, often dissimilar in the two sexes, simple, valvate or imbricate, calycine, rarely petaloid, or double, both outer and inner calycine and imbricate, or the inner petaloid, imbricate, rarely subvalvate, longer or shorter than the outer. Male: stamens definite or indefinite (1–1000); filaments free or connate; anthers 2- (rarely 3–4-) celled; cells usually parallel, adnate to the connective throughout or free except at base or apex and erect, divaricate or suspended, rarely superposed; dehiscence usually longitudinal, rarely porous. Rudimentary ovary present or absent. Female: ovary sessile, rarely shortly stipitate, usually 3-, frequently 2- or 4-, very rarely 1- or more than 4-celled; styles usually as many as and continuous with the carpels, free or more or less connate, erect or spreading, entire or 2-fid or laciniate; inner face of styles or style-arms usually stigmatic throughout; ovules in each cell solitary or 2 collateral, pendulous from the inner angle; funicle often thickened. Disk annular, entire or lobed, or of free contiguous or discrete scales, or none. Fruit usually capsular of 2-valved cocci separating from a persistent axis, or indehiscent and drupaceous, 1–3-celled or of a single or 2–3 connate nuts. Seeds attached laterally near or above the middle of the cell, with or without a caruncle or an arillus; albumen usually copious, fleshy; embryo straight, radicle superior, cotyledons broad, flat, rarely thick, fleshy.—Herbs, shrubs or trees, often with milky juice. Leaves alternate or opposite, simple or rarely compound, sometimes rudimentary; stipulate or exstipulate. Flowers usually small or very small; inflorescence rather variable.

Species about 4000, mostly in the tropics of both hemispheres.

Excluded genera.

BRICCHETTIA, Pax in Ann. Istit. Bot. Roma, vi. 181 = *Cocculus Leæba*, DC.—Menispermaceæ.

GILGIA, Pax in Engl. Jahrb. xix. 80 = *Glossonema Revoili*, Franch.—Asclepiadaceæ.

SCHUBEA, Pax in Engl. Jahrb. xxviii. 22, is a mixture. The leaves are those of *Cola pugionifera*, K. Schum., and the inflorescence that of *Trichoscypha ferruginea*, Engl.

TRIBE I. **Euphorbieæ.** *Apparent flower composed of a number of stamens (really male flowers, each consisting of a single stamen jointed to a pedicel and soon falling away from it, with or without a minute or rudimentary perianth) mingled with bracteoles, with or without one stalked ovary (really a pedicellate female flower, with or without a small or rudimentary or very rarely comparatively large perianth) in their midst, enclosed in a cup-shaped or 4-angled involucre, the whole resembling a small male or hermaphrodite flower, or 4 involucres composed of free bracts containing the stamens, supported by an open 4-lobed common involucre,*

alone or half surrounding one ovary (female flower) which is not enclosed in a separate involucre. Ovary 2–3*-celled, with* 1 *pendulous ovule in each cell.*

*Ovary or female flower, when present, enclosed in the same involucre as the stamens; involucre shortly tubular, cup-like or 4-angled, sometimes open to half-way down on one side, never open to the very base nor composed of entirely free segments.

†Involucre a cup or short tube cut into a fringe of filiform segments at the top, with an erect oblong entire lobe outside and behind, glandular at its apex and over-topping the fringe . . . . . 1. STENADENIUM.

††Involucre a cup (not 4-angled), with an entire rim-like gland or 2–8 green or coloured glands at its margin, surrounding an inner circle of 4–8 (usually 5) thin and usually fringed or toothed lobes, often with a pair of scale-like or conspicuous green or coloured bracts at its base or enclosed in an entire or 2-lobed obliquely cup-like bract.

Involucre with one continuous rim-like entire or rarely 4-crenate erect or spreading gland entirely surrounding it, or open on one side, occasionally with 1–5 cut-like notches separating the gland into contiguous and usually unequal segments, but scarcely forming distinct glands. (See also 4, *Euphorbia*.)

Perennials with thick cylindric fleshy stems or with annual unbranched stems from a tuberous root-stock. Bracts free or combined into an oblique entire or 2-lobed cup longer than and partly concealing the involucre, which is open on one side . . . . . 2. MONADENIUM.

Branching shrubs or small trees; bracts free, scarcely or not exceeding the rim of the involucre, which is usually entire, but sometimes has 1–5 cut-like notches . . . . . 3. SYNADENIUM.

Involucre with 2–8 distinct glands, contiguous or equally spaced, entire and with or without petal-like appendages or 2-horned or divided into 3–15 entire or forked processes. (In a few succulent species of *Euphorbia* the glands are united into a continuous rim and then are technically not distinguishable from *Synadenium*, and a few species of the latter genus have the gland divided by cut-like notches and are then technically scarcely distinct from *Euphorbia*.)

Fruit separating into 3 lobes or cells, which open down the inner face to liberate the seed, not fleshy or but slightly so in a few succulent species . . . . . 4. EUPHORBIA.

Fruit indehiscent, thickly fleshy, containing one hard 3-celled "stone" . . . . . 5. ELÆOPHORBIA.

†††Involucre 4-angled, divided into 4 compartments by 4 large partition-like glands, without a gland or glands on or outside its margin . . . . . 6. DICHOSTEMMA.

**Ovary or female flower, when present, with a cup-like calyx at its base, not enclosed in an involucre, but half surrounded by 4 involucres formed of free bracts, containing the stamens supported on the 4 lobes of an open hand-like common involucre which spreads on one side of it. . . . . 7. ANTHOSTEMMA.

TRIBE II. **Buxeæ.** *Perianth calyx-like. Segments imbricate or (in some extra-African species) absent. Stamens opposite the segments, in the African genera 4 or 6. Ovules 2 in each cell, rarely solitary; raphe dorsal. Styles undivided or slightly bifid. Cotyledons various. Shrubs or trees with opposite entire leaves (African species).*

Stamens 4, opposite the segments . . . . . 8. BUXUS.
Stamens 6, two single opposite the outer segments, four in pairs opposite the inner . . . . . 9. NOTOBUXUS.

TRIBE III. **Phyllantheæ.** *Sepals valvate or imbricate in bud, in 1–2 series. Petals when present small and scale-like. Stamens in 1–2 series, the outer opposite the sepals, rarely indefinite in the centre of the flower. Ovules 2 in each cell (in* Martretia *the ovary is 2-celled, each cell partially divided by a false septum between each ovule), collateral and usually contiguous; caruncle usually conspicuous; raphe ventral. Cotyledons much broader than the radicle. Inflorescence various, axillary, rarely paniculate and terminal.*

*Sepals of the male flowers valvate in bud.
Flowers in axillary fascicles or glomerules, rarely in spicate clusters or short racemes; petals present, very rarely absent; ovary-cells not divided by false septa.
Fruits drupaceous; ovary 2-celled; tertiary nerves of the leaves usually parallel . . . . 10. BRIDELIA.
Fruits capsular; ovary 3-celled; tertiary nerves usually not parallel . . . . . 11. CLEISTANTHUS.
Flowers in racemes; petals absent; ovary-cells partially divided by a false septum . . . . 24. MARTRETIA.
**Sepals of the male flowers imbricate in bud.
Leaves digitately compound.
Leaves opposite; leaflets stalked . . . . 12. OLDFIELDIA.
Leaves alternate; leaflets sessile or subsessile.
Fruits dehiscent; leaflets 1–3 . . . . 13. ARISTOGEITONIA.
Fruits indehiscent; leaflets 5–7 . . . . 14. PAIVÆUSA.
Leaves simple.
†Petals present in the male flowers.
Inflorescence paniculate; capsule loculicidal.
Panicles terminal and clustered at the apices of the shoots; disk in the male flowers consisting of separate glands . . . . 15. MEGABARIA.
Panicles axillary; disk in the male flowers cupular . . . . . 16. CENTROPLACUS.
Inflorescence spicate, racemose or fasciculate.
Styles absent; stigmas sessile, thick, entire . 17. AMANOA.
Styles well developed, usually divided.
Male flowers in spikes or racemes . . 26. THECACORIS.
Male flowers in axillary fascicles.

Shrubs; disk in the male flowers annular, entire or lobed; seeds exalbuminous or nearly so . . 18. ACTEPHILA.
Diffuse herbs or small slender undershrubs; disk in the male flowers consisting of separate glands; seeds usually with copious albumen . 19. ANDRACHNE.

††Petals absent from the male flowers.

Male flowers in globose heads surrounded by calycine bracts; females solitary and axillary . . . . . 20. UAPACA.
Male flowers in spikes or racemes.
Ovary 1-celled; fruits drupaceous . . 21. ANTIDESMA.
Ovary 2–3-celled; fruits not drupaceous.
Fruits winged; disks absent from both sexes . . . . . 22. HYMENOCARDIA.
Fruits not winged; disk present in both sexes.
Stems annual, mostly simple, arising from a woody rhizome . . . 23. CYATHOGYNE.
Stems perennial; much branched trees or shrubs.
Ovary 2-celled, each cell divided by a false septum between each ovule; styles 2, connate at the base, undivided . . . 24. MARTRETIA.
Ovary-cells not divided by false septa; styles bifid or bilobed.
Bracts subtending the male flowers in 3 series, the middle bract cupular and enclosing the flowers in bud; disk of the female flowers adnate to the sepals . . . . . 25. PROTOMEGABARIA.
Bract subtending the male flower solitary; disk in the female flowers not adnate to the sepals.
Fruits depressed-globose, trilobed, 3-celled, dehiscing into 2-valved cocci . . 26. THECACORIS.
Fruits entire, 1-celled by abortion, not dehiscing into cocci 27. MÆSOBOTRYA.
Male flowers in axillary glomerules or fascicles, rarely in short cymes, racemes of fascicles or solitary.
Male flowers in short pedunculate cymes . 28. PSEUDOLACHNOSTYLIS.
Male flowers in axillary fascicles, glomerules, or solitary, rarely in racemes of fascicles.
Rudimentary ovary absent from the male flowers.
Disk central; styles usually absent; stigmas thick and flat, mostly quite entire; fruit indehiscent.

Stamens inserted around and at the base of the central disk . . 29. DRYPETES.
Stamens inserted on and amongst the folds or lobes of the central disk, lobes frequently surrounding the base of each filament and resembling a small fleshy perianth 30. LINGELSHEIMIA.
Disk outside or between the stamens, never central; styles usually present, more or less slender; fruit a capsule 31. PHYLLANTHUS.
Rudimentary ovary present in the male flowers.
Flowers diœcious; rudimentary ovary deeply tripartite; disk in the male flowers consisting of separate glands 32. FLUGGEA.
Flowers monœcious; rudimentary ovary lobed or subentire; disk in the male flowers saucer-shaped, entire or undulately lobed.
Stipules small, lanceolate, membranous; lobes of the disk opposite the sepals; styles divided . 33. CLUYTIANDRA.
Stipules large and foliaceous, encircling the branchlet; lobes of the disk alternate with the sepals; styles undivided . . . 34. ZIMMERMANNIA.

TRIBE IV. **Galearieæ.** *Sepals small, slightly imbricate. Petals present, two or three times the size of the sepals. Stamens* 1–2*-seriate (in the African species* 1*–seriate), the outer ones opposite the sepals and alternate with the petals as in* Phyllantheæ. *Ovule solitary in each cell as in* Crotoneæ. *Rudimentary ovary present in the male flower. Flowers (in the African species) in axillary fascicles.*

Only tropical African genus . . . . . 35. MICRODESMIS.

TRIBE V. **Crotoneæ.** *Sepals usually small, closed or valvate or imbricate in bud, very rarely petaloid. Petals when present free or connate, often longer than the sepals. Stamens* 1–2*-seriate, the outer alternate with the sepals, or more usually central, and few or indefinite, sometimes very many. Ovules solitary in each cell. Cotyledons much broader than the radicle. Inflorescence various, often racemose or spicate or paniculate.*

Leaves digitately compound.
Petals in male flowers 0; calyx shortly lobed, open in flower; fruit capsular . . . 36. HEVEA.
Petals in male flower present and connate; calyx-lobes valvate; fruit indehiscent . . . 37. RICINODENDRON.
Leaves simple, when digitately lobed (*Manihot, Ricinus, Macaranga*) not divided to the base.
Petals in male flowers present.
Anthers inflexed in bud; calyx-lobes valvate or slightly imbricate; male petals free . . 38. CROTON.
Anthers erect in bud.
Male calyx-lobes imbricate.
Flowers paniculate or cymose.

Flowers in 2-sexual dichotomous cymes; male petals free or united . . . 39. JATROPHA.
Flowers in 1-sexual racemes of cymules; male petals free . . . . . 40. MILDBRÆDIA.
Flowers in axillary fascicles or the females axillary and solitary; male petals free . 41. CLUYTIA.
Male calyx-lobes valvate.
Flowers paniculate or cymose; rudimentary ovary 0.
Male petals free; panicles terminal.
Leaves palminerved; fruit indehiscent or subindehiscent . . . . 42. ALEURITES.
Leaves penninerved.
Leaves beneath and calyx outside silvery lepidote . . . . 43. CYRTOGONONE.
Leaves beneath and calyx outside glabrous . . . . . 44. GROSSERA.
Male petals united; panicles axillary; leaves palminerved . . . . . 45. MANNIOPHYTON.
Flowers racemose or spicate.
Male petals usually united; racemes axillary; calyx lepidote; rudimentary ovary 0 46. CROTONOGYNE.
Male petals free; calyx not lepidote.
Racemes or spikes terminal; rudimentary ovary 0 . . . . . 47. HOLSTIA.
Racemes or spikes lateral.
Dioecious trees; filaments almost or quite free; anther-cells almost free, pendulous from a glandular connective; styles 2-fid . . . . 48. AGROSTISTACHYS.
Monoecious herbs; filaments connate into a column.
Rudimentary ovary present; styles lacerate . . . . . 49. CAPERONIA.
Rudimentary ovary 0; styles 2-fid 50. CHROZOPHORA.
Petals in male flowers 0.
*Male calyx in bud enveloping the stamens.
†Styles free or if connate into a slender column continuous with columella.
Racemes or spikes terminal, simple.
Flowers large; leaves (in our species) digitately lobed; calyx-lobes imbricate . 51. MANIHOT.
Flowers very small; leaves not lobed; calyx-lobes valvate . . . . 52. CEPHALOCROTON.
Racemes or spikes or glomerules axillary or lateral.
‡Male calyx-lobes valvate or subvalvate.
Filaments unbranched, usually free.
Anther-cells free except at point of attachment to filament, globose or ovoid; leaves not lobed.
Anther-cells sessile, erect.
Anthers 4-celled; male calyx not closed in bud, lobes subvalvate 53. HASSKARLIA.
Anthers 2-celled; male calyx closed in bud, lobes valvate.

Buds perulate; diœcious shrubs; cocci opening loculicidally, their valves coriaceous . 54. ERYTHROCOCCA.
Buds not perulate.
Flowars regularly distributed along the rhachis of the spikes or racemes; cocci opening loculicidally, their valves coriaceous . 55. CLAOXYLON.
Flowers in distant bracteolate glomerules or spiculæ on a filiform interrupted rhachis; cocci opening both loculicidally and septicidally, their valves crustaceous . . . 56. MICROCOCCA.
Anther-cells stipitate, at length flexuous; anthers 2-celled.
Stamens 8 or fewer . . . 57. ACALYPHA.
Stamens 10 or more . . . 58. MAREYA.
Anther-cells adnate to connective from middle upwards or throughout, usually oblong; male calyx closed in bud, lobes valvate.
Anthers 2-celled.
Stamens somewhat connate at base, usually 8 . . . 59. LEPIDOTURUS.
Stamens free.
Stamens 8 or fewer . . 60. ALCHORNEA.
Stamens 12 or more.
Styles 2-partite.
Leaves palminerved . 61. NEOBOUTONIA.
Leaves penninerved . 62. NECEPSIA.
Styles simple.
Stamens mixed with receptacular glands.
Hypogynous disk distinct . . . 63. CROTONOGYNOPSIS.
Hypogynous disk 0 . 64. ARGOMUELLERA.
Stamens without receptacular glands . . 65. MALLOTUS.
Anthers 4-celled, rarely 3-celled.
Styles 2-fid; anthers with superposed cells . . . 66. CLEIDION.
Styles simple; anthers with collateral cells.
Disk present . . . 67. DISCOGLYPREMNA.
Disk 0. . . . . 68. MACARANGA.
Filaments repeatedly branched, columnar below; anthers 2-celled; male calyx closed in bud; lobes valvate . . 69. RICINUS.
‡‡Male calyx-lobes imbricate; inflorescence axillary or lateral.
Flowers glomerulate; pedicels uniform.

Filaments connate into a column crowned by a rudimentary ovary; capsule echinate or tubercled; glomerules axillary . . . 70. CHÆTOCARPUS.
Filaments free; rudimentary ovary 0; capsule smooth; glomerules leaf-opposed or extra-axillary . . 71. GELONIUM.
Flowers racemose; anthers sessile or nearly so; capsule smooth; rudimentary ovary 0; pedicels thickened upwards . . . . . 77. HAMILCOA.
††Styles connate into a stout column, and continuous with body of carpels.
Ovary 4-carpellary; stamens 8–40 . . 72. PLUKENETIA.
Ovary 3-carpellary.
Flowers in dense involucrate heads; stamens 20–30 . . . . . 73. DALECHAMPIA.
Flowers racemose or spicate.
Stamens numerous; female flowers apical.
Male calyx 3–5-fid; rudimentary ovary 0 . . . . . 74. PYCNOCOMA.
Male calyx 2-fid; rudimentary ovary present . . . . . 75. NEOPYCNOCOMA.
Stamens 3; female flowers basal . . 76. TRAGIA.
**Male calyx in bud open, not covering the stamens completely.
Ovary 1–3-celled; fruit small, indehiscent or capsular.
Flowers racemose; stamens 15, 18 or 21, free anthers nearly sessile; male calyx-lobes imbricate; fruit 1-celled, indehiscent; dicœcious . . . . . 78. PLAGIOSTYLES.
Flowers spicate: stamens 3 or fewer.
Stamens monadelphous; spikes dense, lateral; fruit capsular; monœcious.
Spikes ovoid, subcapituliform; male calyx-lobes imbricate . . . 79. MAPROUNEA.
Spikes subcylindric; male calyx-lobes valvate . . . . . 80. SPIROSTACHYS.
Stamens free; spikes rather lax.
Seeds strophiolate; spikes terminal or both terminal and axillary or lateral; monœcious . . . . . 81. SEBASTIANIA.
Seeds estrophiolate.
Spikes terminal; monœcious . . 82. SAPIUM.
Spikes lateral; dicœcious . . . 83. EXCŒCARIA.
Ovary 5–20-celled; fruit large, capsular; flowers spicate; spikes terminal; stamens 8–20, monadelphous; monœcious . . . . 84. HURA.

1. **STENADENIUM**, Pax in Engl. Jahrb. xxx. 343.

Apparent flower consisting of a short tubular or cup-like involucre open on one side to about the middle, formed of 5 lobes connate at their

base, and cut into a fringe of filiform segments at the top, with an erect oblong entire lobe outside and behind, glandular at its apex and overtopping the fringe. Stamens (really male flowers, as in *Euphorbia*, without a perianth) numerous, in 5 groups, contained in 5 pocket-like cavities at the base of each lobe of the involucre, not mingled with bracteoles, but the membranous partitions separating the groups and surrounding the pedicel of the female flower are produced into a few filiform pubescent segments; anthers small, rather broader than long. Ovary (really a female flower, as in *Euphorbia*) without a perianth at its base, pedicellate, surrounded by the stamens, exserted from the opening in front of the involucre and recurved, 3-celled, with one ovule pendulous from the apex of the inner angle of each cell; styles 3, united below, free above. Capsule 3-angled. Seeds oblong, truncate at each end, 4-angled, carunculate.—A succulent shrub with spiny branches, apparently leafless at the time of flowering. Leaves alternate, not seen. Flowers in dense many-flowered cymes on stout peduncles. Bracts in pairs, connate at the base into an oblique cup-like 2-lobed body (bract-cup) enclosing the involucres or nearly free and embracing the branches at the forkings of the cyme, keeled on the back.

Species 1, endemic.

The structure of the involucre of this remarkable plant clearly demonstrates the fact that the involucre of *Euphorbia* and allied genera is formed by the fusion of two series of bracts. In *Stenadenium* the outer series is reduced to one bract which is free nearly to the base, the greater part of the involucre being formed by the inner series alone.

1. **S. spinescens,** *Pax in Engl. Jahrb.* xxx. 343. A succulent shrub 6–9 ft. high, spiny, leafless at the time of flowering. Branches $\frac{1}{2}$–$\frac{3}{4}$ in. thick, glabrous, armed under each leaf-scar with 3 spreading light brown spines, middle one $\frac{1}{4}$–$\frac{1}{2}$ in. long, very stout, usually slightly recurved, lateral pair smaller, sometimes obsolete, usually 1–$3\frac{1}{2}$ lin. long. Leaves not seen. Peduncles 2–3 at the apex of the branches, erect, 3–$4\frac{1}{4}$ in. long, flattened, acutely 2-edged, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. broad, with a pair of widely spreading spines at the apex, glabrous, terminating in 1 or 2 repeatedly forked dense cymes $1\frac{1}{2}$–$2\frac{1}{2}$ in. in diam., with puberulous branches $\frac{1}{8}$ in. thick. Bracts about $\frac{1}{3}$ in. long, 2–$3\frac{1}{2}$ lin. broad, broadly ovate, obtuse, apiculate, keeled down the back, puberulous on both sides, apparently whitish, those enclosing the involucres connate for about half their length behind, the others more or less free and the pair at the base of the cyme adnate to a short stout spine immediately beneath. Involucre 3–$3\frac{1}{2}$ lin. long, white-pubescent, with the segments of the marginal fringe $1\frac{1}{2}$–2 lin. long, and the entire dorsal lobe or gland 2–$2\frac{1}{2}$ lin. long and $1\frac{1}{2}$ lin. broad, oblong, broadly rounded or subtruncate at the apex, puberulous. Ovary and capsule exserted and recurved, the former white-tomentose, the latter $3\frac{1}{2}$ lin. long, 3 lin. in diam., oblong, somewhat truncate at each end, acutely 3-angled, puberulous; styles $1\frac{1}{2}$ lin. long, united at the base, thickened and bifid at the apex, pubescent.

Mozamb. Distr. German East Africa: Ilonia Mountain, near Lake Rukwa, 5000 ft., *Goetze*, 1099!

Described from the type, kindly lent to Kew by the Berlin authorities.

2. MONADENIUM, Pax in Engl. Jahrb. xix. 126.

Apparent flower consisting of a cup-like involucre, truncate at the top and open on one side to or below the middle, with a continuous gland around its top margin to the opening, exceeding or as long as the interior series of 5 membranous quadrate fringe-toothed erect lobes. Stamens (really male flowers, as in *Euphorbia*, without a perianth) arranged in groups opposite the lobes of the involucre, sometimes mingled with a few filiform glabrous bracteoles and the groups separated (always?) by deeply fringed-toothed membranous glabrous partitions. Ovary (really a female flower, as in *Euphorbia*, with the perianth reduced to a mere rim or of 3 small deltoid acute lobes) pedicellate, surrounded by the stamens, exserted from the opening in the side of the involucre and recurved, 3-celled, with one ovule pendulous from the apex of the inner angle of each cell; styles 3, free or connate below, very shortly to deeply bifid; stigmas often thickened. Capsule obtusely or subacutely 3-angled, with or without a double crest along the angles. Seeds oblong, 4-angled, truncate at each end, carunculate.—Dwarf perennials 3 in. to 2 ft. high, with perennial cylindric thick succulent stems or with a tuberous (or woody?) rootstock and erect annual herbaceous or subfleshy stems. Leaves alternate, more or less fleshy, rigid when dried, with very small or rudimentary stipules. Peduncles at first often bearing but one nodding amply bracteate involucre, ultimately developing cymes with 3 or more bracteate involucres, solitary in the axils of the uppermost leaves or maturing after the leaves have fallen at the apex of the stems. Bracts usually connate in pairs into one oblique cup-like body (*bract-cup*), with overlapping or gaping margins enclosing the solitary involucres or embracing the branchlets at the forkings and the involucre in the fork of the cyme, all on one side of it, emarginate or notched or deeply lobed at the apex and often 2-keeled on the back, rarely quite free.

Species 23, all endemic.

Cymes produced from the tuber, on peduncles less than 1 in. long . . . . . 23. *M. simplex.*

Cymes produced from the upper or terminal part of the stems.

*Stems perennial, stout, fleshy, cylindric, glabrous.

Stems (or branches?) with slightly prominent leaf-scars in spiral series, having 1–2 black glands beside them and 1 in their axils, not tessellate . . . . . 6. *M. Ellenbeckii.*

Stems with rhomboid or 6-angled tessellations or tubercles in spiral series, without glands.

Tubercles or tessellations with 1–6 very small spines or prickles under or around the leaf-scar or base of the leaf, sometimes obsolete.

Tubercles flattish, scarcely prominent . 1. *M. Lugardæ.*
Tubercles very distinctly prominent.
Leaves about as long as broad . . 2. *M. heteropodum.*
Leaves much longer than broad.
Leaves up to $1\frac{1}{2}$ in. long, spathulate . 3. *M. Schubei.*
Leaves $\frac{1}{3}$–$\frac{2}{3}$ in. long, linear-lanceolate. 4. *M. Guentheri.*
Tubercles $\frac{1}{2}$–1 lin. long, without prickles under or around the leaf or leaf-scar; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long . . . . . 5. *M. stapelioides.*
**Stems annual from a perennial rootstock or tuber.
Plant with soft prickle-like processes on the peduncles and cymes.
Peduncles $\frac{1}{2}$–1 in. long; bract-cup 3–4 lin. long, conspicuously reticulate . . . 7. *M. echinulatum.*
Peduncles $1\frac{1}{2}$–$3\frac{1}{2}$ in. long.
Stem pubescent with short deflexed hairs; involucre inrolled at the top margin . 8. *M. aculeolatum.*
Stem glabrous; involucre slightly recurved at the top margin . . . . 9. *M. asperrimum.*
Plant glabrous or pubescent, without prickle-like processes on any part of it.
Cyme-peduncles 1–3 in. long.
Leaves linear-lanceolate, $\frac{1}{6}$–$\frac{3}{4}$ in. broad, acutely toothed; capsule with 2 very narrow wings along each angle . . 10. *M. Gœtzei.*
Leaves subspathulate to suborbicular, $\frac{2}{3}$–2 in. broad, crisped or entire.
Leaves 2–6 in. long; capsule without wings or crests along the angles . 11. *M. læve.*
Leaves $1\frac{1}{6}$–$2\frac{1}{4}$ in. long; capsule with 2 broad toothed wings along each angle 12. *M. major.*
Cyme-peduncles $\frac{1}{12}$–$\frac{3}{4}$ (in *M. erubescens* sometimes 1) in. long.
Stem and leaves puberulous; bract-cup $\frac{1}{3}$–$\frac{1}{2}$ in. long and as much or more in diam. 13. *M. erubescens.*
Stem and leaves (except in *M. invenustum*) glabrous.
Cymes 4–5-times forked, with many involucres, compact or rather dense; bract-cups $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long.
Bract-cups deep red or purple; involucre 2–$2\frac{1}{2}$ lin. long, broadest below the middle . . . 14. *M. coccineum.*
Bract-cups green or reddish-tinted; involucre $1\frac{1}{4}$ lin. long, broadest just above the middle . . . . 15. *M. parviflorum.*
Cymes at first with 1 involucre, finally once or twice forked with 3–7 involucres, often nodding.
Involucre with 4 distinct crenations at the top margin; leaves linear-lanceolate . . . . . 21. *M. crenatum.*
Involucre entire at the top margin.
Bracts free to the base on both margins.

Leaves 3–4 in. long; bracts $\frac{1}{2}$ in. long, with overlapping margins 16. *M. Kæssneri.*
Leaves 2–2$\frac{1}{3}$ in. long; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. long, not overlapping at the margins . . . 18. *M. herbaceum.*
Leaves up to 1$\frac{1}{4}$ in. long, linear; bracts ovate, acute . . 22. *M. Descampsii.*
Bracts united behind at the base or nearly to the top into an oblique 2-lobed cup, free to the base in front; leaves $\frac{3}{4}$–1$\frac{3}{4}$ in. long.
Leaves not much longer than broad; involucre 2–2$\frac{1}{2}$ lin. long . . . . . 17. *M. invenustum.*
Leaves 2–3 times as long as broad; involucre 1$\frac{1}{2}$–1$\frac{3}{4}$ lin. long.
Bract-cup about 4 lin. long; involucre puberulous outside . . . . . 19. *M. Gossweileri.*
Bract-cup 2$\frac{1}{2}$ lin. long; involucre glabrous . . 20. *M. fwambense.*

1. **M. Lugardæ**, *N. E. Br. in Kew Bulletin*, 1909, 138. Stems perennial, succulent, $\frac{3}{4}$–2 ft. high, $\frac{3}{4}$–1$\frac{1}{4}$ in. thick, simple or branching at the base, cylindric, with rather large diamond-shaped tessellations, scarcely forming tubercles, glabrous. Leaves in a small tuft at the tips or spaced along the upper part of the stems, $\frac{2}{3}$–2$\frac{1}{2}$ in. long, $\frac{1}{4}$–1$\frac{3}{4}$ in. broad, obovate, obtuse or subacute, tapering below to a subsessile base or into a very short broad petiole, finely crisped-crenulate or scabrous on the margins, somewhat harshly puberulous on both sides, green, falling before the flowers and fruit fully develop, or persistent under cultivation. Stipules of 3–5 minute spines, $\frac{1}{4}$–$\frac{3}{4}$ lin. long, around the lower side of the base of the leaf, evanescent. Cymes at first 4–5 lin. long with 1 involucre, ultimately $\frac{1}{3}$–$\frac{1}{2}$ in. long and $\frac{3}{4}$ in. broad with 3 involucres, axillary, nodding, after the fall of the leaves forming a small cluster at the apex of the stem, but in cultivated plants sometimes spaced along the stem; peduncles 1–3 lin. long, stout, branches of the cyme very much shorter. Bract-cup oblique, 3–3$\frac{1}{2}$ lin. long, 2$\frac{1}{2}$–3 lin. in diam., shortly and obtusely bifid at the apex, open, with the margins separated in front, flattish on the back, with obtuse angles at the sides when alive, 2-keeled down the back when dried, minutely puberulous, green, not reticulated. Involucre equalling or overtopping the bract-cup, 2–3 lin. long, cup-like, open to half-way down in front, overtopping the fringe-toothed subquadrate inner lobes, glabrous, greenish outside, with the margin or margin and inner surface yellowish to orange-brown. Ovary and capsule exserted and reflexed, 3-angled, with 2 narrow minutely crisp-toothed wings along each angle, minutely puberulous, with a perianth of 3 deltoid acute lobes $\frac{1}{2}$ lin. long at its base; styles free, bifid at the apex or to half-way down; stigmas somewhat thickened. Seeds about 1$\frac{3}{4}$ lin. long, oblong, 4-angled, truncate at each

end, covered with small, very slightly prominent flat tubercles, white, with a dull ochreous caruncle.

Mozamb. Distr. Ngamiland: Kwebe Hills; apparently rare, only one bed of it found, at the foot of Kwebe Peak, 3500 ft., *Mrs. Lugard*, 22! Tropical Transvaal: Zoutpansberg District; Tsama River, *Matthewman*, 5548!

2. **M. heteropodum**, *N. E. Br.* Stems arising from a thick rhizome, probably perennial, 8–10 in. high, 1 in. thick, not branched, cylindric, fleshy, prominently tuberculate; tubercles rhomboid-quadrangular on the lower part and hexagonal on the upper part of the stem, usually bearing 2–3 very short or minute prickles around the base of the leaf or leaf-scar. Leaves fleshy, soon deciduous, about 1 in. long and as much in breadth, rhomboid-spathulate, obtusely rounded, and mucronulate or acute at the apex, narrowed into a short petiole, serrulate at the apical part. Flowers not described.—*Euphorbia heteropoda*, Pax in Engl. Jahrb. xxxiv. 374.

Mozamb. Distr. German East Africa: Pangani (Unguu); lower slopes of Mbalu Mountain, *Engler*, 1472A.

3. **M. Schubei**, *N. E. Br.* Stems perennial, about 18 in. high, 1–1¼ in. thick, cylindric, fleshy, prominently tuberculate, green; tubercles about 5 lin. in diam., angular at the base, bearing 6 short stout radiating spines at their apex. Leaves up to 1½ in. long and ¾ in. broad, spathulate, acute, tapering to the base, crisped-crenulate at the margin. Flowers and fruit not described.—*Euphorbia Schubei*, Pax in Engl. Jahrb. xxxiv. 373.

Mozamb. Distr. German East Africa: Uhehe; by the River Lukosse, near Geme, *Goetze*, 485.

4. **M. Guentheri,** *Pax in Engl. Jahrb.* xliii. 89. Stems perennial, 6–10 in. high, probably about 1 in. thick when alive, ¼–½ in. thick when dried, unbranched, fleshy, cylindric, tessellately tuberculate, with very prominent slightly recurved tubercles about ⅛ in. long in dried specimens from which the leaves arise, bearing 1–3 small spines around the base of the leaf or leaf-scar, with the middle spine deflexed, up to 1 lin. long and the lateral smaller or often obsolete, sometimes all are obsolete, glabrous. Leaves 3½–8 lin. long, 1½–2 lin. broad, linear-lanceolate, acute, entire, fleshy, with infolded or incurved margins when dried, deciduous, glabrous. Peduncles in the axils of the tubercles, about ¼ in. long, bearing 1–2 involucres, glabrous. Bract-cup oblique, 3–4 lin. long, shortly and acutely 2-lobed at the apex, open in front, with the margins not nearly meeting, 2-keeled down the back, glabrous, apparently green. Involucre about 2½ lin. long, open to below the middle in front, scarcely narrowing to the truncate revolute rim-like top or gland, glabrous. Capsule 2½ lin. long, acutely 3-angled, with 2 narrow toothed wings along each angle, glabrous. Seeds 1½–1¾ lin. long, 4-angled, truncate at each end, smooth, grey.

Nile Land. British East Africa: steppe near Make Tan, not far from Buru Mountain, 3200 ft., *Uhlig*, 48!

5. **M. stapelioides,** *Pax in Engl. Jahrb.* xliii. 89. Plant branching at the base (or possibly from the top of a stout fleshy main stem) into simple fleshy (probably perennial) stems 1–6 in. long, 3–5 lin. thick, covered with spirally arranged rhomboid tubercles $\frac{1}{2}$–1 lin. long, glabrous. Leaves sessile on the apex of the tubercles, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, lanceolate, acute, apparently longitudinally folded, with a prominent midrib beneath, fleshy, glabrous, very minutely scabrous along the margins, deciduous. Stipules none. Cymes several at the apex of the stems, 4–5 lin. long, with 3 involucres; peduncles $\frac{1}{2}$–1 lin. long, glabrous. Bract-cup $2\frac{1}{2}$–3 lin. long, oblique, with 2 short rounded apiculate lobes and 2-keeled down the back, with the margins slightly overlapping in front at the base, not undulate, glabrous, green. Involucre 2–$2\frac{1}{2}$ lin. long, somewhat urceolate, slightly inflated below and constricted at the base of the erect truncate rim or gland, "red" (*Jaeger*). Ovary and capsule recurved, 3-angled, very minutely papillate, with 2 toothed wings along each angle.

Mozamb. Distr. German East Africa: steppe east of Ikoma, *Jaeger*, 359! and without precise locality, *Uhlig*, 538!

6. **M. Ellenbeckii,** *N. E. Br.* A fleshy perennial 8–16 in. high, the type consists only of small leafless pieces (branches?) about $4\frac{1}{2}$ in. long and $\frac{1}{3}$ in. thick, doubtless stouter when alive, cylindric, marked with slightly prominent tubercles or leaf-scars, with 1 or 2 black glands beside them and often 1 in their axils, arranged in spiral series, but not tessellately tuberculate. Leaves not seen. Peduncles bearing one involucre, solitary in the axils of the leaf-scars, at the apex of the stems or branches, 1 lin. long, glabrous. Bract-cup $2\frac{1}{2}$ lin. long, $1\frac{1}{2}$ lin. in diam., notched at the apex to $\frac{1}{3}$ of the way down, with 2 slight keels down the back, running out into short subulate points at the apex, glabrous. Involucre (only seen in a fruiting condition) equalling the bract-cup, very oblique and open in front to $\frac{2}{3}$ of the way down, rounded (not truncate) at the apex, with a dark (red?) margin. Capsule (only a few valves seen) $1\frac{3}{4}$ lin. long, glabrous, exserted on a recurved pedice 2–$2\frac{1}{2}$ lin. long. Seeds $1\frac{1}{4}$–$1\frac{1}{3}$ lin. long, narrowly oblong, 4-angled, tuberculate, light brown, with a white mushroom-shaped caruncle.

Nile Land. Gallaland: Boran; Tarro Gumbi, *Ellenbeck*, 2102!

7. **M. echinulatum,** *Stapf in Hook. Ic. Pl. t.* 2666, *figs.* 1–5. Rootstock an irregularly ovoid tuber. Stem solitary, annual, erect, about 1 ft. high and $\frac{1}{4}$ in. thick, herbaceous or somewhat fleshy, terete, beset with numerous spreading scattered soft-prickle-like processes about $\frac{1}{2}$ lin. long, green. Leaves alternate, rather few, $\frac{3}{4}$–$1\frac{1}{2}$ in. apart, somewhat fleshy, green; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, rather stout, flattish above; blade 1–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, the lower smaller, elliptic or elliptic-obovate, subacute or shortly and rather abruptly pointed, cuneately tapering into the petiole at the base, glabrous above, beset with small soft points beneath. Cymes small, pedunculate, once to three times forked, beset with soft entire points on the peduncle, branchlets and veins of the bracts, at first nodding; peduncles $\frac{1}{2}$–1 in. long, stout,

green. Bract-cup $\frac{1}{4}$–$\frac{1}{3}$ in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. in diam., with the margins much overlapping in front, truncately rounded at the top, emarginate or shortly notched, with 2 slight keels down the back, light green, reticulated with darker veins. Involucre 2–3 lin. long, cup-like, open in front to below the middle, overtopping the inner lobes. Ovary with a double minutely crisped-toothed keel at each angle, otherwise glabrous; styles $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, curved upwards from the base, united for $\frac{2}{3}$ of their length, bifid at the apex, with thickened orbicular stigmas.

West Tropical Africa. Locality unknown. Described from a living plant sent to the Royal Botanic Gardens, Kew, by *F. Sander and Co.* in 1900!

8. **M. aculeolatum,** *Pax in Engl. Jahrb.* xliii. 89. Stem annual from a perennial rootstock, erect, 6 in. long in the type, but probably much taller, very stout, 4–5 lin. thick, branching into 4–5 cymes at the top, thinly pubescent with short deflexed hairs (not prickles), and marked with alternate leaf-scars. Leaves not seen. Cymes about 2 in. in diam., 3 times forked, on stout peduncles $1\frac{1}{2}$–2 in. long and $\frac{1}{8}$–$\frac{1}{4}$ in. thick, beset with soft spreading prickles, which are entire on the peduncles and more or less branched or scabrous with minute points on the cyme-branches. Bract-cup oblique, $\frac{1}{3}$ in. long and $\frac{2}{3}$ in. in diam., with the margins scarcely or not at all overlapping in front, truncately rounded and shortly notched at the top, densely scabrous on the middle part of the back and without evident keels, somewhat thick in texture, with inconspicuous veins and the inner surface very minutely papillate. Involucre 2–$2\frac{1}{3}$ lin. long, open in front to below the middle, subcylindric, faintly constricted just above the middle, truncate and the margin inrolled at the top, not overtopping the side lobes, very minutely papillate outside. Ovary exserted and recurved, densely covered all over with filiform processes (not hairs); styles about 1 lin. long, united at the basal third, then recurved-spreading, 2-lobed at the apex, very minutely papillate.

Mozamb. Distr. German East Africa; steppe near Lembeni, *Uhlig*, 92!

9. **M. asperrimum,** *Pax in Engl. Jahrb.* xliii. 90. Stem annual from a perennial rootstock, 7 in. high in the type, but probably taller, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, glabrous, smooth, probably somewhat fleshy. Leaves 1–$1\frac{3}{4}$ in. long, 5–11 lin. broad or perhaps larger, narrowly oblanceolate to elliptic, obtuse or acute, tapering from below the middle to a sessile base or sometimes rounded into a very short petiole, crisped-undulate at the entire or scabrous margins, fleshy, glabrous on both sides, with a few recurved soft prickles on the midrib beneath, deciduous. Cymes 2 or more at the apex of the stem on peduncles $1\frac{3}{4}$–$3\frac{1}{2}$ in. long, 2–6 times forked, 2–$2\frac{1}{2}$ in. in diam., with the peduncles and branches beset with soft reflexed simple or scabrous prickles, otherwise glabrous. Bract-cup oblique, $2\frac{1}{2}$–3 lin. long and 4–5 lin. in diam., very broadly or truncately rounded at the top, shortly notched behind, open in front, with the margins slightly overlapping at the base, wavy (from shrivelling?), more or less scabrous along the margin, rather thin, with distinct reticulated venation, scabrous with minute blunt

tubercles, often densely so at the middle part and thinly elsewhere on the back, without evident keels, apparently whitish or greenish-yellow, with dark green veins. Involucre 2–2½ lin. long, open in front to below the middle, subcylindric-oblong, slightly contracted under the truncate slightly recurved rim, glabrous. Ovary recurved, 3-angled, everywhere covered with short points or filiform processes; styles 1 lin. long, united to the middle, bifid at the tips, minutely papillate.

Mozamb. Distr. German East Africa: Ngaruka, *Merker*, 577! Usambara; Mkumbara, *Braun*, 2874!

10. **M. Gœtzei,** *Pax in Engl. Jahrb.* xxx. 342. Stems annual from a tuberous rootstock, 8–18 in. high, ¼–½ in. thick at the base, apparently somewhat fleshy, sometimes with 1–2 erect parallel branches, terete, glabrous. Leaves apparently somewhat fleshy, 3–6½ in. long and ⅙–¾ in. broad, linear-lanceolate or narrowly lanceolate, acute, gradually tapering from above the middle to the petiole-like base, sharply toothed all round the margin or only on the basal part, glabrous on both sides. Cymes apparently 2 or more at the tips of the stems, 1½ in. or more in diam., about 3 times forked, on peduncles 2½–3½ in. long, glabrous. Bract-cup 3½–4 lin. long, 5–9 lin. broad, broadly or subtruncately rounded at the top margin, crisped from scollop-like portions being incurved, notched to ⅓ of the way down, with 2 crenate keels down the back, more or less reticulately veined, glabrous, green, suffused with purple or violet. Involucre 2 lin. long, much shorter than the bract-cup, open to below the middle in front, truncate, overtopping the subquadrate fringe-toothed lobes, dull greenish-violet, with a yellow appendage and a red margin (*Goetze*). Capsule about 2½ lin. long, sharply 3-angled, with two very narrow membranous wings along each angle, exserted on a recurved pedicel; perianth obsolete; styles 1 lin. long, united to above the middle, with shortly bifid thickened revolute stigmas. Seeds 4-angled, truncate at each end, carunculate, probably smooth, but immature in the type specimen.

Mozamb. Distr. German East Africa: Ussangu Muigi Mountain, north Livingstone (Kinga) Range, 5000 ft., *Goetze*, 1017!

11. **M. læve,** *Stapf in Hook. Ic. Pl. t.* 2666, *fig.* 6. Stem probably more than 1½ ft. high, herbaceous or subfleshy, perhaps annual from a tuberous rootstock, glabrous. Leaves alternate, 2¼–6½ in. long, ¾–2 in. broad, oblanceolate or elliptic-oblanceolate, acute, cuneately tapering from the middle into the ¼–½ in.-long petiole, thinly sprinkled with short hairs above, glabrous beneath; midrib prominently winged on the underside. Cymes axillary, 1½–2½ in. in diam., about 3 times forked, glabrous in all parts; peduncle 2–4 in. long; cyme-branches ¼–⅞ in. long. Bract-cup 3–7 lin. long, 4–8 lin. in diam., thinly herbaceous, reticulately veined, notched to ⅓ or nearly half-way down, sometimes with a thickened margin (gland?) at the base of the notch. Involucre 2 lin. long, cup-like, open in front to below the middle, with

a ∧-shaped thickening (gland ?) at the base under the opening, equalling or slightly overtopping the fringed inner lobes. Ovary and capsule, smooth, not winged nor crested at the angles; perianth a slightly prominent obscurely 3-lobed rim; styles 1 lin. long, united for half their length or more, bifid at the tips. Seeds oblong, 4-angled, truncate at each end, with a stalked mushroom-like caruncle, white, granulate-tuberculate.

Mozamb. Distr. British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte!*

12. **M. major,** *N. E. Br.* Stems 6–16 in. high, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, erect, annual from a perennial (probably tuberous) rootstock, herbaceous or subfleshy, glabrous. Leaves alternate, rigid, probably fleshy when alive, subsessile, $1\frac{1}{6}$–$2\frac{1}{4}$ in. long, $\frac{2}{3}$–$1\frac{3}{4}$ in. broad, cuneately subspathulate, subrhomboid-obovate or suborbicular, somewhat abruptly rounded into a short acute point at the apex, broadly to narrowly wedge-shaped at the base, crisped at the margin, with a narrow wing-like keel along the midrib beneath, quite glabrous on both sides. Peduncles solitary in the axils of the uppermost leaves, $\frac{3}{4}$–2 in. long, erect, glabrous, corymbosely arranged, bearing nodding cymes about 1 in. long and 1–$1\frac{1}{4}$ in. in diam., composed of 3 involucres and their bracts. Bract-cups about $\frac{5}{8}$–$\frac{2}{3}$ in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. in diam., obliquely cup-shaped, divided to more than half-way down on the back, with 2 narrow wing-like keels, thin, glabrous, apparently whitish or pale pinkish, reticulated with rosy-purple veins. Involucre about $\frac{1}{4}$ in. long and $\frac{1}{6}$ in. in diam., not half as long as the bract-cup, cup-shaped, with a revolute margin, open in front to below the middle, slightly exceeding the fringed inner lobes, glabrous. Ovary exserted and reflexed, with a pair of broad toothed wings along each angle, glabrous, with a perianth of 3 distinct ovate acute lobes $\frac{1}{3}$ lin. long, triangular and 1 lin. long in fruit; styles united for half their length, upcurved, scarcely bifid below the thickened globose minutely tubercular stigmas. Capsule $\frac{3}{8}$ in. long, rather more than $\frac{1}{4}$ in. in diam., 3-angled, with the broad wings folded closely against the sides, glabrous, whitish-brown. Seeds about $\frac{1}{5}$ in. long, oblong, 4-angled, with a button-like caruncle, smooth, pale greyish-brown.—*Lortia major*, Pax in Engl. Jahrb. xxxiii. 289.

Nile Land. Southern Abyssinia: Mount Haquim, near Harar, *Ellenbeck*, 921! between Harar and Addis Abeba, *Welby!*

13. **M. erubescens,** *N. E. Br.* Stems 2–5 in. high, simple, erect, annual from a perennial rootstock, herbaceous or subfleshy, $\frac{1}{8}$–$\frac{1}{6}$ in. thick at the base, minutely puberulous. Leaves alternate, subsessile, rigid, probably fleshy when alive, 1–$1\frac{2}{3}$ in. long, $\frac{3}{8}$–1 in. broad, subspathulate-obovate or cuneate-obovate to elliptic or orbicular-ovate, shortly acute or cuspidate at the apex, and tapering from above or below the middle to a narrow or broad cuneate base, wavy-crenulate or crisped at the margins, minutely puberulous on both sides, apparently dull purplish or brownish, with pale green veins above. Cymes solitary in the axils of the uppermost leaves, nodding, each with about 3 involucres, forming

a very short compact terminal cluster; peduncles $\frac{1}{3}$–1 in. long, recurved at the top, very minutely puberulous. Bract-cup $\frac{1}{3}$–$\frac{1}{2}$ in. long, and as much or more in diam., obliquely cup-shaped, notched nearly or quite to half-way down at the back, thin, glabrous, apparently whitish, reticulated with darker veins. Involucre $\frac{1}{5}$ in. long, cup-like, open down the the front to below the middle, with an entire revolute margin, slightly overtopping the fringed inner lobes. Ovary exserted and reflexed, with rather broad toothed or entire wings along the angles, glabrous, with a perianth of 4–5 unequal lobes, the largest about $\frac{1}{3}$ (in fruit 1) lin. long and 3-toothed at the apex; styles united to the middle or nearly free to the base, bifid, with thickened rounded spreading stigmas.—*Lortia erubescens*, Rendle in Journ. Bot. 1898, 30.

Nile Land. Abyssinia: Arussi and Boran countries, *Drake Brockman*, 69! 70! British Somaliland: Wagga Mountains, *Mrs. Lort Phillips!* and without precise locality, *Drake Brockman*, 483!

14. **M. coccineum,** *Pax in Engl. Jahrb.* xix. 127 *and* 126, *figs. A–G.* Stems probably annual from a perennial rootstock, herbaceous, 5–7 in. high in the type, but evidently broken from taller stems, $\frac{1}{8}$–$\frac{1}{5}$ in. thick, simple or from injury branched, glabrous. Leaves unknown. Cymes 2–4 at the top of the stems, 4–5 times forked, many-flowered, dense, forming a cluster about $1\frac{1}{2}$ in. in diam., with peduncles $\frac{1}{4}$–$\frac{2}{3}$ in. long, glabrous in all parts. Bract-cup 2–$2\frac{1}{2}$ lin. long, 2-keeled down the back, 2-lobed to about half-way down and the lobes somewhat auricled and overlapping behind, truncate at the top, thin, herbaceous, deep red or purple. Involucre 2–$2\frac{1}{2}$ lin. long, urceolate, broadest below the middle, thence narrowed to the thickened revolute rim-like rugulose gland around the mouth, shortly exceeding the fringe of the inner lobes. Ovary with a small obtusely 3-lobed perianth at its base, glabrous, exserted on a recurved pedicel. Capsule about 2 lin. long, $\frac{3}{4}$ lin. in diam., oblong, acutely 3-angled, with two slight keels along each angle. Seeds immature, $1\frac{1}{4}$ lin. long, oblong, truncate at each end, 4-angled, minutely tuberculate and with a small sessile yellow caruncle at the apex.

Nile Land or **Mozamb. Distr.** East Africa, without precise locality. *Fischer*, 521!

15. **M. parviflorum**, *N. E. Br.* Stem of the specimen seen 9 in. long, but evidently taller, 2 lin. thick at the base, herbaceous, probably annual from a tuberous rootstock, glabrous, leafless, with leaf-scars 1–$1\frac{1}{3}$ in. apart. Leaves not seen. Inflorescence of 1 terminal and 4 lateral cymes, racemosely arranged. Cymes compact, $\frac{3}{4}$–$1\frac{1}{2}$ in. in diam., on peduncles $\frac{1}{2}$–$\frac{3}{4}$ in. long, 4–5 times forked, many-flowered, glabrous in all parts. Bract-cup $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, 2-lobed to nearly half-way down, 2-keeled down the back, with the keels decurrent on the peduncles and sometimes somewhat frilled, herbaceous, green or reddish, with darker venation on the marginal part; lobes about $\frac{3}{4}$ lin. long, broadly ovate, shortly and rather abruptly acuminate. Involucre $1\frac{1}{4}$ lin. long, urceolate or somewhat pear-shaped, broadest just above the middle, thence narrowed to the thickened rim of the mouth, which

shortly overtops the $\frac{1}{2}$ lin.-long quadrate minutely-toothed inner lobes. Ovary exserted and reflexed, smooth, not winged along the angles, with a perianth of 3 minute ovate acute lobes scarcely $\frac{1}{4}$ lin. long. Capsule $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Seeds 1–$1\frac{1}{6}$ lin. long, 4-angled, truncate at each end, covered with minute white tubercles and with a sessile circular yellow caruncle at the apex, raised into a blunt conical papilla at its centre.

Mozamb Distr. British Central Africa: Nyasaland; Tanganyika Plateau at Fort Hill, *Whyte!*

This is very much like *M. coccineum*, Pax, with the type of which it has been compared, but differs in the greenish colour of its inflorescence and much smaller bract-cups and involucres.

16. **M. Kæssneri**, *N. E. Br.* Stem annual from a tuberous root-stock, 21 in. high in the specimen seen, herbaceous, glabrous. Leaves thin when dried, apparently herbaceous, mostly about 2 in. apart, 3–$4\frac{1}{2}$ in. long, 1–2 in. broad, elliptic or the uppermost lanceolate, obtuse or subacute, apiculate, cuneately narrowed from the lower third to a subsessile or subpetiolate base, entire, glabrous on both sides, green; midrib with a very distinct acute wing about 1 lin. broad beneath. Cymes axillary, nodding, 1–$1\frac{1}{3}$ in. long, including the $\frac{1}{3}$–$\frac{1}{2}$ in.-long recurving peduncle, with 3–4 involucres. Bracts free, with overlapping margins, about $\frac{1}{2}$ in. long and $\frac{3}{4}$ in. broad, transversely elliptic, very obtusely rounded at the apex and base, apiculate, wing-keeled down the back, glabrous, green; veins inconspicuous except by transmitted light. Involucre about $\frac{1}{6}$ in. long, cup-like, open to half-way down in front and sometimes on the dorsal side also, with the erect margin slightly thickened, entire, glabrous, scarcely or but slightly overtopping the subquadrate fringe-toothed glabrous inner lobes. Ovary exserted, reflexed, smooth, glabrous, scarcely acute and not crested at the angles, with a very small cupular perianth at its base; style trifid to the middle, with the branches shortly bifid at the apex.

South Central. Belgian Congo: West Kundelungu, under trees, *Kässner*, 2792!

17. **M. invenustum**, *N. E. Br. in Kew Bulletin*, 1909, 329. Stems probably annual from a tuberous rootstock, 6–14 (or more?) in. high, terete, herbaceous or somewhat fleshy, glabrous. Leaves spreading, rather thick and rigid when dried, probably fleshy when alive; petiole $\frac{1}{6}$–$\frac{1}{5}$ in. long.; blade $\frac{1}{2}$–$1\frac{1}{6}$ in. long, $\frac{1}{2}$–1 in. or rather more in breadth, orbicular-ovate or somewhat rhomboid-ovate, acute at the apex, cuneate or rounded with a short cuneate extension into the petiole at the base, crenulate and more or less crisped at the margin, apparently with a somewhat papillate surface, glabrous to the eye, but with a few very minute scattered hairs on both sides. Stipules 3-fid; middle segment scarcely 1 lin. long, linear, acute, ciliate; lateral segments minute. Cymes axillary at the terminal part of the stem, nodding, about $\frac{1}{2}$ in. long, including the 2–$2\frac{1}{2}$ lin.-long recurved peduncles, composed of 3 involucres. Bract-cup $\frac{1}{4}$ in. long, oblique, open in front, with separated margins, very shortly bifid at the top with broadly rounded apiculate

lobes, 2-keeled down the back, rather thick in substance, with a very minute puberulence, apparently green, veined with darker green at the upper part. Involucre a little shorter than the bract-cup, 2–2½ lin. long, cup-like, open to half-way down in front, with an erect entire slightly thickened margin, glabrous, slightly exceeding the quadrate fringed-toothed inner lobes. Ovary exserted, reflexed, smooth, very minutely papillate-puberulous, with a double crisped (always?) keel along each angle and a perianth at its base with 3 rounded or ovate lobes ¼–⅓ lin. long; styles united to the middle; stigmas thickened.

Nile Land. British East Africa: Kibwezi, *Kässner*, 717! Simba, *Kässner*, 729!

18. **M. herbaceum,** *Pax in Engl. Jahrb.* xlv. 241. Stem annual from a tuberous rootstock, 2 ft. or more high, ⅕ in. thick at the base, herbaceous, glabrous. Leaves erect, thinly coriaceous, 1¼–2½ in. apart, those at the middle of the stem, 2–2⅓ in. long, ½–⅚ in. broad, lanceolate or the upper gradually smaller and becoming linear-lanceolate, about equally narrowed from the middle to an acute apex and a cuneate sessile base, entire, with the midrib acutely keeled beneath, glabrous on both sides. Cymes small, ⅔–¾ in. long, including the ⅓–½ in.-long erect or ascending peduncles, arising from the axils of reduced leaves ¼–½ in. long at the apex of the stem and forming an ovoid raceme 1–1½ in. long, scarcely nodding, glabrous in all parts; peduncles broader than thick, with a wing on each side and 1–3 keels or ridges on the convex faces between. Bracts free to the base, not overlapping at the margins, ¼–⅓ in. long, ⅕–¼ in. broad, elliptic, elliptic-ovate, or suborbicular, acute or obtuse and apiculate, with a wing-like keel down the back, rather thin, apparently green suffused with rosy, with the veins sometimes scarcely evident, at others sub-conspicuous. Involucre ⅕ in. long, open half-way down the front, with an erect slightly thickened entire margin, overtopping the quadrate fringe-toothed inner lobes. Ovary exserted and reflexed, smooth, grooved down each angle, with a perianth of 3 minute scarcely evident rounded lobes; style trifid to the middle or below, with the branches shortly bifid; stigmas slightly thickened.

South Central. Belgian Congo: in a swamp at Luente, *Kässner*, 2489!

19. **M. Gossweileri,** *N. E. Br.* Stem probably annual from a perennial rootstock, 3 in. long in the type, but perhaps taller, 2–3 lin. thick when dried, perhaps somewhat fleshy, glabrous, greyish, with a scurfy appearance from shrinkage. Leaves ¾–1⅓ in. long, ¼–½ in. broad, or perhaps larger, fleshy, oblanceolate-obovate, subacute, cuneately tapering from about ⅓ below the apex into a short petiole, more or less crenulate and somewhat crisped-undulate on the margins, glabrous on both sides; midrib flat above, with a conspicuous wing-like minutely denticulate keel beneath. Cymes in the axils of the upper leaves, about 1⅓ in. long, once or twice forked, with the peduncles and main branches each 5–6 lin. long. Bract-cup about 4 lin. long and as much or more in diam., lobed behind, with two keels down the back, probably green, with distinctly forked venation, lobes very obtusely rounded at the apex,

sprinkled with very minute points on the back. Involucre 1½ lin. long, 2½ lin. in diam., cup-like, with an erect margin, overtopping the ⅔ lin.-long fringed inner lobes, puberulous outside. Ovary smooth, 2-winged down each angle, with a perianth of 3 broadly ovate obtuse lobes, ⅓ lin. long, glabrous; style-branches very short, free to the base, bifid to half-way down.

Lower Guinea. Angola: Benguella, *Gossweiler!*

20. **M. fwambense,** *N. E. Br.* Stem apparently annual and arising from a tuberous rootstock, erect, about 6 in. high in the only specimen seen, somewhat swollen and ⅕ in. thick for about 1 in. up from the base, the remainder in the dried state about $\frac{1}{12}$ in. thick, glabrous. Leaves alternate, erect or ascending, 1½–1¾ in. long, ¼–½ in. broad, narrowly lanceolate or linear-lanceolate, about equally tapering from the middle to an acute apex and a subsessile base, glabrous on both sides, with an acute wing-like keel ½ lin. broad at the base along the midrib beneath. Cymes very small, axillary, solitary, pendulous, ultimately composed of 3 (or more?) involucres, in the immature specimen about ¼ in. long, glabrous in all parts; peduncles 1–1½ lin. long, abruptly recurved, with 2 narrow wing-like keels. Bracts usually united into an acutely 2-lobed cup 2½ lin. long and 2 lin. broad, with 2 acute wing-like keels down the back, but sometimes free nearly or quite to the base and then narrowly deltoid or deltoid-lanceolate, acute, wing-keeled down the back, herbaceous, with only the keel-vein visible, glabrous. Involucre (including the very short stout pedicel) rather more than ⅛ in. long, $\frac{1}{10}$ in. in diam., cup-like, truncate at the top, with a thickened erect entire margin, open to half-way down in front, much overtopping the ½ lin.-long fringed inner lobes, glabrous; ovary (very young) glabrous.

Mozamb. Distr. British Central Africa: Urungu; Fwambo, *Carson*, 17!

21. **M. crenatum,** *N. E. Br.* Stem or stems probably arising from a tuberous rootstock and annual, 3–5 in. high, ⅛–⅙ in. thick when dried, but apparently somewhat fleshy, glabrous. Leaves alternate, sessile, fleshy, 1½–2½ in. long, ⅙–⅓ in. broad, linear-lanceolate or narrowly lanceolate, acute, tapering to the base, much crisped and wavy along the margins, glabrous on both sides. Cymes terminal, pedunculate, once or twice forked, with 3–7 involucres, glabrous; peduncle ¼–⅓ in. long, with branches ⅓–½ in. long. Bracts apparently free at the forks of the cyme, ovate-lanceolate, acuminate, and united into an oblique cup about 2½ lin. long under the terminal involucres, divided to the base in front and to half-way down behind into 2 ovate very acuminate lobes, glabrous. Involucre when fully grown about 2 lin. long and 1¾ lin. in diam., open to half-way down in front, with 4 distinct crenations at the top of the erect margin, overtopping the fringed lobes, glabrous. Ovary only seen in a very immature condition, apparently without a perianth, glabrous; styles united for nearly half their length, thickened at the entire apex.

Mozamb. Distr. Rhodesia or Portuguese East Africa (?): on hills at Lions-Creek, 1000 ft., *Schlechter*, 12204!

Imperfectly known species.

22. **M. Descampsii,** *Pax in Bull. Soc. Bot. Belg.* xxxvii. 108. Stems fleshy. Leaves sessile, up to $1\frac{1}{4}$ in. long, $\frac{1}{5}$ in. broad, linear, pale green. Flowers in cymes; bracts free, ovate, acute, with a wing-like keel $\frac{1}{2}$ lin. broad down the back, reticulated, reddish. Involucre cylindric, with the gland overtopping the lobes. Ovary glabrous.

South Central. Belgian Congo: between Lake Tanganyika and Lake Moero, *Descamps.*

23. **M. simplex,** *Pax in Bull. Herb. Boiss.* vi. 743. Tuber oblong. Leaves unknown. Cymes produced from the tuber; peduncles 7–10 lin. long. Bracts subcordately lobed. Involucre about $\frac{1}{6}$ in. long, scarcely exceeding the inner lobes. Ovary glabrous.

Lower Guinea. Angola: Benguela; on a sandy plain at the sources of the River Lulua, without collector's name, in Montpellier Herbarium.

There is probably some error with regard to the cymes being produced direct from the tuber, they are probably on a short leafy stem, from which the leaves have fallen away, as in most other species.

3. **SYNADENIUM,** Boiss.; Benth. et Hook. f. Gen. Pl. iii. 261.

Apparent flower consisting of an entire shallowly cup- or saucer-like involucre, with a very spreading or more rarely erect rim-like gland outside of and completely surrounding an inner series of 5 inflexed-erect membranous subquadrate fringe-toothed lobes; gland usually entire, occasionally having a cut-like notch on one side or divided by 2–5 cut-like notches into unequal or equal segments, but not forming equally-spaced separate glands. Stamens (really male flowers, as in *Euphorbia*, without a perianth) arranged in 5 groups, contained in 5 compartments with membranous walls opposite the lobes of the involucre. Ovary (really a female flower, as in *Euphorbia*, with the perianth reduced to a rudimentary rim or of 3 minute or rarely well developed conspicuous lobes) pedicellate, 3-celled, often absent; when present central and its pedicel surrounded by a membranous tubular involucel, formed by the inner wall of the compartments containing the stamens, lobed and fringed at the top, puberulous. Styles 3, connate at the basal part; stigmas bifid or rarely entire; ovule solitary in each cell, attached to the inner angle at or above the middle of the cell.—Shrubs or small trees, with the young branches fleshy, full of milky juice. Leaves alternate, exstipulate, more or less fleshy, coriaceous when dried, cuneately obovate, oblanceolate, lanceolate or subspathulate. Inflorescence axillary, cymose, cymose-paniculate or umbel-like, with a pair of free persistent or deciduous bracts at the base of each involucre and not or scarcely exceeding its rim-like gland.

Species 13, of which one is a native of Natal. All similar in appearance (as dried specimens) and require to be critically examined for determination. From an examination of the material available, it is suspected that the species are rather local

and probably more numerous than have been supposed, their great resemblance to one another causing them to be overlooked.

Leaves finely pubescent above or on both sides; perianth rudimentary or very minutely 3-crenate.
Leaves $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, with a distinct wing-like keel to the midrib beneath.
Leaves pubescent all over on both sides; keel on the midrib toothed . . . . . 6. *S. molle.*
Leaves pubescent above, glabrous beneath, except on the midrib; keel on the midrib not toothed . 7. *S. Kirkii.*
Leaves $4\frac{1}{2}$–6 in. long, pubescent above, glabrous and without a wing-like keel to the prominent midrib beneath . . . . . 9. *S. gazense.*
Leaves glabrous on both sides.
Midrib with a wing-like or very acute keel beneath at the base or all along; perianth rudimentary or very minutely 3-crenate.
Leaves 3–5 in. long; capsule (where known) not exserted much beyond the involucre.
Peduncles branching at the apex into an umbel of 4–5 undivided rays . . . . . 1. *S. Cameronii.*
Peduncles umbellately or subumbellately branching at the apex into 3–5 rays 2–3 times forked.
Cyme compact, with the rays all arising from the same point or level . . . . . 4. *S. compactum.*
Cyme lax, with the rays closely placed but arising one above another . . . . . 5. *S. carinatum.*
Leaves mostly 5–6 in. long (some smaller); cymes lax; capsule exserted 2–3 lin. beyond the involucre . . . . . 8. *S. glaucescens.*
Midrib prominent and obtuse or subacute beneath, but without a wing-like keel.
Leaves not more (usually much less) than twice as long as broad; umbels with undivided 1-flowered rays . . . . . 2. *S. Volkensii.*
Leaves 2–4 times as long as broad.
Umbels with the 3–5 primary rays umbellately divided into 3–4 secondary rays; perianth rudimentary . . . . . 3. *S. umbellatum.*
Cymes dichotomously 2–6 times forked.
Perianth a rudimentary 3-crenate rim; styles deeply bifid . . . . . 10. *S. Grantii.*
Perianth with linear, subulate or filiform lobes $\frac{1}{2}$–1 lin. long.
Leaves cuneate-oblanceolate, tapering from near the apex to the subsessile base; styles thickened at the apex, not bifid . . 11. *S. angolense.*
Leaves lanceolate, tapering for about $\frac{1}{4}$ of their length into the petiole; styles bifid . 12. *S. cymosum.*

1. **S. Cameronii,** *N. E. Br. in Kew Bulletin*, 1901, 133. Stems clustered, 7–8 ft. high, terete, fleshy at the young parts, glabrous. Leaves somewhat fleshy, subsessile or shortly petiolate, 3 in. or more long, $1\frac{1}{4}$ in. or more broad, only one seen, cuneately obovate, shortly

acute, minutely and indistinctly crinkled at the edges, with an acute wing-like keel along the midrib beneath, glabrous on both sides, deciduous. Umbels axillary, pedunculate, simple, 4–5-rayed; peduncles $\frac{1}{3}$–$\frac{3}{4}$ in. long, fleshy, slightly puberulous down one side; rays $\frac{1}{4}$–$\frac{1}{3}$ in. long, each bearing 1 involucre, subclavate, fleshy, pubescent with spreading hairs; bracts 1–$1\frac{1}{2}$ lin. long and broad, subquadrate or broadly ovate, pubescent, very minutely gland-toothed. Involucre $2\frac{1}{2}$–$2\frac{3}{4}$ lin. in diam. and about $1\frac{1}{2}$ lin. deep, cup- or shallowly basin-shaped, pubescent on the basal part, with an entire spreading rim-like gland; lobes overtopping the gland, thinly pubescent on both sides. Ovary adpressed-puberulous; perianth reduced to a mere rim; styles shortly united at the base, divided to nearly half-way down into 2 filiform stigmas, pubescent.

Mozamb. Distr. British Central Africa: Nyasaland; Namasi, *Cameron!*

Described from a very short branch preserved in fluid. According to the collector "the leaves fall off in the dry season, and it then looks like a Cactus."

2. **S. Volkensii,** *Pax in Engl. Pfl. Ost-Afr. C*, 243. Branches as in *S. Grantii*, Hook. f., glabrous. Leaves 4–5 in. long, 2–$2\frac{3}{4}$ in. broad, rather thickly coriaceous, probably fleshy when alive, elliptic, elliptic-obovate or obovate-oblong, rounded into a short deltoid point at the apex, cuneately narrowed from the middle or below into a very short stout petiole, minutely serrate, glabrous on both sides; midrib apparently neither acute nor keeled beneath, unless perhaps slightly towards the apex. Peduncles about 1 in. long, branching at the apex into a simple umbel of 3–4 rays $\frac{1}{5}$–$\frac{1}{3}$ in. long surrounding a sessile involucre, shortly pubescent. Bracts $\frac{1}{6}$ in. long and nearly as broad, cuneately subquadrate, often slightly hooded at the truncately-rounded apex, pubescent on both sides. Involucres solitary at the apex of each ray and one sessile between the bases of the rays, $3\frac{1}{2}$ lin. in diam., shallowly cup-like, with a very spreading rim-like entire gland; lobes wholly overtopping the gland. Ovary, styles and pedicel pubescent; perianth with very rudimentary rounded lobules; styles connate at the base, deeply divided into 6 rather slenderly pointed subulate arms.—Pax in Engl. Jahrb. xxiii. 536.

Mozamb. Distr. German East Africa: Kilimanjaro, near the Missionary Station, 5000 ft., *Volkens*, 1059A! Moshi, *Merker*, 608!

3. **S. umbellatum,** *Pax in Engl. Jahrb.* xix. 125. Branches as in *S. Grantii*, Hook. f., glabrous. Leaves alternate, 3–$4\frac{1}{3}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, cuneately oblanceolate or obovate, abruptly acute or with a short deltoid point, tapering to the subsessile or very shortly petiolate base, with the midrib prominent and rounded (not wing-keeled) beneath. Umbels axillary, compound; peduncles $\frac{3}{4}$–1 in. long, glabrous, with 3–5 primary glabrous rays $\frac{1}{2}$–$\frac{3}{4}$ in. long and 3–4 secondary thinly pubescent rays 3–5 lin. long; bracts rectangular or quadrate, truncate, thinly pubescent. Involucre $2\frac{1}{2}$ lin. in diam., shortly and broadly funnel-shaped, with an entire spreading margin, glabrous outside, red; lobes erect, transversely rectangular, ciliate, glabrous on the back, red. Capsule

shortly exserted beyond the lobes of the involucre and curved to one side, 2 lin. in diam., rather acutely 3-angled, obscurely and minutely puberulous; perianth rudimentary; styles about $\frac{3}{4}$ lin. long, united below, bifid at the apex.—Pax in Engl. Pfl. Ost-Afr. C. 242.

Mozamb. Distr. German East Africa: Usukuma; watershed of the River Simiu, *Fischer*, 517!

Var. *puberulum*, N. E. Br. Leaves 5–6$\frac{1}{2}$ in. long, 2–2$\frac{1}{2}$ in. broad, cuneate-oblanceolate. Umbels with the secondary rays forked and more pubescent than in the type. Involucre 3 lin. in diam., pubescent outside and the lobes pubescent on the back at the basal part.

Mozamb. Distr. German East Africa: Ukerewe; Multanga, *Conrads*, 166!

The type of var. *puberulum* consists of 4 leaves and 2 umbels only; when better known it may prove to be a distinct species. The umbels closely resemble those of *S. compactum*, N. E. Br., but the leaves are larger and quite destitute of the wing-like keel on the midrib beneath, characteristic of the latter species.

4. **S. compactum,** *N. E. Br.* Branches as in *S. Grantii*, but perhaps rather stouter, glabrous. Leaves thinly fleshy, 3–4$\frac{1}{2}$ in. long, 1$\frac{3}{4}$–2$\frac{1}{2}$ in. broad, cuneately obovate, broadly rounded into a very short recurved acute point at the apex, narrowing from a little above the middle to the subsessile base, rather finely and serrately crinkled at the subrevolute margins, with an acute wing-like keel along the midrib beneath, $\frac{2}{3}$–1 lin. broad at the basal part, glabrous on both sides. Peduncle $\frac{3}{4}$–1 in. long, moderately stout, glabrous, bearing a compact corymb-like umbel 1$\frac{3}{4}$–2$\frac{1}{2}$ in. in diam. of 4 puberulous rays, which are twice forked, with a sessile involucre in each fork and 1–3 at the end of each branchlet; bracts $\frac{1}{12}$ in. long, $\frac{1}{6}$ in. broad, transversely rectangular, minutely toothed along the truncate top, with here and there a gland, very finely ciliate down the sides, puberulous on the back and part of the inner surface. Involucre about $\frac{1}{5}$ in. in diam. and scarcely $\frac{1}{16}$ in. deep, saucer-like, open or notched on one side to half-way down (always?) with a very spreading entire margin (gland), apparently bright red; lobes erect, much overtopping the gland, slightly puberulous at the base on the back, otherwise glabrous on both sides. Ovary and capsule erect, minutely puberulous; perianth-lobes very minute, rounded; styles connate at the base, shortly bifid at the apex, with roundish stigmas, thinly puberulous, at least on the lower part.

Nile Land. British East Africa: Machakos, *Kässner*, 956!

5. **S. carinatum,** *Boiss. in DC. Prodr.* xv. ii. 187, 1269. A shrub or small tree 6 ft. or more high. Branches terete, fleshy, green, with age becoming grey, marked with leaf-scars. Leaves alternate, 3$\frac{3}{4}$–5 in. long, 1$\frac{2}{3}$–2$\frac{1}{4}$ in. broad, obovate or oblong-obovate, acute or abruptly and obtusely acuminate or subacuminate, tapering to a subsessile base, entire or crisped-crenulate on the margins, acutely keeled on the midrib beneath, glabrous on both sides. Cymes axillary and terminal, somewhat lax, 2–2$\frac{1}{2}$ in. in diam.; peduncles 1–1$\frac{1}{4}$ in. long, subumbellately branching into 3–5 closely-placed rays, but not all arising at the same point; rays 2–3 times forked; bracts transverse, truncate,

shorter than the involucre, puberulous. Involucre $2\frac{1}{4}$ lin. in diam., shallowly cup-shaped, with a spreading entire rim-like gland, minutely pubescent on the basal part, glabrous above. Ovary exserted, minutely subtomentose. Capsule 3 lin. long, deeply 3-lobed as seen from above, with compressed and somewhat keeled lobes, smooth, thinly and minutely puberulous (glabrous to the eye), exserted on a pubescent pedicel.—Baill. Adans. iii. 143. *S. piscatorium*, Pax in Engl. Jahrb. xix. 125, and in Engl. Pfl. Ost-Afr. C. 242. *Euphorbia ? pereskiæfolia*, Houllet ex Baill., Adans. i. 105; Boiss. in DC. Prodr. xv. ii. 176, 1269. *E. sulcata*, Lem. ex Boiss. l.c., 176.

Mozamb. Distr. Zanzibar, *Stuhlmann*, 468!

Introduced into the Paris Botanic Garden in 1853 from the Botanic Garden at Bourbon, by *A. Richard*.

6. **S. molle,** *Pax in Engl. Jahrb.* xliii. 88. Branches as in *S. Grantii*, glabrous. Leaves $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, obovate, rounded at the apex into a small deltoid acute point $\frac{1}{6}$–$\frac{1}{8}$ in. long, cuneately tapering from above the middle into a $\frac{1}{6}$–$\frac{1}{4}$ in.-long petiole, finely pubescent all over on both sides, minutely erose-denticulate at the margins, but this is not always evident on dried specimens; midrib beneath with a distinct narrow wing-like acute keel not more than $\frac{1}{2}$ lin. broad at the base, minutely and irregularly toothed along the edge, not wavy. Peduncles axillary, $\frac{1}{2}$–$\frac{3}{4}$ in. long, umbellately branching at the apex into 3–4 rays $\frac{1}{4}$–$\frac{2}{3}$ in. long, which are forked once or twice and bear a sessile involucre in the forks and at their ends, pubescent on all parts, or almost tomentose on the ultimate branchlets; bracts free, about $\frac{1}{10}$ in. long, subquadrate and $\frac{1}{10}$ in. broad when flattened out, concave, slightly notched at the apex, densely pubescent or subtomentose. Involucre unisexual (no female flowers seen), $\frac{1}{6}$–$\frac{1}{5}$ in. in diam., very broadly and shallowly basin- or almost saucer-shaped, open or notched to half-way down on one side (always ?) with an entire spreading rim-like gland, pubescent outside, apparently crimson; lobes erect, overtopping the gland, pubescent on the back.

Nile Land. British East Africa: Kibwesi, in Ukamba, *Scheffler*, 137!

7. **S. Kirkii,** *N. E. Br.* Branches as in *S. Grantii*, glabrous. Leaves $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$–2 in. broad above the middle, cuneately obovate, broadly rounded with a short deltoid point at the apex, tapering from $\frac{2}{3}$–$\frac{3}{4}$ of the way up into a long wedge-shaped basal part, with scarcely any petiole, narrowly revolute at the margins, with an acute wavy entire wing-like keel $\frac{3}{4}$–1 lin. broad along the midrib beneath, very thinly covered with very minute pubescence above, most conspicuous at the margins, pubescent along the wing of the midrib, but otherwise glabrous beneath. Cymes probably axillary, a few branches only seen, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, twice forked, with a sessile involucre in each fork and at the ends of the branchlets, rather minutely pubescent; bracts free, concave, $\frac{1}{10}$–$\frac{1}{8}$ in. long and $\frac{1}{8}$–$\frac{1}{6}$ in. broad when flattened out, subquadrate, subtruncate or very broadly angular at the

apex, slightly denticulate or fringed with a few glands along the top. Involucre about $\frac{1}{6}$ in. in diam., cup-like, not notched on one side, with an erect entire rim-like gland, pubescent outside; lobes erect, overtopping the gland, glabrous, minutely ciliate. Ovary puberulous; perianth reduced to a minute 3-lobed or subtruncate rim; styles united for half their length, very deeply bifid above, pubescent; stigmas thickened.

Mozamb. Distr. British Central Africa? near Sekwene, 2000 ft., *Kirk!*

8. **S. glaucescens,** *Pax in Engl. Jahrb.* xxxiii. 289. A shrub 7–8 ft. high. Flowering branches stout, $\frac{1}{3}$–$\frac{1}{2}$ in. thick, apparently fleshy at the tips, glabrous, not glaucous. Leaves 5–6 in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, oblanceolate or cuneate-obovate, acute and apparently somewhat recurved at the apex, tapering from above the middle into a stout petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, with a wing-like entire keel $\frac{1}{2}$–1 lin. broad along the midrib beneath and the margins entire or toothed at the apical part, more or less undulate, not ciliate, glabrous on both sides. Cymes axillary, lax, $1\frac{1}{2}$–4 in. long, including the $\frac{3}{4}$–2 in.-long glabrous peduncles, with 3–5 subumbellately arranged or closely placed thinly pubescent branches, once or twice forked or with 2–3 involucres scattered along them. Involucres sessile, 2–$2\frac{1}{2}$ lin. in diam., puberulous outside, with an entire spreading rim-like gland and 5 erect subquadrate truncate-toothed lobes, as long as broad, puberulous on the back. Ovary thickly puberulous; styles $\frac{3}{4}$–1 lin. long, united to the middle, bifid at the apex, with slightly thickened stigmas. Capsule about $2\frac{3}{4}$–3 lin. long, smooth, thinly and minutely puberulous (glabrous to the eye), with a rudimentary 3-lobed perianth at its base, exserted from the involucre on a recurved pubescent pedicel. Seeds $1\frac{1}{4}$ lin. long and 1 lin. broad, slightly compressed, oblong-ellipsoid, brown, thickly covered with pale greyish dots.

Mozamb. Distr. German East Africa: near Masinde, *Busse*, 1147!

Var. *brevipes*, N. E. Br. Peduncles $\frac{1}{4}$–1 in. long, subumbellately branching into 3–4 once-forked rays $\frac{1}{4}$–$\frac{2}{3}$ in. long, otherwise as in the type.

Mozamb. Distr. German East Africa: Usambara; Kwamkuyu, *Engler*, 3399! Bomole, *Braun*, 733!

The branches of the type specimen are not pruinose as originally described, but the epidermis of one piece of stem is attacked by a fungus and has undergone some change in the process of drying, producing a bluish colour; the other two pieces show no evidence of this. I do not find the pedicels to be glabrous or the rim of the involucre lobed as originally described. *Busse* 165, from Mkatta River, referred to *S. glaucescens* by Pax, is a totally different species, with the flowers in simple umbels of 3–5 rays, each bearing but one involucre, never forked, and the capsules are larger, rugose (not smooth), glabrous, and the seeds different. Possibly it may belong to *S. Volkensii*, Pax, but the specimen is leafless, so cannot be determined.

9. **S. gazense,** *N. E. Br.* A large shrub, very like *S. Grantii* in appearance. Branches glabrous. Leaves $4\frac{1}{2}$–6 in. long, $1\frac{1}{4}$–2 in. broad near the apex, cuneately obovate, acute or subobtuse, tapering from $\frac{3}{4}$ of the way up into a short stout petiole, narrowly revolute at the margins and with the midrib prominent, but not wing-keeled beneath,

very shortly pubescent on the upper surface, especially near the margins, glabrous beneath. Cymes numerous, axillary, $4\frac{1}{2}$–$5\frac{1}{2}$ in. long, about 2 in. in diam., or the lower much smaller, with peduncles 2–3 in. long, umbellately divided at the apex into 3–4 main branches, which are once (or perhaps when fully developed twice) forked, shortly pubescent; bracts free, concave, subquadrate and $2\frac{1}{2}$ lin. long and broad when flattened out, truncate and minutely toothed at the apex, puberulous on both sides. Involucre 3–4 lin. in diam., with a spreading light green rim-like gland, pubescent on the basal half, glabrous above. Ovary not seen, only male involucres on the specimen

Mozamb. Distr. Portuguese East Africa: Gazaland; by the Chipetzana River, 3000 ft., *Swynnerton*, 1505!

This species differs from *S. Grantii* in its pubescence and from *S. Kirkii* by the entirely glabrous under-surface of the leaves, absence of a wing-like keel beneath the midrib, and the very much larger involucres.

10. **S. Grantii,** *Hook. f. in Bot. Mag. t.* 5633. A shrub 8–10 ft. high, branching from near the base, with the main stem up to 5 or 6 in. thick; bark of the older parts pale greyish. Younger branches $\frac{1}{3}$–$\frac{1}{2}$ in. thick, terete, glabrous, green and somewhat fleshy, becoming woody and thickening with age. Leaves alternate, thinly fleshy, 3–7 in. long, 1–$2\frac{1}{2}$ in. broad, oblanceolate or obovate, obtuse or subacute, apiculate, gradually tapering from above the middle into a stout petiole $\frac{1}{8}$–$\frac{1}{3}$ in. long, flat or slightly wavy, entire or minutely toothed, minutely ciliate (cilia not always evident on dried specimens), glabrous on both sides, opaque grass-green, reticulately veined with darker green, paler beneath and often tinted with reddish on the prominent obtuse midrib. Cymes axillary, repeatedly forked, 3–6 in. long (including the 1–2 in.-long peduncle), 2–4 in. broad, thinly pubescent with spreading hairs on the upper part, glabrous below; bracts $\frac{1}{8}$–$\frac{1}{6}$ in. long, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. broad, subquadrate, very obtuse or subtruncate, entire, minutely pubescent, red. Involucres bisexual or entirely male, about $\frac{1}{4}$ in. in diam., and 1 lin. deep, shallowly basin- or saucer-shaped, with an entire spreading rim-like gland, dark red, pubescent on the basal part; lobes wholly overtopping the rim, glabrous. Ovary puberulous, or pubescent; perianth scarcely more than a mere truncate or minutely 3-lobed rim; styles connate at the basal half, deeply bifid above; stigmas diverging-recurved.—Oliver in Trans. Linn. Soc. xxix. 145.

Nile Land. Uganda: near villages in Madi, *Speke & Grant*, 754! and *cultivated specimens!*

Mozamb. Distr. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 3817! Portuguese East Africa: Lower Zambesi; near Boruma, *Menyharth*, 614!

Described from the original plant, still in cultivation at Kew. The specimen collected by Menyharth appears to be this species, but the material seen does not admit of dissection. Another specimen at Kew is accompanied by an extract from a letter "from A. M. Fleming to Mr. Millar, 2 London Wall Buildings," containing the following information: "Much sought after by the natives of Barotse-land as a cure for leprosy. This plant comes from the Zambesi Valley and is somewhat rare,

natives travelling for miles to get it. It was obtained by Mr. Worthington, the secretary for native affairs, N.-W. Rhodesia. I am of opinion that, like many other native remedies, its use is probably based on some superstition, and do not anticipate that it is of any practical scientific interest." Col. Grant states that in Uganda it is rare and only found near villages, so that it may even have been carried thus far from the Zambesi Valley by the natives.

11. **S. angolense,** *N. E. Br.* "An erect pyramidal growing tree, quite succulent. Stem 5 in. or more in diam., branched some 2 ft. from the base" (*Gossweiler*). Branches as in *S. Grantii*, glabrous. Leaves thinly fleshy, $4\frac{1}{2}$–6 in. long, 1–$1\frac{3}{4}$ in. broad, cuneately oblanceolate, obtuse or subacute, tapering from about 1–$\frac{1}{2}$ in. below the apex to a narrow subsessile base, apparently narrowly revolute at the entire margins, with a prominent rounded (not winged) midrib beneath, glabrous on both sides, pale green (*Gossweiler*). Cymes axillary, about $3\frac{1}{2}$ in. long including the $\frac{1}{2}$–$\frac{3}{4}$ in.-long peduncle, 1–$1\frac{1}{2}$ in. broad, rather lax, about 4 times forked, with a sessile involucre in each fork and at the tips of the ultimate branchlets, thinly and minutely pubescent on the ultimate branchlets, otherwise glabrous; bracts about $\frac{1}{8}$ in. long and broad, subquadrate, subacute, minutely puberulous on both sides. Involucre nearly $\frac{1}{4}$ in. in diam., very shallowly basin-shaped, open or notched to half-way down on one side, with a very spreading entire rim-like gland, finely pubescent outside; lobes wholly overtopping the gland, with a few scattered hairs on both sides. Ovary rather densely white puberulous on all parts, with the perianth-lobes $\frac{3}{4}$–1 lin. long, as long as or longer than the young ovary and adpressed to its angles, linear or subulate, obtuse or acute, incurved at the tips, puberulous; styles united at the base, slightly dilated and thickened at the apex, not at all bifid.

Lower Guinea. Angola: near Malange, *Gossweiler*, 997 !

To this species may possibly belong a specimen too immature to determine, collected by Monteiro in Angola, about 100 miles inland from Ambriz, which is stated on the label to grow about 12–14 ft. high, with thick stems and leaves. According to Gossweiler *S. angolensis* is "evidently planted near the natives' dwellings," so is probably used by them medicinally or as a poison.

12. **S. cymosum,** *N. E. Br.* Stem (glabrous) and habit as in *S. Grantii*. Leaves $5\frac{1}{4}$–7 in. long, $1\frac{1}{6}$–2 in. broad, lanceolate, apex broken, cuneately narrowed for about $\frac{1}{4}$ of their length into a stout petiole $\frac{1}{6}$–$\frac{2}{3}$ in. long, subentire or minutely serrulate and sometimes also somewhat crenate, rather thick and subrigid, probably fleshy when alive, glabrous on both sides; midrib prominent and rounded at the base, but apparently not prominent at the upper half of the leaf beneath. Cymes axillary, $4\frac{1}{2}$–5 in. long (including the $1\frac{1}{2}$–$1\frac{3}{4}$ in.-long peduncle), 2–$2\frac{1}{2}$ in. broad, dichotomously much-branched, corymb-like or flat-topped; peduncle and lower divisions glabrous, upper branches puberulous or shortly pubescent; bracts $1\frac{1}{3}$–$1\frac{3}{4}$ lin. long and broad, broadly cuneate or cuneately subquadrate, slightly hooded at the subtruncate apex, puberulous on both sides. Involucre rather more than $\frac{1}{5}$ in. in diam., with a spreading entire rim-like gland; lobes

wholly overtopping the gland. Ovary pubescent; perianth with 1, 2 or all 3 of its minute deltoid lobes terminating in a filiform or linear-subulate tail $\frac{1}{2}$–$\frac{2}{3}$ lin. long and as long as the young ovary, pubescent; styles connate at the basal half, more or less deeply bifid above.

Nile Land. Uganda: Butiaba plain, east shore of Lake Albert, 2200 ft., *Bagshawe*, 850!

Nearly allied to *S. angolense*, but differing in the very much shorter cuneate part of the leaves, which are not at all oblanceolate and rather differently veined, and the branches of the cyme are stouter.

4. EUPHORBIA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 258.

Apparent flower consisting of a number of stamens (really male flowers, each consisting of a single stamen jointed to a pedicel and soon falling away from it, without or rarely with a minute perianth just above the articulation) mingled with membranous scales or bracteoles, with or without a stalked ovary (really a pedicellate female flower, with or without a minute 3-lobed or very rarely cup-like or tubular perianth at the base of the ovary, but without a membranous tubular involucel surrounding the pedicel) in their midst, contained in a calyx-like cup-shaped involucre, the whole resembling a small hermaphrodite or male flower. Involucre consisting of a cup with an outer series of 2–8 (usually 5) glands, distinct and equally spaced or rarely united, entire, 2-horned, petal-like or divided, alternating with an inner series of 4–8 (usually 5) membranous erect or inflexed fringe-toothed lobes. Anthers 2-celled; cells usually subglobose and more or less diverging, longitudinally dehiscent. Ovary partly or wholly included or exserted, 3- (rarely 2-) celled, with a single ovule in each cell, pendulous from the apex of the inner angle; styles 3, rarely 2, free or more or less united below, entire or bifid at the apex. Fruit a 3- (rarely 2-) celled capsule; cells separating at maturity from the central persistent axis and opening along their inner face into 2 valves, liberating the seed; inner part of the valves hard or cartilaginous. Seed with a thin crustaceous testa, smooth or variously sculptured, usually carunculate at the hilum; embryo straight, with flat cotyledons, enclosed in a thick albumen.—Herbs, shrubs or trees, very variable in habit, leafy or leafless, often succulent or cactus-like, with copious milky juice. Leaves alternate or the upper or all opposite, entire, toothed or rarely lobed. Stipules present or absent, in the succulent species often transformed into prickles or spines above a larger pair of spines. Involucres solitary and terminal or axillary or in the forks of the stems, or clustered in the axils of leaves or spines, or in cymes, which are axillary or terminal, simple, umbel-like, paniculate or rarely whorled, very rarely in axillary racemes.

Species about 1000, dispersed throughout the warmer and temperate regions.

The cup-like involucre of this genus, which so closely resembles the calyx of a hermaphrodite flower, is really composed of two alternating whorls of 4–5 (rarely more) bracts fused together, the outer whorl terminating in the 4–5 glands and the inner whorl in the fringed or ciliate lobes. Occasionally abnormal flowers may be met with in which this is clearly shown, by one or more of the outer whorl being nearly or quite free to the base and tipped with a rudimentary gland. In the

following descriptions all the measurements are taken from flowers soaked in boiling water or preserved in fluid, the diameter of the involucre usually includes the glands and their appendages or processes, but not their two horns. Usually the involucre-glands are free, but in a few of the terete-stemmed and spiny succulent species they are united into one continuous rim-like gland or with only a faint indication of lobing; in these there is nothing but habit to separate them technically from *Synadenium*. The formation of a key to the species of this genus presents exceptional difficulties, as the characters available are few in proportion to the number of species. It is often easy to see at a glance that two or more species are perfectly distinct, but very difficult to find absolute characters whereby to distinguish them in a key. Leaves are often so similar in a number of species or else so dissimilar on the normal stems and those that spring up after the annual fires, that distinct species have been founded upon them (as in *E. zambesiana*, *E. depauperata*, &c.), so that they can seldom be utilised. Pubescence is absent from the majority. The involucre and its glands are very much alike in a large number of species, whilst in the succulent group the number of angles and spines are very much the same in many kinds and the flowers are often unknown, rendering distinctive characters exclusive of measurements very hard to find. Among the succulent species Pax has proposed groups characterised by the number of spines upon the spine-shields, which I find to be quite invalid. For the difference in the number of spines mentioned by him, depends upon the presence or absence of a pair of prickles above the spines. The spines in books have been called "stipular spines," but as they are always developed below, and sometimes at a distance below the leaf or leaf-scar, they cannot be stipules in the ordinary sense of that term; what their real relation to the leaf is I do not quite understand. But the prickles to which I above allude are developed one on each side of the rudimentary leaf and are true stipules. In some species they seem to be constantly well developed either as small auricles or prickles, but with one exception are never so large as the true spines; in other species they are very frequently well developed on some branches and rudimentary or absent on others or even on the same branch, so that it is often quite impossible to use them as specific characters as has been done by Pax, with the consequence that the same species is found placed under different names in different groups. The term "flowering-eye" made use of for the succulent species, refers to a more or less distinctly marked and usually depressed area or point, like the "eye" of a potato, on the angles of the stem above the spine-pairs, from which the flowers ultimately develop. In the following key only characters that are apparently absolute have been made use of and where the plant is variable or cannot be distinguished by one unvarying character it is inserted under more than one heading.

A. Plants without spine-shields, prickles or spines, with the exception of a few species with rigid woody spine-tipped branches.

Involucre with only 2-3 perfect erect glands, (4-5 or more in all other species); herbs.

Leaves all petiolate; involucre-glands $\frac{1}{2}$–$\frac{2}{3}$ lin. long, 2-lipped, appendaged; herb with tuberous roots — 72. *E. tuberifera.*

Leaves sessile at the flowering nodes; involucre-glands $1\frac{3}{4}$ lin. long, tubular, open down the inner side, without appendages; main stem thick, fleshy, tuberculate . . . . — 108. *E. longetuberculosa.*

Involucre with 4–5 glands, divided on their outer margin into 3-15 simple or forked, filiform, linear or finger-like processes, and including the glands $\frac{1}{3}$–$1\frac{1}{8}$ in. in diam.

Herb $1\frac{1}{2}$–4 in. high; rootstock tuberous; leaves and bracts linear or linear-lanceolate, acute . 49. *E. trichadenia.*

Herb 1–2 ft. high, with annual leafy flowering shoots from a thick succulent tuberculate leafless stem; bracts ovate, acuminate . . 54. *E. Monteiri.*

Herbs or shrubs 3–10 ft. high; flowering branches herbaceous or not distinctly woody; leaves alternate (see also 58, *E. tumbaensis*).

Bracts under the involucres $\frac{3}{4}$–$3\frac{1}{2}$ in. long, with awn-like points $\frac{1}{4}$–1 in. long.

Leaves $\frac{1}{2}$–1 in. broad, sessile . . . 55. *E. Grantii.*

Leaves $1\frac{1}{6}$–$3\frac{1}{4}$ in. broad, tapering into a petiole $\frac{1}{2}$–1 in. long. . . . . 56. *E. pseudograntii.*

Bracts under the involucres $\frac{1}{3}$–$\frac{2}{3}$ in. long, with awn-like points $\frac{1}{8}$ in. or less long . . 57. *E. Cervicornu.*

Shrubs or small trees with woody-looking (or probably fleshy, when alive) flowering branches, leafless or with terminal rosettes or clusters of leaves at the time of flowering, naked below.

Flowering branches 4–$4\frac{1}{2}$ lin. thick; bracts under the involucre $\frac{3}{4}$–1 in. long, acute or shortly subulate-pointed . . . . 92. *E. noxia.*

Flowering branches 1–3 lin. thick; bracts under the involucres scale-like or very deciduous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, obtuse, apiculate.

Involucre (including glands) 6–8 lin. in diam.; ovary partly enclosed in a deep cup-shaped calyx . . . . . 90. *E. Scheffleri.*

Involucre (including glands) about 5 lin. in diam.; ovary with a very rudimentary rim-like calyx . . . . . 91. *E. somalensis.*

Involucre-glands 4–5, pubescent on the inner or upper surface as well as on the back, and ciliate, entire or crenulate, without appendages or processes.

Leaves all alternate or clustered at the apex of the stem.

Plant with a cylindric fleshy tuberculate unbranched stem $\frac{1}{2}$–3 in. high, with a tuft of leaves and flowers at the apex . . . 110. *E. napoides.*

Plant branching, $\frac{1}{2}$–2 (or more?) ft. high.

Branchlets ascending; leaves elliptic; petioles $\frac{1}{4}$–$1\frac{1}{4}$ in. long. . . . . 38. *E. acalyphoides.*

Branchlets horizontally spreading with upcurved tips; leaves linear-lanceolate; petioles $\frac{1}{8}$ in. or less long . . . 96. *E. incurva.*

Leaves opposite at the flowering nodes, alternate elsewhere, linear or linear-lanceolate . . 41. *E. sarmentosa.*

Involucre-glands 4–5, rarely 6–8, glabrous on the inner or upper surface, mostly entire, but sometimes with petal-like appendages or 2-horned or toothed, never divided into several linear or filiform processes.

***Herb*; *branches slender, repeatedly forked, their tips and a very short spur in each fork much thickened and knob- or tubercle-like (not so in any other species), corrugated with leaf-scars and bearing a tuft of* 4–6 *linear leaves and* 1–3 *involucres* . . . . . 35. *E. hedyotoides.*

***Herbaceous annuals or perennials, or, if woody at the lower part, always with herbaceous flowering branches; leaves well developed, always present.*

*Annual, prostrate or decumbent, flowering-leaves opposite, with a basal patch or half the leaf on one side of the midrib white, not so in any other species . . 1. *E. phylloclada.*

**Annual or perennial; stems prostrate or in a few species erect, usually less than 1 lin. thick; leaves opposite, petiolate, often unequal at the base, usually stipulate; involucre-glands 4 (rarely 5), small or minute, entire, with or without a petal-like entire or lobed or minute rim-like appendage, never 2-horned or with other processes.

Involucres several (more than 3) or many together in pedunculate heads, clusters or cymes; leaves 2–9 lin. broad, only occasionally linear.

Young parts of stem and branches conspicuously pilose with spreading yellowish hairs; flowers in globose heads . . . . . 4. *E. hirta.*

Young parts of stem and branches glabrous or puberulous, never with conspicuous spreading hairs; flowers in small cymes or clusters.

Cymes with 1 pair of leaves at the base, sometimes minute or absent; involucres usually many . . . 5. *E. hypericifolia.*

Cymes with more than 1 pair of leaves; involucres usually few . . . 6. *E. glaucophylla.*

Involucres only 1–3 together if on slender peduncle-like axillary branchlets with 1–2 pairs of leaves, but mostly solitary or clustered and axillary or in the forks of the branches or terminal or on short axillary leafy branchlets.

Leaves 5–12 times as long as broad, linear or linear-oblong; branches glabrous all round (except in 32, *E. lupatensis*, and sometimes in 9, *E. zambesiana*).

Gland-appendages very inconspicuous or none.

Plant rather densely leafy; seeds rather deeply rugose or pitted-rugose . . . . . 17. *E. polycnemoides.*

Plant laxly leafy; seeds faintly rugose or nearly smooth . . . . 30. *E. arabica.*
Gland-appendages conspicuous, petal-like, often unequal, white or red.
Erect annuals, unbranched at the basal part; leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long.
Young branches, ovary and capsule glabrous; styles $\frac{1}{2}$ lin. long, with thick clavate stigmas . . 31. *E. leshumensis.*
Young branches, ovary and capsule puberulous; styles $\frac{2}{3}$–$\frac{3}{4}$ lin. long, with filiform stigmas . . 32. *E. lupatensis.*
Perennials, much branched from the base, prostrate or erect; leaves $\frac{1}{4}$–$\frac{7}{8}$ in. long.
Involucre $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, with dark purple-brown glands and white or red appendages.
Stems puberulous; gland appendages inconspicuous . 8. *E. Kerstingii.*
Stems glabrous; gland appendages very conspicuous . 9. *E. zambesiana.*
Involucre about $\frac{1}{2}$ lin. long, with greenish or yellowish glands and white or red appendages.
Flowers axillary or axillary and terminal on short axillary branchlets; ovary minutely puberulous . . . . 28. *E. seclusa.*
Flowers in the forks of the cymes or branches and terminal; ovary glabrous . . 29. *E. Eylesii.*
Leaves 1–4 times as long as broad, linear-lanceolate, lanceolate, oblong, elliptic or orbicular.
†Branches, both sides of the leaves and capsule glabrous.
Leaves of each pair unequal, one very distinctly larger than the other (see also 28, *E. seclusa*) . 27. *E. inæqualis.*
Leaves of each pair equal or nearly equal in size.
Stipules 2 at each node, one on each side of the stem, ovate, toothed or fringed.
Leaves 4–9 lin. long, oblong or elliptic-oblong . . . 6. *E. glaucophylla.*
Leaves $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, elliptic or suborbicular . . . 26. *E. serpens.*
Stipules more than 2 to a node, entire or divided, all free or those on the underside united into one body, often minute or inconspicuous.

Involucre 1–$2\frac{1}{2}$ lin. in diam., including the conspicuous gland-appendages; leaves and pubescence variable.
Stems prostrate, much branched . . . . 15. *E. Rivæ.*
Stems prostrate or erect and clustered, simple or sparingly branched . . . 9. *E. zambesiana* and vars.
Involucre $\frac{1}{3}$–$\frac{3}{4}$ lin. in diam., including the mostly inconspicuous or sometimes absent gland-appendages.
Leaves rather thick and fleshy or rigidly coriaceous, glaucous, without a red spot, usually crowded.
Leaves acute . . . 16. *E. propinqua.*
Leaves very obtuse or rounded at the apex, sometimes apiculate.
Involucre minute, about $\frac{1}{3}$ lin. in diam.; leaves entire or minutely toothed at the apex . 14. *E. Nelsii.*
Involucre $\frac{3}{4}$ lin. in diam.; leaves with very minutely toothed cartilaginous margins . 12. *E. glanduligera.*
Involucre $\frac{2}{3}$ lin. in diam.; leaves entire or very obscurely toothed at the apex . . . 13. *E. subterminalis.*
Leaves herbaceous, not glaucous, toothed or entire.
Leaves oblong, often with a red spot . . . 21. *E. sanguinea.*
Leaves linear or linear-lanceolate, no red spot . 17. *E. polycnemoides.*
††Branches prostrate, puberulous on the upper side, at least along a central line, with minute curved (rarely straight) hairs, glabrous on the under side; leaves sometimes puberulous beneath.
Involucre (including the conspicuous red gland-appendages) $1\frac{1}{2}$–2 lin. in diam. . . . . 22. *E. rubriflora.*
Involucre (including the gland-appendages) $\frac{3}{4}$–1 lin. in diam.
Primary stems 2–8 in. long; gland-appendages just exceeding the margin of the gland or obsolete.
Pubescence on branches of minute curved hairs . . 24. *E. prostrata.*

Pubescence on branches of straight spreading hairs .	11. *E. granulata*, var.
Primary stems 3–18 in. long; gland-appendages $\frac{1}{8}$–$\frac{1}{3}$ lin. long, petal-like, lobed or entire . . .	23. *E. mozambicensis.*
†††Branches with some kind of pubescence all round, at least at the tips, prostrate, or erect; capsule glabrous in 8, *E. Kerstingii* and some vars. of 9, *E. zambesiana*, more or less pubescent or tomentose in the others.	
Leaves glabrous on both sides.	
Leaves 5–18 lin. long, 1–6 lin. broad.	
Involucre 1–1$\frac{1}{2}$ lin. in diam., glabrous	8. *E. Kerstingii.*
Involucre $\frac{2}{3}$–$\frac{3}{4}$ lin. in diam., tomentose	3. *E. convolvuloides.*
Leaves $1\frac{1}{2}$–5 lin. long, $\frac{3}{4}$–4 lin. broad.	
Involucre (excluding the usually conspicuous white or red gland-appendages) $\frac{2}{3}$–$1\frac{1}{4}$ lin. in diam.	
Involucre - glands purple - brown; capsule $1\frac{1}{4}$ lin. in diam.	9. *E. zambesiana*, var.
Involucre-glands yellowish or greenish; capsule $\frac{2}{3}$ lin. in diam.	23. *E. mozambicensis*, var. *Fischeri.*
Involucre (including the inconspicuous or subobsolete gland-appendages) $\frac{1}{3}$ lin. in diam.; capsule $\frac{2}{3}$ lin. in diam. . .	25. *E. loandensis.*
Leaves pubescent beneath or on both sides.	
Involucre (excluding the usually very distinct petal-like appendages) $\frac{3}{4}$–$1\frac{1}{4}$ lin. in diam.	
Leaves 2–5 lin. broad; two gland-appendages more than twice as large as the others .	2. *E. tettensis.*
Leaves $1\frac{1}{2}$–2 lin. broad; gland-appendages not very unequal, sometimes obsolete . .	9. *E. zambesiana.*
Involucre (including the minute or obsolete gland-appendages or excluding them in a large-appendaged form of 3, *E. convolvuloides*) $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam.	
Annual, 1–3 in. high, simple or once or twice forked; involucre glabrous . . .	7. *E. parva.*

Annual (or perennial?) with prostrate or erect branches 2–20 in. long; involucre puberulous or tomentose.
Branches always with a pubescence of very spreading straight hairs, sometimes scanty; leaves entire . 11. *E. granulata.*
Branches tomentose or puberulous with minute curved adpressed hairs, or if villous with spreading hairs, then with toothed leaves.
Leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long, acute, entire or minutely toothed; seeds with 3–4 transverse ridges on each face . . 3. *E. convolvuloides.*
Leaves $\frac{1}{5}$–$\frac{3}{4}$ in. long, usually distinctly and acutely toothed; seeds slightly pitted-rugose . . 10. *E. scordifolia.*
Leaves $\frac{1}{6}$–$\frac{1}{2}$ in. long, entire or minutely or obscurely toothed; seeds with slight transverse ridges.
Involucre $\frac{1}{3}$ lin. in diam.; styles $\frac{1}{4}$ lin. long . 18. *E. Afzelii.*
Involucre $\frac{1}{2}$–$\frac{2}{3}$ lin. in diam.; styles very minute, $\frac{1}{8}$–$\frac{1}{6}$ lin. long.
Gland-appendages very small, but distinct and petal-like . . 19. *E. kilwana.*
Gland-appendages very indistinct or obsolete or rarely 2, petal-like 20. *E. ægyptiaca.*

***Annual or perennial, erect or rarely somewhat scrambling (never prostrate) herbs, sometimes woody at the base and in 73, *E. agowensis*, perhaps shrubby, but always with herbaceous flowering branches, usually 1 lin. or more thick, in a few species more slender; leaves alternate or opposite or opposite at the flowering nodes and alternate elsewhere, equal-sided at the base, exstipulate; involucre-glands 4–5, entire, minutely toothed, crenulate or 2-horned, but without other processes or appendages.
Stem and branches with narrow wing-angles decurrent from the flat petioles; leaves alternate except at the forkings of the flowering branches . . . . . 39. *E. crotonoides.*

Stem and branches terete or slightly angular, but without wing-like angles.	
Ovary densely and conspicuously tuberculate, glabrous; leaves very variable .	70. *E. depauperata.*
Ovary not tuberculate or in 62, ***E. ugandensis***, with a few inconspicuous tubercles, glabrous to tomentose.	
†Involucres solitary, terminal or in the forks of the branches or both, sometimes forming terminal 2–3-flowered cymes, or scattered along one side of long flowering branches, in **37**, *E. claytonioides*, somewhat congested on the short ultimate divisions of the repeatedly forked branches, never in umbels or heads.	
Plant 3–15 in. high.	
Leaves opposite or only those alternate that are on the main stem below its point of branching.	
Leaves very shortly but distinctly petiolate, linear; ovary and capsule sprinkled with minute adpressed hairs . . .	33. *E. glaucella.*
Leaves sessile, linear-filiform to linear-lanceolate; ovary and capsule glabrous.	
Flowers in the forks of the branches or axillary; involucre-glands 2-horned .	34. *E. dracunculoides.*
Flowers at the ends of elongated slender branches; involucre-glands not 2-horned	36. *E. macra.*
Leaves sessile, broadly reniform-ovate; involucre scarcely 1 lin. in diam.	37. *E. claytonioides.*
Leaves alternate or those at the flowering nodes opposite.	
Involucre subsessile or on peduncles 1–2 lin. long; leaves linear.	
Leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long; involucre minutely puberulous	45. *E. bongensis.*
Leaves 2–$5\frac{1}{2}$ in. long; involucre glabrous . .	46. *E. calva.*
Involucres on peduncles 3–12 lin. long, and together with the ovary more or less tomentose.	
Involucre-glands not tuberculate on the inner or upper surface	47. *E. Oatesii.*
Involucre-glands tuberculate on the upper or inner surface	48. *E. Verdickii*

Involucre and ovary glabrous, solitary or in a terminal 2–3-flowered cyme . . .	50. *E. ledermanniana.*
Plant $1\frac{1}{2}$–3 or more ft. high; involucres scattered along one side of long flowering branches or solitary in the forks and terminal.	
Ovary and capsule pilose or tomentose with rather long soft spreading hairs.	
Capsule thinly hairy; styles $\frac{1}{2}$ lin. long	40. *E. Benthami.*
Capsule densely hairy; styles 1–$1\frac{1}{4}$ lin. long . . .	43. *E. systyloides*, var. *hebecarpa.*
Ovary and capsule puberulous with minute adpressed hairs or minutely white-tomentose; leaves linear to elliptic.	
Leaf-blade $\frac{1}{2}$–2 in. long, entire; styles 1 lin. long; seeds constricted at the middle . .	42. *E. systyla.*
Leaf-blade 1–$4\frac{1}{2}$ in. long, usually more or less toothed; styles $\frac{1}{4}$–$\frac{3}{4}$ lin. long.	
Leaves petiolate, without gland-tipped teeth at the base; seeds ovoid, acute, tuberculate . . .	43. *E. systyloides.*
Leaves subsessile with a spreading gland-tipped tooth on each side at the base; seeds dorsally flattened, 3-grooved down the inner face . .	44. *E. pseudoholstii.*
††Involucres in terminal 3–10-rayed umbels of forked or umbellately divided (rarely simple) rays, with or without similar rays arising below the umbels, in a few species with the umbel reduced to a small terminal head-like cluster; leaves opposite below the whorl under the umbel in 52, *E. verticillata*, alternate in all the others.	
Leaves or the lower reflexed or recurved-spreading.	
Leaves $1\frac{1}{2}$–$3\frac{1}{4}$ in. long, lanceolate to elliptic-lanceolate; involucre-glands reniform, 2-lipped, entire	62. *E. ugandensis.*
Leaves $\frac{1}{4}$–$1\frac{1}{4}$ in. long.	
Leaves oblanceolate; involucre-glands with a minute point (not horn) at each end . .	67. *E. petitiana.*

Leaves linear, with revolute entire margins.
Involucre-glands with 2 rather long horns . . . 76. *E. dejecta.*
Involucre-glands with or without a minute point at each end, often denticulate . 77. *E. cyparissioides.*
Leaves ascending or spreading.
Leaves sharply serrate, sessile; annual . . . . . 69. *E. arguta.*
Leaves entire or in 73, *E. agowensis*, finely toothed, and in 67, *E. petitiana*, inconspicuously denticulate; annuals or perennials.
‡Involucre-glands 2-horned, or at least with a minute point at each end of the outer margin.
Leaves $\frac{1}{4}$–$1\frac{1}{4}$ in. long, more or less crowded; stems 2 or more from the same root.
Leaves oblanceolate, very minutely toothed at the apex; umbels 2–3 in. in diam. . . . . 67. *E. petitiana.*
Leaves lanceolate, entire; umbel head-like about $\frac{3}{4}$ in. in diam. . . . 75. *E. Wellbyi.*
Leaves mostly $1\frac{1}{2}$–4 in. long, sometimes smaller, petiolate or tapering to a petiole-like base.
Horns of the involucre-glands about $\frac{3}{4}$ lin. long. 66. *E. longecornuta.*
Horns of the involucre-glands $\frac{1}{8}$–$\frac{1}{2}$ lin. long, occasionally reduced to mere points.
Umbel- or cyme-branches densely puberulous or subtomentose under the nodes.
Leaves narrowed into a slender petiole 4–5 lin. long . . 64. *E. longepetiolata.*
Leaves narrowed to the base but scarcely forming a distinct petiole . . . 65. *E. schimperiana*, var.
Umbel- or cyme-branches glabrous.
Bracts ovate, elliptic, lanceolate or suborbicular, $1\frac{1}{2}$–5 lin. broad, rounded at

the base (see also 63, *E. ampla*, and 65, *E. schimperiana*).	
Leaves lanceolate, $\frac{3}{4}$–2 in. broad; involucre $2\frac{1}{2}$ lin. in diam. . . .	61. *E. Engleri.*
Leaves linear-lanceolate, $\frac{1}{6}$–$\frac{1}{3}$ in. broad; involucre 1 lin. in diam. .	68. *E. repetita.*
Bracts triangular-ovate, 2–12 lin. broad, subtruncate to subcordate at the base.	
Greater diam. of the involucre - glands 2–$2\frac{1}{2}$ times that of the lesser .	65. *E. schimperiana.*
Greater diam. of the involucre - glands not or scarcely twice that of the lesser . . .	63. *E. ampla.*
‡‡Involucre-glands entire, sometimes 2-lipped when dried, but without teeth or points at the ends.	
Plant 3–9 in. high, perennial, with a tuberous rootstock; leaves sessile or subsessile, acute (see also 50, *E. ledermanniana*).	
Leaves opposite, with a whorl at the base of the umbel, lanceolate to elliptic	52. *E. verticillata.*
Leaves alternate, except at the inflorescence.	
Leaves acutely keeled on the midrib beneath; involucre $2\frac{1}{3}$ lin. in diam. . . .	51. *E. carinifolia.*
Leaves not acutely keeled on the midrib beneath; involucre 3–4 lin. in diam. . . .	53. *E. platycephala.*
Plant 1–5 ft. high.	
Leaves and bracts petiolate; blade $\frac{1}{3}$–$1\frac{1}{3}$ in. long; ovary and capsule puberulous . . .	73. *E. agowensis.*
Leaves and bracts sessile or	

subsessile, but often tapering to the base; ovary and capsule glabrous.
Leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long, crowded; umbel 7–10-rayed, dense . . 74. *E. whyteana.*
Leaves mostly 2–6 in. long; umbel 3–5-rayed.
Bracts $\frac{3}{4}$–2 in. broad; umbel-rays 3–8 in. long . . . 59. *E. macrophylla.*
Bracts $\frac{1}{6}$–$\frac{1}{2}$ in. broad; umbel-rays $\frac{1}{3}$–1 in. long.
Bracts $\frac{1}{2}$ in. broad, with overlapping margins, forming a cup, finally free 62. *E. ugandensis.*
Bracts $\frac{1}{6}$–$\frac{1}{4}$ in. broad, not overlapping at the margins . 71. *E. usambarica.*

Shrubs or trees; branchlets distinctly woody, spine-tipped, rigid; ovary puberulous to tomentose.
Branches usually repeatedly 3-forked . . 85. *E. matabelensis.*
Branches alternate, widely or subhorizontally spreading.
Involucres solitary, mostly axillary or on short axillary shoots scattered along the branches, sometimes terminal.
Branches leafy at the time of flowering; involucre $1\frac{1}{2}$–2 lin. in diam. . . 81. *E. lyciopsis.*
Branches usually leafless at the time of flowering; involucre $2\frac{1}{2}$ lin. in diam. . 84. *E. spinescens.*
Involucres usually in umbel-like cymes or 2–3 in a cluster, sometimes solitary, 2–3 lin. in diam.; branches usually leafy at the time of flowering.
Leaves glabrous on both sides; East Africa 82. *E. cuneata.*
Leaves minutely puberulous on both sides; Angola . . . . . 83. *E. Currori.*

Shrubs or trees, woody or succulent; branchlets terete, neither spine-tipped nor armed with spines, and when succulent neither tessellate nor tuberculate.
Leaves present on the flowering branches.
Leaves linear, 1–2 in. long, surrounding the terminal solitary involucre; branches fleshy 93. *E. sepium.*
Leaves obovate, oblanceolate, ovate, elliptic or orbicular, petiolate or tapering to the base.
Leaves (including the petiole, where present) 2–6 in. long.
Involucres in terminal umbels with rays 1–3 in. long.

Leaves acute, tapering to a slender base, not distinctly petiolate; styles rather deeply bifid . . . 61. *E. Engleri.*
Leaves obtuse, distinctly petiolate; styles entire or very minutely bifid 60. *E. transvaalensis.*
Involucres 1–4, terminal, on peduncles $\frac{1}{4}$ in. long; leaves obovate, very shortly petiolate . . . . . 89. *E. Grosseri.*
Leaves (including the petiole, when present) $\frac{1}{4}$–$1\frac{1}{2}$ in. long (see also 95, *E. balsamea*).
Involucres apparently solitary, terminal, subsessile, 2 lin. in diam.; ovary with a 3-lobed calyx . . . 79. *E. commiphoroides.*
Involucres in a small terminal umbel of cymes on peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, sometimes surrounding a sessile involucre.
Involucre $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., with glands $\frac{1}{2}$ lin. in their greater diam. 78. *E. polyantha.*
Involucre $2\frac{1}{2}$–3 lin. in diam., with glands $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in their greater diam. . . . . 80. *E. jatrophoides.*
Leaves usually absent from the mature flowering branches, only present on the young growths, elliptic-oblong and petiolate in 95, *E. balsamea*, linear (in 98, *E. gossypina*, sometimes lanceolate to elliptic) and sessile or rudimentary or unknown in all the others.
Bracts under the glabrous involucre very conspicuous, persistent.
Branches forking or alternately dividing into lax flat-topped cymes 4–6 in. in diam.; bracts 3 lin. long, rhomboid, green 95. *E. balsamea.*
Branches bearing the cyme or umbel at their undivided apex.
Bracts $2\frac{1}{2}$–3 lin. long, elliptic, reflexed, green . . . . . 98. *E. gossypina.*
Bracts 6–7 lin. long, orbicular-ovate, spreading, white . . . . 99. *E. Cameronii.*
Bracts under the involucre not conspicuous, usually not exceeding or shorter than the involucre, or if exceeding it or up to $2\frac{1}{2}$ lin. long deciduous.
Branches woody, with brown bark; leaves not seen.
Involucres in terminal umbels or clusters of 3–5, minutely puberulous; capsule on a pedicel scarcely exceeding the involucre, tomentose . . . 86. *E. inelegans.*
Involucres solitary, glabrous, with the capsule exserted from it on a long curved pedicel, glabrous.
Branches slightly tuberculate, with flower-scars $\frac{2}{3}$–1 lin. in diam.; styles $\frac{2}{3}$–$\frac{3}{4}$ lin. long . . . . 87. *E. espinosa.*

Branches tuberculate with prominent flowering cushions 1–2 lin. in diam.; styles $\frac{1}{2}$ lin. long . . 88. *E. nodosa.*

Branches distinctly succulent or if sub-woody with a green or greyish bark .

Involucre and ovary puberulous or pubescent.

Branchlets not articulated to the stout branches; involucres solitary (always ?); pedicel of ovary scarcely exceeding the involucre . 94. *E. Rogerii.*

Branchlets articulated to the branches; involucres 3 or more together in terminal clusters; pedicel of ovary much exceeding the involucre.

Ultimate branchlets mostly about 1 lin. thick (dried); male involucres $1\frac{1}{4}$–2 lin. in diam. . 103. *E. media*, and var.

Ultimate branchlets usually about $1\frac{1}{2}$ lin. thick (dried); male involucres 2 lin. in diam. . . 104. *E. rhipsaloides.*

Involucre and ovary (where known) glabrous.

Branchlets opposite or forked.

Flowering branchlets 1–$1\frac{1}{4}$ lin. thick (dried); involucre $1\frac{1}{3}$ lin. in diam. . . . . 106. *E. negromontana.*

Flowering branchlets $\frac{1}{3}$–$\frac{2}{3}$ lin. thick (dried); involucre scarcely 1 lin. in diam. . . . . 107. *E. spartaria.*

Branchlets alternate or some opposite, irregular.

Involucres 1 lin. in diam., sessile or subsessile in small clusters at the tips of the branchlets; styles $\frac{1}{3}$ lin. long . . . . . 105. *E. scoparia.*

Involucres $1\frac{1}{2}$–3 lin. in diam., in terminal umbels or cymes, on peduncles (rays or branches) $1\frac{1}{2}$–10 lin. long.

Mature involucre (including glands) 3 lin. in diam.; styles 1 lin. long . . . . 100. *E. nubica.*

Mature involucre (including glands) $1\frac{1}{2}$–2 lin. in diam.

Branches (dried) evidently fleshy; umbel-rays or peduncles 3–10 lin. long . . 97. *E. lateriflora.*

Branches (dried) apparently somewhat woody; umbel-rays or peduncles $1\frac{1}{2}$–5 lin. long.

Bracts under the involucre broadest near or at the

apex ; involucre-glands 1–1¼ lin. in diam. . . 101. *E. Merkeri.*

Bracts under the involucre broadest at or below the middle; involucre-glands ⅔–¾ lin. in diam. . . 102. *E. consobrina.*

Dwarf *(or in* 112, E. Poissoni, *up to* 5 *ft. high)* ***succulent*** *plants, quite spineless, with turnip-shaped or cylindric and tessellated or tuberculate stems or branches.*

Stem 1 in. or more high, thick, turnip-shaped, densely dichotomously branched at the top, pilose . . . . . 109. *E. Pirottæ.*

Stem 1–3 in. high, ⅓–¾ in. thick, cylindric, more or less tuberculate, with a tuft of leaves and flowers at the apex, glabrous. (See also 110, *E. napoides*, which has pubescent involucre-glands) . . . . . 111. *E. rubella.*

Plants branched, up to 5 ft. high; flowering branches 1 in. or more thick, tessellately tuberculate ; leaves 2½–5½ in. long, notched or 2-lobed at the apex . . . . 112. *E. Poissoni.*

B. Succulent plants, always armed with prickles, spines, or spine-shields on which the spines have become aborted ; involucre-glands 4–5, entire and without appendages, rarely united into a continuous rim, glabrous.

Branches 4-(5 ?) angled, spineless, with separate horny shields along the angles. (Branches or parts of them in 168, *E. controversa*, and 150, *E. quinquecostata*, are also sometimes destitute of spines).

Branches ⅓–½ in. (or perhaps more) square, with linear shields . . . . . 135. *E. heterochroma*, var.

Branches 1–1½ in. square ; shields broadly obovate or broader than long . . . . . 169. *E. Murieli.*

Branches cylindric, 1–2 in. thick, tessellately tuberculate, armed with solitary simple spines without a pair of prickles at their base ; leaves 2-12 in. long, deciduous.

Leaves broadly linear or strap-shaped ; peduncles 4–5 lin. long . . . . . 113. *E. Sapini.*

Leaves narrowly lanceolate or tapering from above the middle to the base, acute to truncate or 2-lobed at the apex.

Spines extending into a suborbicular horny shield round their base, pale grey . . 114. *E. unispina.*

Spines ending abruptly at their dilated base, not forming a suborbicular shield, brown or greyish-brown . . . . . 115. *E. venenifica.*

Branches angular or cylindric, ⅙–½ in. thick, leafless ; main spines simple or forked, solitary or with a pair of small

spines or minute prickles at their base.

Main spines not forked at the apex.

Main spines opposite, $\frac{1}{4}$–$\frac{2}{3}$ in. long; branches somewhat 4-angled . . . . . 118. *E. graciliramea.*

Main spines not opposite, in spiral series or irregularly scattered, $\frac{1}{3}$–$1\frac{1}{4}$ in. long on 3-lobed shields.

Spine-shields decurrent 2–5 lin. below the spines and narrowly linear; involucre $1\frac{3}{4}$–2 lin. in diam. . . . . 119. *E. triaculeata.*

Spine-shields decurrent 1–$1\frac{1}{2}$ lin. below the spines and oblong or linear-oblong; involucre $1\frac{1}{4}$–$1\frac{3}{4}$ lin. in diam. . . . 120. *E. monacantha.*

Main spines forked at the apex or below the middle.

Shaft of main spines below the fork terete and solidly horny to the base; involucres sessile, where known.

Shaft of main spines 3–10 lin. long; forks straight . . . . . 121. *E. schizacantha.*

Shaft of main spines 2–3 lin. long; forks recurved . . . . . 122. *E. glochidiata.*

Shaft of main spines with the fleshy stem-teeth extending far up their compressed basal part.

Forks of main spines shorter than the spines at the base of the stem-teeth; involucres in long-peduncled cymes . . . . 123. *E. furcata.*

Forks of main spines longer than the spines at the base of the stem-teeth; involucres sessile or subsessile . . . . . 124. *E. uhligiana.*

Branches up to 6 in. in diam., 8- (or fewer ?) angled; spines in groups of 5 "4 on the sides and one in the centre, scarcely $\frac{1}{2}$ in. long, fragile and of no resistance" . . 167. *E. abyssinica.*

Flowering branches 2–6 in. in diam., flat or 3–8-angled, armed with pairs of spines (sometimes obsolete in 150, *E. quinquecostata*; 168, *E. controversa*; and 169, *E. Murieli*); **leaves usually rudimentary or scale-like, but in** 160, *E. Dawei*; 173, *E. similis*; 174, *E. tenebrosa*; 177, *E. neglecta*; 178, *E. Winkleri*; 179, *E. obovalifolia*; and 189, *E. hermentiana*, **often developed and foliage-like, $\frac{1}{3}$–5 in. long.**

*Spine-shields united into a continuous horny margin to the stem-angles.

Spines $\frac{1}{2}$–$2\frac{1}{2}$ in. long, very stout; branches 3-angled . . . . . 157. *E. breviarticulata.*

Spines $\frac{1}{2}$–$\frac{3}{4}$ in. long, stout; branches 7–8-angled, spirally twisted . . . . . 147. *E. Dinteri.*

Spines $\frac{1}{12}$–$\frac{1}{2}$ in. long; branches 3–5-angled or rarely flat, not spirally twisted.

Flowering branches with very thin wing-like angles, about $\frac{1}{3}$ lin. thick when dried.

Spine-pairs with a pair of hard recurved hooks at their base . . . . 161. *E. angularis.*
Spine-pairs without hooks or prickles at their base, spine-shields only occasionally united . . . . . 162. *E. Nyikæ.*
Flowering branches with the wing-like angles $\frac{3}{4}$ lin. or more thick when dried.
Spine-pairs with a pair of very minute prickles or points at their base, sometimes obsolete on the same stem.
Stem-wings 1–$1\frac{1}{4}$ in. broad, with grey horny margins . . . . . 163. *E. mbaluensis.*
Stem-wings 1–$2\frac{1}{4}$ in. broad, with light brown horny margins . . . 165. *E. kibwezensis.*
Spine-pairs without a pair of minute prickles at their base.
Branches constricted into conical-ovate segments; angles conspicuously indented at the flowering-eyes . . 166. *E. ussanguensis.*
Branches with somewhat parallel-sided segments; angles not indented at the flowering eyes . . . . . 171. *E. intercedens.*
**Spine-shields separate or only here and there united into a continuous horny margin to the stem-angles, but sometimes almost touching each other.
Flowering branches flat and thin or sometimes 3-angled; calyx under the ovary with 3 lobes cut into filiform segments . . . . 160. *E. Dawei.*
Flowering branches 3–7- (usually 4-) angled.
†Flowering-eyes quite separate from the spine-shields and not connected with them by a horny margin (see also 172, *E. Reinhardtii*, and 175, *E. confertiflora*).
Spine-pairs with or without small hardened auricles but without a pair of minute prickles at their base; young growths with distinct foliage-leaves (always?), soon deciduous (see also 190, *E. conspicua*, which may perhaps have flowering branches 2 in. in diam.).
Flowering branches 3-angled; leaves petiolate.
Leaves 1–$1\frac{1}{2}$ in. long, revolute at the margins; involucre $3\frac{1}{2}$–4 lin. in diam. . . . . 178. *E. Winkleri.*
Leaves mostly 2–5 in. long or sometimes smaller, flat; involucre $2\frac{1}{4}$ lin. in diam. . . . . 179. *E. obovalifolia.*
Flowering branches 4–5-angled; leaves tapering from above the middle to a sessile base.
Leaves $1\frac{1}{2}$–$3\frac{1}{2}$ in. long; spine-shields and spines brown . . . 177. *E. neglecta.*

Leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. long; spine-shields and spines blackish.
Young stem-angles at the flowering-eyes not more than $1\frac{1}{4}$ lin. thick and their sides with faintly prominent oblique ribs extending to the spine-shields . . . . 173. *E. similis.*
Young stem-angles at the flowering-eyes 2–3 lin. thick and their sides with very prominent oblique ribs extending to the spine-shields . . . . . 174. *E. tenebrosa.*
Spine-pairs with a pair of minute prickles at their base; leaves rudimentary, scale-like; ovary with a many-lobed calyx at its base . . . . . 164. *E. kamerunica.*
††Flowering-eyes touching, merging into or included in the spine-shields (not described in 172, *E. Reinhardtii*, and 175, *E. confertiflora*).
Flowering branches with very thin wing-like angles about $\frac{1}{3}$ lin. thick when dried . . . . . 162. *E. Nyikæ.*
Flowering branches with angles at least $\frac{1}{2}$ lin. thick (usually much more) in dried specimens.
Flowers unknown; living branches 3–6 in. in diam., usually 6- (sometimes 5-) angled, constricted into conical or elliptic segments . . . . 170. *E. grandis.*
Cymes sessile, subsessile or with peduncles not more than $\frac{1}{8}$ in. long (see also 182, *E. Erythrææ*, of which the flowers are unknown, but from analogy probably pedunculate).
Flowering branches constricted into elliptic, lanceolate or orbicular segments $1\frac{1}{2}$–5 in. long; calyx under the ovary with 3 (or perhaps more) linear lobes 1–$1\frac{1}{4}$ lin. long . . 168. *E. controversa.*
Flowering branches constricted (often slightly) into parallel-sided or slightly conical segments 6–15 in. long; calyx under the ovary (where known) minutely 4-toothed.
A bush up to 3 ft. high; spine-pairs about 5 lin. apart . . . 175. *E. confertiflora.*
Arborescent, 15–30 ft. high; spine-pairs 8–12 lin. apart . . . 176. *E. disclusa.*
Cymes (where known) on peduncles $\frac{1}{6}$–$\frac{7}{8}$ in. long; calyx under the ovary (where known) divided into 5–9 linear or filiform segments $\frac{2}{3}$–$2\frac{1}{2}$ lin. long.

Ovary with 2 styles, 2-celled; involucre about 4 lin. in diam. . 180. *E. bilocularis.*
Ovary with 3 styles, 3-celled (unknown in 182, *E. Erythrææ*).
Wing-like angles of flowering branches much broader than the central solid part is thick (see also 184, *E. Barteri*, which may perhaps have branches 2 in. or more in diam.).
Branches 7- (perhaps sometimes fewer) angled; peduncles 3–4 lin. long . . . . 181. *E. acrurensis.*
Branches 4- (perhaps sometimes 5-) angled; peduncles 6–9 lin. long . . . . . 183. *E. calycina.*
Wing-like angles of the 5–7-angled flowering branches not broader than the central solid part is thick . . . . . 182. *E. Erythrææ.*
[See also 169, *E. Murieli*, which may perhaps have branches 2 in. or more in diam.]

Flowering branches (dried) 1 $\frac{1}{4}$–1 $\frac{3}{4}$ in. in diam. (see also 182, *E. Erythrææ*, and 195, *E. franckiana*).
Spines 4–9 lin. long; branches deeply constricted into many elliptic or orbicular segments 1–1 $\frac{1}{2}$ in. long and 1 $\frac{1}{2}$–1 $\frac{3}{4}$ in. broad (see also 151, *E. opuntioides*) . . . . . 152. *E. bellica.*
Spines 2–9 lin. long, very unequal on the same stem; branches with irregular and usually not very deep constrictions.
Flowering branches 4–6-angled; spine-shields united into continuous horny margins to the angles . . . . . 155. *E. Thi.*
Flowering branches 3-angled; spine-shields not united into continuous horny margins to the angles . . . . . 156. *E. buruana.*
Spines 1–4 lin. long, subequal or not very unequal on the same stem, absent in 169, *E. Murieli* (always?); flowering branches 3–4-angled (see also 175, *E. confertiflora*).
Spine-pairs with a pair of recurved prickles or hooks at their base . . . . . 187. *E. platyacantha.*
Spine-pairs with or without a pair of minute straight (not recurved) prickles or points at or near their base.
Stem-angles distinctly sinuate-toothed along the margins; flowering-eyes separate from the spine-shields or occasionally connected with them by a horny border.
Leaves $\frac{1}{2}$–2 $\frac{1}{4}$ in. long, oblanceolate or spathulate-oblanceolate, soon deciduous; spine-pairs $\frac{1}{4}$–$\frac{1}{2}$ in. apart . . 189. *E. hermentiana.*

Leaves apparently rudimentury and scale-like.
Spine-pairs $\frac{1}{2}$–$1\frac{1}{2}$ in. apart; cymes on peduncles 4–5 lin. long . . . 190. *E. conspicua.*
Spine-pairs $\frac{1}{3}$–$\frac{1}{2}$ in. apart; flowers unknown . . . . . 186. *E. Candelabrum.*
Stem-angles even, without evident teeth.
Cyme-peduncles 6–10 lin. long; calyx under the ovary cut into segments 2–$2\frac{1}{2}$ lin. long; flowering branches spineless (always?) . . . . . 169. *E. Murieli.*
Cyme-peduncles 2–3 lin. long; calyx under the ovary cut into segments $\frac{2}{3}$–1 lin. long; flowering branches spiny . . 184. *E. Barteri.*
Flowering branches (dried) $\frac{1}{8}$–1 in. in diam., armed with spines (except in a spineless form of 135, *E. heterochroma*).
Leaves well developed 2–12 in. long, $\frac{3}{4}$–3 in. broad.
Peduncles 2–4 together, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, bearing 1 sessile and 2 pedunculate involucres 116. *E. Teke.*
Cymes sessile, with 3 involucres . . . 117. *E. leonensis.*
Leaves rudimentary or scale-like.
*Spine-shields none; spines small, recurved-hooked, arising in pairs from the bark, which separates on dried specimens into 4–5 ribbon-like strips; branches $\frac{1}{8}$–$\frac{1}{6}$ in. thick . . 142. *E. Erlangeri.*
**Spine-shields united into a continuous horny margin along the stem-angles; spines in pairs, with or without a pair of smaller spines or prickles above them.
Plant 3–9 in. (rarely up to 1 ft.) high.
Stems $\frac{1}{4}$ in. or less thick (dried) often twisted; spine-pairs with a pair of smaller spines at their base . . . 126. *E. torta.*
Stems $\frac{1}{5}$–1 in. thick, not twisted.
Branches flat, constricted into elliptic or orbicular segments $\frac{3}{4}$–1 in. in diam. 151. *E. opuntioides.*
Branches (dried) $\frac{1}{4}$ in. or less thick, 4-angled; spines in groups of 4, lower pair 6–10 lin. long, upper shorter . 136. *E. tetracantha.*
Branches $\frac{1}{2}$ in. or more thick, cylindric, with several angles, not constricted; spines in crowded pairs, 4–6 lin. long. 145. *E. golisana.*
Branches 4–6-angled, more or less constricted at irregular intervals; spines $\frac{3}{4}$–4 lin. long.
Branches 4–7 lin. in diam. at the thickest parts; spine-pairs with a pair of minute recurved prickles near their base . . . . 128. *E. tetracanthoides.*
Branches 6–12 lin. in diam. at the thickest parts; spine-pairs without a pair of prickles at their base . 154. *E. fraterna.*
Plant $1\frac{1}{2}$–20 ft. high (size unknown in 138, *E. nigrispina*, but apparently more than

1 ft. high); flowering branches 3–6- (usually 4–5-) angled.	
Spines 4–8 lin. long, almost black; branches apparently not constricted into segments	138. *E. nigrispina.*
Spines $\frac{1}{4}$–4 lin. (or very unequal and sometimes 1–9 lin.) long, grey; branches sometimes irregularly constricted into more or less evident segments.	
Spines $\frac{1}{4}$–1 lin. long, absent from the older parts of the branches . .	150. *E. quinquecostata.*
Spines uniformly 3–4 lin. long; stem-teeth with a very short abrupt slope above the spines and a long slope below them	148. (See under *E. griseola.*)
Spines subequal and 1–3 lin. long or in 153, *E. infausta*, and 155, *E. Thi*, very unequal on the same stem and up to 9 lin. long; stem-teeth (when prominent) about equally sloping above and below the spines (see also 195, *E. franckiana*).	
Capsule on a pedicel shorter or scarcely longer than the involucre.	
Styles $1\frac{3}{4}$–2 lin. long, united for nearly or quite half their length; involucre about 2 lin. in diam.	
Spines 1–$2\frac{1}{2}$ lin. long, not very unequal, often curved upwards	149. *E. polyacantha.*
Spines 1–9 lin. long, very unequal on the same branch, straight .	155. *E. Thi*, and var.
Styles shortly united at the base only or for not more than $\frac{1}{3}$ of their length.	
Horny border narrowed and not more than $\frac{1}{3}$ lin. broad between the spine-pairs; involucre $2\frac{1}{2}$ lin. in diam. . . .	139. *E. quadrangularis.*
Horny border scarcely narrowed and $\frac{2}{3}$–$\frac{3}{4}$ lin. broad between the spine-pairs; involucre $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. . . .	153. *E. infausta.*
Capsule far exserted on a pedicel 2–3 times as long as the involucre; involucre $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam. .	135. *E. heterochroma.*
***Spine-shields quite separate or, in a few species, sometimes separate, sometimes united into a continuous horny margin to the angles, even on the same stem.	
†Plant evidently more than 1 ft. high, sometimes a tree 10–25 ft. high.	
Ultimate branchlets very much recurved or hooked, 3-angled, twisted . . .	159. *E. Robecchii.*
Ultimate or flowering branches ascending or spreading, not recurved.	

Flowering-branches subcylindric or subangular; spine-shields elongated obtriangular, with 2 pairs of spines, the larger 1–2 lin. long . . . . 141. *E. Nyassæ.*
Flowering-branches 3-angled, with irregular and often neck-like constrictions; spines very unequal, 2–8 lin. long . . . . . 156. *E. buruana.*
Flowering-branches 3-angled, without constrictions, with regular deltoid teeth; spines equal, 2 lin. long . . 158. *E. Wakefieldii.*
Flowering branches usually 4–5- (sometimes 3-) angled.
Spine-shields small, acute or rounded below the spines, but not long-decurrent and linear.
Stem-angles (dried) $\frac{1}{4}$ lin. or less thick; spines grey . . . 188. *E. quadrialata.*
Stem-angles (dried) $\frac{2}{3}$ lin. or more thick; spines blackish . . 185. *E. garuana.*
Spine-shields decurrent below the spines and sometimes extending to the flowering eye below as a linear horny margin to the stem-angles.
Stem-angles with small rounded teeth 2–4 lin. apart; spines $\frac{1}{4}$–1 lin. long or obsolete . . 150. *E. quinquecostata.*
Stem-angles with very broadly deltoid teeth 5–10 lin. apart or without teeth.
Spine-pairs with a distinct but smaller pair of spines at or 1–2 lin. above their base.
Stems (dried) 2–4 lin. thick; larger pair of spines very slender 1–$2\frac{1}{2}$ lin. long . 134. *E. taitensis.*
Stems (dried) 4–6 lin. thick; larger pair of spines stoutly needle-like, 2–6 lin. long . 137. *E. subsalsa.*
Spine-pairs with or without (often on the same stem) a pair of minute prickles or points (not distinct spines) at their base or above them.
Ovary far exserted on a pedicel much longer than the involucre . . . . 135. *E. heterochroma.*
Ovary subsessile, included in the involucre . . . 139. *E. quadrangularis.*
††Plant not more (usually distinctly less) than 1 ft. high (see also 141, *E. Nyassæ*, of which only small bits have been seen, but is said to be $1\frac{1}{2}$ ft. high).
Spine-shields bearing 4 subequal spines, 2 directed upwards, 2 downwards . . 140. *E. isacantha.*

Spine-shields bearing 4 unequal spines or 2 spines and a pair of mere prickles.
Lower pair of spines 3–10 lin. long.
Branches cylindric or subcylindric with about 6 spiral series of spine-shields . . . . . 143. *E. Ellenbeckii.*
Branches 4-angled.
Upper pair of spines 2–6 lin. long; stem-angles not very prominently toothed . . . . 136. *E. tetracantha.*
Upper pair of spines $\frac{1}{4}$–2 lin. long; stem-angles prominently toothed.
Horny margins of the teeth more or less prolonged beyond the tooth into a sort of neck supporting the spines.
Spines shorter than the neck supporting them . . 123. *E. furcata.*
Spines longer than the neck supporting them . . 124. *E. uhligiana.*
Horny margins of the teeth not prolonged beyond the tooth : 125. *E. Schinzii.*
Lower pair of spines $\frac{1}{2}$–$3\frac{1}{2}$ lin. long, upper pair $\frac{1}{4}$–1 lin. long or almost obsolete.
Dried stems slender, $1\frac{1}{4}$–2 lin. thick, more or less twisted . . . 126. *E. torta.*
Dried stems 3–5 lin. thick.
Spine-shields bright chestnut-brown; larger spines 2–$3\frac{1}{2}$ lin. long . . . . . 127. *E. angustiflora.*
Spine-shields grey; larger spines 1–2 lin. long.
Smaller pair of spines or prickles hooked, recurved . . . 128. *E. tetracanthoides.*
Smaller pair of spines or prickles straight, ascending or spreading 129. *E. cœrulans.*
Spine-shields bearing only 2 spines, rarely also with a pair of very rudimentary prickles or minute points, one on each side of the leaf-scar.
Spines often very unequal on the same stem, with the larger 4–9 lin. long.
Branches (dried) $\frac{1}{4}$–$\frac{1}{3}$ in. thick, cylindric, with many series of grey spine-shields; spines slender, needle-like, grey . . . . . 144. *E. inæquispina.*
Branches (living) $\frac{3}{4}$–$1\frac{1}{4}$ in. thick, 9-angled; spine-shields and the rather stout spines chestnut-brown. 146. *E. Phillipsiæ.*
Spines subequal, 1–4 lin. long; dried branches $\frac{1}{8}$–$\frac{1}{4}$ in. thick.
Branches obscurely 4-angled or perhaps subcylindric; spine-shields in opposite pairs . . . . . 130. *E. tortistyla.*

Branches 3-angled; spine-shields not in opposite pairs.	
Cymes or solitary involucres on peduncles 3–5 lin. long; styles bifid at the apex . . .	131. *E. brevis.*
Cymes or clusters of 3 involucres sessile or subsessile.	
Spine-shields as broad or broader than long, not decurrent below the spines; styles entire .	132. *E. imitata.*
Spine-shields much longer than broad, decurrent below the spines; styles minutely bifid .	133. *E. Johnsonii.*

1. **E. phylloclada,** *Boiss. in DC. Prodr.* xv. ii. 66. Annual or perennial, with radiately spreading or prostrate branches 1–6 in. long, in the larger specimens repeatedly branched, glabrous. Leaves and bracts on the branches all opposite, sessile, often crowded and imbricate on the flowering parts, $\frac{1}{5}$–$\frac{2}{3}$ in. long, and as much in breadth, broadly cordate-ovate or orbicular-ovate, obtuse or acute, mucronate, coriaceous or perhaps somewhat fleshy, with a narrow subcartilaginous white or reddish margin, green, with a large white area at the base or occupying half the leaf on one side of the midrib; leaves on the young main stem under the primary branches alternate, $\frac{1}{3}$–$1\frac{1}{4}$ in. long, spathulately obovate or orbicular-obovate, obtuse, apiculate, cuneately tapering into a petiole $\frac{1}{2}$–$\frac{2}{3}$ as long as the blade. Stipules none. Involucre solitary at the nodes, subsessile, 1 lin. in diam. and rather longer than broad, campanulate, thin or somewhat membranous, apparently whitish or purplish, with 4 glands and 5 quadrate or rectangular 3-toothed ciliate lobes; glands $\frac{1}{3}$–$\frac{2}{3}$ lin. in their greater diam., transversely linear-oblong, with a conspicuous petal-like slightly crenulate white or purplish appendage. Capsule far exserted, recurved, $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. in diam., oblong, glabrous; styles $\frac{1}{4}$–$\frac{1}{3}$ lin. long, free, deeply bifid. Seeds 1 lin. long, 4-angled, with a small caruncle, very minutely tuberculate-scabrous, grey.—*E. peploides*, E. Meyer, Zwei Pfl. Documente, 184, not of Gouan. *E. hereroensis*, Pax in Engl. Jahrb. x. 35.

Lower Guinea. German South-west Africa: Hereroland (Damaraland) Haichamkab, *Marloth* 1190! Gouchassib River, *Range*, 701! on rocks at Otyimbingue, *Lindner!* Welwitsch, *Dinter*, 1490! *Galpin and Pearson*, 7548! between Okahandya and Swakop River, *Dinter*, 156! and without precise locality, *Schinz!*

Also in Great Namaqualand as far south as the Orange River.

The habit and peculiar variegation of the leaves readily distinguish this from all other species.

2. **E. tettensis,** *Klotzsch in Peters, Reise Mossamb. Bot.* 94. Annual. Stems solitary or many from the crown of the root, erect, decumbent or prostrate, simple or sparingly branched, 2–18 in. long, woolly-tomentose with rather long hairs to puberulous with minute curved hairs. Leaves opposite, very shortly petiolate, $\frac{1}{3}$–1 in. long, 2–5 lin. broad, ovate-lanceolate or ovate, acute or subobtuse and apiculate, cordate and equal or slightly unequal at the base, thinly

pubescent with very fine and rather long spreading hairs on both sides, entire, often marked with a red blotch. Stipules all free, subulate. Inflorescence of small dense axillary clusters arranged along one (the upper) side of the stem. Peduncles $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Involucre (excluding the appendages) $\frac{3}{4}$–1 lin. in diam., cup-like, tomentose, with 4 conspicuously appendaged glands and 5 subulate woolly lobes; glands minute, transverse; appendages petal-like, white, two of them more than twice as large as the other two, about $\frac{1}{3}$–$1\frac{1}{4}$ lin. long and $\frac{1}{4}$–1 lin. broad, obliquely oblong, cuneate-obovate or cuneate-oblong, entire or crenulate on the margin, the smaller pair narrowly tranversely oblong to cuneate-subquadrate, about 3-crenulate, sometimes obsolete. Capsule about 1 lin. in diam., tomentose; styles $\frac{1}{2}$ lin. long, shortly bifid, with slender stigmas. Seeds $\frac{2}{3}$–$\frac{3}{4}$ lin. long, ovoid, subacute, 4-angled, rather deeply transversely rugose, whitish or reddish-brown.—Boiss. in DC. Prodr. xv. ii. 49, and Ic. Euphorb. 13, t. 20. *Anisophyllum tettense*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 34.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; near Tete, *Peters!* *Kirk!* opposite Sena, *Kirk!* Boruma, *Menyharth*, 522! British Central Africa: Nyasaland; beyond Murchison Falls, *Meller!* Lake Nyassa, *Simons!* and without precise locality, *Buchanan*, 174!

The two large wing-like gland-appendages are directed over the back of the recurved ovary or capsule and always towards the apex of the branch, in such a way as to produce an extraordinary resemblance to a white-winged fly.

3. **E. convolvuloides,** *Hochst. ex Boiss. in DC. Prodr.* xv. ii. 46. Annual. Stems one to several, erect, branching, 6–20 in. high, tomentose, often with rather minute curved and somewhat adpressed and interwoven hairs or occasionally (in possibly hybrid forms) with longer and more spreading hairs. Leaves opposite, $\frac{1}{3}$–$1\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{2}$ in. broad, oblong-lanceolate, ovate-lanceolate or rarely ovate, acute, very unequal at the semicordate base, minutely serrulate or subentire, minutely subtomentose to nearly or quite glabrous on one or both sides. Stipules all free and subulate or lanceolate-subulate or the pair on one side of the stem united. Flowering branchlets short, with the involucres densely clustered along them among the small leaves and bracts. Involucres subsessile or very shortly pedunculate, $\frac{2}{3}$–$\frac{3}{4}$ lin. long and in diam., obconic-campanulate, densely covered with white or tawny tomentum, with 4 appendaged or unappendaged glands and 5 deltoid-lanceolate densely ciliate lobes; glands minute, transverse, their appendages, when present, about equal on all 4 glands, often very minute, but sometimes up to $\frac{1}{3}$ lin. long and $\frac{2}{3}$ lin. broad, transversely oblong, entire or unequally crenulate. Capsule about 1 lin. in diam., very obtusely 3-angled, densely tomentose; styles $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Seeds $\frac{1}{2}$–$\frac{2}{3}$ lin. long, 4-angled, with about 3 transverse ridges on the faces, whitish or pale reddish.—Boiss. Ic. Euphorb. 12, t. 15. *E. prieuriana*, Baill. Adansonia, i. 61. *Anisophyllum convolvuloides*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 34.

Upper Guinea. Senegal: Upper Senegal, *Lecard*, 136! near Barni, *Leprieur*, ex *Baillon*. Dagombi; Salaga, on the upper Volta, *Krause*, 13! Togo, *Zech*, 41!

90! *Baumann*, 537! Lagos, *Dawodu*, 272! Southern Nigeria: Attah (Idda), *Vogel*, 85! Stirling Hill, *Ansell!* Northern Nigeria: Nupe, *Barter*, 1489! Lokoja, *Parsons*, 54! Katagum district, *Dalziel*, 208! near the River Benue, *Talbot!* Cameroons, *Passarge*, 5! 5A! 6!

Nile Land. Kordofan: Mount Kohn, *Kotschy*, 242! Obeid, *Pfund*, 23! 93!

Mozamb. Distr. British Central Africa: Nyasaland; banks of the River Shire, just above Elephant Marsh, *Scott!* south-west Matabeleland, at Matlouei, *Holub!*

This plant is said to be used as a remedy for "scorpion-bite." In Talbot's specimen from the River Benue, the gland-appendages are larger and much more conspicuous than in any other I have seen, being fully $\frac{1}{3}$ lin. long and $\frac{2}{3}$ lin. broad.

4. **E. hirta,** *Linn. Sp. Pl. ed.* i. 454 *and Amœn. Acad.* iii. 114. Annual, 4–16 in. high. Stems erect or decumbent at the base, simple or dichotomously branching, rather coarsely pilose with yellowish spreading hairs, usually densely at the upper part, thinly below, with an under pubescence of minute curved subadpressed hairs. Leaves opposite, $\frac{1}{3}$–2 in. long, $\frac{1}{6}$–$\frac{3}{4}$ in. broad, obliquely lanceolate or ovate or rhomboid-oblong, acute or subobtuse, on one side of the midrib cuneate at the base, on the other rounded, finely serrate, thinly adpressed, pubescent on both sides, more minutely so or sometimes glabrous above; petiole $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Stipules minute, subulate. Cymes axillary, pedunculate, $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., globose or dichotomously divided into 2–3 globose heads; peduncle 1–6 lin. long, puberulous with minute curved hairs. Involucres densely crowded, male or bisexual, minute, about $\frac{1}{3}$ lin. long, very shortly pedicellate, obconic or cup-like with 4 glands and 5 deltoid acute fringed lobes; glands erect, slightly exceeding the lobes, linear viewed sideways, orbicular at the truncate apex, viewed from above, with a very minute rounded dorsal appendage just below the apex. Capsule globose-trigonous, $\frac{1}{2}$ lin. in diam., thinly puberulous with minute adpressed hairs; styles short, deeply divided into 2 slender truncate arms, scarcely thickened at the apex. Seeds about $\frac{1}{3}$ lin. long, oblong, 4-angled, with slight transverse rugosities, light reddish.—Jacq. Collect. v. 160, t. 11, fig 1. *E. pilulifera*, Jacq. Ic. iii. 5, t. 478, and Collect. ii. 361; Hook. Niger Fl. 499, excl. syn.; Boiss. in DC. Prodr. xv. ii. 21; Hiern in Cat. Afr. Pl. Welw. i. 940; Pax in Bull. Soc. Bot. Belg. xxxvii. 107; in Bolet. Soc. Brot. x. 156; in De Wild. & Durand, Contrib. Fl. Congo, i. 52; in Engl. Jahrb. xxviii. 420, and xxxix. 631; Schweinf. in Bull. Herb. Boiss. vii. App. 2, 313; De Wild. & Durand, Contrib. Fl. Congo, ii. 56; and Reliq. Dewevr. 202; De Wild. Études Fl. Katanga 80; Études Fl. Bas et Moyen Congo i. 280; and Miss. É. Laurent, i. 142; Stapf in Johnston, Liberia, ii. 646, not of Linnæus. *E. globulifera*, Kunth in H. B. & K., Nov. Gen. et Sp. Pl. ii. 56. *Tithymalus botryoides zeylanicus* &c., and *Tithymalus botryoides erectus* &c., Burm. Thes. Zeylan. 223, 224, tt. 104 and 105, fig. 1.

Upper Guinea. Senegal, *Farmar*, 7! Sierra Leone, *Don! Vogel*, 157! *Welwitsch*, 288! *Scott-Elliot*, 3904! 4591! 5845! 5851! Lagos, *MacGregor*, 360! *Millen*, 61! *Rowland!* Liberia, *Vogel*, 38! *Whyte! Dinklage*, 1652! Gold Coast: Aburi, *Brown*, 386! Togo, *Baumann*, 220! Southern Nigeria: Old Calabar, *Milne!*

Emi lle, *Dodd*, 410! Cameroons, *Braun*, 11! *Bates*, 4! *Diestel*, 10! *Preuss*, 1214! *Staudt*, 909! Fernando Po, *Mann*, 237! *Vogel*, 2!

Nile Land. Eritrea, *Schweinfurth & Riva*, 497, 597! East Shoa, *Rosen* ex *Pax*. Soudan, *Schweinfurth*, 778! *Broun!* British East Africa: various localities, *Wakefield! Kässner*, 73! *Thomas*, 174! *Taylor!*

Lower Guinea. Island of St. Thomas, *Don!* Lower Congo: various localities, *Dewèvre*, 16, *Dupuis*, 13! *Moller*, *Quintas*, *Gillet*, 2642 bis. Angola, *Dekindt*, 274! *Wellmann*, 1593! *Gossweiler*, 229 partly!

South Central. Belgian Congo: various localities, *Hens*, C, 114! *Descamps*, *Laurent*, *Demeuse*, *Verdick*, 299, *Dewèvre*, 1117A.

Mozamb. Distr. Pemba Island, *Bojer!* Zanzibar, *Bojer! Last! Schmidt*, 47! *Stuhlmann*, 749! German East Africa: various localities, *Stuhlmann*, 6026! 6203! 6482! 7248! 7269! 7280! 7445! 9294! *Goetze*, 362! *Busse*, 2277! 2403! 2761! *Merker*, 604! *Engler*, 2107! *Zimmermann*, 956! *Holst*, 593! 2069! Portuguese East Africa: various localities, *Scott! Stewart! Kirk! Stuhlmann*, 673! *Cavalho! Peters*, 55 partly! British Central Africa: Nyasaland, *Whyte! McClounie*, 85! 139! *Buchanan*, 62! 454! 1196!

Var. *procumbens*, N. E. Br. Annual or perennial, stems procumbent and often producing erect shoots or decumbent at the base.—*E. pilulifera*, var. *procumbens*, Boiss. in DC. Prodr. xv. ii. 21. *E. obliterata*, Jacq. Select. Stirp. Amer. Hist. 190; Swartz, Fl. Ind. Occ. ii. 872. *E. capitata*, Lam. Encycl. ii. 422; Descourtilz, Fl. Ant. iii. 344, t. 227. *E. ophthalmica*, Pers. Syn. Pl. ii. 13. *E. procumbens*, DC. Cat. Hort. Monsp. 111. *E. verticillata*, Vell. Fl. Flum. v. t. 16, not of Poir. *E. nodiflora*, Steud. Nom. ed. 2, i. 613.

Upper Guinea. Togo, *Baumann*, 220 partly! *Zech*, 36! *Büttner*, 87! 91! Northern Nigeria: Lokoja, *Parsons*, 41! Katagum district, *Dalziel*, 414! Cameroons, *Dinklage*, 165!

Nile Land. British East Africa: near Mazeras, *Kässner*, 276! Lake Albert Edward, *Mildbraed*, 1913!

Lower Guinea. Annabon Island, *Burton!* Island of St. Thomas, *Moller*, 182! Congo, *Büttner*, 267!

Mozamb. Distr. Zanzibar, *Peters*, 55 partly! Portuguese East Africa: Beira, *Engler*, 311! *Hildebrandt*, 1154! German East Africa, *Braun*, 660! *Stuhlmann*, 6378! British Central Africa: Likoma Islands in Lake Nyasa, *Johnson*, 43! Blantyre, *Buchanan in Herb. Wood*, 6929!

Widely distributed throughout the tropics and in some subtropical areas. I adopt the name *E. hirta*, Linn., for this species instead of *E. pilulifera* because, besides being printed on a previous page to the latter, it is most certainly the plant described by Linnæus and preserved in his herbarium under that name, whilst, although this plant is accepted by Boissier and others as being *E. pilulifera*, Linn., it is clear that that acceptation has been based upon the figure in Burmann's *Thes. Zeylan.* 224, t. 105, fig. 1, which Linnæus has incorrectly referred to as a synonym of *E. pilulifera*. For it is certain that Linnæus considered *E. hirta* and *E. pilulifera* to be distinct species. In his herbarium are two specimens, named in his own handwriting "18 *hirta*" and "19 *pilulifera*." Comparing these specimens with the descriptions, it is evident that the latter were made from the former. Linnæus describes *E. hirta* as having pointed leaves and pilose stems, but omits these characters from the description of *E. pilulifera*, implying (as was his custom) that it does not possess them. This distinction completely accords with the specimens of these species in the Linnean herbarium. The figure of Burmann, however, referred by Linnæus to *E. pilulifera* disagrees with this distinction, having hairy stems and acute leaves, and merely represents another form of *E. hirta*. The type specimen of

E. pilulifera, Linn., is an Indian form, which has been correctly referred to *E. hypericifolia* in the Flora of British India. *E. hirta*, var. *procumbens*, gradually passes into the typical form.

5. **E. hypericifolia,** *Linn. Sp. Pl. ed.* i. 454. Annual, erect, 3–18 in. high, branching at the base or sometimes simple; stems simple or alternately branching, puberulous or glabrous. Leaves opposite, $\frac{1}{4}$–$1\frac{1}{2}$ in. long including the very short petiole, $\frac{1}{6}$–$\frac{3}{4}$ in. broad, oblong, linear-oblong, oblong-lanceolate, elliptic or ovate, subacute to rounded at the apex, oblique at the base, minutely toothed or rarely entire, puberulous or glabrous on one or both sides. Stipules variable. Cymes axillary, $\frac{1}{6}$–$\frac{1}{2}$ in. in diam., laxly few- to densely many-flowered. Peduncles $\frac{1}{10}$–$\frac{3}{4}$ in. long, puberulous or glabrous, often with a pair of leaves at the apex. Bracts $\frac{1}{2}$–$\frac{2}{3}$ lin. long, lanceolate, acuminate, ciliate or entirely glabrous. Involucres about $\frac{1}{2}$ lin. long, cup-shaped, puberulous or glabrous, with 4 appendaged glands and 5 deltoid-subulate ciliate lobes; glands minute, orbicular or transversely elliptic; appendages spreading, transversely elliptic, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, entire, white. Capsule 1 lin. in diam., pubescent or glabrous; styles deeply bifid. Seeds ellipsoid, 4-angled, slightly transversely rugose, reddish-brown with a glaucous hue to whitish-grey.—Hook. Exot. Fl. i. t. 36; Boiss. in DC. Prodr. xv. ii. 23; Oliver in Trans. Linn. Soc. xxix. 144; Pax in Bolet. Soc. Brot. x. 156; De Wild. Miss. É. Laurent, i. 142. *E. pilulifera*, Linn. Sp. Pl. ed. i. 454, in Amœn. Acad. iii. 115; and Herbarium, excl. reference to Burmann, not of other authors. *E. indica*, Lam. Encycl. ii. 423; Boiss. in DC. Prodr. xv. ii. 22, incl. var. *angustifolia*, Boiss.; De Wild. & Durand, Contrib. Fl. Congo, i. 52, ii. 56; Reliq. Dewevr. 202; De Wild. Études Fl. Bas- et Moyen-Congo, i. 279 and ii. 289, and Miss. É. Laurent, i. 142; Pax in Bolet. Soc. Brot. x. 157, and in Bull. Soc. Bot. Belg. xxxvii. 107; Stapf in Johnston, Liberia, ii. 646. *E. indica*, var. *pubescens*, Pax in Engl. Jahrb. xix. 117. *E. decumbens*, Forsk. Fl. Ægypt.-Arab. cxii.; Willd. Enum. Pl. Hort. Berol. Suppl. 27; Hiern in Cat. Afr. Pl. Welw. i. 940 (name only). *Anisophyllum indicum*, Schweinf. Beitr. Fl. Aethiop. 34. *A. hypericifolium*, Haw. Syn. Pl. Succ. 161; Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 36.

Upper Guinea. Upper Senegal, *Lecard*, 116! Sierra Leone, *Scott-Elliot*, 5011! 5040! Liberia: Cape Palmas, *Ansell!* Grand Bassa, *Dinklage*, 1685! Togo, *Baumann*, 153! 220! Dahomey, *Newton*, 180! Southern Nigeria: Ogumde, *Holland*, 267! Cameroons, *Bates*, 25!

Nile Land. Galabat: around Matamma, *Schweinfurth*, 874! 877! *Steudner*, 556! Abyssinia: various localities, *Schimper*, 168! 907! 1632! *Steudner*, 551! *Roth*, 126! Sudan, *Schweinfurth*, 593! 740! *Ehrenberg*, 57! *Kotschy*, 334! *Petherick!* Ethiopia, *Kotschy*, 5! 309! Kordofan, *Kotschy*, 154! *Pfund*, 264! 489! Somaliland, *Ellenbeck*, 987! 2281! 2315! Nuer Country, *Murie!* Uganda: various localities, *Murie! Speke & Grant*, 602! *Mildbraed*, 1912! *Bagshawe*, 739! Ruwenzori, *Wollaston!* Lake Rudolf, *Wellby!* British East Africa: various localities, *Kässner*, 279! *Hildebrandt*, 2694! *Taylor! Gregory!*

Lower Guinea. St. Thomas Island, *Don!* Lower Congo, *Smith*, 75! Gaboon, *Buchholz!* Angola: various localities, *Monteiro! Gossweiler*, 229 partly! *Welwitsch*, 290! 291! 292 partly! 294! 295! *Mechow*, 20! San Salvador, *Büttner*, 268!

South Central. Belgian Congo: various localities, *Käsner*, 2524! *Pogge*, 124! 126! *Sapin, Gillet, Laurent* ex *De Wildeman.*

Mozamb. Distr. Zanzibar, *Schmidt*, 46! German East Africa: various localities, *Uhlig*, 250! *Holst*, 527! *Busse*, 2371! *Stuhlmann*, 308! 841! 6445! 6541! 6715! 6855! 6950! 7171! 7212! Portuguese East Africa: Mozambique, *Peters*, 57! *Cavalho!* Lower Zambesi at Sena, *Kirk!* British Central Africa: Nyasaland: various localities, *Whyte! Scott-Elliot*, 8427! *Buchanan*, 392! 1105!

Widely distributed throughout all warm regions.

A very variable plant. The type specimen in the Linnean Herbarium is more tomentose on the young parts of the stem, involucres, and capsule than in any other that I have seen.

6. **E. glaucophylla,** *Poir. Encycl. Suppl.* ii. 613. Annual or perennial. Stems usually several or many, $\frac{1}{4}$–$1\frac{1}{4}$ ft. long, slender, prostrate, sometimes somewhat woody at the base, glabrous. Leaves opposite, very shortly petiolate, $\frac{1}{3}$–$\frac{3}{4}$ in. long, $1\frac{1}{2}$–5 lin. broad, oblong, lanceolate, elliptic-oblong or somewhat obovate-oblong, rounded and often apiculate at the apex, unequally subcordate at the base, entire or obscurely toothed, firm in texture, 3–5-nerved at the base, glabrous, glaucous (not always in dried specimens). Stipules on both sides of the stem united, broadly ovate, fringed. Involucres in small pedunculate axillary leafy cymes or solitary and axillary or on short axillary branchlets, shortly pedunculate, $\frac{1}{2}$–$\frac{2}{3}$ lin. in diam., campanulate, glabrous, with 4 glands and 5 quadrate fringed lobes; glands minute, distant, $\frac{1}{4}$ lin. or less in their greater diam., transversely elliptic, bordered by a very narrow white entire petaloid appendage. Capsule glabrous. Seeds about $\frac{1}{2}$ lin. in diam., subglobose, slightly 4-angled, pointed at one end, transversely wrinkled.—Boiss. in DC. Prodr. xv. ii. 14. *E. trinervia*, Schum. in Schum. & Thonn. Beskr. Guin. Pl. 253; Benth. in Hook. Niger Fl. 498; Baill. Adans. i. 60; Boiss. in DC. Prodr. xv. ii. 15; Williams in Bull. Herb. Boiss., sér. 2, vii. 203. *E. decumbens*, Hiern in Cat. Afr. Pl. Welw. i. 940, partly. *Anisophyllum glaucophyllum*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 35.

Upper Guinea. By the sea-shore: Senegal, *Sieber*, 18! *Perrottet! Roussillon*, 56, *Dupuis* ex *Poiret*. Gambia, *Don! Boteler*. Liberia: Grand Bassa, *Vogel*, 54! *Dinklage*, 2094! Gold Coast, *Thonning! Krause*, 98! Southern Nigeria: shore of Nun River, *Vogel*, 10! Cameroons, *Ledermann*, 148! *Winkler*, 769! *Bates*, 25!

Lower Guinea. By the sea-shore: Loango; near Chinchosho, *Soyaux*, 32! Angola, *Curror!* Loanda, *Welwitsch*, 292 partly! 293!

The type specimen of *E. trinervia*, Thonning, is identical with Vogel, 10, from Nun River. Although very different in appearance this is difficult to distinguish in words from *E. hypericifolia*, L.

7. **E. parva,** *N. E. Br.* A small annual $1\frac{1}{2}$–2 in. high. Stem simple or forking at the base into 2–3 branches, slender, erect, pilose. Leaves opposite, shortly petiolate, $\frac{1}{2}$–$\frac{2}{3}$ in. long, 1–2 lin. broad, lanceolate, acute, very oblique at the base, thinly sprinkled with long white hairs beneath and glabrous or with a few hairs above, thinly ciliate, green above, dark purple beneath. Stipules all free, subulate, longer than the petioles. Involucres solitary, axillary, about $\frac{2}{3}$ lin. long and $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam. including the appendages, somewhat ellipsoid, on peduncles about

$\frac{2}{3}$ lin. long, glabrous, with 4 glands and 5 minute ciliate lobes; glands minute, transversely elliptic-oblong, 2 of them with oblique petaloid white appendages $\frac{1}{4}$ lin. long, the other 2 without appendages. Ovary exserted on a recurved pedicel, thinly pilose; styles $\frac{1}{3}$ lin. long, united at the base, bifid at the apex.

Lower Guinea. Angola: Huilla Plateau, *Dekindt*, 1046!

8. **E. Kerstingii,** *Pax in Engl. Jahrb.* xxxiii. 285. Perennial, probably with a woody or tuberous rootstock. Stem or stems branching at the base, apparently about 2–4 in. long, ? prostrate, puberulous all round. Leaves opposite, very shortly petiolate, subcoriaceous, 5–9 lin. long, 1–4 lin. broad, linear-lanceolate to ovate-lanceolate, acute, cordate or subcordate and slightly unequal at the base, entire or very minutely toothed at the apex, glabrous on both sides, sometimes purple beneath. Stipules of 2 or more filiform segments. Peduncles solitary, axillary, 1–3 lin. long, bearing 1 involucre, glabrous. Involucre 1–1$\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 4 glands and 5 ovate acute ciliate lobes; glands $\frac{1}{2}$ lin. in their greater diam., transverse, narrowly oblong, bordered with a petal-like entire white appendage $\frac{1}{8}$–$\frac{1}{4}$ lin. broad along their outer margin. Ovary ultimately exserted and curved to one side, glabrous; styles about $\frac{1}{4}$ lin. long, free and spreading from their base, rather stout, bifid at the apex.

Upper Guinea. Togo: savannah at Trogode, 1000 ft., *Kersting*, 35! Kete Kratye, *Zech*, 45!

9. **E. zambesiana,** *Benth. in Hook. Ic. Pl. t.* 1305. Rootstock perennial, woody, descending deeply, producing numerous simple or sparingly branched stems, sometimes only 1–2$\frac{1}{2}$ in. high in rather dense erect clusters (these are rather starved branches, only developed after the annual burnings), sometimes 2–18 in. long and more or less spreading on the ground (these are the more normal stems of the plant, and their charred remains are often present among the short clustered erect stems), glabrous or puberulous all round in the same gathering. Leaves opposite, shortly petiolate, $\frac{1}{8}$–$\frac{7}{8}$ in. long, $\frac{1}{2}$–2 lin. broad, linear-oblong, lanceolate or oblong-lanceolate, or the lower ovate or cordate or sometimes scale-like, acute or obtuse, subequal or unequal and rounded or subcordate at the base, entire, glabrous on both sides. Stipules variable. Peduncles solitary, axillary, very variable in length, on the more leafy stems usually all short and 1–6 lin. long, on the erect clustered stems $\frac{1}{4}$–2 in. long, with or without a pair of scale-leaves below the middle, glabrous. Involucre $\frac{3}{4}$–1$\frac{1}{4}$ lin. long and as much in diam. (excluding the gland-appendages), cup-shaped, glabrous, often purple, with 4 conspicuously appendaged glands and 5 deltoid acute fringed lobes; glands transversely oblong or somewhat kidney-shaped, dark red-brown or purplish-brown, their appendages petal-like up to 1$\frac{1}{4}$ lin. long, and as much in breadth, but sometimes less than half as long as broad, somewhat semicircular, crescent-shaped, cuneately subquadrate to suborbicular, entire or obtusely 2–4-crenate or lobed, white or rose. Capsule 1$\frac{1}{4}$ lin. in diam., exserted on a recurved pedicel, glabrous or minutely puberulous; styles $\frac{1}{4}$–$\frac{1}{2}$ lin.

long, united at the base, bifid. Seeds ¾ lin. long, ovoid, 4-angled, with one of the angles grooved, transversely rugose, reddish-brown or grey. —*E. Poggei*, Pax in Engl. Jahrb. xix. 118 and xxx. 341, and in Bull. Soc. Bot. Belg. xxxvii. 107; De Wild. Études Fl. Katanga, 80, and Études Fl. Bas- et Moyen-Congo, ii. 290.

Lower Guinea. Angola: Benguella, Mount Elende, *Wellman*, 1161!

South Central. Belgian Congo: by the River Lulua, *Pogge*, 121! Lukafu, *Verdick*, 57; M'Towa, *Descamps*.

Mozamb. Distr. German East Africa: Usafua, *Goetze*, 1124! British Central Africa: Tanganyika-Moero Plateau, *Carson*, 21! by the River Kalangwizi at Lake Moero, *Carson*, 13! Nyasaland; near Zomba, *Meller! Purves*, 14! near Mount Sochi, 3000 ft., *Kirk!* near Blantyre, *Buchanan*, 10! at the foot of Mount Mlanji 3000 ft., *Purves*, 115! *McClounie*, 74!

Var. *benguelensis*, N. E. Br. Stems prostrate, leafy, glabrous or thinly pubescent with spreading hairs (both forms in the same gathering). Leaves 2–5 lin. long, 1½–4 lin. broad, usually ovate, elliptic-oblong or elliptic, and broader in proportion to their length than in the type, rounded or subcordate at the slightly unequal base, glabrous on both sides. Involucre-glands with distinct petal-like appendages. Ovary glabrous. Otherwise as in the normal leafy prostrate specimens of the type.—*E. Poggei*, var., Pax in Baum, Kunene-Samb. Exped. 284, and var. *benguelensis*, Pax in Engl. Jahrb. xxiii. 532. *E. andongensis*, Hiern in Cat. Afr. Pl. Welw. i. 943.

Lower Guinea. Angola: Huilla; *Antunes*, 91A! by the River Chitanda, *Baum*, 167! near the River Cunene, *Johnston!* Pungo Andongo; pastures between Condo and Quisonde, *Welwitsch*, 281!

Var. *villosula*, N. E. Br. Stems, ovary, and capsule pilose or tomentose. Leaves on the fully developed prostrate stems as in var. *benguelensis*, more or less pilose or pubescent beneath or glabrous on both sides. Involucre-glands varying with very large to very small petal-like appendages, or sometimes without them and occasionally with them well developed and quite absent on the same plant.—*E. villosula*, Pax in Engl. Jahrb. xix. 118. *E. angolensis*, Pax in Engl. Jahrb. xix. 117. *E. Serpicula*, Hiern in Cat. Afr. Pl. Welw. i. 941. *E. Poggei*, var. *villosa*, Pax in Bull. Herb. Boiss. vi. 737, and Bolet. Soc. Brot. xvii. 75.

Nile Land. Uganda: Buddu, *Scott-Elliot*, 7450!

Lower Guinea. Angola: near the River Cunene, *Johnston!* Huilla Plateau, *Antunes*, 84, 1244! near Mompulla, *Welwitsch*, 279! Malange, *Gossweiler*, 989! 991! *Teuscz*, 207!

Mozamb. Distr. German East Africa: South-east Mpororo, *Mildbraed*, 364! Karagwe, *Stuhlmann*, 1654! 1656! Ukerewe; at Bugora, *Conrads*, 255!

This widely distributed species varies very much in appearance and pubescence, the normal growth of prostrate leafy stems being totally different from the short erect densely tufted stems, often with reduced leaves, which spring up after the normal stems have been burnt off by the annual fires. Most, but not all, of the normal specimens from Angola have broader and more ovate leaves than the eastern specimens, whilst the secondary growths are indistinguishable; the forms gradually pass into one another. As specimens with pubescent and glabrous stems occur in the same gathering, vars. *benguelensis* and *villosula* can sometimes only be distinguished by the glabrous or hairy ovary. I am quite unable to distinguish specifically the various forms here included under *E. zambesiana* from one another by any character or characters that have been assigned to them.

10. **E. scordifolia,** *Jacq. Collect.* v. 113, *and Ic. Rar.* iii. 5, *t.* 476. Annual, tomentose or densely (rarely thinly) pubescent with spreading

hairs on all parts including the involucre and capsule. Stems several from the crown of the root, erect, decumbent or prostrate, usually branched. Leaves opposite, usually $2\frac{1}{2}$–9 lin. long, 1–5 lin. broad, very rarely larger, oblong or elliptic-oblong, rarely cuneate-oblong or somewhat rhomboid-oblong, obtuse or rounded at the apex, very unequal at the semicordate base, serrulate. Stipules minute or inconspicuous (see note). Involucres usually crowded along the short densely leafy axillary flowering branchlets, rarely solitary and axillary on the main branches, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, cup-shaped, with 4 conspicuously appendaged glands and 5 subulate or deltoid ciliate lobes; glands minute, transversely oblong, appendage petal-like, $\frac{1}{4}$–$\frac{1}{3}$ lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, transversely oblong to broadly cuneate, toothed or rarely entire, white. Capsule 1 lin. in diam. Seeds $\frac{2}{3}$–$\frac{3}{4}$ lin. long, ovoid, acute, 4-angled, slightly pitted-rugose, whitish.—Boiss. Ic. Euphorb. 12, t. 11, and in DC. Prodr. xv. ii. 36; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 315. *E. thymifolia*, Forsk. Fl. Ægypt.-Arab. 94, not of Linnæus. *E. tomentosa*, Pers. Syn. Pl. ii. 13. *E. hirta*, Spreng. Syst. Veg. iii. 793, partly, not of Linnæus. *Anisophyllum scordifolium*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 35; Schweinf. Beitr. Fl. Aethiop. 35; Penzig in Atti Congr. Bot. Genova, 1892, 359.

Upper Guinea. Senegal, *Sieber*, 17! *Roger*, 29! *Heudelot! Perrottet! Lelievre*, 53! Senegambia, *Heudelot*, 474! *Brunner*, 11A! 24! Sierra Leone: Ninia, Talla Hills, *Scott-Elliot*, 4993! Northern Nigeria: near Lake Chad, at Kuka, *Vogel*, 6! at Bure, *Elliott*, 109!

Nile Land. Nubia: near Suakin, *Schweinfurth*, 879! Soturba Mountains, *Schweinfurth*, 878! 880! coast region, *Bent!* Red Sea Province, *Crossland*, 1516! Eritrea: various localities, *Schweinfurth & Riva*, 12, 203! 349, 350, 1616, *Hildebrandt*, 735! *Steudner! Ehrenberg.* Abyssinia: Airnri, *Stecker*, 33 partly! Jaja, *Schimper*, ex *Schweinfurth*. Somaliland: Zeila, *Ellenbeck*, 130! Sennar, *Kotschy*, 291! Kordofan, *Pfund*, 368! 369! 371! *Kotschy*, 1! *Steudner*, 530! *Broun*, 892! 1243! Darfur, *Purdy*, 14! White Nile: near Turra, *Schweinfurth*, 958! Meshra el Zeraf, *Broun*, 1590!

The specimens from Meshra el Zeraf (*Broun*, 1590) in appearance are totally unlike any of the others quoted, having leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long and $\frac{1}{3}$–$\frac{3}{4}$ in. broad, obliquely rhomboid-oblong, somewhat thinly pubescent on both sides. The stems are tomentose only on the terminal internodes, thinly pubescent below, each pair of stipules is united into one broad-toothed body and quite conspicuous, and the flowers are solitary in the axils of the main stems, without any short flowering branches. But there is no structural difference, and I believe them to be individuals grown in rich soil, which have developed a luxuriant foliage at the expense of the flowers.

11. **E. granulata,** *Forsk. Fl. Ægypt.-Arab.* cxii. *and* 94. Annual. Stems spreading on the ground, 1–8 in. long, simple or with alternate branches, sometimes thickened or with ring-like marks at the nodes, thinly or thickly pubescent all round with very spreading straight hairs. Leaves opposite, very shortly petiolate, 1–5 lin. long, $\frac{1}{2}$–3 lin. broad, oblong or obovate-oblong, obtusely rounded at the apex, very unequal at the base, entire, puberulous on both sides (sometimes thinly) with adpressed or spreading and usually minute hairs. Stipules subulate, ciliate, sometimes minute and inconspicuous. Inflorescence of very

short leafy raceme-like branchlets in the axils of and sometimes not longer than the leaves of the primary branches, with one involucre to each pair of reduced leaves. Peduncles $\frac{1}{6}$–$\frac{1}{2}$ lin. long. Involucre $\frac{1}{3}$–$\frac{2}{5}$ lin. long, campanulate or somewhat funnel-shaped, green, with 5 paler stripes and together with the peduncle puberulous with minute curved hairs, with 4 or occasionally 3 glands and 5 deltoid ciliate lobes; glands minute, transverse, narrowly half surrounded by an entire or slightly 2–3-lobed petal-like appendage. Capsule $\frac{2}{3}$–$\frac{3}{4}$ lin. in diam., puberulous all over with minute adpressed or spreading hairs. Seeds about $\frac{1}{2}$ lin. long, 4-angled, slightly transversely rugose or scrobiculate.—Vahl, Symb. ii. 54; Boiss. in DC. Prodr. xv. ii. 33; Pax in Ann. Istit. Bot. Roma, vi. 186; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 314. *E. Forskalii*, Gay in Webb & Berth. Phyt. Canar. iii. iii. 240, partly. *E. prostrata*, Hiern in Cat. Afr. Pl. Welw. i. 942, partly, not of Ait. *E. fragilis*, Decne in Ann. Sc. Nat. 2me sér. ii. 241. *Anisophyllum granulatum*, Schweinf. Beitr. Fl. Aethiop. 34. *A. Forskalei*, Klotzsch & Garcke in Abh. Akad. Berlin, 1859, 25, partly.

Nile Land. Perim Island, *Farmer!* Dalak Isles, *Steudner*, 554! Nubia, *Kotschy*, 364! *Bent! Petherick! Ehrenberg*, 16! *Schweinfurth*, 454A! Abyssinia, *Stecker*, 33 partly! *Rohlfs!* Galabat, *Schweinfurth*, 896! Cordofan, *Kotschy*, 17! 69 partly! 470! Darfur, *Pfund*, 501! Somaliland, *Hildebrandt*, 868! *Miss Cole! Riva*, 288, 405. *Mrs. Lort Phillips!*

Lower Guinea. Angola: Loanda district, *Welwitsch*, 647 partly! between the River Geraul and Mossamedes, *Welwitsch*, 648 partly!

Also in Egypt and Arabia. A specimen collected by Bolle in the Cape Verde Islands is probably a form of this species.

Var. *glabrata*, Boiss. in DC. Prodr. xv. ii. 34. Leaves entire, glabrous on the upper surface, thinly pubescent beneath, sometimes becoming glabrous on both sides with age. Involucre thinly pubescent or nearly glabrous; glands with their appendages rather more petaloid than in the type, but not much larger. Capsule, when ripe, very thinly pubescent with spreading hairs all over or along the angles only or glabrous. Otherwise as in the type.—*E. Forskalii*, var. *glabrata*, Gay in Webb & Berth. Phyt. Canar. iii. iii. 243.

Nile Land. Nubia, *Schweinfurth*, 314! *Bent!* Cordofan, *Kotschy*, 9*! 69 partly! 443! *Steudner*, 528! *Pfund*, 500! Eritrea, *Schweinfurth*, 104, 1724. Somaliland, *Mrs. Lort Phillips!*

Var. *dentata*, N. E. Br. Stems rather slender, 2–7 in. long. Leaves toothed, at least at the apex, glabrous on both sides or with a few hairs beneath. Involucre glabrous. Capsule thinly pubescent with spreading hairs all over or only along the angles. Otherwise as in var. *glabrata*, but apparently rather more slender in habit.

Nile Land. Abyssinia: Harar, *Ellenbeck*, 724! British East Africa: near Lake Rudolph, *Wellby!*

The variety *dentata* may prove to be a distinct species when better known, but I can find no important character besides the toothing of the leaves to separate it.

E. fragilis, Decne, appears to be a perennial form, with the basal part of the stems much stouter and more woody than in *E. granulata*, but otherwise there seems to be no distinction.

12. **E. glanduligera,** *Pax in Engl. Jahrb.* **xix. 142.** Stems slender, with alternate distant subparallel slightly curved branches, in the type

specimen 6–8 in. long and $\frac{1}{3}$–$\frac{1}{2}$ lin. thick, glabrous, slightly thickened at the nodes with about 4 pairs of leaves at the tips, otherwise leafless. Leaves opposite, very small, petiolate, 1–$1\frac{1}{2}$ lin. long including the petiole, elliptic or orbicular, obtuse or rounded at both ends, apiculate, coriaceous or perhaps somewhat fleshy, with very minutely denticulate cartilaginous margins, glabrous, apparently glaucous. Stipules very minute or none. Involucre solitary, axillary at the apex of the branches, about $\frac{3}{4}$ lin. in diam., obconic, glabrous, glaucous, with 4 glands and 5 oblong fringed lobes; glands minute, about $\frac{1}{4}$ lin. in their greater diam., transverse, oblong, entire, without distinct appendages. Capsule fallen away, not seen, but exserted on a recurved pedicel about $1\frac{1}{4}$ lin. long.

Lower Guinea. German South-west Africa: by the Swakop River, near Salem, *Gürich*, 3!

Pax has described this as a small decumbent herb, but the very imperfect type specimen has more the appearance of being erect, with ascending branches at a little distance from, but subparallel with, the main stem or branch. The glands described by Pax, from which the plant is named, are merely the scars of the fallen involucres, which occur in many species.

13. **E. subterminalis,** *N. E. Br.* Perennial? Stems up to 6 in. long, perhaps prostrate, angular, glabrous, woody at the base. Leaves opposite, shortly petiolate, 1–$2\frac{1}{2}$ lin. long, $\frac{2}{3}$–$1\frac{1}{3}$ lin. broad, oblong to obliquely elliptic, very obtuse or rounded and very minutely denticulate at the apex, entire below, oblique at the base, thick and coriaceous or perhaps fleshy, glabrous on both sides, apparently glaucous. Stipules all free or those on the under side of the stem sometimes united, entire and subulate or divided. Involucres solitary in the axils of the 1–3 terminal pairs of leaves, shortly pedunculate, $\frac{2}{3}$ lin. long and in diam., narrowly funnel-shaped, glabrous outside, pubescent within, with 3–4 glands and 4–5 very small lobes; glands minute, transverse, bordered on the outer margin with a narrow entire or very slightly toothed petal-like white appendage. Capsule 1 lin. long and in diam., acutely 3-angled, glabrous, exserted on an abruptly recurved pedicel scarcely $\frac{1}{3}$ longer than the involucre. Seeds $\frac{3}{4}$ lin. long, 4-angled, rather acute at one end, somewhat deeply and irregularly rugose, reddish.

Lower Guinea. Angola; by the River Cunene, *Newton!* between Huilla and Humpata, *Johnston!*

This resembles both *E. glanduligera*, Pax, and *E. Nelsii*, Pax, but seems distinct from both. From *E. glanduligera* it differs in its leaves being only very minutely toothed at the apex, not all round, its involucre-glands having distinct petaloid appendages and a shorter pedicel to the capsule. From *E. Nelsii* it differs in having involucres twice as large and the pedicel of the capsule abruptly recurved and only $\frac{1}{3}$ longer than the involucre.

14. **E. Nelsii,** *Pax in Bull. Herb. Boiss.* vi. 737. Annual or possibly perennial, with very numerous densely leafy prostrate stems radiating from the crown of a 1–$1\frac{1}{2}$ lin.-thick root. Stems 1–3 in. long, rather densely pinnately branched, glabrous. Leaves opposite, densely crowded in 2 ranks, $\frac{3}{4}$–$1\frac{1}{2}$ lin. long including the very short petiole, $\frac{1}{2}$–1 lin. broad, oblong or slightly obovate-oblong, very obtusely rounded or

emarginate (not acute as originally described) at the apex, apiculate, very oblique at the base, entire or obscurely and very minutely toothed at the apex, rather thick and somewhat fleshy, glabrous on both sides. Stipules free or more or less united, cut into filiform segments. Involucres one to each pair of leaves at the apex of the branches, minute, about $\frac{1}{30}$ lin. long and in diam., obconic-campanulate, on peduncles about $\frac{1}{2}$ lin. long, glabrous, greenish or purple, with 4 glands and 5 minute acute lobes; glands minute, transverse, narrow, purplish, with a very minute appendage along their outer margin. Capsule $\frac{3}{4}$ lin. in diam., subacutely 3-angled, glabrous, exserted on an erect pedicel about twice as long as the involucre and slightly curved to one side; styles very minute, about $\frac{1}{16}$ lin. long, bifid. Seeds $\frac{2}{3}$ lin. long, oblong, rather sharply 4-angled, transversely rugose, pale reddish, glaucous.

Lower Guinea. German South-west Africa: near Windhoek, *Dinter!* Hereroland, *Nels*, 91!

A specimen collected near Kunjas in German South-west Africa by Dr. Range (311) probably belongs to this species; the leaves and involucres are the same, but the internodes are elongated and the leaf-pairs distant, giving the specimen an entirely different appearance. It possibly grew in a less dry locality.

15. **E. Rivæ,** *Pax in Ann. Istit. Bot. Roma,* vi. 186. A perennial herb with radiately spreading prostrate glabrous stems, much-branched. Leaves opposite, slightly fleshy, very shortly petiolate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 1–$1\frac{3}{4}$ lin. broad, ovate, acute, subcordate or rounded at the slightly unequal base, entire, glabrous on both sides. Stipules free and subulate on the upper side, united into an ovate toothed membrane on the under side of the stems. Involucres on peduncles $\frac{1}{2}$–1 lin. long, solitary, one to each pair of leaves on the branchlets, $1\frac{1}{4}$ lin. in diam. including the appendages, campanulate, glabrous, purple, with 4 conspicuously appendaged glands and 5 minute deltoid acute ciliate lobes; glands minute, transversely oblong, with petal-like white entire appendages $\frac{1}{4}$–$\frac{1}{3}$ lin. long and $\frac{2}{3}$ lin. broad. Ovary glabrous, sharply 3-angled, exserted on a recurved pedicel ultimately $1\frac{1}{4}$ lin. long; styles $\frac{1}{4}$ lin. long, free to the base, bifid at the apex. Fruit and seeds not seen.

Nile Land. Somaliland: between Surro and Rogono, *Riva*, 94!

16. **E. propinqua,** *R. Br. in Salt, Voy. Abyss. Append.* iv. lxv. *name only.* The single type specimen is $9\frac{1}{2}$ in. long, consisting of a somewhat woody or wiry main branch, $\frac{3}{4}$ lin. thick at the base, with the branchlets all subparallel to the main branch, glabrous, brown. Leaves all opposite, somewhat rigidly coriaceous, shortly petiolate, closely placed or subimbricate, 2–$4\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, linear-oblong or lanceolate, acute or obtuse, slightly unequal at the rounded base, entire, glabrous on both sides, but when very young with a very minute ciliation on one or both margins, at least at the base. Stipules all free, minute, subulate. Flowering branchlets shorter than or about equalling the leaves from whose axils they arise, with one involucre to each pair of reduced leaves. Involucre about $\frac{1}{2}$ lin. long, including the very short peduncle, $\frac{1}{3}$ lin. in diam., somewhat pear-shaped, very minutely and

thinly puberulous, with 3–4 glands and 4–5 minute ciliate lobes; glands very minute, transverse, narrowly oblong, concave, peltate, without appendages. Ovary exserted on a rather long recurved pedicel, glabrous; styles minute, scarcely $\frac{1}{8}$ lin. long. Capsule and seeds not seen.—Boiss. in DC. Prodr. xv. ii. 179, name only.

Nile Land. Abyssinia, *Salt!*

This is closely allied to *E. polycnemoides*, Hochst., and when better known may possibly prove to be a form of that species. The single specimen of which the type consists has, however, a quite different appearance. It has dried brown. The leaves, which appear to be thicker, more opaque, and more coriaceous than in *E. polycnemoides*, are not toothed, and although somewhat apiculate are not mucronate in the same way; the minute ciliation on the young leaves seems wanting in *E. polycnemoides*, and the styles are shorter than in the latter plant.

17. **E. polycnemoides,** *Hochst. ex Boiss. in DC. Prodr.* xv. ii. 46, *and Ic. Euphorb.* 12, *t.* 16. Annual. Stems prostrate, decumbent or erect, 4–14 in. long, usually much-branched, glabrous. Leaves opposite, shortly petiolate, 1–11 lin. long, $\frac{1}{3}$–2 lin. broad, linear-lanceolate, linear-oblong, or linear, more rarely oblong, often slightly falcate, acute or obtuse, often somewhat mucronate, more rarely rounded at the apex, obtuse to subcordate at the unequal base, minutely and acutely toothed at the apex, entire below or sometimes quite entire, glabrous on both sides. Stipules all free, subulate or those on one side of the stem broader and divided. Involucres solitary, axillary and usually spaced along the flowering branchlets, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, including the very short peduncle, campanulate, glabrous, with 4 glands and 5 deltoid-subulate slightly ciliate lobes, green or purplish; glands minute, transverse, with or without a minute notched or 2-lobed appendage. Capsule not quite 1 lin. in diam., glabrous. Seeds $\frac{1}{2}$ lin. long, ovoid, subacute at one end, 4-angled, rather deeply and somewhat pitted-rugose or irregularly transversely rugose, reddish or whitish.—*Anisophyllum polycnemoides*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 34, name only.

Upper Guinea. North Cameroons, *Talbot!*

Nile Land. Eritrea: Keren, *Steudner*, 552! Galabat: around Matamma, *Schweinfurth*, 881! Abyssinia; by the river Anzeba, *Hildebrandt*, 608! Hamedo Plain and Valleys, 4600–4700 ft., *Schimper*, 99! 196! Soudan: Gebel Regeb, *Broun*, 1022! Kordofan: Obeid, *Kotschy*, 302! *Pfund*, 42! 401! Dilling, *Broun*, 1305! Jur: Jur Ghattas, *Schweinfurth*, 2358!

Mozamb. Distr. British Central Africa: Nyasaland; Nyika Plateau at Nymkowa, 6500 ft., *McClounie*, 171!

18. **E. Afzelii,** *N. E. Br.* Habit as in *E. ægyptiaca*, Boiss., but perhaps perennial, with slender pinnately branching prostrate stems up to 1 ft. long, minutely puberulous with adpressed curved hairs all round or more or less glabrous on the under side, naked and somewhat woody with thickened nodes at the basal parts. Leaves opposite, shortly petiolate, very crowded on the lateral branches, 2–3 lin. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad, oblong or oblong-ovate, obtuse or acute at the apex, oblique or subequal at the rounded base, entire or minutely toothed, glabrous or with a few hairs above, thinly pubescent beneath. Stipules all free or

those on the under side of the stem united. Inflorescence as in *E. ægyptiaca*, but involucre smaller, $\frac{1}{3}$ lin. in diam.; glands with distinct although minute petaloid appendages much larger than themselves; styles $\frac{1}{4}$ lin. long, deeply bifid. Capsule and seeds not seen.

Upper Guinea. Sierra Leone, *Afzelius!*

19. **E. kilwana,** *N. E. Br.* Annual, with prostrate or decumbent simple or branching stems $1\frac{1}{2}$–10 in. long radiating from the crown of the root, minutely puberulous or subtomentose all round at the tips. Leaves opposite, shortly petiolate, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{3}{4}$–2 lin. broad, oblong, very obtusely rounded at the apex, oblique and rounded at the base, entire, glabrous above, thinly pubescent with minute curved hairs beneath. Stipules all free, subulate. Flowering-branchlets axillary, shorter than the leaves, with 2–5 involucres clustered among the reduced leaves or bracts. Involucres about $\frac{2}{3}$ lin. in diam., very shortly pedunculate, obconic-campanulate, pubescent or subtomentose, with 4 glands and 5 minute lobes; glands minute, transverse, with small but distinct petaloid appendages. Capsule nearly 1 lin. in diam., somewhat acutely 3-angled, densely white-puberulous; styles very minute, about $\frac{1}{8}$ lin. long, bifid. Seeds $\frac{1}{2}$ lin. long, 4-angled, with 2–3 slight transverse ridges on the faces, greyish.—*E. convolvuloides*, var. *integrifolia*, Pax in Engl. Jahrb. xliii. 85.

Mozamb. Distr. German East Africa: Kilwa-Singino, *Braun*, 1292!

The prostrate habit, very obtuse and differently shaped leaves, more acutely angled capsule and very minute styles, readily distinguish this from all forms of *E. convolvuloides*, Hochst. It also dries much darker in colour.

20. **E. ægyptiaca,** *Boiss. Cent. Euphorb.* 13. Annual. Stems spreading on the ground, $1\frac{1}{2}$–12 in. long, with alternate branches, puberulous all round with minute curved and scarcely spreading hairs or with longer soft or slightly woolly hairs. Leaves opposite, shortly petiolate, 2–6 lin. long, $\frac{2}{3}$–3 lin. broad, oblong, rounded or obliquely subacute at the apex, very unequal at the base, usually slightly toothed, sometimes entire, puberulous or pubescent on both sides or glabrous above. Stipules all free or rarely those on the under side of the stem united, usually cut into 2 or more segments. Inflorescence as in *E. prostrata*. Peduncles $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Involucre $\frac{1}{2}$ lin. in diam., obconic-campanulate or globose-campanulate, more or less open down one side for the extrusion of the capsule, with 4 glands and 5 lobes, minutely puberulous or subtomentose; glands minute, transverse, with their appendages very reduced or obsolete. Capsule $\frac{3}{4}$ lin. in diam., thinly adpressed-puberulous or subtomentose all over, especially when young, sometimes becoming nearly glabrous, its pedicel included in or scarcely longer than the involucre; styles $\frac{1}{8}$–$\frac{1}{6}$ lin. long, spreading, bifid. Seeds $\frac{2}{3}$ lin. long, 4-angled, transversely rugulose, whitish or glaucous on a pale reddish ground.—Boiss. in DC. Prodr. xv. ii. 35; Pax in Engl. Jahrb. xxxix. 631. *E. Forskalii*, Gay in Webb & Berth. Phyt. Canar. iii. iii. 240, partly. *E. burmanniana*, Gay in Webb & Berth. Phyt. Canar. iii. iii. 239, as to the Senegambia plant. *Anisophyllum ægyptiacum*,

Schweinf. Beitr. Fl. Aethiop. 34. *A. Forskalei*, partly, and *A. burmannianum*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 25.

Upper Guinea. Senegal, *Guillemin ! Heudelot ! Perrottet ! Grolier !* Senegambia, *Leprieur ! Heudelot*, 226! Sierra Leone, *Scott-Elliot*, 4636! Northern Nigeria: Kuka, on Lake Chad, *Vogel*, 2! Nupe, *Barter*, 316! 834! Katagum District, *Dalziel*, 306! Yola, *Dalziel*, 154! Lokoja, *Shaw*, 35! Cameroons; Rio del Rey, *Johnston !*

Nile Land. Nubia: Suakin, *Lord !* Dongola, *Ehrenberg*, **17**! between Suakin and Berber, *Schweinfurth*, 592! 624! Abu Hamed, *Petherick !* banks of the Nile, *Bromfield*, 64! Galabat, *Schweinfurth*, 898! 899! Abyssinia: by the River Tacazze, *Schimper*, 618! *Rosen* ex *Pax*. Sudan: Wadi Schellai, *Schweinfurth*, 926! near Khartoum, *Broun !* Sennar, *Kotschy*, 247! Ethiopia, *Kotschy*, 176! 310! Kordofan, *Kotschy*, 155 !

Lower Guinea. Lower Congo, *Smith*, 58! 63! German South-west Africa, *Dinter*, 105! 222! 1418!

Also in the Cape Verde Islands, Egypt, Arabia, and Syria.

E. thymifolia, Linn. Diss. Euphorb. in Amœn. Acad. iii. 115, and Sp. Pl. ed. i. 454, a native of India, is quoted by De Wildeman in Études Fl. Bas- et Moyen-Congo, i. 280, and ii. 291, and Miss. E. Laurent, i. 142, as having been collected in Belgian Congo by Laurent, 437, and Gillet, 2567, but I have not seen a specimen from Africa that agrees with the type of *L. thymifolia* in the Linnean Herbarium, and suspect that the specimens referred to belong to *E. ægyptiaca*, Boiss.

21. **E. sanguinea,** *Hochst. & Steud. ex Boiss. in DC. Prodr.* xv. ii. 35. Annual, with several prostrate or decumbent branching glabrous stems. Leaves opposite, shortly petiolate, 1–5 lin. long, $\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, oblong or occasionally obliquely elliptic, obtusely rounded at the apex, very oblique at the base, toothed nearly to the base, at least on one margin or sometimes nearly or quite entire, glabrous on both sides, often marked with a red spot or blotch. Stipules all free, often as long as or longer than the petioles, those on the under side of the stem usually broader and more divided than those on the upper side. Inflorescence as in *E. prostrata*. Peduncles $\frac{1}{3}$–$\frac{2}{3}$ lin. long, glabrous. Involucre $\frac{1}{3}$–$\frac{1}{2}$ lin. long, campanulate or globose-campanulate, glabrous, with 4 glands and 5 lobes; glands minute, transverse, half surrounded by a narrow appendage, which is usually 2–3-lobed. Capsule $\frac{3}{4}$–1 lin. in diam., glabrous. Seeds $\frac{2}{3}$ lin. long, 4-angled, slightly transversely rugose, pale reddish.—*E. prostrata*, Hiern in Cat. Afr. Pl. Welw. i. 942, partly, not of Ait.

Nile Land. Somaliland, *Mrs. Lort Phillips ! Ellenbeck*, 463A! Uganda: Kavirondo; between Nandi and Mumias, *Whyte !* near Nairobi, *Whyte !* Gilgil River, *Scott-Elliot*, 6573!

Lower Guinea. Angola: between the mouth of the River Giraul and Mossamedes, *Welwitsch*, 648 partly! between Nene and Lopollo, *Welwitsch*, 278! German South-west Africa: Olukonda, *Schinz*, 897! Okandya, *Dinter*, 361! Awichab, *Dinter*, 1002! Kuibis, *Range*, 885! Koes Redmond, *Graf-Pfeil*, 152!

Mozamb. Distr. German East Africa: Usambara: Kwai, *Albers*, 364! Kwa Mshuza, *Holst*, 9157! Kilimanjaro, at Marangu, *Volkens*, 1250! 1250A! *Uhlig*, 338! 489! Karagwe; Kafuro, *Stuhlmann*, 1892! 1898! British Central Africa: Nyasaland; Zomba, *Mahon !*

Var. *intermedia*, Boiss. in DC. Prodr. xv. ii. 35. Stem either solitary and erect

with alternate ascending-spreading branches or several from the root and all erect or ascending. Leaves up to 7 lin. long and $3\frac{1}{2}$ lin. broad, but often not larger than in the type.—Schweinf. in Bull. Herb. Boiss. vii. Append. ii. 314. *E. intermedia*, Hochst. ex Boiss. in DC. Prodr. xv. ii. 35.

Nile Land. Eritrea: various localities, *Schweinfurth*, 342, 344, 569, 1259, 1746, 2043, ex *Schweinfurth*. Abyssinia: Shoata, *Schimper*, 1133! Wojerat, *Petit!* and without precise locality, *Schimper*, 182! Uganda: Kavirondo, *Scott-Elliot*, 7015!

Also in Arabia and South Africa. The specimen of *Welwitsch*, 648, at the British Museum is *E. granulata*.

22. **E. rubriflora,** *N. E. Br.* Annual. Stems prostrate, radiating from the crown of the root, 1–10 in. long, simple or branched, minutely puberulous with curved hairs on the upper, glabrous on the under side. Leaves opposite, shortly petiolate, $2\frac{1}{2}$–6 lin. long, 1–4 lin. broad, oblong, elliptic-oblong or obliquely ovate-oblong, rounded or subacute at the apex, unequal at the rounded base, entire, glabrous on both sides or with a few hairs along the midrib beneath. Stipules all free, subulate or lanceolate-subulate, entire or slightly divided. Flowering branchlets axillary, often shorter than the leaves from whose axils they arise, with 1 involucre to each pair of reduced leaves. Peduncle $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Involucre $\frac{2}{3}$–1 lin. long, cup-shaped or obconic, 5-angled, thinly pubescent with fine spreading curved hairs or almost glabrous, with 4 conspicuously appendaged glands and 5 lanceolate ciliate lobes; glands small, transverse, with large petal-like bright red, pink or white appendages, unequal in size, the two larger $\frac{3}{4}$–$1\frac{1}{3}$ lin. long, $\frac{2}{5}$–$\frac{3}{4}$ lin. broad, obliquely oblong and somewhat auricled on one side at the base, the two smaller about half as large or less, transverse, somewhat cuneate-oblong, all entire. Capsule nearly 1 lin. in diam., pubescent along the angles, glabrous on the sides; styles 1 lin. long, filiform, entire, not bifid at the apex. Seeds $\frac{3}{5}$ lin. long, 4-angled, transversely or somewhat pitted-rugulose, whitish on a pale reddish ground.

Mozamb. Distr. Rhodesia: in sand at Livingstone, 3000 ft., *Rogers*, 7132! in mud, near the river at Victoria Falls, *Allen!*

23. **E. mozambicensis,** *Boiss. in DC. Prodr.* xv. ii. 36. Annual, radiately branching at the crown of the root into several or many much-branched prostrate stems 3–18 in. long and $\frac{1}{4}$–$\frac{1}{2}$ lin. thick, puberulous with minute curved hairs along the upper side, glabrous beneath. Leaves opposite, shortly petiolate, 1–3 lin. long, $\frac{2}{3}$–2 lin. broad, obovate, obtusely or subtruncately rounded and emarginate, with a minute tooth in the notch or very minutely toothed at the apex, rarely quite entire, oblique at the base, with a rounded auricle on one side of the midrib and acutely tapering into the petiole on the other, or subequally tapering on both sides, quite glabrous. Stipules minute, free or those on the under side somewhat united. Flowering branchlets very short, with 1 involucre to each pair of reduced leaves. Peduncle very short. Involucre $\frac{1}{3}$–$\frac{1}{2}$ lin. long and as much in diam., subglobosely cup-shaped, glabrous, apparently green, without paler stripes, with 4 glands and 5 deltoid-acuminate ciliate lobes; glands minute, about $\frac{1}{6}$ lin. in their greater diam., trans-

versely elliptic, with small white or red petal-like lobed or subentire appendages $\frac{1}{10}$–$\frac{1}{8}$ lin. long. Capsule $\frac{2}{3}$ lin. in diam., somewhat acutely 3-angled, glabrous, exserted on a recurved pedicel $\frac{2}{3}$ lin. long; styles minute, scarcely $\frac{1}{8}$ lin. long, free, minutely notched at the apex. Seeds $\frac{1}{3}$ lin. long, oblong-ovoid, somewhat pointed at one end, truncate at the other, 4-angled, slightly rugose between the angles, pinkish-grey or glaucous.—Henriques in Bolet. Soc. Brot. xvii. 75. *Anisophyllum mossambicense*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 30.

Mozamb. Distr. Portuguese East Africa: Rios de Sena, *Peters*, 33! Rio Mbaruri, *Cavalho!* Lower Zambesi at Tete, *Kirk!* British Central Africa: Rhodesia; Livingstone, *Rogers*, 7002!

Var. *nyasica*, N. E. Br. Stems 8–24 in. long. Leaves up to 5 lin. long, $\frac{1}{2}$–3 lin. broad. Involucre $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{3}{4}$–1 lin. in diam., with rather conspicuous white or red appendages to the glands $\frac{1}{8}$–$\frac{1}{3}$ lin. long, slightly lobed or entire. Capsule puberulous (at least on the basal part) with spreading hairs or glabrous, exserted on a pedicel $\frac{2}{3}$–1 lin. long; styles $\frac{1}{8}$–$\frac{1}{4}$ lin. long. Otherwise as in the type.

Mozamb. Distr. British Central Africa: Nyasaland; Nyika Plateau, *McClounie*, 169! Mount Malosa, 4000–6000 ft., *Whyte!*

Var. *Fischeri*, N. E. Br. Branches pubescent all round (at least at the tips) with spreading slightly curved hairs. Involucre, excluding the appendages, $\frac{2}{3}$ lin. in diam., thinly pubescent, with conspicuous petal-like deeply lobed gland-appendages $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Capsule thinly pubescent (at least along the angles) with spreading hairs. Otherwise as in the type.—*E. Fischeri*, Pax in Engl. Jahrb. xix. 117.

Mozamb. Distr. German East Africa: Salanda, *Fischer*, 32! Ugogo, *Stuhlmann*, 386!

The leaves of var. *Fischeri* are described as entire by Dr. Pax, but I do not find them so in the type.

24. **E. prostrata,** *Ait. Hort. Kew. ed.* 1, ii. 139. Annual. Stems several, spreading on the ground, 2–8 in. long, with alternate branches, often, but not always, slightly flattened from above, puberulous on the upper side, at least along a middle line, with minute curved hairs, glabrous on the under side. Leaves opposite, shortly petiolate, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long, $\frac{1}{2}$–2 lin. broad, oblong to elliptic or slightly oblong-obovate, obtuse or rounded at the apex, distinctly or obscurely toothed, sometimes ciliate, glabrous on both sides or with a few scattered hairs beneath, chiefly near the apex. Stipules on the upper side of the stem usually free, those on the lower side united into one deltoid or deltoid-ovate body, toothed at the apex. Inflorescence of short axillary leafy raceme-like branchlets, with 1 axillary involucre to each pair of reduced leaves, sometimes reduced to a cluster of 2–3 involucres on a short peduncle, with 2–3 pairs of minute spathulate leaves. Peduncles $\frac{1}{3}$–1 lin. long, glabrous. Involucre $\frac{1}{4}$–$\frac{1}{3}$ lin. long, campanulate, glabrous or very thinly pubescent, with 4 glands and 5 lobes; glands minute, with the appendage just exceeding their margin or obsolete. Capsule $\frac{1}{2}$–$\frac{2}{3}$ lin. in diam., pubescent with spreading hairs along the somewhat acute angles, glabrous on the sides. Seeds $\frac{1}{2}$ lin. long, 4-angled, transversely wrinkled, pale reddish.—Hook. Niger Fl. 498; Boiss. Ic. Euphorb. 12, t. 17, and in DC. Prodr. xv. ii. 47; Pax in Bolet. Soc. Brot. x. 156;

Hiern in Cat. Afr. Pl. Welw. i. 942, partly; De Wild. Miss. É. Laurent, i. 142, and Études Fl. Bas- et Moyen-Congo, i. 280 and ii. 289; Stapf in Johnston, Liberia, ii. 646.

Upper Guinea. Senegal, *Farmar*, 8! Sierra Leone, *Don! Barter! Vogel! Welwitsch*, 650! Liberia: Cape Palmas, *Dinklage*, 67! Gold Coast: Aburi, *Johnson*, 238! Adafo, *Krause*, 96! Lagos, *Millen*, 23! Southern Nigeria: Old Calabar, *Holland*, 123! Cameroons, *Dusen*, 283! *Diestel*, 75! Fernando Po, *Barter! Mann*, 213!

Nile Land. British East Africa: near Nairobi, *Whyte!*

Lower Guinea. Princes Island, *Welwitsch*, 649! *Newton*, 17! Island of St. Thomas, *Quintas*, 184! *Moller*, 390! *Newton* ex *Pax*. Gaboon, *Büttner*, 273! *Soyaux*, 383! Belgian Congo: Boma, *Laurent*, *Pynaert*; Moanda, *Gillet*, 3240, 4059, ex *De Wildeman*.

Mozamb. Distr. Zanzibar, *Last! Stuhlmann*, 337! Rhodesia: Kalomo, *Rogers*, 8224!

Also in the Cape Verde Islands and South Africa. A native of Tropical America, whence it has probably been introduced into various parts of the Old World.

25. **E. loandensis,** *N. E. Br.* Annual. Stems spreading on the ground, 2–6 in. long, laxly branched, thinly sprinkled all round with very spreading straight hairs. Leaves opposite, shortly petiolate, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long, $\frac{2}{3}$–$1\frac{1}{2}$ lin. broad, oblong, obtusely rounded at the apex, very unequal at the base, entire or obscurely toothed at the apex, glabrous on both sides or with a few hairs beneath at the base. Stipules all free, those on the upper side of the stem subulate, those on the under side broader and cut into 2–3 segments. Inflorescence as in *E. prostrata*. Peduncle at first almost obsolete, finally lengthening to $\frac{1}{4}$ or $\frac{1}{3}$ lin. long, glabrous. Involucre $\frac{1}{3}$ lin. long, rather longer than broad, campanulate, glabrous, uniformly reddish, without paler stripes, with 4 glands and 5 lobes; glands minute, narrowly half surrounded with an inconspicuous or sub-obsolete appendage; lobes subulate, entire, not ciliate. Capsule $\frac{2}{3}$ lin. in diam., with pubescent angles, nearly glabrous on the sides. Seeds $\frac{1}{2}$ lin. long, oblong, 4-angled, minutely tuberculate, whitish.

Lower Guinea. Angola: Loanda, *Gossweiler*, 395! near Loanda and Penedo and Imbondeiro dos Lobos, *Welwitsch*, 647 partly!

Allied to ***E. prostrata***, Ait., and ***E. granulata***, Forsk., but its more loosely branched habit gives it a different appearance from either. From the former the pubescence and stipules, and from the latter the differently shaped proportionately longer and glabrous leaves, absence of the characteristic pale stripes on the involucre and want of cilia on its lobes, readily distinguish it. Welwitsch, 647, as distributed, is a mixture, one of the specimens under this number at Kew being *E. granulata*.

26. **E. serpens,** *H. B. & K. Nov. Gen. et Sp.* ii. 52. Habit and arrangement of inflorescence as in *E. prostrata*, Ait Stems 3–7 in. long, branching, glabrous. Leaves opposite, shortly petiolate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 1–$2\frac{1}{3}$ lin. broad, suborbicular, slightly notched at the obtusely rounded apex, unequally subcordate at the base, entire, glabrous on both sides. Stipules 2 at each node, each pair being united into a deltoid-ovate or deltoid-oblong body, irregularly cut or toothed at the top. Involucres shortly pedunculate, $\frac{2}{5}$ lin. long, campanulate, with 4 glands

and 5 lobes, glabrous; glands minute, transverse, with a small transverse petal-like white appendage, rather broader than the width of the gland. Capsule not quite 1 lin. in diam., rather sharply 3-angled, glabrous. Seeds ½ lin. long, 4-angled, with smooth (not wrinkled) sides, reddish, somewhat glaucous on the sides but not on the angles.—Boiss. in DC. Prodr. xv. ii. 29. *Anisophyllum serpens*, Klotzsch & Garcke in Abh. Akad. Berl. 1860, 23.

Upper Guinea. Sierra Leone, *Vogel*, 29!

A native of Tropical and Central America, whence it has doubtless been introduced to the above locality.

27. **E. inæqualis,** *N. E. Br.* Perhaps perennial, with a slender main stem ½ lin. thick, somewhat woody and tortuous at the base, as if arising from a deeply seated rootstock, developing at intervals of ½–¾ in. many weak slender angular glabrous branches 6–15 in. long, apparently decumbent or straggling. Leaves opposite, one of each pair much larger than the other, shortly petiolate, 2–5 lin. long, ⅔–2 lin. broad, oblong, rounded at the apex, very unequal at the base, minutely toothed, glabrous on both sides. Stipules all free, subulate or divided. Involucres on peduncles ¼–⅓ lin. long, solitary, axillary, 1 to each pair of leaves of the branches or of the very short axillary branchlets, campanulate, ½ lin. long, glabrous, with 4 minute glands and 5 lobes, 2 of the glands usually being double and 2 single (always?), narrowly bordered on the back by a notched or shortly 3-toothed appendage. Capsule nearly 1 lin. in diam., glabrous. Seeds ¾ lin. long, white, irregularly marked with impressed transverse lines and pits.

Nile Land. British Somaliland, without precise locality, *Miss Cole!*

28. **E. seclusa,** *N. E. Br.* Perennial, with a woody rootstock. Stems many, probably prostrate, branching, slender, glabrous. Leaves opposite, shortly petiolate, one of each pair usually rather larger than the other, ¼–⅔ in. long, ⅔–2 lin. broad, linear-oblong, obtuse, rounded or obscurely emarginate and very minutely 3-toothed at the apex, rounded at the slightly unequal base, entire, glabrous above, with a scanty very minute pubescence beneath. Stipules free, minute, subulate. Involucres on peduncles ⅓–½ lin. long, solitary, axillary, ½ lin. long, obconic or pear-shaped, very minutely puberulous with 4 conspicuously appendaged glands and 5 rather broadly ovate subulate-pointed ciliate lobes; glands transversely oblong, with petal-like unequal appendages ⅕–⅓ lin. long, ⅖–½ lin. broad, transversely oblong, more or less obtusely toothed, white or red on the same plant. Capsule ¾ lin. in diam., with a thinly scattered very minute pubescence, at least when young; styles about ¼ lin. long, bifid at the apex, with thickened stigmas. Seeds ½ lin. long, oblong-ovoid, acute, acutely 4-angled, faintly rugulose on the sides, reddish.

Nile Land. Eritrea: east of Amba Tokhan, *Schweinfurth & Riva*, 612

29. **E. Eylesii,** *Rendle in Journ. Bot.* 1905, 52. Perennial, with a woody rootstock. Stems numerous, procumbent (*Eyles*), but apparently

erect on Monro's specimen, 6–12 in. long, slender, dichotomously branched, glabrous. Leaves opposite, very shortly petiolate, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$1\frac{3}{4}$ lin. broad, linear or linear-oblong, obtuse or subacute, entire, with slightly revolute margins, glabrous on both sides. Stipules all free, minute, subulate. Involucres on peduncles $\frac{1}{3}$–1 lin. long, solitary in the forks and terminal on the ultimate branchlets (in the type, from injury to the main branches, the new growths are reduced to much-branched cymose inflorescences), $\frac{1}{2}$–$\frac{3}{4}$ lin. long and without including the appendages $\frac{2}{3}$–$\frac{3}{4}$ lin. in diam., cup-shaped, glabrous, with 4 unequally appendaged glands and 5 minute oblong toothed and ciliate lobes; glands minute, with the 2 larger appendages $\frac{1}{3}$–$\frac{1}{2}$ lin. long and $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, the other two much smaller, all broadly cuneate-obovate to sub-orbicular, petal-like, white. Capsule immature, glabrous, exserted on a recurved pedicel; styles $\frac{1}{4}$–$\frac{1}{2}$ lin. long, shortly united at the base or almost free, bifid at the apex or sometimes divided nearly to the base, so that there appears to be 6 styles. Seeds not seen.

Mozamb. Distr. Rhodesia: Deka Siding, between Buluwayo and Victoria Falls, *Eyles*, 130! Victoria, *Monro*, 910!

30. **E. arabica,** *Hochst. et Steud. ex Boiss. in DC. Prodr.* xv. ii. 33, *and Ic. Euphorb.* 12, *t.* 10. Annual, erect, branching; branches slender, laxly leafy, glabrous. Leaves opposite, shortly petiolate, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{3}$–1 lin. broad, linear, straight or slightly curved, acute, obtuse at the base, entire, opaque by transmitted light, glabrous on both sides. Stipules free, subulate, sometimes as long as the petioles. Peduncles (or peduncle-like branchlets) axillary, $2\frac{1}{2}$–4 lin. long, slender, bearing a pair of small leaves and 2–3 involucres, with or without a solitary one in the fork between the peduncle and the stem. Involucre $\frac{1}{2}$–$\frac{2}{3}$ lin. long, subglobose-campanulate, slightly narrowed at the mouth, glabrous, with 4 glands and 5 deltoid-subulate ciliate lobes; glands minute, transverse, with very inconspicuous appendages or none. Capsule nearly 1 lin. in diam., glabrous; styles about $\frac{1}{4}$ lin. long, with slightly thickened stigmas. Seeds $\frac{2}{3}$ lin. long, oblong-ovoid, acute, sharply 4-angled, nearly smooth or but faintly rugose.—Schweinf. in Bull. Herb. Boiss. vii. App. ii. 313. *Anisophyllum arabicum*, Schweinf. Beitr. Fl. Aethiop. 34; Penzig in Atti Congr. Bot. Genova, 1892, 359.

Nile Land. Nubia: Uaratab Mountain, near Suakin, *Schweinfurth*, 882! Coast region, *Bent!* Eritrea: various localities, *Hildebrandt*, 609! *Schweinfurth*, 46, 256, 1632 (ex *Schweinfurth*), *Penzig*. Abyssinia: Amhara, *Sterker*, 38! Dalac Islands, *Ehrenberg* (ex *Schweinfurth*). British Somaliland: at the foot of Rugga Pass, *Mrs. Lort Phillips!* East shore of Lake Rudolph, *Cockburn!*

31. **E. leshumensis,** *N. E. Br.* Annual. Stem 8–10 in. or perhaps more high, branching; branches slender, spreading or ascending, glabrous. Leaves opposite, shortly petiolate, $\frac{1}{2}$–$1\frac{1}{3}$ in. long, linear, acute, obtuse or rounded at the unequal base, entire, with revolute margins or some of the lower flat, glabrous on both sides; venation dense and inconspicuous by transmitted light. Stipules free, minute, subulate. Involucres on peduncles $\frac{1}{3}$–1 lin. long, usually 2 at each

flowering node, one on a pedunculate flowering branchlet with 2 leaves and 1 in the fork it forms with the stem, $\frac{3}{4}$–1 lin. long, cup-like, slightly 5-grooved at the basal part, with 4 glands (2 of them conspicuously appendaged) and 5 subulate ciliate lobes, glabrous; glands rather large in proportion to the involucre, transversely elliptic or suborbicular, 2 without or with rudimentary appendages and 2 with large petal-like white appendages 1–2 lin. long, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. broad, broadly cuneate-obovate, entire. Ovary glabrous; capsule and seeds not seen; styles $\frac{1}{2}$ lin. long, bifid to nearly half-way down, with very thick clavate stigmas.

Mozamb. Distr. Rhodesia: Leshumo forest, *Holub !* Sesheke, *Miss Gairdner*, 423 !

Almost identical in appearance with *E. lupatensis*, N. E. Br., but the revolute margins of the leaves, glabrous involucre and ovary, and thick clavate stigmas, readily distinguish it.

32. **E. lupatensis,** *N. E. Br.* Annual. Stem erect, sparingly branched, 1–$1\frac{1}{4}$ ft. high, very minutely and thinly puberulous with curved adpressed hairs, glabrous to the naked eye. Leaves opposite, very shortly petiolate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, linear, straight or slightly falcate, acute, obtusely rounded on one side of the very unequal base, entire, flat, not revolute at the margins, glabrous above, with some very minute scattered hairs on the somewhat glaucous under surface, venation conspicuously reticulate by transmitted light. Stipules free, minute, subulate. Involucres usually 2 together at each flowering-node, 1 on a rudimentary flowering branchlet and 1 in the fork it forms with the stem, $\frac{3}{4}$ lin. long, obconic-campanulate, with 5 deltoid acute ciliate lobes and 4 conspicuously appendaged glands, puberulous with curved hairs outside; glands transversely oblong; appendages unequal, petal-like, white, the two larger $\frac{1}{2}$–$\frac{3}{4}$ lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, very oblique, entire, twice as large as the transversely oblong entire smaller pair. Capsule about 1 lin. in diam., white-tomentose with minute curved hairs; styles $\frac{2}{3}$–$\frac{3}{4}$ lin. long, slender, nearly as long as the capsule, bifid at the apex, with slender filiform stigmas. Seeds $\frac{2}{3}$ lin. long, ovoid, 4-angled, with 4–5 deep transverse parallel furrows on each side, reddish.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Lupata, *Kirk !*

Very much like *E. arabica*, Steud. & Hochst., in appearance, but the leaves as seen by transmitted light are much more coarsely reticulated and the pubescence, gland-appendages and styles are quite different.

33. **E. glaucella,** *Pax in Bull. Herb. Boiss.* vi. 737. Annual, 2–15 in. high, with about 3–6 ascending main branches, 1–6-times forked, glabrous. Leaves all opposite or some of the lower alternate, with a whorl of 3 at the apex of the main stem, petiolate, glabrous on both sides; petiole $\frac{1}{2}$–4 lin. long; blade $\frac{1}{3}$–$2\frac{1}{2}$ in. long, 1–4 lin. broad, linear, linear-lanceolate, oblong, elliptic or suborbicular, obtuse and apiculate or acute or minutely 3-toothed at the apex, otherwise entire, rounded or cuneate at the base. Stipules very minute or absent.

Involucres solitary in the forks of the branches or terminal, shortly pedunculate, $\frac{3}{4}$–1 lin. in diam., somewhat subglobosely cup-shaped, glabrous, with 3–5 (usually 4) glands and 4–5 short oblong or subquadrate bifid or subentire fringed lobes; glands $\frac{1}{3}$–$\frac{2}{5}$ lin. in their greater diam., transversely oblong or elliptic, entire, with a narrow firm (not petal-like) rim along the outer margin, green. Capsule $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., often rather longer than broad, exserted on a slender pedicel, thinly sprinkled with minute stout adpressed hairs or glabrous; styles about $\frac{1}{4}$ lin. long, free to the base, bifid at the apex. Seeds 1–$1\frac{1}{3}$ lin. long, oblong, subtruncate at each end, dorsally flattened, labyrinthically tuberculate-rugose or scrobiculate-tuberculate, dark brown (perhaps immature) or bluish-white, with a pale yellowish or whitish caruncle.—*E. kwebensis*, N. E. Br. in Kew Bulletin, 1909, 137.

Lower Guinea. German South-west Africa: in a ravine along the bed of the Swakop River, near Haikamchab, *Pearson & Galpin*, 7550! Okahandya, *Hopfner*, 68; *Dinter*, 426! Rehoboth, *Fleck*, 454A; Leber River, *Trotha!* Gana-ams, *Hartmann*, 73! 76! Kuibis River, *Range*, 381! Sechem, *Dinter*, 1207!

Mozamb. Distr. British Central Africa: Ngamiland; Kwebe Hills, *Lugard*, 143! *Mrs. Lugard*, 81!

Also in South Africa.

34. **E. dracunculoides,** *Lam. Encycl.* ii. 428. Annual, erect, 3–12 in. high, with the main branches alternate or opposite, ascending-spreading, dichotomously branched, terete, glabrous in all parts. Leaves opposite on all the flowering parts, alternate on some of the lower parts of the stem and branches, sessile, $\frac{1}{3}$–2 in. long, $\frac{3}{4}$–3 lin. broad, linear or linear-lanceolate, acute or obtuse, rounded in at the base, apparently somewhat glaucous. Stipules none. Involucres solitary at the forks or ends of the branches, subsessile or shortly pedunculate, $\frac{3}{4}$–1 lin. in diam., cup-shaped, with 4 glands and 5 ovate-oblong or subquadrate fringed lobes, glabrous outside; glands about $\frac{1}{3}$–$\frac{2}{3}$ lin. in their greater diam., transverse, narrowly oblong or half-moon-shaped, 2-horned. Capsule about $1\frac{1}{2}$ lin. in diam., exserted on a recurved pedicel twice as long as the involucre, glabrous; styles $\frac{1}{3}$–$\frac{2}{5}$ lin. long, free to the base, deeply bifid, erect, with recurved tips. Seeds 1–$1\frac{1}{4}$ lin. long, ellipsoid or ovoid, obtuse, white-rugose with a few smooth dark brown or dull green markings and with a peltate caruncle.—Boiss. in DC. Prodr. xv. ii. 139, and Ic. Euphorb. 21, t. 91. *E. glauca*, Ehrenb. ex Boiss. l.c. *Tithymalus dracunculoides*, Klotzsch & Garcke in Abh. Akad. Berl. 1860, 84.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 863! coast region, *Bent!*

Mozamb. Distr. German East Africa: in the Government garden at Dar-es-Salaam, *Stuhlmann*, 97!

Also in Arabia, India and Mauritius.

35. **E. hedyotoides,** *N. E. Br.* Probably perennial and more than 1 ft. high. Stems $\frac{1}{2}$–1 lin. thick in the specimen seen, repeatedly forked, thickened or clavate at the tips and with very short flowering

spurs in the forks, perhaps slightly 4-angled, glabrous, brown. Leaves opposite at the forkings of the stem and about 4 in a tuft at the thickened apex of the branchlets and of the very short thick flowering spurs in the forkings, spreading, subsessile or very shortly petiolate, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, linear, acute, with a recurved or hooked point, glabrous on both sides. Involucres 1–3 together amid the leaf-tufts, on peduncles about $\frac{1}{3}$ lin. long, immature, about 1 lin. in diam., cup-shaped, glabrous, with 5 glands and 5 small fringed lobes; glands scarcely $\frac{1}{2}$ lin. in their greater diam., transversely oblong, entire. Ovary and fruit not seen.

Mozamb. Distr. German East Africa: Mombo, *Braun*, 1680!

The specimens from which I describe may be only flowering branches of the plant, but they are quite unlike those of any other species I have seen.

36. **E. macra,** *Hiern in Cat. Afr. Pl. Welw.* i. 941. Perennial, very variable in appearance. Rootstock woody or perhaps a tuber with a long woody neck. Stems few or many, 2–11 in. high, erect, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick at the base, 2–3-times forked, in the taller specimens with long slender internodes, glabrous. Leaves all opposite, with the pairs in dwarf specimens $\frac{1}{6}$–1 in. and in tall specimens $1\frac{1}{4}$–3 in. apart, sessile, $\frac{1}{3}$–1 in. long, $\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, usually linear, sometimes linear-lanceolate or lanceolate, acute, in dried specimens often with inrolled margins, entire, glabrous on both sides. Stipules none. Involucre solitary in the forks of the stem or terminal, subsessile, about $1\frac{1}{2}$ lin. in diam., cup-shaped, with 4 glands and 5 subquadrate lobes minutely toothed at the truncate apex, glabrous outside; glands about $\frac{3}{4}$ lin. in their greater diam., transverse, narrowly oblong, somewhat 2-lipped or the inner margin inflexed, entire or indistinctly crenulate on the outer margin. Capsule about 2 lin. in diam. and rather more in length, glabrous; styles $\frac{3}{4}$–1 lin. long, erect in a cluster, united below, minutely bifid at the apex. Seeds $1\frac{1}{2}$ lin. long, oblong, 4-angled, with irregular flattened tuberculate sculpturing and raised flattened margins to the two inner sides, pale greyish-white.—*E. tenella*, Pax in Bull. Herb. Boiss. vi. 738, and Bolet. Soc. Brot. xvii. 75, not of H. B. & K. *E. nenensis*, Hiern in Cat. Afr. Pl. Welw. i. 942.

Lower Guinea. Angola: Huilla; dry pastures and poor soil, between Lopollo and Nene, *Welwitsch*, 284! near Lopollo, 284B! near Nene, *Welwitsch*, 280! Gambos, *Dekindt*, 828, 830, 842. Lunda: between Kimbundu and the River Quango, *Pogge*, 117!

Welwitsch 284B and Pogge 117 probably represent the fully developed condition of the plant, with stems 6–11 in. high; the other specimens seen are only 2–$4\frac{1}{2}$ in. high.

37. **E. claytonioides,** *Pax in Engl. Jahrb.* xxiii. 533. Perennial or annual. Rootstock woody, $1\frac{1}{2}$–3 lin. thick, resembling an annual tap-root. Stems 3–12 in. high, repeatedly dichotomously branched from the base, glabrous, glaucous. Leaves opposite, those at the very base shortly petiolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $3\frac{1}{2}$–$4\frac{1}{2}$ lin. broad, elliptic or elliptic-oblong, very obtuse or rounded at both ends, all others (as well as

the bracts) sessile, $\frac{1}{8}$–$\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{3}{4}$ in. or more broad, with the larger transverse or somewhat deltoid-reniform and the upper or bracts passing into orbicular-ovate, obtuse, apiculate, subtruncate at the base, somewhat fleshy, glaucous. Inflorescence terminal, cymose, unequally branched, with the involucres rather closely placed along the erect branchlets. Involucre solitary at the flowering nodes of the short cyme-branchlets, and terminal, subsessile, rather less than 1 lin. in diam., cup-shaped, glabrous outside, with 4 glands and 5 oblong toothed or sometimes entire ciliate lobes; glands usually about $\frac{1}{4}$ (rarely $\frac{1}{3}$) lin. in their greater diam., transverse, narrowly oblong, entire, slightly concave. Capsule about $1\frac{1}{2}$ lin. in diam., thinly and minutely hispid; styles $\frac{1}{3}$ lin. long, free, spreading, bifid at the apex. Seeds (immature) oblong or subrectangular, dorsally flattened, with a slight furrow on each side of a median ridge down the back, smooth, dark brown.—Hiern in Cat. Afr. Pl. Welw. i. 950.

Lower Guinea. Angola: Mossamedes; stony slopes of the Serra de Montes Negros, *Welwitsch*, 287 !

According to Welwitsch this plant is an annual or of several years' duration.

38. **E. acalyphoides,** *Hochst. ex Boiss. in DC. Prodr.* xv. ii. 98, *and Ic. Euphorb.* 17, *t.* 49. Annual, 6–15 in. high. Stem erect, branching at the base, 2–3 lin. thick, glabrous or puberulous at the tips. Leaves alternate; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. long; blade $\frac{3}{4}$–$1\frac{3}{4}$ in. long, 5–10 lin. broad, elliptic or elliptic-oblong, obtuse or rounded at the apex, more or less cuneate at the base, entire, glabrous above, thinly pubescent beneath. Stipules none. Peduncles axillary, borne all along the stem and branches, much shorter than the petioles, with a pair of small opposite bract-leaves and 1–3 involucres. Involucre sessile, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., cup-shaped, puberulous outside or glabrous on the basal part, with 4 glands and 5 rectangular or subquadrate ciliate lobes; glands $\frac{2}{3}$ lin. in their greater diam., transversely elliptic or elliptic-oblong, entire, pubescent all over. Capsule 2–$2\frac{1}{3}$ lin. in diam., puberulous with minute curved hairs, which, on the ovary, arise from minute tubercles; styles 1 lin. long, shortly united below, shortly bifid at the apex, at first spreading, afterwards collected. Seeds $1\frac{1}{4}$ lin. long, ovoid, slightly angular, acute, transversely encircled by 2 constrictions, minutely tuberculate.—Schweinf. in Bull. Herb. Boiss. vii. App. ii. 315; Hiern in Cat. Afr. Pl. Welw. i. 950. *E. thelesperma*, Hochst. ex Boiss. in DC. Prodr. xv. ii. 98. *Tithymalus acalyphoides*, Schweinf. Beitr. Fl. Aethiop. 38.

Nile Land. Eritrea: Gedem Mountain, near Massowa, *Schweinfurth*, 117; Terha Valley, near Saati, *Schweinfurth*, 301; Habab, *Hildebrandt*, 690! Amba Tochan, *Schweinfurth*, 636; near Togodele, *Ehrenberg!* Abyssinia: near Gageros, *Schimper*, 182! 2294! Modat province, *Schimper*, 1753! Kordofan: Arashkol Mountain, *Kotschy*, 88 ! Darfur, *Pfund*, 485 !

Lower Guinea. Angola: Loanda; near Loanda and near Penedo, *Welwitsch*, 296 ! *Gossweiler*, 184 ! 227 !

Also in Arabia.

39. **E. crotonoides,** *Boiss. in DC. Prodr.* xv. ii. 98. An erect annual, 1–2 ft. or more high. Stem terete below, angular above, 2–3 lin. thick, branching, glabrous or slightly puberulous; branches with narrow wing-like angles. Leaves alternate on the stem and branches, opposite only at the forkings of the flowering branches; petiole $1\frac{1}{2}$–9 lin. long, $\frac{1}{2}$–1 lin. broad, flat and thin, decurrent as angles on the stem and branches; blade $\frac{3}{4}$–$3\frac{1}{4}$ in. long, $\frac{1}{5}$–1 in. broad, lanceolate or on the flowering branches sometimes linear, acute, cuneately tapering from below the middle into the petiole, irregularly serrate with smaller and larger teeth and with a very prominent wing-like midrib beneath, thinly pubescent with fine spreading hairs on both sides or nearly glabrous above. Stipules reduced to glands. Flowering-branches forked or raceme-like, $1\frac{1}{2}$–8 in. long, ascending or spreading. Involucre sessile or very shortly pedunculate, solitary in the forks or at the nodes and apex of the branches, 1–$1\frac{1}{2}$ lin. in diam., cup-shaped, somewhat woolly-pubescent outside and within, with 4 glands and 5 oblong or ovate-oblong lobes, more or less toothed at the apex; glands distinctly stalked, erect, transverse, about $\frac{1}{2}$ lin. in their greater diam., concave, entire, red or purple. Capsule shortly exserted, erect, about $\frac{1}{4}$ in. in diam. at the base, slightly narrowing to the apex and about as long as broad, covered with long soft spreading hairs; styles 1–$1\frac{1}{2}$ lin. long, united for the greater part of their length, with recurved entire stigmas. Seeds 2 lin. long, ovoid, acutely 4-angled, acute at one end, tuberculate and with 2 more or less evident encircling transverse furrows, greyish-brown.—N. E. Br. in Kew Bulletin, 1909, 138.

Nile Land. Kordofan: near Obeid, *Kotschy,* 419! Darfur, *Pfund,* 484!

Lower Guinea. German South-west Africa: various localities, *Dinter,* 633! 633A!

Mozamb. Distr. German East Africa: Karagwe, *Stuhlmann,* 1850! British Central Africa: Ngamiland; Kwebe Hills, 3300 ft., *Lugard,* 160! *Mrs. Lugard,* 183! Rhodesia; near Buluwayo, *Flanagan,* 3186!

Easily recognised by its flat petioles and winged midribs and branches.

40. **E. Benthami,** *Hiern in Cat. Afr. Pl. Welw.* i. 943. Perennial, similar to broad-leaved forms of *E. systyloides* in habit and appearance; stems probably annually produced, 2–3 ft. high, herbaceous, somewhat woody at the base, simple or sparingly branched below, usually divided at the top into a forked or 3-rayed cyme, but sometimes undivided and flowering at the upper nodes and as well as the cyme-branches more or less angular, thinly puberulous at the nodes. Leaves alternate on the stem, 3 in a whorl at the base of the cyme and opposite on the cyme-branches; petiole $\frac{1}{6}$–$\frac{3}{4}$ in. long, rather slender; blade 1–3 in. long, $\frac{1}{6}$–1 in. broad, narrowly lanceolate to oblong-lanceolate, acute and mucronate at the apex, acute to rounded at the base, with small teeth tipped with a short subulate gland, thinly pilose on both sides with long and very fine hairs. Stipules none or reduced to minute glands. Cyme-branches $1\frac{1}{2}$–6 in. long, simple, with 2–3 distant flowering nodes, or forked. Involucre sessile, solitary, or 2 together at the nodes or forkings of the cyme-branches and terminal, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., cup-shaped, with 4

glands and 5 subquadrate lobes, ciliate at the apex, puberulous outside; glands $\frac{1}{3}$–$\frac{1}{2}$ lin. in their greatest diam., transversely oblong, entire. Capsule $2\frac{1}{2}$–3 lin. long, erect, only just exserted from the involucre, covered with rather long spreading hairs; styles about $\frac{1}{2}$ lin. long, united at the base or to above the middle, entire at the apex. Seeds $1\frac{1}{2}$ lin. long, ovoid, somewhat pointed at one end, encircled with 3 irregular series of small contiguous tubercles, dull greenish-brown.

Lower Guinea. Angola: Huilla; in wooded pastures between Lopollo and Ivantala, *Welwitsch*, 283 !

41. **E. sarmentosa,** *Welw. ex Pax in Engl. Jahrb.* xix. 121. Perennial, somewhat shrubby and more or less scrambling when adult, woody and $\frac{1}{2}$–$\frac{2}{3}$ in. thick at the base. Stems suberect, much-branched or forked, reddish; branches spreading, tortuous, with recurved spreading branchlets, puberulous with curved hairs. Leaves apparently soon falling off, alternate on the branches, opposite on the flowering branchlets, somewhat fleshy, petiolate, $\frac{3}{4}$–$3\frac{1}{2}$ in. long, $\frac{2}{3}$–5 lin. broad, linear or linear-lanceolate, acute, obtuse at the base, with fine distant teeth on the margin, glabrous above, puberulous with curved hairs beneath, slightly glaucous; midrib narrowly wing-like on the underside; petiole 2–4 lin. long or the flowering leaves subsessile. Stipules none. Involucres solitary on the forks or at the nodes along one side of the branchlets or occasionally terminal on short aborted branchlets, subsessile or shortly pedunculate, about $1\frac{1}{4}$ lin. in diam., cup-shaped, densely whitish puberulous with curved hairs outside, with 4 glands and 5 oblong or subquadrate lobes 3-toothed and ciliate at the apex; glands with a small pocket-like base, produced dorsally into a revolute limb, rectangular and $\frac{1}{2}$ lin. long and broad when flattened out, minutely crenulate along the truncate apex, puberulous on the inner face, reddish-brown (*Welwitsch*). Capsule exserted, erect, $2\frac{1}{3}$–$2\frac{1}{2}$ lin. in diam., and rather longer than thick, minutely puberulous; styles $\frac{1}{3}$ lin. long, rather stout, stiffly erect, free nearly or quite to the base, subacute, with a simple oblique stigma. Seeds 2 lin. long, oblong, compressed dorsally, with 2 vertical rows of 3–4 deep pits on each face and 1 row along each edge, glabrous, blackish, with a white caruncle.—Hiern in Cat. Afr. Pl. Welw. i. 950.

Lower Guinea. Angola: Loanda; on dry hills around Quicuxe, mountain thickets near Mutollo and near Loanda, rare, *Welwitsch*, 297 !

A specimen collected at Eiora, *Antunes*, 336, may also belong here.

Flowering branches of this species much resemble those of *E. systyloides*, Pax, from East Africa, but that species is an annual, with a more globose capsule and totally different tuberculate (not pitted) seeds.

42. **E. systyla,** *Edgew. in Journ. Asiat. Soc. Beng.* xvi. 1218. Annual 1–2 ft. high, cymosely or corymbosely branched, glabrous. Leaves opposite at the forks and flowering nodes of the branches, alternate elsewhere; petiole 2–6 lin. long; blade $\frac{1}{2}$–2 in. long, 1–5 lin. broad, linear to elliptic, subacute or obtuse at the apex, obtuse or rounded at the base, quite entire, glabrous on both sides. Stipules none. Involucres subsessile or shortly pedunculate at the forks, nodes or tips of the branches,

solitary, 1½–2 lin. in diam., cup-like, most minutely puberulous, with 4 glands and 5 oblong or rectangular toothed puberulous lobes; glands ¾–1¼ lin. in their greater diam., transversely elliptic-oblong or very broadly wedge-shaped with broadly rounded outer and inner margins, entire, dull purple? Capsule exserted, subglobose, 2 lin. in diam., most minutely puberulous; styles 1–1¼ lin. long, united for ¾ of their length, with scarcely spreading subentire or shortly bifid tips. Seeds 1¾ lin. long, 4-angled, acute at the apex, truncate at the base, with 2–3 constrictions around it, brown.—Anderson in Journ. Linn. Soc. v. Suppl. i. 35, t. 5; Boiss. in DC. Prodr. xv. ii. 98.

Nile Land. Somaliland: plain between the shore and the Ahl Mountains, *Hildebrandt*, 872!

Also in Arabia.

43. **E. systyloides,** *Pax in Engl. Jahrb.* xix. 121. Annual, 2–4½ ft. high, with a single stem below, branching near or above the middle in a laxly corymbose manner, glabrous below, minutely puberulous to subglabrous on the upper part; branches suberect, repeatedly alternately forked. Leaves alternate on the main stem, opposite on the branches, petiolate; those on the main stem with petioles ¾–1⅙ in. long and blades 1½–4½ in. long and ⅓–¾ in. broad, lanceolate, narrowly oblong-lanceolate or sometimes elliptic, those on the branches with shorter petioles and blades 1–4 in. long, ½–4 lin. broad, linear or linear-lanceolate, rarely lanceolate, all acute at the apex and more or less cuneate at the base, finely serrate, glabrous on both sides; midrib acute or wing-like beneath. Stipules none. Involucres sessile or rarely pedunculate, solitary in the forks or at the nodes or apex of the branches, 1–1¼ lin. in diam., cup-shaped, adpressed-puberulous, with 4 glands and 5 transverse or sub-quadrate fringed lobes; glands ⅖–⅗ lin. in their greater diam., transverse, somewhat 2-lipped, entire. Capsule very shortly exserted, 2½ lin. in diam., rather shorter than broad and slightly narrowed upwards, adpressed puberulous, with a small cupular entire or irregularly toothed calyx at its base; styles ¼–⅓ lin. long, stout, entire, finally spreading, scarcely or very shortly united at the base. Seeds 1½ lin. long, ovoid, not angular, acute at one end, minutely tuberculate, with the tubercles more or less arranged in transverse series, whitish-grey or brown.—*E. Holstii*, Pax in Engl. Jahrb. xix. 121. *E. Volkensii*, Pax in Engl. Pfl. Ost-Afr. C. 242, and Engl. Jahrb. xxiii. 534.

Nile Land. Uganda: Toro; Mpanga River, *Bagshawe*, 1068!

Mozamb. Distr. Zanzibar! Kokotoni, *Hildebrandt*, 1041! German East Africa: Usambara, *Holst*, 530! 8852! 9120! *Engler*, 415! Kilimanjaro, *Volkens*, 638! Usaramo, *Stuhlmann*, 6464! 6573! 6877! Ndoa, *Stuhlmann*, 8058! Madissa, *Stuhlmann*, 8130! British Central Africa: Nyasaland; Shire River (a broad-leaved form with 4-angled seeds), *Kirk!*

Var. *pedunculata*, N. E. Br. Leaves on the flowering branches ⅓–1½ in. broad, oblong-lanceolate or elliptic, acute or obtuse and apiculate. Involucres on distinct peduncles ¾–2 lin. long, densely adpressed-pubescent to subglabrous. Seeds 1¾–2 lin. long, ovoid, acute at one end, distinctly 4-angled, brown or greyish-green. Otherwise as in the type.

Nile Land. Uganda: Mawonota district, in banana gardens, *Dawe*, 238! British East Africa: Kibwezi, *Scheffler*, 77!

Var. *hebecarpa*, N. E. Br. Leaves on the branches linear or lanceolate. Ovary densely tomentose, becoming rather densely and softly pilose in fruit; styles 1–1¼ lin. long, united nearly to the top. Seeds distinctly 4-angled. Otherwise as in the type.—*E. Holstii*, var. *hebecarpa*, Pax in Engl. Jahrb. xxxiv. 374.

Nile Land. British East Africa: near Lake Nakuro, *Engler*, 2019!

Mozamb. Distr. German East Africa: Meru, *Uhlig*, 770! between Kilimanjaro and Meru, *Merker!* Ukerewe Island in Lake Victoria, *Conrad*, 213! and without precise locality, *Jaeger*, 59!

Var. *lata*, N. E. Br. Leaves on the branches lanceolate to elliptic. Ovary minutely and densely white-tomentose, becoming densely adpressed white-pubescent in fruit (not pilose). Otherwise as in the type.

Mozamb. Distr. German East Africa: Kilimanjaro; at Moshi, *Merker*, 605! 606! Sonjo Sale, *Merker*, 583!

E. systyloides appears to vary very much in the size and shape of its leaves and size and angulation of its seeds. Probably when better known the above varieties will be found to grade into each other by a series of intermediate forms so that they can scarcely be distinguished from the type by the characters given. The manner in which the involucres are peduncled in var. *pedunculata* seems constant, but I have also seen them with equally long peduncles mingled with the ordinary sessile condition on the type. The type specimen of *E. Holstii* (Holst, 530) and that of *E. Volkensii* (Volkens, 638) are identical, and have shorter and more lanceolate leaves than in the typical *E. systyloides*, but do not otherwise differ, and as there are intermediate forms, I do not consider it worth distinguishing as a variety.

44. **E. pseudoholstii,** *Pax in Engl. Jahrb.* xxxiii. 287. Annual, with the habit and general appearance of *E. systyloides*, Pax. Leaves opposite at the flowering nodes, alternate elsewhere, subsessile, 1½–4 in. long, 1–4 lin. broad, linear or linear-lanceolate, acute, tapering to the base, entire or very minutely toothed, with a subulate spreading gland-tipped tooth on each side at the base, glabrous on both sides. Stipules none or exceedingly minute. Involucres generally 2–3 together in small cymules at the tips of the branches, subsessile, ¾ lin. in diam., cup-shaped, very minutely puberulous, with 4 glands and 4–5 subquadrate fringed lobes; glands ⅓–½ lin. in their greater diam., transverse, oblong or subelliptic. Capsule exserted and curved to one side, about 2 lin. long and 1½ lin. in diam., oblong, minutely puberulous with curved adpressed hairs; styles ¾ lin. long, erect, united at the basal part, bifid at the apex, with the lobes parallel. Seeds 1½ lin. long, dorsally flattened, oblong, notched at the base and with a cap-like terminal caruncle, slightly keeled down the back and with 3 grooves down the inner face, whitish.

Nile Land. Somaliland: Boran, *Ellenbeck*, 2067! 2096!

This is distinguished from *E. systyla*, Edgew., and *E. systyloides*, Pax, which are similar in general appearance, by the subsessile leaves, with a subulate tooth on each side at their base and by the much smaller, more clustered involucres and different seeds.

45. **E. bongensis,** *Kotschy & Peyr. Pl. Tinn.* 40, *t.* 19, *fig. A.* Perennial; stems 2½–12 in. high, arising annually in small clumps from

a tough creeping rhizome $\frac{1}{3}$–$\frac{2}{3}$ in. thick, erect, branching, puberulous or glabrous, brown or green; branches straight, divaricate. Leaves all alternate, shortly petiolate, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–3 lin. broad, linear, abruptly acute or obtuse, obtuse at the base, flat or narrowly revolute at the margins, with a prominent midrib beneath, glabrous on both sides. Stipules reduced to minute glands or obsolete. Involucre solitary, terminal or falsely lateral at the ends of the branches, subsessile or on peduncles up to 2 lin. long, $2\frac{1}{2}$–3 lin. in diam., minutely puberulous outside, glabrous within, broadly cup-shaped, with 4–5 glands and 5 broad transversely rectangular fringed lobes; glands about $\frac{3}{4}$ lin. in their greater diam., transverse, 2-lipped or obliquely funnel-shaped, and in dried specimens usually with the inner lip pressed against the larger outer lip, entire. Capsule erect, $\frac{1}{4}$ in. in diam., velvety-puberulous; styles united below, with recurved-spreading branches, truncate or bifid at the apex. Seeds about $\frac{1}{8}$ in. in diam., globose, smooth.—Boiss. in DC. Prodr. xv. ii. 1264. *E. djurensis*, Schweinf. ex Pax in Engl. Jahrb. xix. 119. *E. Kassneri*, Pax in Engl. Jahrb. xliii. 86.

Nile Land. Jur: near the River Jur, *Tinne*, 58; at Kurshook Ali's Seriba, *Schweinfurth*, 1591! Uganda: Madi, *Bagshawe*, 1632! near Masinde in Unyoro, *Bagshawe*, 1547! British East Africa: Gadu, *Kässner*, 413!

46. **E. calva,** *N. E. Br.* Perennial, with a tuberous rootstock. Stem of the only specimen seen 5 in. high, 1–$1\frac{1}{3}$ lin. thick, but on the label stated to be 12–14 in. high, erect, unbranched, herbaceous or perhaps subsucculent, glabrous, brown. Leaves alternate, ascending, 2–$5\frac{1}{2}$ in. long, 2–$3\frac{1}{2}$ lin. broad, linear, acute, rounded at the base into a very short petiole, entire with narrow cartilaginous margins, coriaceous or somewhat fleshy, with the midrib stout and prominent beneath, glabrous on both sides. Stipules none. Involucres evidently terminal, possibly solitary and subsessile, only one detached example seen, including the glands, about 4 lin. in diam., 2 lin. deep, cup-shaped, glabrous, with 5 glands and 5 rectangular or subquadrate minutely ciliate-denticulate lobes; glands $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire, with a rim-like ridge on the inner margin. Ovary and capsule not seen.

Upper Guinea. Cameroons: Korrowae Plateau, 2300 ft., *Ledermann*, 3880!

47. **E. Oatesii,** *Rolfe in Oates, Matabele Land, ed.* ii. 408. Perennial. Rootstock probably a tuber. Stem dividing at ground-level into 2–3 erect or ascending branches $\frac{1}{2}$–8 in. long, puberulous. Leaves alternate or at the inflorescence opposite or subopposite, of rather thick texture, $\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{2}{3}$–$2\frac{1}{2}$ lin. broad, linear or linear-lanceolate, acute, very shortly narrowed to a subsessile base or into a short petiole, glabrous on both sides or sometimes with a few minute curved hairs on the keel-like midrib beneath, sometimes minutely ciliate when young. Stipules minute and gland-like, or none. Peduncles solitary, arising in the forkings of the stem or falsely axillary, $\frac{1}{4}$–1 in. long, erect, puberulous. Involucre 2–$2\frac{1}{2}$ lin. long and 3–$3\frac{1}{2}$ lin. in diam., broadly cup-shaped with 5 glands and 5 lobes, puberulous or tomentose, with

minute curved hairs outside; glands $\frac{2}{3}$–$\frac{3}{4}$ lin. long and $\frac{3}{4}$–$1\frac{1}{4}$ lin. broad, peltate, 2-lipped, lips somewhat pressed together, forming an oblique flattened funnel-shaped cavity, with the lip on the inner side half as long as the outer, both broadly rounded, entire; lobes transversely oblong, $1\frac{1}{4}$–$1\frac{1}{3}$ lin. broad, truncate and cut into a fringe of many ciliate teeth at the top. Ovary densely tomentose when young; styles short and thick, bifid at the recurved tips. Capsule not seen.

Mozamb. Distr. Rhodesia: Matabeleland, *Oates!* Guelo district, 100 miles north-east of Buluwayo, *Rand*, 218! Chilanga, *Rogers*, 8466!

This is only distinguishable from *E. bongensis*, Kl. & Peyr., by its longer peduncles and the longer hairs on the tomentose involucre and ovary.

48. **E. Verdickii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, i. 280. A perennial herb about 6 in. high. Stem with spreading straight branches, more or less fleshy, shortly and densely pubescent. Leaves $\frac{1}{3}$–1 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, linear or oblong-linear, acute, rounded at the base, with revolute ciliate margins, glabrous above, with some hairs on the under surface, especially on the prominent midrib; petiole $\frac{1}{2}$ lin. long. Involucres terminal, about $3\frac{1}{2}$ lin. in diam., on peduncles up to 1 in. long, velvety, with 5 glands forming rounded glabrescent lobes, tuberculate on their upper surface, wavy at the margins. Ovary shortly pedicellate, tomentose; styles bifid. Capsule about $2\frac{1}{2}$ lin. in diam., tomentose. Seeds smooth, greyish-brown.

South Central. Belgian Congo: Katanga district, Lukafu, *Verdick*, 309.

This may prove to be identical with *E. Oatesii*, Rolfe.

49. **E. trichadenia,** *Pax in Engl. Jahrb.* xix. 125. Perennial. Rootstock a tuber with an elongated woody neck, sometimes 3–4 in. long, producing annual herbaceous prostrate or erect herbaceous stems $1\frac{1}{2}$–4 in. high, branching from the base, puberulous or glabrous. Leaves opposite at the forkings of the stems and the flowering nodes, alternate elsewhere, sessile, thinly coriaceous or perhaps slightly fleshy, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, linear or linear-lanceolate, or the lower and sometimes those under the involucres (bracts) smaller and lanceolate or scale-like, acute, usually slightly curved, often longitudinally folded, glabrous on both sides, sometimes ciliate on the narrow cartilaginous margins. Stipules none. Involucres solitary in the forks of the stems or in terminal 3–10-flowered cymes, shortly pedunculate, about $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., cup-shaped, glabrous or minutely puberulous (not pilose as originally described) outside, with 5 glands and 5 transversely rectangular or subquadrate fringed lobes; glands 2–$2\frac{1}{2}$ lin. broad, palmate or fan-shaped, deeply divided into 4–9 linear or filiform simple or once or twice forked segments, flat or channelled but not corrugated on their upper surface, with the undivided basal part 2-lipped, from the inner margin being inflexed. Capsule erect, $3\frac{1}{2}$–4 lin. in diam., glabrous, on a puberulous pedicel; styles $1\frac{1}{2}$–2 lin. long, united for about half their length, with recurved-spreading thickened minutely 2-lobed tips, and with or without an articulation on the united part. Seeds about $1\frac{1}{2}$ lin. in diam., globose, acutely pointed at one end, thinly and minutely scabrous-

puberulous.—Pax in Bull. Herb. Boiss. vi. 741. *E. benguelensis*, Pax in Bull. Herb. Boiss. vi. 741; Henriques in Bolet. Soc. Brot. xvii. 76; Baum, Kunene-Samb. Exped. 284. *E. subfalcata*, Hiern in Cat. Afr. Pl. Welw. i. 948. *E. Gossweileri*, Pax in Engl. Jahrb. xliii. 88.

Lower Guinea. Angola: in open thickets near the River Kubango, *Gossweiler*, 1924! *Baum*, 368! common in reed-beds along the left bank of the River Quanza, *Gossweiler*, 994! Huilla; dry hills near Huilla, *Welwitsch*, 282! *Antunes*, 362! mouth of the River Quatiri, *Baum*, 403A! between Kimbundo and the Quango River, *Pogge*, 116! Sources of the River Luala, *Dekindt*, 827.

Also in South Africa.

Var. *Gibbsiæ*, N. E. Br. Peduncle, outside of involucre and ovary all densely or thinly puberulous. Segments of the involucral glands $\frac{1}{2}$–$\frac{2}{3}$ lin. long, free or more or less connate, very shortly and somewhat crisped-forked at their tips. Styles $1\frac{2}{3}$ lin. long, often united to rather above the middle with revolute shortly bifid tips, puberulous. Otherwise as in the type.

Mozamb. Distr. Rhodesia: near Isotye, Matoppo Hills, 5000 ft., *Miss Gibbs*, 234! Victoria, *Monro*, 141!

Different specimens of this plant vary much in appearance, as the stems which spring up after the annual fires are shorter, stouter and less leafy than the earlier and more normal leafy growth. Pax describes the involucres of *E. trichadenia* as pilose, but the pubescence on the type specimen consists of minute spreading hairs, scarcely visible to the naked eye. It varies considerably in different specimens, even in the same gathering, and usually the involucres are glabrous.

50. **E. ledermanniana,** *Pax & Hoffm. in Engl. Jahrb.* xlv. 241. Stems annual from a perennial rootstock, 3–8 in. high, about 1 lin. thick, herbaceous, usually forking into a 2-branched cyme at the apex, simple or rarely branched below, glabrous. Leaves alternate on the simple part of the stem, opposite at the base of the cyme and on its branches, sessile or subsessile, 1–$3\frac{1}{3}$ in. long, 3–5 (or those at the flowering nodes sometimes 6–7) lin. broad, linear-lanceolate, acute, coriaceous or perhaps somewhat fleshy, with cartilaginous entire margins, not keeled on the midrib beneath, often longitudinally folded, glabrous on both sides. Stipules none. Cyme-branches $\frac{1}{2}$–3 in. long, each with 1 terminal involucre and sometimes one or two others scattered along them and 1 in the fork between them at their base, glabrous. Involucres $3\frac{1}{2}$–4 lin. in diam., cup-shaped, glabrous, "yellowish-green" (*Ledermann*), with 5 glands and 5 erect subquadrate minutely crenulate lobes; glands erect in dried specimens, $1\frac{1}{4}$ lin. in their greater diam., transversely subrectangular, minutely crenulate on the outer margin, rugulose on the flat inner surface, with a slightly raised ridge at the lower or inner margin. Ovary subglobose, glabrous, exserted on an erect pedicel; styles about 1 lin. long, shortly united at the base, then spreading-recurved, 2-lobed at the apex.

Upper Guinea. Northern Cameroons: in a small river-forest at Kanjang, 1200 ft., *Ledermann*, 3668!

51. **E. carinifolia,** *N. E. Br.* Rootstock a fleshy tuber, with an elongated woody neck. Stems annual, branching close to the ground, ascending, 4–6 in. high, pubescent or subscabrous with very minute

rather stiff hairs (glands ?). Leaves alternate, except at the inflorescence, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, $\frac{3}{4}$–2 lin. broad, linear or linear-lanceolate, acute and mucronate at the apex, shortly cuneate at the sessile or subsessile base, revolute at the margins, with a very prominent acute or almost wing-like keel beneath, glabrous on both sides. Cymes terminal, umbel-like, with 3 once-forked rays $\frac{1}{3}$–1 in. long. Bracts under the involucres $\frac{1}{3}$–1 in. long, 2–4 lin. broad, ovate-lanceolate to subcordate-ovate, acute or acuminate and mucronate, rounded or abruptly contracted into a distinct broad petiole, otherwise as in the leaves. Involucre solitary, sessile, 2 lin. long, $2\frac{1}{3}$ lin. in diam., campanulate, glabrous outside and within, with 4 glands and 5 subquadrangular oblong or ovate toothed lobes; glands about $\frac{2}{3}$ lin. in their greater diam., compressed-funnel-shaped when viewed from the back, shallowly concave and transversely oblong when viewed from above, entire. Capsule erect, $3\frac{1}{2}$–4 lin. in diam., glabrous; styles $1\frac{1}{4}$ lin. long, united for $\frac{3}{4}$ of their length, stiffly erect, narrowed at the apex into the minutely bifid stigmas. Seeds 2–$2\frac{1}{4}$ lin. long, ovoid, subacute, smooth, light ochreous-brown.

Lower Guinea. Angola: woods at Campulua-Cuito, *Gossweiler*, 2798!

52. **E. verticillata,** *Pax in Bull. Herb. Boiss.* vi. 740. Rootstock a tuber, producing 1 or more annual stems 4–9 in. high, branching into a 3-rayed umbel at the top and with 1–2 pairs of opposite branches (or a whorl of them, *Pax*) below, glabrous. Leaves opposite, whorled at the base of the umbel, sessile, subcoriaceous, $\frac{1}{3}$–$1\frac{1}{2}$ in. long, 2–7 lin. broad, with the basal pairs very much reduced or scale-like, lanceolate or elliptic, acute, rounded or narrowed at the base, glabrous on both sides. Branches and rays of the umbel 2–$2\frac{1}{2}$ in. long, once-forked, glabrous. Bracts 6–10 lin. long, 4–6 lin. broad, sessile, ovate, acute. Involucres solitary, sessile, $1\frac{1}{2}$–2 lin. in diam., glabrous (pubescent, *Pax*), with 4 glands and 5 oblong truncate toothed lobes; glands $\frac{3}{4}$ lin. in their greater diam., transversely oblong, concave, entire. Ovary glabrous, exserted on a recurved pedicel; styles $\frac{2}{3}$ lin. long, free to the base, not spreading, bifid at the apex. Capsule about 2 lin. in diam. and rather longer than broad, oblong, trigonous.

Lower Guinea. Angola: Huilla; by the River Nene, *Antunes*, 889; Huilla Plateau, *Dekindt*, 1047!

I have not seen the type of this species, but describe from Dekindt's specimen, which is named *E. verticillata* by Pax himself, and agrees with the original description except that the stem does not bear 2 whorls of branches and the involucres are not surrounded by 4 bracts and are glabrous. The presence of 4 bracts surrounding one involucre in the type suggests that it is abnormal, as no *Euphorbia* I have examined has been found to have 4 bracts to the same involucre.

53. **E. platycephala,** *Pax in Engl. Jahrb.* xix. 122. Rootstock an elongated fleshy tuber $1\frac{1}{4}$ in. (or more?) thick, producing 1 or more annual erect stems 3–4 in. high and $\frac{1}{8}$–$\frac{1}{4}$ in. thick at the base, with an umbel of 3–4 rays at the apex, glabrous. Leaves sessile, alternate, whorled at the base of the umbel, $1\frac{3}{4}$–3 in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, narrowly lanceolate to cuneate-oblanceolate, acute, entire, glabrous on both sides.

Rays of the umbel 1–2 in. long, simple or once forked, glabrous. Bracts $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{2}{3}$–$1\frac{2}{3}$ in. broad, sessile, deltoid-ovate, truncate or rounded at the base, tapering to an acute apex, glabrous. Involucres solitary, sessile or on peduncles 1–$1\frac{3}{4}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam. and $\frac{1}{6}$ in. deep, broadly cup-shaped, glabrous, with 5 glands and 5 transversely subrectangular emarginate or subentire lobes $\frac{3}{4}$–1 lin. long and 1–$1\frac{3}{4}$ lin. broad; glands distant, $\frac{3}{4}$–$1\frac{1}{4}$ lin. in their greater diam., transversely elliptic, with the base excavated or very obliquely and shallowly funnel-shaped, entire. Ovary glabrous, wholly or partly included; styles united below, with the free part about 1 lin. long, slender, slightly thickened at the apex. Fruit and seeds not seen.—*E. uhehensis*, Pax in Engl. Jahrb. xxviii. 420.

Mozamb. Distr. German East Africa: Kageyi on Lake Victoria, *Fischer*, 516! Uhehe, *Goetze*, 525!

I can find no specific distinction between the type specimens of ***E. platycephala*** and ***E. uhehensis.***

54. **E. Monteiri,** *Hook. f. in Bot. Mag. t.* 5534. Perennial. Primary stem about 1 ft. high and up to $1\frac{3}{4}$ in. (or perhaps more) in thickness, cylindric, tuberculate with the conical persistent leaf-bases, simple or with a few similar branches, fleshy, glabrous, leafy only at the apex, naked below, described as resembling "an old cabbage-stump," producing around the apex annual deciduous leafy flowering-branches 6–12 lin. long and $1\frac{1}{2}$–$2\frac{1}{2}$ lin. thick, erect, terete, not tuberculate, glabrous, glaucous-green. Leaves all alternate, 2–6 in. long, $\frac{1}{4}$–$1\frac{1}{6}$ in. broad; those on the fleshy stems linear to spathulate-oblong, obtuse or rounded and apiculate at the apex, cuneately tapering from or below the middle into a petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; those on the flowering branches sessile or very shortly petiolate, narrowly lanceolate or linear-oblong, acute or obtuse, apiculate, shortly cuneate at the base, or occasionally like those on the fleshy stems, all glabrous on both sides, glaucous-green. Stipules none. Cyme terminal, umbel-like, 2–3-rayed, sometimes accompanied by solitary rays in the axils of the leaves below; rays at first $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, ultimately developing into dichotomous cymes up to 8 in. long. Bracts opposite, or those at the base of the umbel-like cyme 3 in a whorl, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, sessile, cordate-ovate, acute or tapering to a long point, glabrous. Involucres on peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, campanulate, about 5 lin. in diam., glabrous outside and within, with 5 glands and 5 transversely rectangular lobes, many-toothed along the truncate top, chocolate or dark brownish-red, with yellow tips to the glands, which are $1\frac{1}{2}$ lin. long and 2–$2\frac{1}{2}$ lin. broad and palmately divided into 3–6 spreading linear segments, thickened and minutely lobed at the apex. Ovary with a small cupular calyx at its base exserted and recurved on a pedicel becoming in fruit 4–5 lin. long, glabrous; styles $1\frac{3}{4}$–2 lin. long, united for more than half their length, rather slender, neither thickened nor bifid at the apex. Capsule $4\frac{1}{2}$–5 lin. in diam., divided into 3 broad, somewhat wedge-shaped lobes by 3 deep grooves, glabrous. Seeds subglobose, about $1\frac{3}{4}$ lin. in diam., greyish, with slightly depressed

irregular hieroglyphic darker markings, slightly viscid.—Boiss. in DC. Prodr. xv. ii. 1264; Henriques in Bolet. Soc. Brot. xvii. 76; N. E. Br. in Kew Bulletin, 1909, 138. *E. Marlothii*, Pax in Engl. Jahrb. x. 36, and Bull. Herb. Boiss. vi. 741, 742; Berger, Sukkul. Euphorb. 115 and 117, fig. 31; Dinter, Deutsch Sudw.-Afr. 26, 90. *E. longibracteata*, Pax in Bull. Herb. Boiss. vi. 742. *E. Baumii*, Pax in Bull. Herb. Boiss. 2me sér. viii. 636.

Lower Guinea. Southern Angola: by the Kubango River, *Baum*, 458! and without precise locality, *Monteiro!* German South-west Africa: Amboland; Olukonda, *Schinz*, 734! Damaraland, *Baines! Een! Hartmann*, 40! *Luderitz*, 85! Hereroland; Karribib, *Marloth*, 1425! *Dinter*, 1390! Great Namaqualand: Rehoboth, *Fleck*, 447A.

Mozamb. Distr. British Central Africa: Ngamiland; Kobis, *Baines!* Kwebe Hills, *Lugard*, 247! *Mrs. Lugard*, 87! Totin, near Lake Ngami, *Lugard*, 75!

55. **E. Grantii,** *Oliv. in Trans. Linn. Soc.* xxix. 144, *t.* 93. A stout bush or shrub 5–10 ft. high, with flowering branches $\frac{1}{3}$ in. or more thick, glabrous, leafy, apparently herbaceous, perhaps woody at the base. Leaves alternate, sessile, ascending, subcoriaceous, 6–12 in. long, $\frac{1}{2}$–1 in. broad, strap-shaped or linear-lanceolate, acute or the upper mucronate, rounded or narrowed at the base, glabrous on both sides. Stipules none. Umbel terminal, 5–15 in. in diam., with (apparently 3) repeatedly forked cyme-rays. Bracts opposite, sessile, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–2 in. broad, ovate or orbicular-ovate, acuminate into a fine awn $\frac{1}{3}$–1 in. long, glabrous. Involucres solitary at the forks and flowering nodes of the cymes, shortly pedunculate, $\frac{1}{3}$ in. in diam. without the glands, broadly cup- or somewhat basin-shaped, minutely puberulous outside, with 4 large glands and 5 or sometimes fewer subquadrate bristle-toothed puberulous lobes, apparently purplish or red; glands about 4 lin. long and 5–6 lin. across, fan-shaped, palmately divided into 5–9 (usually 7) filiform segments (appendages) 2–3-times forked at the apex, with a crenation of the gland at the base of each segment, apparently greenish, and its segments red with whitish or greenish tips. Capsule exserted, $\frac{1}{2}$ in. in diam., with a very small slightly lobed ciliate calyx at its base, glabrous; styles about $\frac{1}{4}$ in. long, united for half their length, shortly 2-lobed or transversely capitate at the apex. Seeds globose, $2\frac{1}{2}$ lin. in diam., smooth, but with a surface like that of ground glass, dark brown, greyish-white when unripe, without a caruncle.—Pax in Bull. Soc. Bot. Belg. xxxvii. 108, and Bull. Herb. Boiss. vi. 741, 742. *E. Mulemæ*, Rendle in Journ. Linn. Soc. xxxvii. 209.

Nile Land. Uganda: near Entebbe, 3900 ft., *Brown*, 384! Bugegu, *Dawe*, 265! Buddu, *Dawe*, 274! near Mulema, *Bagshawe*, 321! 340! Ukamba, *Hildebrandt*, 2632!

South Central. Belgian Congo: Moliro, *Descamps*.

Mozamb. Distr. German East Africa: Unyanyembe; near Kazeh (Tabora) *Speke & Grant!* Lower Plateau north of Lake Nyasa, *Thomson!* Plagrige, *Fischer*, 520! 565! Bukoba, *Stuhlmann*, 1620! 3617! 3791! Kutogo, *Mildbraed*,

271! Lages Muku in East Ruanda, *Mildbraed*, 449! Kilmatinde, *Claus*, 27! *Prittwitz*, 126!

56. **E. pseudograntii,** *Pax in Engl. Jahrb.* xxx. 342. A stout herb, 3–6 ft. high. Leaves alternate, somewhat whorled at the base of the inflorescence, 8–12 in. long (including the petiole), $1\frac{1}{6}$–$3\frac{1}{4}$ in. broad, cuneately oblong-lanceolate or lanceolate or the upper strap-shaped, shortly acute or subacute, tapering at the basal $\frac{1}{4}$–$\frac{1}{3}$ into a petiole $\frac{1}{2}$–1 in. long, glabrous on both sides. Stipules none. Inflorescence terminal, dividing into a large cyme or umbel several times forked, glabrous. Bracts opposite or 3 in a whorl at the base of the umbel, sessile, $\frac{3}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, ovate to elliptic, acutely or abruptly terminating in an awn $\frac{1}{4}$–$\frac{1}{2}$ in. long, cordate at the base, glabrous. Involucres solitary, terminal, in the forks of the cyme or sometimes axillary and arranged along the branches in a raceme of 3 or 4, very shortly pedunculate, $\frac{1}{3}$ in. or more in diam. without the glands, cup-shaped, glabrous, with 4 glands and 5 subquadrate fringed lobes; glands with the body part $2\frac{1}{2}$ lin. in their greater diam., transversely linear-oblong, 2-lipped, whitish-green, with the outer margin divided into 5–6 filiform violet processes $\frac{1}{4}$ in. long and crutch-like at their yellow tips. Ovary glabrous, with a distinct cupular several-toothed calyx at its base, exserted on a pedicel $\frac{1}{4}$–$\frac{1}{3}$ in. long, at first recurved, afterwards erect; styles 2 lin. long, united at the base, spreading above, slender, with 2-lobed and somewhat crutch-like tips. Capsule and seeds not seen.

Mozamb. Distr. German East Africa: Langenburg district; sides of Ukangu Mountain by Lake Nyassa, 1600 ft., *Goetze*, 888!

Very similar to *E. Grantii*, Oliver, but with broader petiolate leaves, different involucre-glands and a larger calyx.

57. **E. Cervicornu,** *Baill. in Bull. Soc. Linn. Paris*, ii. 878. A herbaceous plant 2–3 ft. high (*Mann*). Stems of the specimens seen, 2–$2\frac{1}{2}$ lin. thick, glabrous. Leaves alternate, 4–6 in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ in. broad, oblanceolate or obovate-lanceolate, acute or very shortly subcuspidate, cuneately tapering into a petiole $\frac{1}{4}$–$\frac{3}{4}$ in. long, glabrous on both sides. Stipules none. Cyme terminal, commencing with a single subsessile terminal involucre, when fully developed 4–$4\frac{1}{2}$ in. in diam., with 3 primary repeatedly forked rays, forming a rather compact mass, glabrous. Bracts sessile, $4\frac{1}{2}$–7 lin. long, 4–5 lin. broad, suborbicular or broadly elliptic, rounded at the apex into a short awn-like point not more than $\frac{1}{8}$ in. long, rounded at the base, glabrous. Involucre solitary at the forks or nodes of the cyme or terminal, subsessile or very shortly pedunculate, 5–6 lin. in diam. from tip to tip of the gland-lobes, cup-shaped, with 4–5 glands and 5 erect oblong or rectangular lobes rather deeply fringed at the truncate apex, glabrous; glands large, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in their greater diam., half-circular, or cuneately subquadrate, yellowish-green, with 2–5 filiform forked red processes about $1\frac{1}{2}$ lin. long on the straight outer margin. Ovary recurved, glabrous; styles free or shortly connate at the base, 1–$1\frac{1}{2}$ lin. long,

filiform, minutely bifid at the very apex only.—*E. Quintasii*, Pax in Bolet. Soc. Brot. x. 156; Engl. Jahrb. xix. 124, and Bull. Herb. Boiss. vi. 742, and 2me sér. i. 46; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 291. *E. Zenkeri*, Pax in Engl. Jahrb. xxiii. 536, and Bull. Herb. Boiss. vi. 741, 742. *E. calabarica*, Burkill in Kew Bulletin, 1901, 133.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann*, 2315!

Lower Guinea. Island of St. Thomas, *Chevalier*, 13751! *Quintas.* French Congo: by the River Alima, *Thollon*, 951! Lower Congo: Kisantu, *Gillet*, 28.

South Central. Belgian Congo: Kisinga, *Vanderyst* ex *De Wildeman.*

In Bull. Herb. Boiss. vi. 741, Pax describes this and other species as having a thick fleshy trunk. This is an error, as the only one among all that he enumerates which has such a trunk is *E. Marlothii*, Pax (=*E. longibracteata*, Pax=*E. Monteiri*, Hk. f.).

58. **E. tumbaensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 291. Stems cylindric, striate, glabrous, greyish-brown. Leaves alternate, 2–3¼ in. long, 1–1½ in. broad, obovate or oblong, subobtuse or shortly mucronate, tapering into a short petiole, those towards the apex of the stem passing into bracts. Involucres in terminal groups of 3, with peduncles about 1 lin. long, campanulate, glabrous, with the lobes (? glands) deeply divided into 3 linear segments forked at the apex, 1 lin. long; glands 1–1¼ lin. in their greater diam., elliptic, entire. Ovary not exserted, glabrous; styles 1 lin. (or more?) long, united at the basal third, entire and slightly thickened at the apex.

South Central. Belgian Congo: at Lake Tumba, *Laurent.*

I have not seen any species in which the lobes of the involucre are divided into linear forked segments as described by De Wildeman, but if, as I suspect, the glands are intended, then this plant must be closely allied to, if not identical with, *E. Cervicornu*, Baill.

59. **E. macrophylla,** *Pax in Engl. Jahrb.* xix. 122. Probably perennial, about 1½ ft. high in the specimens seen, with simple stems 12–14 in. long and ¼ in. thick, bearing at the apex a 3–5-rayed umbel, with simple or forked rays 3–8 in. long, when simple (from the abortion of one of the 2 branches which arise under each involucre), with 2–3 distant flowering nodes, glabrous. Leaves on the stem rather few and somewhat distant, alternate, with a whorl of 3–5 at the base of the umbel, subcoriaceous, 2¾–6 in. long, 1⅛–2⅓ in. broad, those on the stem obovate or oblanceolate to elliptic, obtuse or rounded at the apex, apiculate, cuneately tapering to a subsessile or shortly petiolate base; those of the whorl sessile, 2–3 of them usually somewhat oblong, deltoid-ovate or rhomboid-ovate, and the other or others cuneate-obovate, oblanceolate or elliptic-lanceolate, cuneate to nearly sub-truncate at the base, all glabrous on both sides. Stipules none. Bracts sessile, ¾–2 in. long, and as much or more in breadth, suborbicular or very broadly ovate, obtuse or rounded, apiculate, truncate or slightly cordate at the base, glabrous. Involucres on peduncles 1½–2½ lin. long, solitary, about 4½ lin. in diam., and 2–2⅔ lin. deep, broadly cup-shaped, glabrous, with 5 glands and 5 transversely rectangular lobes, minutely

and irregularly denticulate (not ciliate) along the truncate top; glands $1\frac{3}{4}$–2 lin. in their greater diam., transversely elliptic-oblong, with the outer margin rounded and minutely crenulate and the inner inflexed, forming a very short lip. Ovary erect, glabrous, with a small cupular minutely denticulate calyx at its base, its pedicel finally about as long as the involucre; styles united into a short column at the base, then recurved spreading, 1 lin. long, flattened, minutely bifid at the apex, capsule 5 lin. in diam. Seeds about 2 lin. long, and nearly as much in diam., subglobose, faintly 3-angled, slightly reticulated, without a caruncle, brown.

Upper Guinea. North Togo: Gambaga, *Norman!*

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, ser. iii. 150! and 2006!

60. **E. transvaalensis**, *Schlechter in Journ. Bot.* 1896, 394. A shrub 3–5 ft. high, usually with forked branches. Young branches $2\frac{1}{2}$–$4\frac{1}{2}$ in. long and 2–$2\frac{1}{2}$ lin. thick, herbaceous, becoming woody with age, terete, hollow, glabrous, bearing a pedunculate umbel at the apex, which at first appears to be a mere continuation of the branch. Leaves 2–3 and alternate on the lower part of each branch, with a whorl-like cluster at their tips, and a whorl of 3–4 at the base of the umbel; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. long, glabrous or ciliate with a few long hairs; blade $1\frac{1}{4}$–$4\frac{1}{4}$ in. long, $\frac{2}{3}$–2 in. broad, oblong-lanceolate, elliptic or elliptic-ovate, obtuse, rounded or subacute at the apex, minutely apiculate, cuneately narrowed into the petiole, glabrous on both sides or thinly pubescent beneath. Stipules none. Umbel solitary, terminal, with a peduncle 2–8 in. long, and 3–4 simple or once or twice-forked rays $\frac{3}{4}$–4 in. long, glabrous, deciduous. Bracts $\frac{1}{4}$–$1\frac{1}{4}$ in. long, ovate, rhomboid-ovate, subreniform or orbicular, obtuse, acute or slightly notched at the apex, apiculate, abruptly rounded or cuneately contracted into a short petiole, glabrous on both sides or thinly pubescent beneath. Involucre 2–$2\frac{3}{4}$ lin. in diam., cup-shaped, glabrous outside, with 5 pubescent stripes (opposite the glands) inside, with 4–5 glands and 5 transversely oblong or subquadrate ciliate lobes; glands $\frac{2}{3}$–$1\frac{1}{4}$ lin. in their greater diam., transversely oblong, obtusely or acutely 2–3-lobed or toothed or subentire, pitted-rugulose on the surface. Capsule about $\frac{1}{3}$ in. in diam., exserted on an erect pedicel $2\frac{1}{2}$–5 lin. long, glabrous; no evident calyx; styles $\frac{3}{4}$–1 lin. long, united at the basal half, then ascending-spreading, entire or obscurely bifid. Seeds $2\frac{1}{2}$ lin. long, ellipsoid or ellipsoid-oblong, stoutly apiculate at one end, with scattered flat-topped tubercles or irregular raised markings, brown or the tubercles different from the ground colour.—*E. ciliolata*, Pax in Bull. Herb. Boiss. vi. 743; Pax in Baum, Kunene-Samb. Exped. 284. *E. Gœtzii*, Pax in Engl. Jahrb. xxviii. 420.

Nile Land. British East Africa: Taita Hills, 2000 ft., *Grenfell!*

Lower Guinea. Angola: Chella Mountains and Gambos, 2900–3000 ft., *Antunes*, 781 ex *Pax*, between Gambos Fort and Mission Station, *Pearson*, 2137! by the Kubango River near Chirumbu, 3900 ft., *Baum*, 274! Benguella; at Anha, *Gossweiler*, 3630! German South-west Africa: Strejdsfontein, *Dinter*, 672!

Mozamb. Distr. German East Africa: Uhehe; near the River Ruaha,

Goetze, 450 ! near Marumba, *Busse*, 1075! Portuguese East Africa: Lower Zambesi, at Lupata, *Kirk !*

Also in South Africa.

The branches of this plant seem always to originate from buds in the axils of the cluster of leaves at the base of the peduncle, never from those of the alternate leaves on the lower part. After fruiting the leaves and umbels fall, and the next season's growth is developed from the apex of the previous year's branches.

61. **E. Engleri,** *Pax in Engl. Pfl. Ost-Afr. C.* 242. A tree (*Johnston*). Stems or branches of the specimens seen herbaceous or sub-woody, 1½–2 lin. thick, terete, glabrous. Leaves alternate, thin, 2½–6 in. long, ¾–2 in. broad, lanceolate, acute or acuminate and apiculate at the apex, tapering from above or below the middle into a petiole ¼–½ in. long, glabrous on both sides. Stipules none. Umbel terminal or with the branch ultimately developing beyond it, composed of 3–6 rays 2–5 in. long, once or twice forked, glabrous. Bracts 2½–6 in. long, 1¾–5 lin. broad, elliptic or elliptic-ovate to suborbicular, obtuse or rounded at the apex and base, apiculate, glabrous on both sides. Involucres on very short peduncles, solitary in the forks or at the ends of the ray-branches of the umbel, about 2½ lin. in diam., cup-shaped, glabrous, with 4 glands and 5 subquadrate-ovate lobes, minutely 2-toothed at the apex and ciliate; glands ¾–1 lin. in their greater diam., transversely oblong, half-circular, or subrectangular, with 2 teeth or short horns, sometimes reduced to minute points at the outer angles. Capsule 3–3½ lin. in diam., glabrous, exserted on a long recurved pedicel; styles about ¾ lin. long, very shortly united at the base, rather deeply bifid at the apex, suberect. Seeds 1¾ lin. long, subglobose-ellipsoid, tuberculate. —Pax in Engl. Jahrb. xxiii. 535. *E. pseudo-engleri*, Pax in Engl. Jahrb. xliii. 87.

Nile Land. Uganda: Eldama Ravine and three days' march from it, 7000–7500 ft., *Whyte !* Nandi Plateau, in Forest, *Johnston !* British East Africa: near the Tana River, *Battiscombe*, 222 ! Escarpment, *Thomas*, 78 !

Mozamb. Distr. German East Africa: Kilimanjaro, *Johnston*, 158 ! *Volkens*, 847 ! *Uhlig*, 532 ! *Meyer*, 105 ! Usambara, *Braun*, 2860 ! Ngaruka, *Uhlig*, 334 ! 423 !

On the respective labels, Sir Harry Johnston states that this is a tree and Volkens that it is a laxly branched shrub 10 ft. high. I find no difference whatever between *E. Engleri* and *E. pseudo-engleri*, both leaves and glands vary considerably when a sufficient number of specimens is examined.

62. **E. ugandensis,** *Pax in Engl. Jahrb.* xlv. 240. Probably perennial, up to 2 ft. high (*Scheffler*), only a few branches seen, 4–7 in. long, varying from pilose to glabrous, naked at the lower 1¼–1½ in., with prominent leaf-scars, leafy above, dark brown, or perhaps purplish when alive. Leaves alternate, with a whorl of 5 at the base of the umbel; those on the stem recurved-spreading 1½–3¼ in. long, ½–1 in. broad, lanceolate to elliptic-lanceolate, acute, tapering to a subpetiolate base, glabrous on both sides or thinly pilose beneath, especially on the margins and underside of the petiole; those of the whorl ½–1½ in. long and 5–8 lin. broad, elliptic or subcordate-ovate, acute, subsessile. Umbel

subterminal, on a peduncle $1\frac{1}{2}$–3 in. long, 5-rayed; rays $\frac{2}{3}$–$\frac{3}{4}$ in. long. Bracts sessile $\frac{1}{3}$ in. long, $\frac{1}{2}$ in. broad, transverse, obtuse, apiculate, with overlapping margins, forming a broad funnel-shaped cup. Involucres subsessile, about 2 lin. in diam., cup-shaped, glabrous, with 5 glands and 5 subquadrate ciliate lobes; glands about 1 lin. in their greater diam., transverse, reniform, 2-lipped, entire. Ovary exserted, globose, smooth or slightly tuberculate, glabrous; styles $\frac{3}{4}$ lin. long, shortly united at the base, deeply bifid with widely diverging segments at the apex.

Nile Land. British East Africa: Ukamba; Lamuru, *Scheffler*, 268!

63. **E. ampla,** *Hook. f. in Journ. Linn. Soc.* vi. 20. "Herbaceous plant 4 ft. high" (*Mann*). Stems probably arising from a perennial root, but "annual 2–3 ft. high" (*Kalbreyer*), 1–4 lin. thick, woody, simple or branching at the top, glabrous, brown, leafy above, naked below. Leaves alternate, with a whorl of 4–10 at the base of the umbel, spreading, $1\frac{1}{2}$–4 in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. or more broad, lanceolate, acute, tapering from about the middle into a short petiole or acutely subsessile base, glabrous on both sides, perhaps glaucous beneath. Stipules none. Umbel 4–10-rayed and often with similar rays or with branches bearing umbels arising from the axils of the leaves below the umbel; rays 2–12 in. long, 2–4 times forked, glabrous. Bracts sessile, opposite, $\frac{1}{3}$–$1\frac{3}{4}$ in. long, $\frac{1}{4}$–1 in. broad, ovate or triangular-ovate, acute, rounded, subtruncate or almost subcordate at the base, glabrous. Involucre solitary at the forks of the rays and terminal, about 1 lin. in diam., obconic-cup-shaped, with 4 glands and 5 subquadrate or rectangular shortly bifid or denticulate lobes with or without cilia, glabrous; glands $\frac{2}{5}$–$\frac{1}{2}$ lin. in their greater and $\frac{1}{4}$ lin. in their lesser diam., transversely oblong or somewhat crescent-shaped, or 2-lobed with 2 horns $\frac{1}{8}$–$\frac{1}{2}$ lin. long. Capsule $1\frac{3}{4}$–2 lin. in diam., smooth, glabrous; styles shortly united at the base, about $\frac{3}{4}$ lin. long, bifid, with recurving arms. Seeds 1 lin. long, oblong-ellipsoid, with a small caruncle, smooth, probably dark brown or grey when ripe.—Boiss. in DC. Prodr. xv. ii. 1268; Engl. Hochgebirgsfl. Trop. Afr. 288. *E. ampla*, var. *tenuior*, Hook. f. in Journ. Linn. Soc. vii. 215; Engl. l.c. 288. *E. Preussii*, Pax in Engl. Jahrb. xix. 123. *E. Lehmbachii*, Pax in Engl. Jahrb. xxviii. 27.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–8000 ft., *Mann*, 1265! 2006! *Kalbreyer*, 117! *Mildbraed*, 3428! Buea, *Lehmbach*, 14! between Buea and Mann's Fountain, 8400 ft., *Preuss*, 636! Manenguba Mountain, *Thornbecke*, 10! 29! Bansso Mountain, *Ledermann*, 2017! Fernando Po: Clarence Peak, 8500 ft., *Mann*, 614!

Very difficult to distinguish from the large forms of *E. schimperiana*, Scheele, except by the larger glands, in which the lesser diameter is proportionately much broader than in those of *E. schimperiana*. Small examples from Cameroon Mountain constitute the var. *tenuior*, Hk. f.

64. **E. longepetiolata,** *Pax & K. Hoffm. in Engl. Jahrb.* xlv. 241. Annual, 2–$2\frac{3}{4}$ ft. high, erect, leafy and puberulous or subtomentose on the upper parts, naked and glabrous below. Leaves $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. broad, thinly membranous, lanceolate, acute,

tapering from above the middle into a slender petiole 4–5 lin. long, entire. Umbel in the type 5-rayed; rays about $1\frac{1}{3}$ in. long before forking, 2–3 times forked, puberulous or subtomentose, especially under the nodes. Bracts sessile, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $2\frac{1}{2}$–$5\frac{1}{2}$ lin. broad, oblong-lanceolate, acute, rounded at the base. Involucre $1\frac{1}{2}$ lin. in diam., campanulate, glabrous, with 4 glands and 5 lobes; glands about $\frac{2}{3}$ lin. in their greater diam., transversely oblong, with 2 horns $\frac{1}{3}$–$\frac{2}{5}$ lin. long. Ovary glabrous, exserted on a recurved pedicel; styles $\frac{3}{4}$ lin. long, bifid to $\frac{1}{3}$ of their length, with recurved tips.

Upper Guinea. Cameroons: in open forest on the slopes of Muti Mountain, Mfongu, 5500–6200 ft., *Ledermann*, 5899!

With the exception that the rays of the umbel are puberulous or subtomentose this does not seem to differ from *E. ampla*, Hk. f., and will probably prove to be a variety of that species.

65. **E. schimperiana,** *Scheele in Linnæa*, xvii. 344. Annual (or biennial?), $\frac{1}{2}$–$4\frac{1}{2}$ ft. high. Stem simple below or occasionally branching at the base, often rather copiously branching above, it and the branches sometimes ending in a 3 to many times forked cyme, sometimes terminating in a 3–5-rayed umbel, with cyme-branches in the axils of the leaves below the umbel, glabrous or rather thinly puberulous on the cyme-branches. Leaves alternate or with a whorl of 3–5 under the umbel, $\frac{3}{4}$–$3\frac{1}{2}$ in. long, 1–7 lin. broad, linear-lanceolate or lanceolate, acute, narrowed to a short petiole-like base, entire, glabrous on both sides. Stipules none. Cyme-branches $2\frac{1}{2}$–8 in. long, 3 to many times forked. Bracts opposite, sessile, $\frac{1}{4}$–1 in. long, $\frac{1}{6}$–1 in. broad, triangular-ovate, acute or acuminate, very broadly cuneate, subtruncate or cordate at the base. Involucre solitary, very shortly pedicellate or sessile, $\frac{2}{3}$–1 lin. in diam., cup-shaped or somewhat obconic, glabrous outside, with 4 glands and 5 erect oblong lobes notched at the apex and more or less ciliate; glands $\frac{1}{4}$–$\frac{1}{2}$ lin. in their greater diam., $\frac{1}{8}$–$\frac{1}{5}$ lin. in their lesser diam., somewhat crescent-shaped, but usually with the outer margin straight or nearly so, 2-horned, with the horns $\frac{1}{6}$–$\frac{1}{2}$ lin. long. Filaments of the stamens hairy or glabrous, sometimes both forms occur in the same involucre. Capsule $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., exserted on a slender pedicel, usually glabrous, occasionally slightly puberulous; styles free, suberect or spreading, $\frac{1}{2}$-$\frac{3}{4}$ lin. long, bifid. Seeds about 1 lin. long, ellipsoid or oblong-ellipsoid, smooth, with a small caruncle, at first pale ochreous, then with a dark brown spot at each end, finally dark grey or blackish.—Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 242; Boiss. in DC. Prodr. xv. ii. 155; Engl. Hochgebirgsfl. Trop. Afr. 286. *E. esula*, Forsk. Fl. Ægypt.-Arab. 94, not of Linn. *E. dilatata*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 240; Boiss. in DC. Prodr. xv. ii. 155; Engl. Hochgebirgsfl. Trop. Afr. 288. *E. monticola*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 242; Boiss. in DC. Prodr. xv. ii. 155; Engl. Hochgebirgsfl. Trop. Afr. 287; Pax in Ann. Istit. Bot. Roma, vi. 188; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 330. *E. kilimandscharica*, Pax in Engl. Hochgebirgsfl. Trop. Afr. 287. *E. hochstetteriana*, Pax in Engl. Jahrb. xix. 123, and in Ann. Istit. Bot. Roma, vi. 188.

Tithymalus schimperianus, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 96; Schweinf. Beitr. Fl. Aethiop. 40; Penzig in Atti Congr. Bot. Genova, 1892, 360. *T. dilatatus*, Klotzsch & Garcke, l.c. 89. *T. hochstetterianus*, Klotzsch & Garcke, l.c. 97.

Nile Land. Sudan: Sennar, *Broun*, 798! Eritrea: various localities, *Schweinfurth & Riva*, 164, 211, 342, 343, 977, 1172, 1441, 1572! 1899! 2035, 2061! *Steudner*, 550! Abyssinia: near Adowa, *Schimper*, 274! Addi Dschoa, *Schimper*, 511! near Enschedcap (Intjatkab), *Schimper*, 543; Amba Sea, *Schimper*, 582! near Jelajeranne, *Schimper*, 1706! between Harrar and Addi Abbaba, *Wellby!* Shashago District, *Wellby!* Ankober, *Roth*, 51! and without precise locality, *Plowden! Petit*, 96! *Schimper*, 971! Gallaland, *Ellenbeck*, 417! 1378! 1712! Somaliland, *Donaldson-Smith*, 225! between Oi and Jaribule, *Riva*, 1195! Uganda: Entebbe, *Bagshawe*, 740! British East Africa: Mau, *Scott-Elliot*, 6827! Kikuyu, Eldama Ravine and other localities, *Whyte!* Alngaria, *Gregory!*

Mozamb. Distr. German East Africa: Kilimanjaro, 10,000 ft., *Johnston! Meyer*, 124! *Volkens*, 1539! *Engler*, 1834! *Uhlig*, 621! 1115! Usambara, *Braun*, 2856A! 2856B! Ngaruka, *Uhlig*, 345; Lake Mohasi, *Mildbraed*, 648! British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte!* Ntondwe, *Cameron*, 142! Zomba and vicinity, *Whyte!* Blantyre, *Buchanan*, 162! 209! and without precise locality, *Buchanan*, 31! 116! 978! Rhodesia; near Chirinda, *Swynnerton*, 1531!

Also in Arabia.

Var. *Buchanani*, N. E. Br. Branches and leaves glabrous. Ovary and capsule pilose or villous-tomentose with rather long spreading white hairs; otherwise as in the type.—*E. Buchanani*, Pax in Engl. Jahrb. xxviii. 27.

Mozamb. Distr. British Central Africa: Nyasaland; between Shibisa and Tshinmuzo, *Kirk!* Blantyre, *Buchanan!* Portuguese East Africa: Gazaland; Inyamadzi Valley, *Swynnerton*, 1532! Chirinda Forest, *Swynnerton*, 238!

Var. *velutina*, N. E. Br. Branches, leaves, ovary and capsule more or less pilose-pubescent to subtomentose. Glands (even on the same involucre) with or without horns. Otherwise as in the type.—*E. velutina*, Pax in Engl. Pfl. Ost-Afr. C. 242, and Engl. Jahrb. xxiii. 535, not of Greene.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, *Volkens*, 587! Meru Mountain, *Merker*, 590! Kibosho, *Volkens*, 1665! Moshi, *Merker*, 603!

As in the case of most annuals there is a very great diversity of appearance among the specimens above quoted and several species have been founded upon this variation. In the large series of specimens examined, I find every gradation from small 6 in.-high Arabian and Abyssinian examples to others of 4 ft. high which occur in Abyssinia, Nyasaland and elsewhere; but allowing for size and luxuriance, I can find no structural difference whatever to separate them. The involucre-glands vary very much in the length of their horns sometimes on the same plant or even on the same involucre, and I am very doubtful if *E. longecornuta* is anything more than a mere form of *E. schimperiana* with unusually long horns, as there seems to be no other distinction. Boissier has distinguished *E. monticola* and *E. dilatata* from *E. schimperiana* by the filaments of their stamens being glabrous instead of pubescent, as well as by trifling vegetative characters that are inconstant, but in several cases I have found glabrous and pubescent filaments in the same involucre. All the specimens seen have small dormant buds in the axils of the fallen leaves on the main stem, and in some cases these seem to grow out, so that a second time of flowering on the same stem takes place, therefore the plant is probably sometimes biennial.

66. **E. longecornuta,** *Pax in Engl. Hochgebirgsfl. Trop. Afr.* 286. Annual, 2–6 ft. high, with 1–2 stems from the same root, sometimes (from injury) forked or subumbellately branched a few inches above the base, glabrous, leafless on the lower part, with raised leaf-scars. Leaves alternate, with a whorl of 5–7 at the base of the umbel, $1\frac{3}{4}$–4 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, lanceolate, acute or subacuminate, tapering to a shortly petiolate or subsessile base, glabrous on both sides. Stipules none. Inflorescence paniculate, consisting of a terminal umbel of 5–7 cyme-rays 4–8 in. long and 2–4 times forked, with several similar cymes arising from the axils of the upper leaves. Bracts sessile, $\frac{2}{3}$–$1\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, ovate, oblong-ovate or ovate-lanceolate, acute, subtruncately rounded at the base. Involucre shortly pedunculate, excluding the glands, about 1 lin. in diam., somewhat pear-shaped, glabrous outside and within, with 4 glands and 5 oblong-ovate or subquadrate slightly notched and minutely ciliate lobes; glands $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., crescent-shaped, with 2 linear horns $\frac{3}{4}$ lin. or perhaps more long, often toothed at the apex. Capsule exserted, about 2 lin. in diam., glabrous; styles about $\frac{3}{4}$ lin. long, free nearly to the base, bifid at the apex. Seeds about 1 lin. long, ellipsoid, smooth, with a small caruncle.—*E. longicornuta*, Pax in Ann. Istit. Bot. Roma, vi. 188. *E. Stuhlmanni*, Pax in Engl. Jahrb. xxiii. 535, not of Schweinfurth.

Nile Land. Abyssinia: Mountain sides by the River Reb, near Gerra, Abuna Tekla Haimanot, *Schimper!* Somaliland: between Oi and Jaribule, *Riva*, 1319, ex *Pax*. Uganda: Ruwenzori, 6000 ft., *Scott-Elliot*, 7804! British East Africa: Mau, *Scott-Elliot*, 6868! Ukamba; Lamuru, *Scheffler*, 291!

South Central. Belgian Congo: Kirunga Volcano, *Goetzen*, 52!

Mozamb. Distr. German East Africa: Uluguru; Lukwangula, *Stuhlmann*, 9221 (not 221 as quoted by *Pax*)! various localities, *Keil*, 125! *Kandt*, 76! *Mildbraed*, 1328! 1444! British Central Africa: Nyasaland; Nyika Plateau, 7500 ft., *McClounie*, 51! *Eik*, 251! *Albers*, 282!

Var. *pubescens*, N. E. Br. Upper part of the stem and branches of the umbel puberulous with minute curved hairs; otherwise as in the type.

Nile Land. Uganda: Kivata, *Scott-Elliot*, 7573!

This is very closely allied to *E. schimperiana*, Scheele, and structurally is only distinguishable by the larger horns of the involucral glands; possibly it may be only a form of that species and like it varies very much in stature and appearance, some of the specimens from the moister regions near the Equator being much larger than those from Abyssinia, whilst others are identical with them. Pax has described it as perennial, but his type specimens and all others that I have seen with roots are annual.

67. **E. petitiana,** *A. Rich. Tent. Fl. Abyss.* ii. 241. Perennial, or perhaps biennial? Stems usually 2 or more to a root, erect, 6–10 in. high, often clothed with a number of short erect or ascending very leafy branches, glabrous. Leaves alternate, rather crowded, at first ascending, finally reflexed, sessile, $\frac{1}{3}$–$1\frac{1}{4}$ in. long, $1\frac{1}{4}$–3 lin. broad, oblanceolate or somewhat spathulate-lanceolate, acute or obtuse, apiculate, tapering from above the middle to the base, very minutely denticulate at the apical part, glabrous on both sides. Stipules none. Umbel terminal, $2\frac{1}{4}$–3 in. in diam., of 5 once or twice forked rays $1\frac{3}{4}$–$2\frac{1}{2}$ in. long or occasionally

broken up into a corymbose cyme of forked branches, glabrous. Bracts 3–5 lin. long and broad, orbicular-ovate, obtuse or rounded, apiculate, broadly rounded at the sessile base, entire or subdenticulate, with very narrow cartilaginous margins, those at the base of the umbel 6–8 lin. long, 2–3 lin. broad, oblong, oblong-lanceolate or ovate-lanceolate, minutely denticulate, deflexed, all glabrous on both sides. Involucre sessile, when mature $1\frac{1}{3}$–$1\frac{3}{4}$ lin. in diam., cup-shaped, glabrous, with 4 glands and 5 subquadrate toothed or subentire more or less ciliate lobes; glands $\frac{1}{2}$–1 lin. in their greater diam., transversely oblong, with a straight dorsal margin and a minute tooth (scarcely a horn) at each end of it. Capsule about $1\frac{1}{2}$ lin. long, somewhat ovoid, obtusely 3-angled, glabrous, exserted on a recurved pedicel; styles $\frac{2}{3}$–$\frac{3}{4}$ lin. long, nearly free or shortly united at the base, bifid at the apex. Seeds about 1 lin. long, oblong, 4-angled, subtruncate at each end, obscurely rugulose, caruncu-late.—*E. cebrina*, Hochst. ex Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 86, name only. *E. cerebrina*, Hochst. ex Boiss. in DC. Prodr. xv. ii. 146. *Tithymalus petitiana*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 96. *T. cebrinus*, Klotzsch & Garcke, l.c. 86, name only; Schweinf. Beitr. Fl. Aethiop. 39.

Nile Land. Abyssinia: Wojerat, *Petit!* Debra Eski, *Schimper*, 937, ex *Boissier*.

This is closely allied to *E. schimperiana*, Scheele, but is possibly perennial, with several stems to a root and more densely leafy; the minutely toothed and smaller leaves and larger involucres also sufficiently distinguish it. The ovary does not appear to become exserted from the involucre at so early a stage as it does in *E. schimperiana*. The description is made from the type kindly lent by Prof. Lecomte.

68. **E. repetita,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 240. Annual? Stem 2–4 ft. high, hollow, glabrous, divided at the apex into a 5-rayed umbel of repeatedly forked lax cymes, with few or several similar cyme-branches arising from the axils of the leaves below the umbel. Leaves alternate, with a whorl of 5 at the base of the umbel, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, 2–4 lin. broad, lanceolate-linear, subacute, narrowed at the base into a short petiole, glabrous on both sides. Rays of the umbel and cyme-branches 4–10 in. long. Bracts subsessile, very spreading, $\frac{1}{4}$–1 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, ovate or lanceolate, acute to obtuse, rounded at the base, glabrous on both sides. Involucre solitary at the forks or nodes of the cymes, shortly pedunculate, 1 lin. in diam., campanulate, with 4 glands and 5 subquadrate lobes, bifid or subtruncate at the apex, ciliate; glands about $\frac{1}{2}$ lin. in their greater diam., transverse, crescent-shaped, with the 2 short horns usually much incurved, some-times nearly or quite meeting, occasionally they are nearly or quite absent and the gland is merely notched or almost entire on the outer margin, all forms are found on the same plant. Capsule about $1\frac{3}{4}$ lin. in diam., smooth, glabrous; styles $\frac{1}{3}$–$\frac{1}{2}$ lin. long, free, shortly bifid at the apex. Seeds not seen.—Boiss. in DC. Prodr. xv. ii. 156; Engl. Hoch-gebirgsfl. Trop. Afr. 288. *E. Brevicornu*, Pax in Engl. Jahrb. xliii. 88. *Tithymalus repetitus*, Klotzsch & Garcke in Abh. Akad. Berlin, 1860, 96.

Nile Land. Abyssinia: by streams in the valleys of Wogara district, *Schimper*, 1281! by streams in Shoa and Wojerat, *Petit*, and without precise locality, *Quartin-Dillon & Petit*, 86! Gallaland; Abo Wadela, *Steudner*, 553, ex *Engler*. British East Africa: 2nd day's march from Eldama Ravine, *Whyte!* Aberdare Mountains, *James!* Mau Escarpment, *Baker*, 82 (104)!

69. **E. arguta,** *Soland. in Russell, Nat. Hist. Aleppo, ed.* 2, ii. 253. Annual, 3–15 in. high; stem simple or branching at the base, divided at the top into an umbel of 3–5 rays, with or without 1 or more rays in the axils of the upper stem-leaves, thinly pilose with long fine hairs, sometimes almost glabrous. Leaves alternate, sessile, lanceolate, oblong-lanceolate, obovate or cuneately oblanceolate, acute or obtuse, sharply serrate, thinly pilose on one or both sides (at least along the midrib) to nearly glabrous. Stipules none. Rays of the umbel $2\frac{1}{2}$–5 in. long, cymosely 2–4 times divided. Bracts opposite or 3 in a whorl, sessile, ovate, usually acute, broadly rounded to subcordate at the base, serrate, glabrous on both sides or slightly pilose at the very base. Involucre solitary, sessile or subsessile, about $1\frac{1}{4}$ lin. in diam., cup-shaped, with 4 glands and 5 transversely rectangular or subquadrate fringed lobes, glabrous; glands $\frac{1}{3}$–$\frac{1}{2}$ lin. in their greater diam., transversely oblong, entire. Capsule erect, 2 lin. in diam., glabrous; styles variable, $\frac{1}{3}$–$\frac{3}{4}$ lin. long, free to the base, bifid at the apex. Seeds about $1\frac{1}{4}$ lin. long, ellipsoid, nearly smooth, but with a very faint indication of reticulation, dark brown, with a shortly stalked peltate circular caruncle.—Sibth. Fl. Græca, v. t. 468; Boiss. in DC. Prodr. xv. ii. 117. *E. calendulæfolia*, Delile, Fl. Égypte, 89, t. 30, fig. 1. *Tithymalus calendulæfolius*, Klotzsch & Garcke in Abh. Akad. Berl. 1860, 74.

Nile Land. Nubia: Wady Halfa, *Scott-Elliot*, 3419!

Also in Egypt, Asia Minor and South-east Europe.

70. **E. depauperata,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 241. Rootstock perennial, woody. Stems 2 to several, herbaceous, or, if not burnt by the annual fires, enduring for 2 or more years and becoming woody and naked below, simple or branched, 4 to 36 in. high, glabrous. Leaves alternate, with a whorl of 4–5 at the base of the umbel, $\frac{1}{2}$–3 in. long, 2–7 lin, broad, varying from linear-lanceolate or lanceolate to elliptic or suborbicular, acute or obtuse, narrowed or rounded into a short petiole or subsessile, those of the whorl sessile and usually shorter and broader than the stem-leaves, glabrous on both sides. Stipules none. Umbel $\frac{3}{4}$–$2\frac{1}{2}$ in. in diam., with 4–5 simple or once divided rays $\frac{1}{2}$–$2\frac{1}{2}$ in. long, often with 1 or more similar rays arising from the axils of the leaves below the umbel. Bracts 3–4 lin. long, 4–6 lin. broad, somewhat reniform-ovate, very broadly ovate or transversely elliptic ovate, obtuse or apiculate. Involucre solitary or more rarely 2–3 on each ray, 2–$2\frac{1}{2}$ lin. in diam., cup-shaped, glabrous outside, woolly-pubescent within, with 4–5 glands and 5 subquadrate entire or slightly notched ciliate lobes; glands $\frac{3}{4}$–$1\frac{1}{4}$ in. in their greater diam., transversely oblong or elliptic, entire, peltate, with the inner margin incurved or slightly 2-lipped in dried specimens. Capsule far exserted, erect, $2\frac{1}{4}$–3

lin. in diam., verrucose-tuberculate, glabrous; styles 1–1¼ lin, long, united below, bifid at the apex. Seeds 1–1½ lin. long, ellipsoid, with a small caruncle, smooth, glabrous, light brown or grey.—Boiss. in DC. Prodr. xv. ii. 119, 1266; Engl. Hochgebirgsfl. Trop. Afr. 286; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 330; Pax in Engl. Jahrb. xxxix. 631. *E. shirensis*, Baker f. in Trans. Linn. Soc. ser. 2, iv. 38. *E. lepidocarpa*, Pax in Engl. Jahrb. xxxiii. 287. *E. trachycarpa*, Pax in Engl. Jahrb. xxxiii. 288. *E. multiradiata*, Pax & Hoffm. in Engl. Jahrb. xlv. 240.

Upper Guinea. Northern Cameroons: Bansso Mountain, 6000 ft., *Ledermann*, 2006!

Nile Land. Eritrea: Mount Bizen, *Schweinfurth & Riva*, 1895! 2050! Ambelaco, *Schweinfurth*, 341, and Sabr Mountain, *Schweinfurth*, 1538 (ex *Schweinfurth*). Abyssinia: Amba Sea, *Schimper*, 290! Mount Sholoda, *Schimper*, 336! 1532! Nori, *Steudner*, 544. Wojerat, *Quartin-Dillon & Petit*, 84! Ankober, *Roth*, 103! Metscha, *Rosen* ex *Pax*. Somaliland, *Ellenbeck*, 590! 1413! 1827! British East Africa: Nandi, *James!* Mount Kenia, *Gregory!* Aberdare Mountains, *James!* Ukamba, *Scott-Elliot*, 6406!

Mozamb. Distr. German East Africa: Urundi, *Scott-Elliot*, 8111! Usambara, *Buchwald*, 176! 608! *Engler*, 1087! various localities, *Jaeger*, 201! 225! 469! *Prittwitz & Graffon*, 174! Portuguese South Africa: Namuli Hills, *Last!* British Central Africa: Nyasaland; Nyika Mountains, 4000–6000 ft., *Whyte!* Nyika Plateau, 6000–7000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* *Cameron*, 10! Mount Zomba, *Whyte!* Mount Mlanji, *Whyte!* Rhodesia: at Mount Pene or Singwenwe, 7000 ft., *Swynnerton*, 6041! near Haroni River, 5500 ft., *Swynnerton*, 1528!

Var. *pubescens*, Pax in Ann. Istit. Bot. Roma, vi. 188. Stems pubescent. Involucre glabrous, otherwise as in the type.

Nile Land. Somaliland: between Biddome and Olghe, *Riva*, 1234! 1360.

Var. *pubiflora*, N. E. Br. Apparently a more robust form. Stems probably 18 in. or more high, usually branching at the top, glabrous. Involucres villous-pubescent outside. Ovary and capsule glabrous or pubescent. Otherwise as in the type.

Mozamb. Distr. British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte!* between Mpata and the Nyika Plateau, 2000–3000 ft., *Whyte!*

Var. *aprica*, Pax in Engl. Jahrb. xxxix. 631. Branches unequal, the sterile procumbent and densely leafy, those producing flowers erect with few leaves; internodes more or less elongated.

Nile Land. Abyssinia: East Shoa, at Akaki, *Rosen* ex *Pax*.

This species varies considerably in appearance, so that different specimens appear to represent totally different species. A form common in Nyasaland and German East Africa with fewer, smaller and more elliptic leaves than in the type, has been distinguished under the names of *E. shirensis*, *E. trachycarpa*, *E. lepidocarpa*, and *E. multiradiata*. This form appears to me always to consist of secondary growths after the annual burnings of the savannahs, in some cases the specimens even bear branches on which the leaves are lanceolate and more numerous, exactly as in the type, whilst other specimens from Nyasaland are quite the same as the Abyssinian plant, and structurally all are identical. Other species vary in the same way. The root is said to be used as a remedy for tape-worm.

71. **E. usambarica,** *Pax in Engl. Jahrb.* xix. 122. A large branching herb (or shrub?) up to 4½ ft. high. Stems or main branches somewhat umbellately branching or forked from points where umbels

were previously borne, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, glabrous, leafy above, naked below. Leaves alternate, whorled under the umbels, 1–3$\frac{1}{2}$ in. long, $\frac{1}{3}$–1 in. broad, lanceolate to obovate-lanceolate, acute to obtuse, mucronate, tapering to the petiole-like base, glabrous on both sides. Stipules none. Umbels terminal, with 5 or fewer slender rays $\frac{1}{3}$–1 in. long, each bearing a pair of bracts and 1 involucre. Bracts 2–3$\frac{1}{2}$ lin. long and as much in breadth, broadly elliptic or suborbicular, obtuse, mucronate, glabrous. Involucres of the rays subsessile or very shortly pedunculate, hermaphrodite, with the central one of the umbel male and on a peduncle 1$\frac{1}{2}$ lin. long, somewhat funnel- or broadly cup-shaped, 1$\frac{3}{4}$–2 lin. in diam., glabrous, the male with 5 and the hermaphrodite with 4 glands and 5 usually 2-toothed lobes; glands not contiguous, peltate, $\frac{3}{4}$–1 lin. in their greater diam., broadly elliptic or suborbicular, entire. Ovary glabrous, at first subincluded, finally exserted on a recurved pedicel 1$\frac{1}{2}$–3 lin. long; styles 1 lin. long, united at the base, then spreading-ascending, bifid at the apex. Capsule about 3$\frac{1}{2}$ lin. in diam. Seeds 1$\frac{1}{3}$–1$\frac{1}{2}$ lin. long, ellipsoid or subglobose, irregularly tuberculate and wrinkled.—Pax in Engl. Pfl. Ost-Afr. C. 242. *E. usambarica*, sub-sp. *elliptica*, Pax in Engl. Jahrb. xxxiv. 374. *E. membranacea*, Pax, l.c. 242, and in Engl. Jahrb. xxiii. 534.

Mozamb. Distr. German East Africa: Usambara; various localities, *Holst*, 660! 3318! *Braun*, 2897! *Engler*, 1072! 1161! 1439!

72. **E. tuberifera,** *N. E. Br.* Perennial herb 1$\frac{1}{2}$ ft. or more high, with fibrous roots, some of which end in elongated fleshy tubers. Stem terete, sparingly branched, herbaceous, with internodes 1$\frac{1}{2}$–3 in. long, "striate with greenish-white parallel lines" (*Gossweiler*), glabrous or more or less pubescent above. Leaves alternate, spreading, apparently soon falling from the lower part of the branches; petiole $\frac{1}{8}$–$\frac{3}{4}$ in. long, slender; blade 1$\frac{1}{2}$–2$\frac{3}{4}$ in. long, $\frac{7}{8}$–1$\frac{1}{2}$ in. broad, somewhat rhomboid-elliptic, obtusely pointed, cuneate at the base, glabrous or with a few minute hairs near the margins on both sides. Cymes small, in terminal pairs, $\frac{1}{3}$–$\frac{2}{3}$ in. long (including the slender peduncles), about 2-flowered. Bracts about $\frac{2}{3}$ lin. long, ovate-lanceolate, acute, ciliate. Involucres on peduncles 1$\frac{1}{2}$–2 lin. long, campanulate, 1–1$\frac{1}{4}$ lin. in diam., glabrous or slightly puberulous outside, with 2–3 appendaged glands and 5 very small ovate ciliate lobes, 2–3 of the latter alternating with 2–3 minute filiform processes (imperfect glands); glands erect, $\frac{1}{2}$–$\frac{2}{3}$ lin. in their greater diam., 2-lipped, with the lips subequal; appendage twice as broad as long, half surrounding the gland, crescent-shaped, with the concave side applied to the gland, or very broadly ovate, obtuse to subtruncate, apparently green. Ovary exserted and recurved, densely tomentose; styles scarcely $\frac{1}{4}$ lin. long, very stout, free, erect, entire. Capsule not seen entire, probably about 1$\frac{1}{2}$–2 lin. in diam., pubescent. Seeds 1$\frac{1}{2}$ lin. long, ellipsoid, carunculate, covered with numerous small tubercles mingled with minute papillæ of a dull mustard-yellow colour on a dark brown ground.

Lower Guinea. Angola: on hills, under the shade of trees in the district of Cacuaco, *Gossweiler*, 1536!

73. **E. agowensis,** *Hochst. ex Boiss. in DC. Prodr.* xv. ii. 70, *and Ic. Euphorb.* 16, *t.* 44. A woody shrub, with annual herbaceous flowering branches 6–12 in. (or more ?) long, which partly or entirely decay, divided at the top into a cyme or umbel of 3 branches, $\frac{3}{4}$–10 in. long, which are 1–3 times trichotomously or dichotomously divided, sometimes also with lateral simple flowering branches below the umbel, glabrous or slightly puberulous on the upper parts. Leaves alternate, with a whorl of 3 at the base of the umbel and opposite on its branches; petiole 2–$3\frac{1}{2}$ lin. long, rather slender; blade 5–16 lin. long, $3\frac{1}{2}$–10 lin. broad, thin, elliptic, obtuse, apiculate, broadly and acutely cuneate at the base, minutely toothed, glabrous on both sides or slightly puberulous on the midrib beneath. Stipules none or represented by minute glands. Umbel terminal of 3 primary trichotomously or dichotomously divided rays 1–10 in. long, glabrous. Involucres in small cymes of 3 at the ends of the umbel-branches, subsessile between a pair of reduced leaves, campanulate, about 1 lin. in diam., minutely puberulous outside, with 4 glands and 5 short transverse or subquadrate fringed lobes; glands $\frac{2}{5}$–$\frac{1}{2}$ lin. in their greater diam., transversely oblong, entire. Ovary with a small cupular slightly 3-lobed perianth at its base; styles $\frac{1}{2}$–$\frac{2}{3}$ lin. long, shortly united at the base, straight and collected, not spreading, minutely bifid at the apex. Capsule 2 lin. long, $1\frac{2}{3}$ lin. in diam., shortly oblong, thinly and minutely puberulous. Seeds $1\frac{1}{2}$ lin. long, rectangular, dorsally flattened, with about 5 longitudinal grooves on one side and 2 more obscure on the other, irregularly tuberculate-rugulose, white, with a pale yellow transverse caruncle.—Schweinf. in Bull. Herb. Boiss. vii. App. ii. 315. *E. effusa*, Ehrenb. ex Boiss. in DC. Prodr. xv. ii. 71. *Tithymalus agovensis*, Schweinf. Beitr. Fl. Aethiop. 38.

Nile Land. Eritrea: Baresa Valley, *Schweinfurth*, 1174; near Saati, *Schweinfurth*, 406; Damas Valley, *Schweinfurth*, 1179! Shohos and Dalak Island, *Ehrenberg!* Abyssinia: near Goelleb and Gageros, *Schimper*, 56! 2150! and 1414 ex *Boissier*. Sennar: Fasokl, *Cienkowsky* ex *Schweinfurth*.

74. **E. whyteana,** *Baker f. in Trans. Linn. Soc. ser.* 2, iv. 39. "Plant 1–$1\frac{1}{2}$ ft. high" (*Purves*), probably perennial. Stems woody, 1–2 lin. thick at the base, straight, simple or branched, very leafy, becoming naked and somewhat rough with prominent leaf-scars at the base, glabrous, reddish-brown. Leaves alternate, ascending or spreading, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{2}{3}$–3 lin. broad, linear, oblanceolate-linear or oblong-linear, obtuse, minutely apiculate, shortly cuneate at the base, with a very short petiole, entire, with revolute margins, glabrous on both sides. Stipules none. Umbel terminal, $1\frac{1}{2}$–2 in. in diam., of 7–10 rays $\frac{1}{2}$–1 in. long, some of which arise immediately under the primary umbel, each with 2 involucres. Bracts opposite, sessile, 2–5 lin. long, 1–3 lin. broad, ovate to broadly rhomboid-ovate, acute or obtuse, yellowish. Involucres very shortly pedunculate or sessile, $1\frac{1}{4}$–2 lin. in diam., campanulate, glabrous outside, with 4 glands and 5 erect oblong lobes much overtopping the glands and toothed at the apex; glands $\frac{1}{2}$–$\frac{3}{4}$ lin. in their greater diam., transversely elliptic or oblong, peltate, entire, with the margins more or less infolded when dried, yellow. Capsule far exserted,

2–2¼ lin. in diam., glabrous; styles about 1 lin. long, united at the base, with spreading bifid tips. Seeds 1½ lin. long, cylindric-oblong, smooth, black, with a yellow caruncle, slightly shining.

Mozamb. Distr. Portuguese East Africa: Chimanimani Mountains, 7000 ft., *Swynnerton*, 1526! British Central Africa: Nyasaland; Mlanji Plateau, 6000 ft., *Whyte*, 24! Tuchila Plateau, 6000–7000 ft., *Purves*, 99!

75. **E. Wellbyi,** *N. E. Br.* Perennial, with a woody rootstock, producing a clump of erect unbranched stems 5–7 in. high and ½–⅔ lin. thick, very rough below from the prominent scars of fallen leaves, leafy above, puberulous below the base of each leaf. Stem-leaves alternate, ascending and loosely imbricating, sessile, ¼–½ in. long, 1–2½ lin. broad, lanceolate or oblong-lanceolate, acute and as if pinched together into an apiculus at the apex, more or less rounded at the base, glabrous on both sides. Floral leaves or bracts whorled at the base of the inflorescence, opposite under the involucres, 2–5 lin. long, 2½–3½ lin. broad at the base, somewhat triangular-ovate to broadly reniform-ovate, acute, very broadly tuneate to subruncate at the base, otherwise as the stem-leaves. Stipules none. Umbel terminal, about ¾ in. in diam., with 5 short puberulous rays, each with 1–2 short secondary rays. Involucre 1⅓–1½ lin. in diam., somewhat pear-shaped, glabrous outside, with 4 glands and 5 small oblong minutely ciliate lobes; glands about ½ lin. in their greater diam., somewhat crescent-shaped, with 2 long subulate horns. Ovary glabrous; styles ⅓ lin. (or perhaps more finally) long, free almost to the base, very shortly bifid. Capsule and seeds not seen, but the former evidently exserted on a pedicel twice as long as the involucre and erect.

Nile Land. Abyssinia: Hawash and Maki Rivers, *Wellby!*

76. **E. dejecta,** *N. E. Br.* Perennial, with a thick woody rootstock, producing clumps of herbaceous stems 2½–10 in. high, ⅔–1 lin. thick, branching at the top, glabrous. Leaves very numerous, alternate, except at the flowering nodes, sessile, reflexed, ¼–¾ in. long, ½–1 lin. broad, linear, acute or obtuse, mucronate, with revolute margins, glabrous on both sides. Stipules none. Involucres solitary and terminal or 2–6 in a small terminal cyme or umbel, often mingled with very short densely leafy shoots, subsessile or shortly pedunculate, about 2 lin. in diam., cup-shaped, glabrous outside, with 5 glands and 5 subquadrate fringed lobes; glands about ¾ lin. in their greater diam., transversely oblong, entire or slightly notched at the middle of the outer margin and with 2 long subulate horns. Capsule exserted on a long slender pedicel, at first reflexed, finally erect, 2½ lin. in diam., glabrous; styles about ⅓ lin. long, free to the base, bifid at the apex. Seeds ellipsoid, smooth, glabrous.

Mozamb. Distr. British Central Africa: Nyasaland; Tanganyika Plateau at Fort Hill, 3500–4000 ft., *Whyte!* Fwambo, *Carson*, 12, probably belongs here, but flowers are wanting.

As the form of the involucre-glands has hitherto been considered to be a good specific character, I have not united this with *E. cyparissioides*, although I think it

probable that when better known it will be found to be only a variety of that species. In appearance it is quite like the variety *minor*, and only to be distinguished by the involucre-glands.

77. **E. cyparissioides,** *Pax in Engl. Jahrb.* xix. 123. Perennial, with a woody rootstock, producing a cluster of several or many erect herbaceous terete stems 10–12 in. high, $\frac{2}{3}$–1 lin. thick, simple or branching at the top, glabrous. Leaves alternate on the stem and branches, whorled or opposite under the cyme or umbel or at the flowering nodes, reflexed or the upper spreading, $\frac{1}{3}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–2 lin. broad, sessile, linear, acute or obtuse, mucronate, with revolute margins, glabrous on both sides, possibly glaucous. Stipules none. Involucres solitary or congested in small head-like cymes, terminal, very shortly pedunculate, about $1\frac{1}{2}$ lin. in diam., cup-shaped, glabrous outside, with 5 (rarely 7) glands and 5 transversely rectangular or subquadrate fringed lobes; glands $\frac{1}{2}$–$\frac{3}{4}$ lin. in their greater diam., transverse, with the outer margin straight or obtusely many-toothed or crenulate. Capsule exserted much beyond the involucre, erect, $\frac{1}{4}$ in. in diam. at the base, slightly narrowing above, glabrous. Seeds $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, ellipsoid, smooth, with a small rugose caruncle, pale grey, sometimes irregularly spotted with brown.—De Wild. Études Fl. Bas- et Moyen-Congo, ii. 289; Hiern in Cat. Afr. Pl. Welw. i. 951. *E. genistoides*, Hiern in Cat. Afr. Pl. Welw. i. 952, not of Berg. *E. ericifolia*, Pax in Engl. Jahrb. xxxiii. 288. *E. huillensis*, Pax in Engl. Jahrb. xxviii. 27.

Nile Land. Dar Fertit: at Dem Gudyu, *Schweinfurth*, Ser. iii. 149! Niam-niam: at the River Ibba, *Schweinfurth*, 3979!

Lower Guinea. Angola: Pungo Andongo; between Quisonde and Condo, *Welwitsch*, 286! Huilla; near Lopoilo, *Welwitsch*, 285! *Dekindt*, 1029! Malange, *Buchner*, 677!

South Central. Belgian Congo: between Lake Nyasa and the Congo, *Descamps* (ex *De Wildeman*).

Mozamb. Distr. German East Africa: without precise locality, *Gaffron*, 97! Rhodesia: Northern Melsetter, *Swynnerton*, 6217! Rusapi, *Engler*, 3112! Kafulafula River, *Rogers*, 8408!

Var. *minor*, N. E. Br. Stems 4–10 in. high, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick. Leaves 2–5 lin. long, usually rather few and $\frac{1}{4}$–$\frac{1}{2}$ in. apart, spreading or reflexed, linear to oblong or ovate, with revolute margins, glaucous. Involucres sometimes 2–5 in a small lax terminal cyme, sometimes congested into small head-like cymes $\frac{1}{2}$–$\frac{2}{3}$ in. in diam.; glands $\frac{1}{3}$–1 lin. in their greater diam., very variable, transversely elliptic with the outer margin slightly irregular, or nearly as long as broad with the outer margin crenately several toothed or 3-lobed, or transversely oblong with the outer margin produced into a minute tooth at each end and either straight or with a third obtuse tooth or crenation between, yellow; otherwise as in the type.

Lower Guinea. Angola: near the Cunene River, *Johnston!* near the Kubango River, *Gossweiler*, 1857! 1926! by the Quango River, *Pogge*, 119!

Mozamb. Distr. Portuguese East Africa: Gazaland; Inyamadzi Valley, 2500 ft., *Swynnerton*, 1533! British Central Africa: Nyasaland; between Songwe and Karonga, *Whyte!* Rhodesia; between Broken Hill zinc-mine and Bwana M'Cuba copper-mine, *Allen*, 354! near Melsetter, *Swynnerton*, 6043! 6044! hills near Haroni River, *Swynnerton*, 1529! North-west Rhodesia, *Kässner*, 2125!

Like several species which produce annual stems from a perennial rootstock, this

is a very variable plant, the typical form and var. *minor* being quite different in appearance, but after closely examining and dissecting the specimens I can find no absolute distinction besides that of size and number of leaves, the glands of the involucre are very variable, sometimes on the same specimen. I believe var. *minor* to be merely a weakened condition of the plant, consisting of the secondary growth which springs up after the burningof the vegetation of the open country, as is often demonstrated by the presence of the charred remains of taller and stouter stems on the specimens. *E. zambesiana*, Benth., and *E. depauperata*, Hochst., vary in a similar manner from the same cause.

78. **E. polyantha,** *Pax in Engl. Jahrb.* xliii. 87 A woody shrub 3–4 ft. high. Branches alternate, glabrous or minutely puberulous when young. Leaves alternate, thin in texture, 4–11 lin. long, 2–5 lin. broad, cuneately obovate or oblanceolate, rounded to subacute at the apex, tapering from above the middle into the short petiole, glabrous on both sides or with a thin excessively minute pubescence beneath. Stipules reduced to minute glands. Inflorescence terminal, at first consisting of 1 sessile involucre and 3 radiating buds on peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, which develop into 3 small forked cymes forming an umbel about 1 in. in diam., with a whorl of 3 leaves at the base and a pair of elliptic bracts 1–2 lin. long at the forks. Involucres $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., cup-shaped, with 5 glands and 5 broadly rounded fringed lobes, glabrous outside; glands about $\frac{1}{2}$ lin. in their greater diam., transversely oblong, peltate, slightly convex, entire. Ovary shortly exserted, erect, glabrous; styles about $\frac{3}{4}$ lin. long, united for $\frac{3}{4}$ of their length, with ascending bifid tips. Capsule and seeds not seen.

Nile Land. British East Africa: Taru district, *Scott-Elliot*, 6172! Mbuyuni, *Scott-Elliot*, 6224! a very common shrub below 3000 ft., *Scott-Elliot*, 6264!

Mozamb. Distr. German East Africa: edge of the Rift, *Merker*, 578!

79. **E. commiphoroides,** *Dinter*, *Deutsch Sudw.-Afr.* 90. A tree 6–20 ft. high, with a trunk $\frac{1}{2}$–1 ft. in diam.; bark papery. Ultimate branches usually widely diverging or making nearly a right angle with those they arise from, slender, glabrous, bearing small densely leafy branchlets $\frac{1}{8}$–$\frac{1}{2}$ in. long, arising from the axils of their fallen primary leaves. Leaves shortly petiolate, 3–10 lin. long, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, lanceolate, elliptic-oblong, elliptic or orbicular, obtuse, rounded or subacute at the apex, rounded or cuneately narrowed into the petiole, very minutely puberulous on both sides. Involucre solitary and terminal on the short leafy branchlets, male or hermaphrodite, subsessile, 2 lin. in diam., cup-shaped or obconic, glabrous or very minutely puberulous, with 5 glands and 5 broad transverse fringed pubescent lobes; glands about $\frac{3}{4}$ lin. in their greater diam., transversely elliptic, entire. Ovary globose-trigonous, minutely puberulous, with a calyx at its base, having 3 deltoid-lanceolate lobes $\frac{1}{3}$–$\frac{1}{2}$ lin. long and exserted on a rather stout minutely puberulous pedicel and curved to one side; styles $1\frac{1}{4}$ lin. long, united for half their length, then recurved-spreading, entire at the apex. Capsule about $\frac{1}{3}$ in. in diam., much exserted on a recurved pedicel, glabrous. Seeds 2 lin. long, tipped with a small caruncle, ellipsoid-oblong, smooth, pale grey with patches of darker grey.

Lower Guinea. German South-west Africa: between Okahandya and Swakopmund, *Dinter*, 192! Omatako, *Dinter*, 1382! Omburo, *Dinter*, 1406! Modderfontein, *Dinter*, 1571! Salem or Tsaobis, *Dinter*, 198.

80. **E. jatrophoides,** *Pax in Engl. Jahrb.* xxxiii. 287. A woody shrub 4–6 ft. high. Branches 1–2 lin. thick in the type specimen, minutely pulverulent when young, brown. Leaves alternate on the elongated branches, tufted on the short lateral spurs, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{2}{3}$ in. broad near the apex, cuneate-obovate, obtuse to nearly truncate and apiculate at the apex, gradually tapering from near the top to the sessile or subpetiolate base, glabrous above, minutely puberulous beneath. Cymes pedunculate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, once or twice forked, arranged in a terminal umbel about $1\frac{1}{4}$–$1\frac{1}{2}$ in. in diam., glabrous. Bracts $\frac{1}{4}$–$\frac{1}{3}$ in. long, broadly cuneate, subtruncate, very minutely and densely ciliate when young, but scarcely or not at all puberulous beneath, rather thin and apparently yellowish-green. Involucres all male in the specimens seen, globose when young, becoming basin-shaped, $2\frac{1}{2}$–3 lin. in diam., glabrous, green, with 4–5 glands and 5 subquadrate fringed lobes; glands $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in their greater diam., peltate, transversely elliptic, entire. Ovary and capsule not seen.

Nile Land. Somaliland: between Arovis and Rufa, *Ellenbeck*, 1081! and between Wabi and Budugo, *Ellenbeck*, 1164!

This resembles *E. cuneata*, Vahl, but the branchlets do not appear to be spine-pointed and the leaves are puberulous beneath. Described from the type specimens.

81. **E. lyciopsis,** *Pax in Engl. Pfl. Ost-Afr. C.* 242. A woody shrub. Branches alternate, very spreading, mostly spine-tipped, minutely puberulous to nearly glabrous, whitish or pale grey, leafy at the time of flowering. Leaves alternate on the primary, tufted on the secondary or rudimentary branchlets, minutely petiolate, $\frac{1}{4}$–1 in. long, 1–3 lin. broad, narrowly linear-oblong or cuneate-oblong, obtuse, apiculate, obtuse at the base, or tapering into the petiole, coriaceous, glabrous on both sides with a puberulous petiole or sometimes puberulous on the base of the midrib beneath. Stipules none. Involucre solitary, mostly axillary or on rudimentary axillary shoots scattered along the branchlets, sometimes terminal, usually sessile, surrounded at the base by about 5 spreading cuneate-obovate obtuse minutely ciliate bracts $\frac{3}{4}$–$1\frac{1}{4}$ lin. long and $\frac{1}{3}$–$\frac{3}{4}$ lin. broad, but sometimes on short axillary pedunclelike branchlets $1\frac{1}{2}$–2 lin. long, with the bracts spaced along them, bowl- or broadly cup-shaped, $1\frac{1}{2}$–2 lin. in diam., minutely and thinly puberulous, with 5 glands and 5 subquadrate fringe-toothed lobes; glands erect, about $\frac{1}{8}$ lin. long and $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam., in dried specimens obliquely cup-shaped or funnel-shaped with the margin slightly recurved, but perhaps flatter, half circular and but slightly concave when alive. Ovary immature, densely pubescent or tomentose; styles short, free, erect, stout, entire or notched at the apex. Capsule and seeds not seen.—Pax in Engl. Jahrb. xxiii. 533.

Nile Land. British East Africa: Tarro (Taro?), *Kässner*, 516! Kibwezi, common, *Scott-Elliot*, 2352!

Mozamb. Distr. German East Africa: steppe near Lake Chala, 3900 ft., *Volkens*, 1781!

82. **E. cuneata,** *Vahl, Symb.* ii. 53. A woody shrub growing to a height of 10–12 ft.; branches horizontally spreading, often spine-tipped, glabrous or at first puberulous, becoming glabrous with age; bark brown or greyish. Leaves alternate, scattered along the primary branches and tufted on the very short secondary branchlets, usually $\frac{1}{3}$–1 in. long, rarely longer, $1\frac{1}{2}$–$4\frac{1}{2}$ lin. broad, linear-cuneate, cuneately obovate or cuneately spathulate, rounded, truncate or notched at the apex, or rarely subtruncate with a short apiculus, very shortly petiolate, glabrous on both sides or at first minutely puberulous beneath. Cymes terminal and lateral, umbel-like, $\frac{1}{3}$–$\frac{2}{3}$ in. long, including the peduncle, $\frac{1}{2}$–$\frac{2}{3}$ in. in diam., with 3–5 involucres or sometimes reduced to 1 involucre, with reduced leaves at the base of the cyme and under the involucres. Peduncles of the cymes and the cyme-branches 1–$2\frac{1}{2}$ lin. long, or the involucres sessile, puberulous or glabrous. Involucre 2–3 lin. in diam., broadly cup-shaped, puberulous or glabrous outside, glabrous within, with 5 glands and 5 broad transverse subtruncate fringed lobes; glands peltate, concave, transversely elliptic or suborbicular, entire, $\frac{1}{2}$–1 lin. in their greater diam. Capsule erect, $2\frac{1}{2}$ lin. in diam., minutely tomentose or puberulous; styles $\frac{2}{3}$ lin. long, united below or to half-way up, with 3 stout simple or minutely bifid recurved or revolute branches, deciduous in fruit. Seeds $\frac{1}{8}$ in. long, ellipsoid, not angular, smooth, brown.—Jaubert & Spach, Illustr. Pl. Orient. v. 71, t. 463; Anders. in Journ. Linn. Soc. v. Suppl. i. 35, t. 4; Boiss. in DC. Prodr. xv. ii. 97 (including vars. *Perrottetii* and *carpasus*); Terraciano in Ann. Istit. Bot. Roma, v. 98 and vi. 188; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 317. *E. fruticosa*, Edgew. in Journ. As. Soc. Beng. xvi. 1219. *E. Perrottetii*, Jaub. & Spach, Illustr. Pl. Orient. v. 72, t. 464. *E. carpasus*, Ehrenb. ex Boiss. in DC. Prodr. xv. ii. 98. *Lyciopsis cuneata*, Schweinf. Beitr. Fl. Aethiop. 37.

Nile Land. Nubia: Gebel Kuureb, *Schweinfurth*, 852! Uaratab Mountain, near Suakin, *Schweinfurth*, 853! Sea-coast, *Bent!* Eritrea: Togodele, *Ehrenberg!* vicinity of Saati, *Schweinfurth & Riva*, 72, 268! 355! Haressan Island, Ferehan Volcano and Achil Island, *Terraciano*. Somaliland: Harradigit, *James & Thrupp!* Web Karanle, *Riva*, 879; Uadi, *Robecchi*, ex *Pax*.

Mozamb. Distr. German East Africa: Dar es Salaam, *Holtz*, 512! 1904! Kidonga, *Holtz*, 1075A!

Also in Arabia.

83. **E. Currori,** *N. E. Br.* A woody shrub. Branches horizontally spreading, spine-tipped, glabrous, with a grey bark, probably puberulous when young. Leaves alternate on the primary branches, clustered at the ends of the short spur-like secondary branchlets, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 2–$3\frac{1}{2}$ lin. broad, oblanceolate, obtusely pointed or subacute, cuneately tapering from above the middle to a subsessile base or very short petiole, thinly puberulous on both sides. Involucre solitary, or 2–3 clustered at the apex of the short lateral spur-like branchlets, on puberulous peduncles $\frac{1}{2}$–1 lin. long, about $2\frac{1}{2}$ lin. in diam., broadly cup-shaped, minutely

puberulous with curved hairs, with 4 glands and 5 broad transverse truncate fringed lobes; glands peltate, $\frac{3}{4}$ lin. in their greater diam., transversely elliptic, concave, entire. Ovary erect, densely covered with very short straight hairs; styles short, stout, recurved from the base, truncate or bifid at the apex. Capsule and seeds not seen.

Lower Guinea. Angola: Elephants Bay, *Curror*, 29!

Very similar to *E. cuneata*, Vahl, but the leaves are thinner in texture, puberulous on both sides, pointed (not rounded nor truncate) at the apex and dry black, the fifth gland of the involucre is absent in this species, but always seems present in *E. cuneata*.

84. **E. spinescens,** *Pax in Engl. Jahrb.* xix. 120. A thorny woody shrub, leafless except on the very young growths. Branches alternate, stout, often somewhat zigzag, with straight horizontally spreading ultimate branchlets, rigid, spine-pointed, puberulous when young, becoming glabrous, brown. Leaves alternate on the branchlets, tufted on the very short lateral tubercle-like flowering-spurs, $\frac{1}{2}$–$\frac{2}{3}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, cuneately-obovate, very obtusely rounded at the apex, tapering from above the middle into a very short petiole, glabrous on both sides. Bracts under the involucres $1\frac{1}{4}$–2 lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, sessile, resembling reduced leaves, slightly ciliate, soon deciduous. Involucres solitary on the flowering-tubercles, scattered along the branchlets, subsessile or on peduncles $\frac{1}{2}$–$\frac{2}{3}$ lin. long, cup-shaped, about $2\frac{1}{2}$ lin. in diam., glabrous, with 5 glands and 5 subquadrate or rectangular long-fringed lobes; glands distant, somewhat trumpet-shaped, but open nearly to the base on the inner side, about $\frac{2}{3}$ lin. long and $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam. Ovary exserted on a pedicel about as long as the involucre, tomentose; styles stout, about $\frac{3}{4}$ lin. long, shortly united at the base, then spreading, with revolute tips. Capsule exserted on a pedicel, not much exceeding the involucre and staminal remains, tomentose.

Mozamb. Distr. German East Africa: steppe near Pangani swamp, *Jaeger*, 99! Masai steppe, *Jaeger*, 60! 98! *Fischer*, 524! near Same, in Pare district, *Uhlig*, 95!

Allied to *E. cuneata*, Vahl, but with stouter dark brown branches and solitary involucres. It is quoted by Pax under *E. jægeriana*, Pax (= *E. matabelensis*, Pax), but is totally different from that species in its mode of branching, glabrous leaves and solitary glabrous involucres, with entirely different glands.

85. **E. matabelensis,** *Pax in Ann. Naturhist. Hofmus. Wien*, xv. 51, *t.* 2, *fig. A.* A woody branching spiny shrub up to 10 ft. high, with leaves only on the very young parts or when flowering. Branches usually in whorls of 3, radiating from the apex of a branch of the previous year, usually spine-pointed, minutely puberulous or velvety, finally glabrous, grey or brown. Leaves alternate or tufted, $\frac{1}{6}$–$1\frac{3}{4}$ in. long, 1–6 lin. broad, linear-lanceolate to cuneately obovate, acute, gradually tapering from above the middle into a short petiole, glabrous above except on the basal half of the midrib, softly pubescent to nearly glabrous beneath. Inflorescence of 1–5 pedunculate or sometimes subsessile

involucres in a small cyme or head-like cluster at the apex of very short lateral spur- or tubercle-like branchlets. Peduncles 1½–2½ lin. long, puberulous or velvety, bearing a pair of obovate bracts 2–2½ lin. long, 1¼–1½ lin. broad, glabrous above, puberulous beneath, ciliate. Involucre 2½–3 lin. in diam., cup-shaped, pubescent or tomentose outside, glabrous within, with 5 glands and 5 transversely rectangular or subquadrate fringed lobes; glands large, contiguous, peltate, turned outwards, 1¼–1⅔ lin. in their greater diam., transversely elliptic or suborbicular, yellow or green. Staminal bracteoles conspicuously woolly. Capsule 4½ lin. in diam., densely pubescent or subtomentose, erect on a stout pedicel not longer than the remains of the stamens. Seeds about ⅛ in. in diam., subglobose, smooth.—Gibbs in Journ. Linn. Soc. xxxvii. 468. *E. jægeriana*, Pax in Engl. Jahrb. xliii. 87.

Mozamb. Distr. German East Africa: steppe west of Lake Eiassi, *Jaeger*, 339! British Central Africa: Nyasaland; near Tsenga (Magunga), *Kirk!* Rhodesia: near Victoria Falls, *Galpin*, 7056! *Monro*, 424! *Rogers*, 5306! between Melsetter and Umtali and other parts of Mashonaland, *Swynnerton*, 691! 6611! Matopo Hills, *Miss Gibbs*, 24! Matabeleland, *Penther*, 944!

The remarkable 3-forked manner of branching and spine-tipped branchlets readily distinguish this from all other species.

86. **E. inelegans,** *N. E. Br.* A woody branching shrub up to 10 or 12 ft. high, with no leaves at the time of flowering. Branches alternate, not spine-tipped, marked with alternate leaf-scars, very minutely puberulous, finally glabrous, pale brown becoming grey. Leaves not seen. Inflorescence a head-like cluster of 5 shortly pedunculate involucres at the apex of the ½–6 in.-long flowering branchlets. Peduncles about ⅛ in. long, minutely puberulous, with a pair of obovate bracts about 2½ lin. long and 1½ lin. broad, glabrous on both sides, minutely ciliate, having a very young involucre in the axil of each, which may ultimately develop. Involucre about ¼ in. in diam., cup-shaped, very minutely puberulous, with 5 glands and 5 transversely rectangular or subquadrate fringed lobes; glands large, peltate, contiguous, turned outwards, 1¼ lin. in their greater diam., transversely elliptic or suborbicular. Staminal bracteoles conspicuously woolly. Capsule (immature) just exserted from the involucre, erect, minutely tomentose; styles about ½ lin. long, free or nearly so, stout, recurved-spreading, entire or bifid. Seeds not seen.—*E. matabelensis*, Pax in Engl. Jahrb. xxx. 341, not of Ann. Naturhist. Hofmus. Wien, xv. 51, t. 2, fig. A.

Mozamb. Distr. German East Africa: Usufua; Songwe Valley, 3600 ft., *Goetze*, 1052!

This has been confused by Pax with *E. matabelensis*, from which it conspicuously differs in its alternate spineless branches.

87. **E. espinosa,** *Pax in Engl. Jahrb.* xix. 120. A woody branching shrub, leafless at the time of flowering. Branches alternate, subopposite or subverticellate, ascending to very widely spreading, moderately straight, 1–2 lin. thick, slightly tuberculate at the nodes with flower-scars ⅔–1 lin. in diam., not spine-tipped, glabrous, brown. Leaves not

seen, probably small and very deciduous, leaving crescent-shaped scars. Involucres solitary, sessile along the branches in the axils of the leaf-scars, male or hermaphrodite, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. in diam., cup-shaped, with 5 glands and 5 subquadrate fringed lobes, glabrous outside, pubescent under the glands within, surrounded at the base by about 6 suborbicular or broadly ovate bud-scales, very obtuse or rounded at the apex, ciliate on the margin, with the outer much smaller and more coriaceous than the inner; glands $\frac{3}{4}$–1 lin. in their greater diam., transversely elliptic-oblong, nearly straight on the inner margin, entire or faintly crenulate on the outer. Staminal bracteoles pubescent, but not conspicuously woolly. Ovary at first partly included and finally far exserted from the involucre on a slender recurved pedicel, subglobose, glabrous, with a very rudimentary calyx; styles $\frac{2}{3}$–$\frac{3}{4}$ lin. long, united for $\frac{1}{3}$ of their length, then recurved-spreading, rather stout, shortly bifid at the apex. Capsule $\frac{1}{3}$ in. in diam., with 3 rounded lobes as seen from above, exserted on a curved pedicel $\frac{1}{4}$–$\frac{1}{2}$ in. long, glabrous. Seeds $2\frac{1}{2}$ lin. long, ellipsoid, smooth, with a circular or mushroom-shaped caruncle, peltate on a very slender stalk.—*E. gynophora*, Pax in Engl. Jahrb. xxxiv. 374.

Mozamb. Distr. German East Africa, without precise locality, *Fischer*, 285! between Kisuani and Madji-ya-juu, *Engler*, 1579! 1586! British Central Africa: Nyasaland; Magomero, south of Lake Shirwa, *Meller!* Rhodesia; Buluwayo, *Chubb*, 345! Victoria, *Monro*, 319!

E. gynophora, Pax, is founded upon fruiting specimens of *E. espinosa*. This species is distinguished from *E. matabelensis* and *E. inelegans*, N. E. Br., by its pubescent (not woolly) staminal bracteoles and long-stalked capsules.

88. **E. nodosa,** *N. E. Br.* "A leafless tree of 10 to 25 ft., with erect trunk from 1 to 5 inches in diam. Outer bark often peeling off. Branches virgate, but erect" (*Gossweiler*). Branches 2–3 lin. thick, tuberculate with prominent flowering cushions 1–2 lin. in diam., and marked with crescent-shaped scars of fallen leaves, glabrous, brown. Leaves evidently very deciduous, perhaps scale-like, not seen. Flowering-cushions axillary, tubercle-like, apparently producing flowers for two or more years in succession. Involucres solitary or 2–3 together, sessile, 2–$2\frac{1}{4}$ lin. in diam., cup-shaped, with 5 glands and 5 transversely rectangular fringed lobes, glabrous outside and within and surrounded by 9–12 adpressed bud-scales, imbricating in about 3 series, with the outer series very small and coriaceous and the inner larger and thin, broadly rounded, ciliate; glands $\frac{3}{4}$–1 lin. broad in their greater diam., transversely oblong, entire, greenish-yellow. Capsule about $\frac{1}{3}$ in. in diam., glabrous, exserted on a recurved (or perhaps finally erect) pedicel $2\frac{1}{2}$–4 lin. long; styles $\frac{1}{2}$ lin. long, recurved-spreading, bifid at the apex. Seeds 2–$2\frac{1}{4}$ lin. long, oblong-ellipsoid, smooth, grey, with a transverse yellow caruncle.

Lower Guinea. Angola: Loanda, *Gossweiler*, 435! 449! abundant along the River Cavaco, east of Benguella, *Gossweiler*, 1695!

89. **E. Grosseri,** *Pax in Engl. Jahrb.* xxxiii. 288. A tree 12 ft. high. Branchlets $\frac{1}{6}$–$\frac{1}{4}$ in. thick, apparently fleshy when young, crooked,

glabrous, leafy at the apex, naked below, brown or dark grey. Leaves about 5–7 in terminal rosettes, spreading, $1\frac{3}{4}$–$3\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, obovate, obtuse to broadly rounded at the apex, minutely apiculate, tapering from above the middle to a very short petiole, glabrous on both sides, slightly ciliate on the margins of the petiole. Stipules none. Inflorescence terminal, in the centre of the rosette of leaves, apparently of 3–4 or perhaps more involucres on stout peduncles $\frac{1}{4}$ in. long, probably forming a small umbel. Involucre $\frac{1}{3}$ in. in diam. or perhaps larger, cup-shaped, glabrous, with 5 glands and 5 subquadrate subentire lobes; glands spreading, not contiguous, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in their greater diam., but nearly as long as broad, transversely elliptic, minutely denticulate or almost entire; ovary with a rudimentary rim-like calyx at its base, exserted on a very stout pedicel about as long as the involucre, very minutely puberulous; styles 1 lin. long, free, spreading, with revolute bifid tips. Fruit not seen.

Nile Land. Somaliland: Mallsari, *Ellenbeck*, 2151!

Ellenbeck, 1163, also quoted by Pax as belonging to this species, is *E. Scheffleri*, Pax. It differs from *E. Grosseri* in having pubescent leaves, different involucre-glands and a very large cup-shaped calyx partly enclosing the ovary.

90. **E. Scheffleri,** *Pax in Engl. Jahrb.* xliii. 88. A branching shrub or small tree? Ultimate branches opposite or whorled, $\frac{1}{8}$–$\frac{1}{4}$ in. thick, woody, with apparently a somewhat fleshy bark, terete, glabrous, marked with alternate scattered leaf-scars, brown, apparently often leafless at the time of flowering. Leaves in the specimens seen all collected in terminal tufts of 5–6, spreading; petiole $1\frac{1}{2}$–8 lin. long; blade $1\frac{1}{2}$–4 in. long, $\frac{3}{4}$–$2\frac{1}{4}$ in. broad, obovate, elliptic or suborbicular, rounded or emarginate to subacute at the apex, apiculate, cuneately tapering into the petiole, varying from glabrous to thinly or densely pubescent on both sides, or becoming more or less glabrous above. Stipules none. Inflorescence terminal, at first consisting of a single involucre, subsessile or on a very short peduncle, from under which usually develop 1–3 others on glabrous peduncles 5–7 lin. long, forming a small umbel when fully developed. Bracts under the involucres 3–4 lin. long, 4–$5\frac{1}{2}$ lin. broad, scale-like, broadly and somewhat rhomboid-obovoid, with slight rounded angles at the sides, entire or notched at the rounded top, apiculate, glabrous, densely ciliate. Involucre 6–8 lin. in diam., broadly cup-shaped, glabrous outside and within, with 5 glands and 5 transversely rectangular fringed lobes, glands $2\frac{1}{2}$–3 lin. long, and 3–4 lin. broad, transversely oblong or somewhat half-circular, fringed along the outer margin with 7–15 linear-filiform segments $\frac{1}{2}$–1 lin. long, entire or bifid at the apex. Ovary glabrous, partly or quite enclosed in a deep cup-shaped or short tubular glabrous calyx, more or less toothed at the top; styles 2 lin. long, shortly united at the base, very spreading, rather stout, shortly bifid at the apex. Capsule about 7 lin. in diam., acutely 3-lobed as seen from the top, with woody cell-walls $\frac{2}{3}$ lin. thick. Seeds $\frac{1}{4}$ in. long, $\frac{1}{5}$ in. broad, compressed, elliptic, slightly oblique, with acute margins, smooth, light brown.—*E. monocephala*, Pax in Engl. Jahrb. xliii. 223.

Nile Land. Somaliland: between Wabi and Budugo, *Ellenbeck*, 1163! British East Africa: near Makindu River, *Kässner*, 604! 676! Taita Hills, *Grenfell! Hildebrandt*, 2569! Kibwezi, *Scheffler*, 104! Tuna River, *Battiscombe*, 273!

Mozamb. Distr. German East Africa: east foot of the Ngirimasi Mountains, *Merker*, 582! and at the foot of Pare Mountains, *Volkens*, 2394! *Engler*, 1641! various localities, *Jaeger*, 64! 76!

The type of *E. monocephala* consists of leafless branches, with solitary involucres, the lateral involucres being undeveloped and having shorter and more entire segments to their glands than in *E. Scheffleri*, but all the species with pectinately cut glands vary in this character, and it is quite evident that *E. monocephala* and *E. Scheffleri* are not specifically distinct. The pubescence on the leaves is very variable.

91. **E. somalensis,** *Pax in Ann. Istit. Bot. Roma*, vi. 187. A shrub, without spines, leafless at the time of flowering (always?). Branchlets 1–2 lin. thick, terete, woody or perhaps slightly fleshy when young, at first minutely puberulous, becoming glabrous, brown. Umbel terminal, of few rays, each 2–3 lin. long and bearing 1 involucre, very minutely puberulous. Involucre about $\frac{1}{3}$ in. in diam., broadly cup-shaped, minutely puberulous, with 5 glands and 5 subentire or obscurely toothed broad lobes; glands about $1\frac{1}{2}$ lin. long and $1\frac{1}{2}$–2 lin. broad, somewhat elliptic or suborbicular, with 3–5 filiform finger-like processes on the outer margin, thickened and slightly bifid at the apex. Ovary included in the involucre, glabrous, with a very rudimentary rim-like calyx at its base; styles $1\frac{1}{2}$ lin. long, very shortly united at the base, slightly thickened and minutely 2-lobed or notched at the apex. Fruit and seeds not seen.

Nile Land. Somaliland: Ogaden; near the River Milmil, *Riva*, 333! 345! Web Ruspoli, *Riva*, 832, 1075 ex *Pax*.

I have not seen the type of this species, but describe from *Riva's*, 333, which is named *E. somalensis* by Dr. Pax, and except in the minute pubescence (which might easily be overlooked) agrees with his description of that species.

92. **E. noxia,** *Pax in Engl. Jahrb.* xix. 124, *t.* 2. A shrub about 10 ft. high, sparingly branched, glabrous. Branches stout, 4–5 lin. thick, apparently somewhat fleshy when young, becoming woody, leafy only at the tips, naked and marked with closely placed leaf-scars below, brown. Leaves alternate, rather crowded in terminal rosettes or with some scattered for a short distance along the young branches below the rosettes, $2\frac{1}{2}$–6 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, cuneately oblanceolate, obtuse and apiculate or mucronate, tapering to the sessile base, glabrous on both sides. Umbel terminal, 4- (or perhaps 5-) rayed; rays $1\frac{1}{4}$ in. long, probably ultimately forked, in the type specimen each with a pair of bracts, 1 shortly pedunculate involucre and a pair of undeveloped cyme-branches at its base, glabrous. Bracts about 1 in. long and $\frac{2}{3}$–$\frac{3}{4}$ in. broad, broadly ovate, acute, tipped with a subulate point $1\frac{1}{2}$–2 lin. long, cordate at the sessile base, glabrous. Involucre $\frac{3}{4}$–$\frac{7}{8}$ in. in diam., cup-shaped, velvety-puberulous, with 4 glands and 5 subquadrate fringed lobes; glands about $\frac{1}{4}$ in. long and as much in breadth, shortly stalked, somewhat fan-shaped, with the outer margin cut into 9–10 filiform segments thickened at their tips. Ovary densely pubescent, without

a calyx at its base, seated on a pubescent pedicel about as long as the involucre; styles broken off, but united into a column for at least 1½ lin. and according to the figure with spreading bifid arms.—Pax in Bull. Herb. Boiss. vi. 741, 742.

Nile Land. Somaliland: Ahl Mountains, 5000–6500 ft., *Hildebrandt*, 870!

Described from the type, in the Berlin Herbarium. According to Hildebrandt, the bark of this shrub is boiled for some hours and the extract used as an arrow poison.

93. **E. sepium,** *N. E. Br.* A shrub. Branches terete, forking, glabrous, perhaps subfleshy at the young parts, ¾–3 lin. thick in the specimens seen, densely leafy at the tips, naked below. Leaves alternate, 1–2 in. long, 1¼–3 lin. broad, linear, somewhat abruptly acute, tipped with a short hair-like point, shortly tapering at the sessile base, entire, glabrous on both sides, with the midrib scarcely or but slightly prominent beneath, drying pale green, those immediately around the involucre yellow. Involucre solitary, terminal, on a stout peduncle about 1 lin. long, broadly and shallowly cup-shaped, 3–3½ lin. in diam., minutely puberulous outside, glabrous within, with 5 glands and 5 transversely rectangular fringed lobes; glands 1–1¼ lin. broad in their greater diam., transversely oblong or elliptic, entire, yellow. Ovary (immature) densely pubescent or subtomentose, articulated to a pedicel as long as the involucre, without a calyx at its base, probably finally exserted; styles ¼ lin. long, free, erect, rather stout, entire.

Upper Guinea. Senegambia: in hedges, wild in Sor Island, *Brunner*, 21! Togo, *Kersting*, 739! Northern Nigeria: Katagum District, *Dalziel*, 320!

Called "*Yaro*" by the natives and used as a hedge-shrub.

94. **E. Rogeri,** *N. E. Br.* A much-branched shrub, woody below, succulent at the younger parts, naked, bearing leaves at the ends of the young branches only, without spines, glabrous. Stems or main branches ½–¾ in. thick; younger branches 1½–4 lin. thick, terete, forking and often somewhat tortuous. Leaves alternate, sessile, deciduous, thin, ¾–1½ in. long, 1–3 lin. broad, linear or linear-lanceolate, narrowing towards the base, obtuse and apiculate or acute, glabrous on both sides. Involucre terminal, apparently solitary, 2½–3 lin. in diam., only one seen, with the glands and lobes broken off. Capsule just exserted from the involucre, ⅓ in. in diam., subglobose, pubescent; styles not seen. Seeds (immature) globose, 1½ lin. in diam., smooth.

Upper Guinea. Senegal: in the sands on the heights of Lampsar and of Maka, *Roger!* and without precise locality, *Farmar*, 54!

Also from Cape Juby, so that it probably extends along the coast north of the tropic to or beyond that point.

95. **E. balsamea,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 951. A fleshy perennial shrub 1½–3 ft. high, much branched from the base, glabrous, very glaucous. Primary stem about 1 in. thick; young branches tapering upwards, becoming leafless; flowering branches forking alternately, forming a lax flat-topped corymb-like cyme, 4–6 in. in diam.

Leaves alternate; petiole 2–4 lin. long; blade 6–8 lin. long, 3–3½ lin. broad, or perhaps larger, elliptic-oblong, obtuse, cuneately rounded into the petiole, longitudinally folded in the specimens seen, somewhat fleshy. Stipules none. Bracts under the involucres sessile, ¼–⅓ in. long and as broad or broader than long, orbicular-rhomboid or transversely rhomboid, very obtuse, longitudinally concave-folded so that the pairs form a sort of cup. Involucre solitary, terminal, sessile, about 1¾ lin. long and 1¼ lin. in diam., subcylindric-obconic, glabrous outside, with 5 glands and 5 oblong minutely 3-toothed pubescent and ciliate lobes; glands ½–¾ lin. in their greater diam., transverse, somewhat elliptic-oblong and 2-lipped, with the small rounded entire inner margin inflexed and the much larger rounded minutely crenate outer margin spreading. Ovary, capsule and seeds not seen, all the involucres examined being male.

Lower Guinea. Angola: on sandy maritime hills between Mossamedes and Cabo Negro, also near San Antonio, *Welwitsch*, 634!

The sap is stated to have a balsam-like odour.

96. **E. incurva,** *N. E. Br.* Stem in the only specimen seen (a piece 9 in. long) apparently succulent or herbaceous, but possibly a branch from a shrub, about 2 lin. thick, tapering upwards, branching, glabrous. Branches alternate, numerous, subequidistant, 3–5 lin. apart, 1½–4 in. long, 1 lin. thick, horizontally spreading at their basal part, then upcurved, leafy at the tips, naked and marked with prominent leaf-scars below, glabrous. Leaves alternate, ½–¾ in. long, 1–1½ lin. broad, linear-lanceolate, with inrolled margins, acute, somewhat rounded or tapering into a petiole 1–1½ lin. long, glabrous above, puberulous with minute curved white hairs beneath. Peduncles axillary, solitary, ⅔–1 lin. long, bearing a pair of bracts and 1 involucre, glabrous. Bracts 1¼–1½ lin. long, ½–⅔ lin. broad, somewhat rhomboid-elliptic, acute, with incurved margins, puberulous on both sides. Involucre sessile between the bracts, about 1 lin. in diam., cup-shaped, puberulous, with 4 glands and 5 quadrate puberulous densely ciliate lobes; glands not contiguous, ¼–⅓ lin. in their greater diam., transversely oblong or subquadrate, entire, white-puberulous on the back and more or less on the upper or inner surface, densely ciliate. Ovary exserted and curved to one side, densely covered with minute curved white hairs; styles ½ lin. long, free, erect, bifid at the apex, puberulous.

Mozamb. Distr. German East Africa: Sonjo Sale, *Merker*, 579!

A very distinct species, easily recognised by the curvature of its regularly placed branches and the puberulous glands of the involucre.

97. **E. lateriflora,** *Schum. & Thonn. Beskr. Guin. Pl.* 252. Stems 3 ft. or more long, scrambling, fleshy, terete, with lax hanging branches, marked with the scars of fallen leaves, glabrous, glaucous (*Thonning*). Branches alternate or sometimes somewhat clustered, 1–3 lin. thick, leafy when young. Leaves alternate, 1–3 lin. apart, with a whorl at the base of the umbels, sessile, 1–1½ in. long, 1–2½ lin. broad, linear-lanceolate or linear, acute, tapering to the base, entire, glabrous, with the midrib prominent beneath, veins invisible. Umbels terminal, with

about 4 simple rays 3–10 lin. long, each with 1 involucre and a pair of orbicular-obovate thin bracts about 2 lin. long and broad, glabrous. Involucre shortly pedunculate within the bracts, about 2 lin. in diam., cup-shaped, glabrous, with 5 glands and 5 rounded subentire lobes slightly woolly on their inner surface; glands $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., suborbicular, or transversely elliptic, yellow (*Thonning*). Ovary globose-trigonous, glabrous, exserted on a pedicel about 2 lin. long and curved to one side; styles about 1 lin. long, shortly united at the base, then widely spreading, emarginate or minutely 2-lobed at the apex. Capsule and seeds not seen.—Boiss. in DC. Prodr. xv. ii. 96. *E. togoensis*, Pax in Engl. Jahrb. xliii. 224.

Upper Guinea. Togo: Kratye, *Thonning!* (Büatja?), *Doering*, 190! Lagos: Eppah, *Barter*, 3309!

A specimen (*Dalziel*, 327) from Katagum district, Northern Nigeria, is probably this species, but the styles are deeply bifid with diverging recurved tips. Also a specimen collected near Lome in Togo (*Busse*, 3260) probably belongs here. In Thonning's type specimen the umbel is really terminal, but a branch growing out at its base and falsely appearing to be continuous with that which bears it, makes the umbel seemingly lateral.

98. **E. gossypina,** *Pax in Engl. Jahrb.* xix. 119. A bush 2–3 ft. high, formed of a mass of long slender naked succulent interwoven stems and branches, leafy only on the young growth for a short period. Branches ascending or making a right-angle with the stems or main branches or becoming pendulous, 2–3½ lin. thick in the specimens seen, terete, with small crescent-shaped leaf-scars, glabrous. Leaves alternate, whorled at the base of the umbel, sessile, reflexed, soon deciduous, those on the stem $\frac{1}{2}$–$1\frac{1}{4}$ in. long, 1–2½ lin. broad, lanceolate or linear-lanceolate, acute, narrowed towards the base, the upper sometimes shorter and broader and becoming more elliptic or ovate, those of the whorl usually 3–5 lin. long and $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, ovate to orbicular, very obtusely rounded to acute and apiculate, but sometimes like those of the stem, all glabrous on both sides. Stipules none. Umbel terminal, simple, with a central shortly pedunculate involucre which is male and deciduous and 4–5 rays $\frac{1}{2}$–$1\frac{1}{4}$ in. long, each with 1 hermaphrodite involucre and a pair of reflexed elliptic obtuse bracts about 3 lin. long and 2 lin. broad, glabrous. Involucres on peduncles $1\frac{1}{2}$–2 lin. long, broadly and shallowly cup-shaped, about $\frac{1}{3}$ in. in diam., glabrous, but with a dome-like mass of very white woolly bracteoles filling the interior, with 5–6 large glands and 5–6 subquadrate lobes, notched or slightly toothed at the top, with a fringe of very fine weak hairs, which appear to arise from the inner surface and are only seen (on dried specimens) when the lobe is placed in water; glands turned outwards, $1\frac{1}{2}$–2 lin. in their greater diam., transversely elliptic to suborbicular, flattish, entire or slightly crenate on the outer margin. Ovary exserted above the dome of woolly bracts, erect, glabrous; styles $1\frac{1}{4}$ lin. long, united at the base, deeply bifid at the apex with revolute tips.—*E. implexa*, Stapf in Kew Bulletin, 1908, 408.

Nile Land. Uganda: Mawokota, 3900 ft., *Brown*, 414! British East Africa, between Ribe and the Galla Country, *Wakefield!*

Mozamb. Distr. German East Africa: Kageyi, on Lake Victoria, *Fischer*, 514! Masaini, *Fischer*, 515! Umbugwe and Iraku, on the edge of the Rift, *Merker*, 127! near a plantation at Dar-es-Salaam, *Hedde*, 6!

Easily recognised by the dome-like white-woolly mass of bracteoles filling the involucre.

99. **E. Cameronii,** *N. E. Br.* Probably a shrub, only 2 branchlets seen, about 5 in. long and 1½–2 lin. thick, terete, naked, marked with small alternate crescent-shaped leaf-scars, probably succulent when young, glabrous. Leaves not seen. Inflorescence apparently terminal, but only 3 detached involucres seen, embraced by their bracts and on peduncles 1 lin. long. Bracts large, white, very conspicuous, widely spreading, ½–⅝ in. long, ½ in. broad, sessile, orbicular-ovate, folded together and slightly recurved at the acute or apiculate apex, glabrous. Involucre solitary, sessile, 2¼ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 erect transversely oblong fringed lobes; glands 1–1¼ lin. in their greater diam., transversely oblong, very distinctly 2-lipped, with the inner lip about half as large as the outer. Ovary (not seen mature) with 3 convex faces and 3 slender ribs between them, glabrous, with a small cupular entire calyx at the base; styles 1 lin. long, united nearly to the top, with very short stout arms, minutely lobed at the apex. Fruit and seeds not seen.

Mozamb. Distr. British Central Africa: Nyasaland; Ntondwe, *Cameron*, 153!

This appears to be a very showy plant when in flower, and would be well worth cultivating. The involucral bracts are as large as or larger than those of *E. splendens*, Boj., and quite as conspicuous, but are white instead of bright red.

100. **E. nubica,** *N. E. Br.* A succulent bush up to 6 ft. high, leafless except on the very young branches, spineless, glabrous. Branchlets alternate, more or less clustered, subparallel or very little divergent, 2½–12 in. long, 1½–3 lin. thick, terete, with prominent leaf-scars. Leaves not seen, soon deciduous. Umbels terminal, of 3–7 simple rays, ⅕–½ in. long, each bearing 1 involucre, glabrous; when young with a whorl of thin green oblong acute bracts at the base of the umbel about as long as the peduncle-like rays and a pair under each involucre about 2 lin. long and 1½–2 lin. broad, orbicular-obovate, obtuse, apiculate, all soon deciduous. Involucre ¼ in. in diam., broadly and shallowly cup-shaped, glabrous, with 4 glands and 5 transverse scarcely toothed or ciliate but sometimes 2-lobed lobes; glands 1–1½ lin. in their greater diam., transversely elliptic or suborbicular. Capsule about ¼ in. in diam., obtusely 3-angled, far exserted on a pedicel ultimately ¼ in. or more long, glabrous; styles 1 lin. long, shortly united at the base, then spreading, bifid at the apex with the lobes widely diverging. Seeds about 1¾ lin. long, ellipsoid, with a small caruncle, faintly tuberculate-rugulose, whitish.—*E. Schimperi*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 317, partly; Berger, Sukk. Euphorb. 25, fig. 4, not of Presl.

Nile Land. Nubia: coast region, *Bent!* Eritrea: near Acrur, *Schweinfurth & Riva*, 1083!

This is readily distinguished from *E. Schimperi*, Presl, by the scarcely diverging branches and much longer rays of the umbel. Several perfectly distinct species bearing a superficial resemblance to one another have also been mistaken for *E. Schimperi*, which does not seem to occur in Africa. Possibly the plant collected in East Shoa by Rosen and named *E. Schimperi* by Pax in Engl. Jahrb. xxxix. 631, may belong here. I have not seen it.

101. **E. Merkeri,** *N. E. Br.* A shrub or tree (?), with woody (or perhaps somewhat succulent when young) branches, leafless and spineless. Branches of the specimens seen up to a foot or more long and nearly straight, with few or no branchlets, terete, up to 2 lin. thick, marked with scattered alternate leaf-scars, glabrous, green, becoming dark greyish with age. Leaves not seen, evidently very soon deciduous. Umbels terminal, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., of 3–5 simple glabrous rays 2–3 lin. long, each bearing 1 involucre sessile between a pair of thin orbicular or orbicular-obovate bracts 1–$1\frac{1}{4}$ lin. in diam., broadest near the apex, minutely apiculate. Involucre about 2 lin. in diam., cup-shaped, glabrous, with 4 (in male involucres perhaps 5) glands and 5 subquadrate or transverse toothed lobes; glands 1–$1\frac{1}{4}$ lin. in their greater diam., transversely oblong to suborbicular. Ovary obtusely 3-angled, far exserted on a pedicel 2 lin. or more long, glabrous; styles $\frac{2}{3}$ lin. long, very shortly united at the base, then widely spreading, rather stout, bifid at the apex.

Mozamb. Distr. German East Africa: between Ngaruka and Lake Natron, *Merker*, 580! Sonjo Sale, *Merker*, 581! east of Moriro, *Uhlig*, 292!

102. **E. consobrina,** *N. E. Br.* A much-branched shrub, almost woody, but perhaps with a somewhat succulent bark, leafless except on the very young branchlets, spineless, glabrous, perhaps glaucous. Branches numerous, alternate, diverging, simple or forked, $\frac{3}{4}$–$1\frac{3}{4}$ lin. thick, terete, with prominent leaf-scars. Leaves sessile, $1\frac{3}{4}$–3 lin. long, linear-lanceolate, acute, somewhat fleshy, spreading, soon deciduous. Umbel terminal with a whorl of leaves at its base, of 3 or fewer simple rays $1\frac{1}{2}$–5 lin. long, each bearing 1 involucre with a pair of elliptic or elliptic-oblong obtuse apiculate bracts $1\frac{1}{2}$ lin. long at its base. Involucres $1\frac{1}{2}$–2 lin. in diam., broadly and shallowly cup-shaped, glabrous, with 4 glands and 5 subquadrate subentire slightly ciliate lobes; glands about $\frac{3}{4}$ lin. in their greater diam., transversely elliptic or suborbicular, yellowish (?); ovary glabrous, exserted on a pedicel $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long and curved to one side; styles nearly 1 lin. long, shortly united at the base, ascending, with bifid tips. Capsule and seeds not seen.

Nile Land. Nubia: Erkowit Mountain, *Schweinfurth*, 265! Wady Teeke, between Suakin and Berber, *Schweinfurth*, 207!

The more slender and more woody branches, which in some cases seem almost spine-tipped, and the more compactly and very differently branched habit, readily distinguish this from its allies. It bears very little resemblance to *E. Schimperi*, Presl, under which name it has been distributed by German botanists. *Schweinfurth*, 924, from the Soturba Mountains, may also belong to this species, but is in an immature state, the secondary or pedunculate involucres being in a very rudimentary condition at the base of the primary involucre of the umbel.

103. **E. media,** *N. E. Br.* A tree up to 20 ft. high when growing singly, or forming bushes when grown for fences, etc., apparently unisexual, only male specimens seen. Branchlets terete, articulated to the branches, leafless except when very young, alternate or clustered, 1–2½ lin. thick. Leaves soon deciduous, sessile, 2–5 lin. long, ½ lin. broad, linear, acute or subobtuse, with a few very minute crisped hairs, chiefly on the under surface. Involucres in dense head-like subsessile terminal clusters ⅓–½ in. in diam., cup-shaped, 1⅓–1½ lin. in diam., puberulous with minute crisped hairs outside, with 5 glands and 5 small ovate to subquadrate ciliate lobes; glands distant, peltate, ¼–½ lin. in diam., elliptic or suborbicular. Ovary and capsule not seen.—*E. Tirucalli,* T. Thoms. in Speke, Journ. Nile, Append. 646, and Trans. Linn. Soc. xxix. 144; Volkens in Notizbl. Königl. Bot. Gart. Berlin, ii. 263, not of Linnæus.

Mozamb. Distr. German East Africa: various localities, *Speke & Grant! Fischer,* 525! *Busse,* 250! 2463! *Volkens,* 191! *Merker,* 576! *Mildbraed,* 1082! *Kässner,* 20! British Central Africa: Nyasaland; Karonga, *Scott!*

Var. *Bagshawei,* N. E. Br. Involucres larger, about 2 lin. in diam. and fewer in a cluster than in the type; glands ⅔ to 1 lin. in diam., sometimes contiguous. Ovary subglobose, with 3 convex faces alternating with 3 slender ribs, puberulous with crisped hairs and having a very small 3-lobed calyx at its base, far exserted from the involucre on a rather stout erect or slightly curved pedicel 1½–3½ lin. long; styles ½–⅔ lin. long, stout, united for about ½ their length, recurved-spreading, 2-lobed at the apex. Capsule about 3½ lin. in diam., thinly puberulous with very fine crisped hairs. Seeds subglobose, about 1½ lin. in diam., smooth, at first white, finally dark brown, with a small yellow caruncle.

Nile Land. Uganda: Unyoro; at Kibero, near Lake Albert, 2200 ft., *Bagshawe,* 898! Toro; at Bukurungu, east shore of Lake Ruisambi, 2900 ft., *Bagshawe,* 1196!

Mozamb. Distr. Zanzibar: Kokotoni, *Stuhlmann,* I, 642! Portuguese East Africa: Lower Zambesi at Tete, *Kirk!*

The variety seems only to differ from the type in having fewer and larger involucres, with larger glands, the stems and leaves are identical; the female of the type is, however, at present unknown, and when found may possibly prove the two to be distinct species.

104. **E. rhipsaloides,** *Welw. in Ann. Consel. Ultramar. Lisb.* 1856, *no.* 24, *parte não offic.* 252, *no.* 11. A succulent bush 8–12 ft. high, or a tree 15–20 ft. high, with a trunk 6–8 in. in diam. (*Welwitsch*). Branches forked or alternately branching or the branchlets more or less clustered, distinctly jointed to the stems and branches, terete, 2–12 in. long, 1¼–3 lin. thick in the specimens seen, naked, spineless, marked with very small alternate leaf-scars, glabrous. Leaves, according to *Welwitsch,* linear, not seen, only present on young growing branchlets, deciduous. Cymes crowded in terminal head-like clusters ⅓–½ in. in diam., sessile or subsessile, each with 2–3 involucres. Bracts scale-like, ½–¾ lin. long, broadly ovate or rounded. Involucre 2 lin. in diam. and 1½ lin. deep, cup-shaped, minutely woolly-puberulous on the upper part, with 5 glands and 5 erect subquadrate toothed or subentire puberulous lobes, yellowish; glands ⅔–¾ lin. in their greater diam., peltate, transversely elliptic, apparently somewhat 2-lipped, entire. Ovary with a calyx at its

base, divided into three ovate acute or obtuse entire lobes $\frac{1}{2}$–$\frac{2}{3}$ lin. long, pubescent, exserted on a pubescent pedicel about 4 lin. long; styles 1 lin. long, united to the middle or slightly beyond, puberulous, with spreading arms, channelled above and 2-lobed at thea pex. Capsule 5 lin. in diam., subglobose, obscurely trigonous, pubescent, with woody cell-walls $\frac{1}{3}$ in. thick. Seeds not seen, destroyed by a gall-fly in the specimens seen.—*E. Tirucalli*, Ficalho, Pl. Uteis, 248, and Hiern in Cat. Afr. Pl. Welw. i. 949, partly, not of Linnæus.

Lower Guinea. Angola: Loanda; about Loanda, *Welwitsch*, 630! *Gossweiler*, 474! *Rattray!* *Buchner*, 532! Golungo Alto; thickets of Sobato de Bumba, near Camilungo, *Welwitsch*, 651!

This may be the plant quoted by Pax as *E. Tirucalli*, Linn., in Bull. Soc. Bot. Belg. xxxvii. 108; in De Wild. & Durand, Contrib. Fl. Congo, i. 52, and Reliq. Dewevr. 203, and in De Wild. Miss. É. Laurent, i. 143. But it is quite distinct from the true *E. Tirucalli*, Linn., which is an Indian plant.

105. **E. scoparia,** *N. E. Br.* A tree 15–25 ft. high. Branchlets alternate and usually clustered at the ends of larger branches, terete, succulent, spineless, leafless except when very young, $\frac{2}{3}$–3 lin. thick, marked with small leaf-scars, glabrous. Leaves soon deciduous, alternate, distant below, clustered at the ends of the branchlets, $\frac{1}{3}$–$\frac{2}{3}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, linear or cuneately linear, subacute, sessile, somewhat fleshy, glabrous. Inflorescence a small dense sessile cluster of involucres at the tips of the branchlets, about $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. Bracts minute, scale-like, suborbicular. Involucres subsessile or very shortly peduncu-late, scarcely 1 lin. in diam., cup-shaped, glabrous, with 5 glands and 5 or fewer oblong or ovate subciliate lobes; glands $\frac{1}{4}$–$\frac{1}{2}$ lin. in their greater diam., transversely elliptic, entire. Ovary erect, on a stout pedicel about as long as the involucre, glabrous; styles $\frac{1}{3}$ lin. long, free, very deeply bifid.—*E. Tirucalli*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 316, not of Linn. *E. Schimperi*, Pax in Engl. Hochgebirgsfl. Trop. Afr. 285, partly, not of Presl.

Nile Land. Eritrea: near Mai Mafales, 5500–6200 ft., *Schweinfurth*, 345! Sudan: Dakila, south of Roseires, *Muriel*, 67! Abyssinia: Schahagenne, *Schimper*, 896!

The name *E. Tirucalli* has been applied to several African species of *Euphorbia*, but all of them are very distinct from the true *E. Tirucalli*, Linn., which is a native of India, although in the Flora of British India it is stated to have been probably introduced there from Africa. There is, however, no evidence of this and the Indian plant is certainly perfectly distinct from all the African specimens I have seen.

106. **E. negromontana,** *N. E. Br.* A succulent shrub 3–4 ft. high, leafless and spineless, dichotomously or trichotomously much-branched from the base, fleshy, glaucous, probably diœcious; stems or branches $\frac{1}{8}$–$\frac{1}{4}$ in. thick in the specimens seen, terete, glabrous; branchlets opposite, articulated to the branches, 1–1$\frac{1}{4}$ lin. thick (dried), probably 2 lin. or more thick when alive, with the barren ones 4–6 in. long, diverging, straight, and the flowering abbreviated into joints $\frac{1}{8}$–$\frac{1}{2}$ in. long and more or less congested or clustered. Leaves opposite, rudimentary, reduced to very minute scales. Involucres solitary or 3 together,

terminal, with a pair of scale-like bracts at their base, closely sessile, $1\frac{1}{3}$ lin. in diam., broadly cup-shaped, glabrous outside, hairy within in front of the glands, with 5 glands and 5 oblong slightly ciliate or toothed lobes; glands distant, $\frac{1}{2}$ lin. in their greater diam., transversely oblong, entire. Ovary and capsule not seen.—*E. decussata*, Hiern in Cat. Afr. Pl. Welw. i. 944, not of E. Meyer.

Lower Guinea. Angola: Mossamedes; Serra de Montes Negros, *Welwitsch* 632!

107. **E. spartaria,** *N. E. Br.* A succulent leafless shrub 3 ft. high, dichotomously or trichotomously branched. Stems or main branches $\frac{1}{8}$–$\frac{1}{4}$ in. thick, with lateral suberect branches often 1 ft. or more long and $\frac{3}{4}$–1 lin. thick, flowering branchlets $\frac{1}{3}$–$\frac{2}{3}$ lin. thick, all articulated at their origin, terete, ending in 2–4 times forked cymes, glabrous. Leaves opposite, rudimentary, only seen at the base of the involucres, soon deciduous, 1–$1\frac{1}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, spathulate, with the dilated part transversely rhomboid to suborbicular, very obtuse, often apiculate, entire or minutely denticulate, fleshy. Involucre solitary and terminal on each cyme-branch, 1–$1\frac{1}{4}$ lin. in diam., that of the male plant $\frac{3}{4}$–1 lin. deep, scarcely narrowed to the base, cup-shaped; of the female plant $\frac{2}{3}$ lin. deep, distinctly narrowed to the base, funnel-shaped, glabrous outside, pubescent within, with 5 glands and 5 minute oblong or transverse ciliate lobes; glands $\frac{1}{4}$–$\frac{2}{5}$ lin. in their greater diam., transversely oblong, entire. Ovary nearly exserted from the involucre, erect, 3-angled, glabrous; styles $\frac{1}{3}$ lin. long, stout, united for half their length and rising $\frac{1}{5}$ lin. clear above the ovary before spreading, bifid at the apex. Capsule and seeds not seen.

Lower Guinea. German South-west Africa: Hoffmung Farm near Windhoek, *Pearson*, 7560! *Dinter*, 983! in the bed of a river near Windhoek, *Dinter*, 255!

This is closely allied to *E. ephedroides*, E. Meyer, of South Africa, and evidently the tropical representative of it, but the main branches seem to be longer, straighter and rather stouter, giving the plant a different appearance and the styles are not free and spreading directly from their base as they do in *E. ephedroides*.

108. **E. longetuberculosa,** *Hochst. ex Boiss. in DC. Prodr.* xv. ii. 85. Perennial, 6–10 in. high. Primary stem rising 2–3 in. above the ground, erect, clavate, $\frac{3}{4}$–1 in. thick at the top, gradually tapering down to the root, fleshy, covered with cylindric-conical tubercles 1–$2\frac{1}{2}$ lin. long, leafless, glabrous, producing around the top several more slender fleshy tuberculate branches $\frac{3}{4}$–$2\frac{1}{2}$ in. long and 2–3 lin. thick, terminating in 1–2 flowering branches or an umbel of 3 smooth and more herbaceous once to four times forked cymes $2\frac{1}{2}$–6 in. long, glabrous. Leaves on the fleshy branches alternate, $\frac{3}{4}$–$2\frac{1}{4}$ in. long, including the 2–6 lin.-long slender petiole, 3–7 lin. broad, elliptic, oblong-lanceolate to linear-lanceolate, obtuse, apiculate, cuneately narrowed into the petiole; those on the flowering branches opposite, sessile, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, 2–6 lin. broad, elliptic or ovate-lanceolate to linear-lanceolate, acute or obtuse, apiculate, rounded at the base, all glabrous on both sides. Stipules none. Involucres very shortly pedunculate or subsessile, solitary in the forks

of the cyme or terminal, narrowly campanulate or obconic and about $1\frac{1}{4}$ lin. in diam., with 2 glands and 5 erect oblong or subquadrate deeply-fringed lobes, glabrous; glands $1\frac{3}{4}$ lin. long, erect, resembling a narrow slightly flattened tube, slit down the inner side nearly to the base, with incurved margins when dried, minutely toothed at the truncate apex, yellow. Ovary exserted on a pedicel bent nearly at a right angle, erect in fruit, glabrous; styles $1\frac{1}{2}$ lin. long, connate almost or quite to the very apex into a slender upcurved column, which is divided into 6 or fewer minute stigmas. Capsule $\frac{1}{4}$ in. in diam. Seeds $1\frac{3}{4}$–2 lin. long, ovoid, subacute at one end, smooth, encircled by 3 series of slight bumps, scarcely tubercles.—Boiss. Ic. Euphorb. 16, t. 47. *E. longetuberculata*, Boiss. in DC. Prodr. xv. ii. 1264. *Tithymalus Brauni*, Schweinf. in Journ. Bot. 1863, 295, and Beitr. Fl. Aethiop. 38.

Nile Land. Abyssinia: mountains near Gursarfa, 3300–3500 ft., *Schimper*, 2307! near Goelleb, *Schimper*, 221! Somaliland: limestone rocks on the maritime plain, *Thomson*, 89! Somadu, *Ellenbeck*, 276!

Also in Arabia.

109. **E. Pirottæ,** *Terracc. in Ann. Istit. Bot. Roma*, v. 97. A dwarf perennial herb. Main stem 1 in. or more high, simple, thick and turnip-shaped, marked with leaf-scars, then densely dichotomously branched, striate, pilose; branches slender, diverging. Leaves oblong-lanceolate, cuneate at the base, tapering into a long petiole. Cymes subsessile at the apex of the branches. Involucres few, on long peduncles, shortly campanulate, many-toothed, pilose, white-hairy within. Peduncles (? pedicels) recurved in fruit. Capsule deeply sulcate-trigonous, with rounded angles, densely hairy; styles short, united at the base, bifid at the apex. Seeds cylindric-subtrigonous, compressed at the apex, somewhat rounded on the back and transversely and irregularly greyish-undulated (? rugose), with the other sides only undulated at the margins.

Nile Land. Eritrea: Midir Island in Hamfila Bay, *Terracciano*.

110. **E. napoides,** *Pax in Ann. Istit. Bot. Roma*, vi. 187. Perennial. Stem erect, 1–$1\frac{1}{2}$ in. high, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, unbranched, cylindric, fleshy, covered with small tubercles, from which the leaves and cymes arise, naked below, bearing a cluster of leaves and cymes at the very obtuse or subtruncate apex, glabrous. Leaves $1\frac{1}{4}$–2 in. long (or perhaps longer as the tips are all broken off in the specimen seen), $\frac{3}{4}$–1 lin. broad, linear, longitudinally folded and more or less incurved, entire, petiolate, thinly and minutely pubescent, glabrous to the eye. Cymes (including the $\frac{1}{4}$–$\frac{3}{4}$ in.-long peduncle) $\frac{3}{4}$–$1\frac{1}{3}$ in. or less long, once-forked, with an involucre in the fork and 1–2 on each branch or sometimes reduced to bearing only 1 involucre with the lateral branches suppressed, puberulous with minute white curved hairs. Bracts sessile, about $1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad, oblong or oblong-lanceolate, subacute or obtuse, concave, puberulous on both sides. Involucres sessile, cup-shaped, white-puberulous, 1 lin. in diam., with 4 glands and 5 subquadrate toothed or bifid lobes; glands incurved-erect in dried specimens, perhaps spreading when alive, suborbicular and $\frac{1}{3}$–$\frac{1}{2}$ lin. in diam., with a very shallow dark-coloured

pocket-like cavity at the base, rather thin in texture, white-puberulous on the inner face and back, ciliate. Capsule 1½ lin. in diam., with a distinct circular rim-like calyx at its base, puberulous, exserted on a rather stout pedicel about twice as long as the involucre; styles ¾ lin. long, shortly united at the base, minutely bifid at the apex. Seeds nearly 1 lin. long, 4-angularly pyramidal, truncate at the base, with 2 large pits on each face, giving the appearance of a double constriction, and abruptly constricted into the acute apex, glabrous, dark brown.

Nile Land. Somaliland: east of the River Shebeli, *Donaldson-Smith*, 311! Web Karanle, *Riva*, 1002!

E. napoides only differs from the Arabian *E. hadramautica*, Baker (syn. *E. oblongicaulis*, Baker), by the stem being distinctly tuberculate and the pedicel of the ovary rather longer and more slender than in that species, otherwise it is quite the same.

111. **E. rubella,** *Pax in Engl. Jahrb.* xxxiii. 287. Stem probably solitary, erect, 1¼ in. high in the type, nearly ⅓ in. thick, probably stouter when alive, cylindric, fleshy, slightly tuberculate when dried, bearing a crown of 5 or 6 leaves at the apex, glabrous. Leaves erectly spreading, 8–11 lin. long, including the 1½–2 lin.-long petiole, ¼–⅓ in. broad, elliptic, obtuse, apiculate, rounded to acute at the base, glabrous on both sides, purple beneath and more or less suffused with it above. Peduncles arising from the apex of the stem outside the tuft of leaves, ½–⅔ in. long, slender, bearing a small cyme of 1 sessile and 2 shortly pedunculate involucres at its apex, glabrous. Bracts 1½–2 lin. long, broadly obovate, abruptly cuspidate-apiculate at the obtuse apex, thin and veiny. Involucres ¾–1 lin. in diam., cup-shaped, glabrous, with 4 glands and 5 subquadrate lobes cut into 3–4 long teeth at the apex; glands about ½ lin. in their greater diam., transverse, narrowly oblong, peltate, with a depressed centre, entire. Ovary exserted and finally recurved on a pedicel 1⅓ lin. long, glabrous; styles ⅓ lin. long, free to the base, ascending, deeply bifid at the apex, with thickened or capitate stigmas.

Nile Land. Abyssinia: Haquim Mountain, near Harar, *Ellenbeck*, 954!

In habit this is very similar to *E. hadramautica*, Baker, but has broader and glabrous leaves and different cymes.

112. **E. Poissoni,** *Pax in Bull. Mus. Hist. Nat. Paris*, 1902, 62. A succulent much branched bush "of grotesque appearance, 5 ft. high" (*Barter*). Branches cylindric, 1¼–1½ in. thick, somewhat obscurely areolate, scarcely tuberculate when alive, but apparently so when dried, glabrous, greyish, naked or bearing 5–6 deciduous leaves at the apex of the branches, spineless. Leaves spreading, 2½–5½ in. long, 1¾–2¾ in. broad, cuneately obovate, rather deeply notched or shortly 2-lobed at the apex, with the lobes broadly rounded and a minute apiculus in the notch, tapering below into a very short stout petiole, thick and fleshy, glabrous, green. Inflorescence at first consisting of a single involucre, ultimately developing into a small cyme ½–¾ in. in diam. in dried specimens, very shortly and stoutly pedunculate or subsessile in the axils of

the leaves. Involucres on the living plant $\frac{1}{3}$ in. in diam., but very much less in dried specimens, broadly and shortly funnel-shaped, glabrous, green, with 5 glands and 5 broad transverse fringed lobes; glands contiguous, spreading, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. in their greater diam., much smaller when dried, transversely oblong, entire, green. Stamens crimson. Capsule about $\frac{1}{4}$ in. in diam., of 3 subglobose lobes, glabrous, far exserted on a recurved pedicel $\frac{1}{4}$–$\frac{1}{2}$ in. long. Seeds $1\frac{1}{4}$ lin. long, 1 lin. in diam., ellipsoid, smooth, light grey, with a few irregular darker markings.

Upper Guinea. Gold Coast, *Anderson!* Togo: various localities, *Kersting*, 88! 91! 414! 574! Dahomey, *Poisson*. Northern Nigeria: between Kasage and Lom, *Barter*, 1491!

According to Barter, "this is used with an apocynaceous plant to poison arrows." Partly described from a living plant cultivated at Kew.

113. **E. Sapini,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 290, *t.* 80. A stout succulent, 3–4 ft. high, with several branches. Main stem up to 6 in. thick; branches 2–4 in. thick, naked or leafy at the apex only, cylindric, with crowded spirals of slightly prominent diamond-shaped tubercles $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., each marked with a large leaf-scar and bearing a single flattened deflexed brown spine $\frac{1}{4}$–$\frac{1}{2}$ in. long, deciduous with age. Leaves 8–15 in a terminal tuft, recurved-spreading, 8–12 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, strap-shaped or broadly linear, obtuse to emarginate, apiculate, narrowed to a sessile base, green. Cymes arising from the axils of the leaves, on peduncles 4–5 lin. long, bearing 3 involucres, with the lateral on branches 2–$2\frac{1}{2}$ lin. long, glabrous. Bracts $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, elliptic, keeled. Involucre subcampanulate, with transversely elliptic glands $\frac{3}{4}$ lin. in their greater diam. Ovary scarcely exserted; styles about $\frac{1}{2}$ lin. long, spreading, slightly thickened at the apex.—Watson in Gard. Chron. 1909, xlv. 66, fig. 37; De Wild. Comp. Kasai. Miss. Étud. Sc. i. 343, t. 44.

South Central. Belgian Congo: Madibi Bush, *Sapin*.

114. **E. unispina,** *N. E. Br.* A stout succulent bush, up to 10 ft. high, leafy at the tips of the branches, naked below, or perhaps sometimes entirely leafless, spiny. Branches $\frac{3}{4}$–1 in. (or perhaps more) thick, cylindric, with several spiral series of solitary dark grey spines $\frac{1}{8}$–$\frac{1}{2}$ in. long, stout, not much flattened at the base, but very abruptly dilated into convex suborbicular horny light grey shields $\frac{1}{6}$–$\frac{1}{4}$ in. in diam., absent from some parts, glabrous. Leaves few in a tuft at the tips of the branches, 2–$4\frac{1}{2}$ in. long, $\frac{1}{3}$–1 in. broad at the apex, cuneate or linear-cuneate, broadly rounded to rather deeply 2-lobed at the more or less dilated apex, thence gradually tapering to the sessile base, with a short point in the notch and the margin narrowly crisped and frilled all round or entire, fleshy, glabrous on both sides. Cymes small, arising from the axils of the leaf-scars or spine-shields, about $\frac{1}{2}$ in. or less in diam., subsessile, bearing 3–9 involucres, glabrous. Bracts adpressed to the involucres, membranous, about 1 lin. long and as much or more in breadth, suborbicular-ovate, very obtuse, minutely denticulate. Central involucres sessile, lateral very shortly pedunculate, $\frac{1}{8}$ in. in

diam., cup-shaped, glabrous, with 5 glands and 5 subquadrate or transverse fringed lobes; glands contiguous, about $\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire. Capsule $\frac{1}{4}$ in. in diam., somewhat 3-lobed, with the rounded lobes faintly keeled down the back, glabrous, far exserted on a curved and twisted pedicel $\frac{1}{4}$–$\frac{1}{3}$ in. long; styles $\frac{3}{4}$–1 lin. long, shortly united at the base, then recurved-spreading, rather slender, with large dilated or subcapitate tips. Seeds not seen mature, but apparently smooth.

Upper Guinea. Togo: Loso, *Kersting*, 569! Difale, *Kersting*, 573! Northern Nigeria: Katagum District, *Dalziel*, 329!

Closely related to *E. venenifica*, Trém., but the spines are not flattened at the base, the leaves are different in form, more crisped on the margins and the styles longer, less united and more slender.

115. **E. venenifica,** *Trémaux ex Kotschy in Allg. Ueberbl. des Nil-Länder*, 172. A large bush-like or arborescent spiny cactus-like perennial, branching at the base into few or several main cylindric stems several inches thick, which are loosely branched in an irregular manner (ex *Trémaux's* figure). Ultimate branchlets cylindric, 1–$1\frac{1}{2}$ in. thick, with several series of spine-pointed slight tubercles, glabrous. Spines stout, $\frac{1}{4}$–$\frac{1}{3}$ in. long, much dilated or flattened at the base where the hardened part ends abruptly, not extending into a suborbicular horny shield, brown or greyish brown, with a large leaf scar in the axil of each. Leaves deciduous, 3–$10\frac{3}{4}$ in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, narrowly lanceolate, oblanceolate, cuneate or oblong-cuneate, varying from somewhat acuminate to subtruncate, tapering into a short stout petiole or subsessile, entire or finely crisped at the margin, apparently somewhat fleshy, glabrous on both sides. Cymes solitary in the axils of the tubercles, $\frac{1}{2}$–$\frac{3}{4}$ in. long, including the short stout compressed 2–4 lin.-long peduncles, once or twice forked, with the branches 3-flowered. Bracts adpressed to the involucres, submembranous, $1\frac{1}{4}$–2 lin. long, ovate-oblong, very obtuse, toothed at the apex and slightly on the sides, glabrous. Central involucre sessile, lateral shortly pedunculate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 transverse or very broadly cuneate lobes, fringed at the top; glands contiguous, $\frac{3}{4}$–1 lin. in their greater diam., transversely oblong, entire. Ovary and the deeply 3-lobed capsule erect, the latter $3\frac{1}{2}$ lin. in diam. finally exserted on a pedicel up to $\frac{1}{4}$ in. long, glabrous; styles about $\frac{2}{3}$ lin. long, united into a short stout cone at the lower half, with the stout tips recurved-spreading, entire at the dilated apex. Seeds globose, about $1\frac{1}{4}$ lin. in diam., smooth to the eye, but covered with an excessively minute lace-like fibrous reticulation.—Boiss. in DC. Prodr. xv. ii. 178; Schweinf. Beitr. Fl. Aethiop. 36; Pax in Engl. Jahrb. xxxiv. 64. *E. mamillaris*, Trémaux, Voy. Soudan Orient, Atlas, tt. 13–14 with description, not of Linnæus.

Nile Land. Eastern Soudan: mountains of Dar Foq, *Trémaux*. Upper Sennar; Fazokl, &c., *Cienkowsky*, *Hartmann*. Kordofan, *Kotschy*. Jur: Jur Ghattas, *Schweinfurth*, 1375! Abu Gurun's Seriba, *Schweinfurth*, 1827! Mittu; Dukutu, *Schweinfurth*, 2829!

116. **E. Teke,** *Schweinf. ex Pax in Engl. Jahrb.* xix. 118. An enormous tree (*Schweinfurth*). Young branches fleshy, 4-angled, about $\frac{1}{2}$ in. in diam. when dried, glabrous, armed with stipular spines. Leaves 3–12 in. long (including the petiole) and 1–3 in. broad or larger, elongated cuneate-obovate, obtuse or rounded at the apex, gradually tapering from much above the middle into the $\frac{1}{3}$–1 in.-long petiole, coriaceous or somewhat fleshy, with the midrib prominent and rounded beneath, glabrous on both sides. Spines $1\frac{1}{2}$–2 lin. long, straight, blackish, in pairs, diverging, not connected by a horny border along the angles. Cymes in the axils of the leaves, sessile, composed of 2–4 peduncle-like branches $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, each with two smaller branches $\frac{1}{3}$–$\frac{2}{3}$ in. long at the apex, terminating in a sessile solitary involucre. Bracts under the involucre $2\frac{1}{2}$ lin. long, $1\frac{1}{2}$ lin. broad, ovate, obtuse and slightly fringed at the apex, keeled down the back, thin and submembranous, only present on the youngest involucres, very deciduous, leaving prominent rigid scars. Involucre $4\frac{1}{2}$–5 lin. in diam. and about 2 lin. deep, broadly cup-shaped, with 5 glands and 5 broadly cuneate transverse lobes, fringed with fine teeth along the truncate top, glabrous outside and within; glands $1\frac{3}{4}$–3 lin. in their greater diam., transversely elliptic-oblong, entire. Ovary glabrous, on a very stout pedicel shorter than the stamens, erect, with a calyx of 3 subulate lobes 1–$1\frac{1}{2}$ lin. long, often with a smaller tooth at their base; styles 1–$1\frac{1}{4}$ lin. long, very shortly united at the base, recurved-spreading, slender, with minutely bifid thickened or clavate stigmas. Fruit not seen.—Pax in Engl. Jahrb. xxxiv. 68. *E. Laurentii*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 289.

South Central. Belgian Congo: Niamniam; near the River Diagbe, *Schweinfurth*, 3293! near the River Yuru, *Schweinfurth*, iii. 143. Eala (cultivated) Laurent, *Pynaert*, 696; road to Bambili Amandi, *Seret*, 251; and Bamanica, *Laurent*, 803 ex *De Wildeman*.

This species so closely resembles *Elæophorbia drupifera*, Stapf, that in the absence of fruit it might easily be referred to that genus. The pedicel and ovary, however, are not confluent as in that genus; there is a distinct calyx and the young fruit has the thin cell-walls of *Euphorbia*, instead of being very thick and fleshy as in *Elæophorbia*. I have not seen specimens of *E. Laurentii*, but find no character in the brief description to distinguish it from *E. Teke*.

117. **E. leonensis,** *N. E. Br.* A shrub, with fleshy (probably) 4-angled branches about $\frac{1}{2}$ in. in diam. when dried, armed with stipular spines, glabrous. Leaves $2\frac{1}{4}$–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in broad, cuneately oblong-obovate, obtuse or rounded at the apex, gradually and acutely tapering from above the middle into a short petiole, entire, coriaceous or somewhat fleshy, with an acutely prominent midrib beneath, glabrous on both sides. Spines 1–$1\frac{1}{2}$ in. long, straight, brown, in pairs, not connected by a horny border along the angles. Cymes sessile, apparently 3–5-flowered, $\frac{3}{4}$–1 in. in diam., with the glabrous branches not more than $\frac{1}{4}$ in. long. Bracts about 2 lin. long and $1\frac{3}{4}$–$2\frac{1}{2}$ lin. broad, very broadly ovate, obtuse, mucronate, with slightly torn or toothed margins, submembranous. Involucre $3\frac{1}{2}$–4 lin. in diam., 2 lin. deep, broadly and shallowly cup-shaped, glabrous outside and within,

with 5 glands and 5 transversely oblong lobes, broadly cuneate at their base and deeply fringe-toothed at the truncate top; glands $1\frac{3}{4}$–2 lin. in their greater diam., transverse, with a very rounded outer and straight raised or rim-like inner margin, entire. Ovary acutely 3-angled, with a calyx of 3 minute rounded lobes about $\frac{1}{5}$ lin. long at its base, glabrous, on a very short stout pedicel, with only the styles exserted beyond the level of the stamens at the time of flowering; styles $\frac{3}{4}$ lin. long, united for about $\frac{1}{3}$ of their length, then spreading, with thickened channelled truncate stigmas. Capsule and seeds not seen.

Upper Guinea. Sierra Leone: near Regent, *Scott-Elliot*, 4112!

118. **E. graciliramea,** *Pax in Engl. Jahrb.* xxxiv. 78. A leafless spiny succulent. The type consists of 5 simple fleshy branches 5–$6\frac{1}{2}$ in. long and $\frac{1}{6}$ in. thick, but probably stouter when alive, somewhat 4-angled, from opposite pairs of short teeth running out into long spines and decurrent below, but without horny margins. Leaves rudimentary, minute, scale-like. Spines $\frac{1}{4}$–$\frac{2}{3}$ in. long, opposite, widely spreading, solitary, with 2 minute prickles at the base of each, grey. Flowering-eyes in the axils of the spines. Involucres 3 together, sessile, $1\frac{1}{4}$–$1\frac{1}{3}$ lin. in diam., broadly obconic, glabrous, with 5 glands and 5 erect subquadrate fringe-toothed lobes; glands contiguous, about $\frac{2}{3}$ lin. in their greater diam., transversely oblong, entire. Ovary glabrous, with a small cupular subtruncate calyx at its base, shortly pedicellate, perhaps ultimately exserted; styles $\frac{2}{3}$ lin. long, united at the base, then recurved-spreading, with rather large capitate entire stigmas.

East Africa (German or British?): without precise locality, *Fischer*, 522!

119. **E. triaculeata,** *Forsk. Fl. Ægypt.-Arab.* 94. A bushy leafless spiny succulent, 5–20 in. high. Stems or branches 3–5 lin. thick (dried), 3–5- (rarely 7-) angled; angles sometimes very prominent, compressed (in dried specimens), with deep notches, forming triangular teeth (? tubercles when alive) nearly as long as broad, sometimes but slightly prominent and more rib-like, with slightly raised teeth, each margined with a horny grey linear shield having a short lobe on each side at its apex, bearing 1 straight needle-like spine $\frac{1}{3}$–$1\frac{1}{4}$ in. long with a pair of prickles $\frac{1}{2}$–$1\frac{1}{2}$ lin. long at its base. Cymes small, solitary in the axils of the teeth, with 3 involucres, subsessile. Bracts scale-like, about $\frac{2}{3}$ lin. long, ovate or suborbicular, concave, obtuse, minutely toothed. Involucre $1\frac{3}{4}$–2 lin. in diam., perhaps larger when alive, broadly funnel-shaped, glabrous, with the glands united into an entire or 5–6-lobed spreading rim, rarely partly free, surrounding 5–6 transversely rectangular or subquadrate fringed lobes. Ovary not exserted in the specimens seen, glabrous; styles $\frac{3}{4}$ lin. long, very shortly united at the base, slender, entire and slightly thickened at the apex. Capsule and seeds not seen.—Vahl, Symb. ii. 53; Willd. Sp. Pl. ii. 884; Boiss. in DC. Prodr. xv. ii. 85; Schweinf. Beitr. Fl. Aethiop. 36, and in Bull. Herb. Boiss. vii. App. ii. 328; Pax in Engl. Jahrb. xxxiv. 78; Berger, Sukk. Euphorb. 88. *E. triacantha,* Pax in Engl. Jahrb. xxxiv. 79, not of

Ehrenb. *E. infesta*, Pax in Engl. Jahrb. xxxiv. 80. *E. sp.*, Courbon in Ann. Sc. Nat. 4me sér. xviii. 149.

Nile Land. Nubia: Uaratab Mountain, near Suakin, *Schweinfurth*, 840! Chor Sseterra, south of Suakin, *Schweinfurth*, 841! Olao, *Johnston*, 9! Eritrea: Ras Gerar, *Beccari!* Howakel Island, *Ehrenberg!* Dessi Island, *Schweinfurth! Courbon.* Near Massowa, *Schweinfurth*, 87, 1781; Saati, *Schweinfurth*, 81 (all ex *Schweinfurth*). Somaliland: Dadab, *Ellenbeck*, 157!

E. infesta, Pax, is described from a specimen preserved in fluid, which retains its original size and form, but is not in any way distinct from *E. triaculeata*.

Var. *triacantha*, N. E. Br. Branches 2–2½ lin. thick when dried; spines rather more slender than in the type. Involucres 1¼ lin. in diam. Otherwise as in the type and apparently passing into it.—*E. triacantha*, Ehrenb. ex Boiss. in DC. Prodr. xv. ii. 85; Schweinfurth, Beitr. Fl. Aethiop. 36; Terracc. in Ann. Istit. Bot. Roma, v. 98; Berger, Sukk. Euphorb. 88. *E. Fauroti*, Franchet in Morot, Journ. de Bot. i. 135; Pax in Engl. Jahrb. xxxiv. 79.

Nile Land. Eritrea: Toalut Island, *Ehrenberg!* various islands in Hamfila Bay, *Terracciano.* Obeck: Dullul; on the sea-shore and in the valley, *Roth!* on rocks near Obock, *Faurot.*

In Ann. Istit. Bot. Roma, v. 98, Terracciano quotes specimens collected on the islands in Hamfila Bay, Eritrea, and Pax in vol. vi. 186, quotes specimens collected by Robecchi and by Riva in Somaliland, but some of these may belong to typical *E. triaculeata*; I have not seen them.

120. **E. monacantha,** *Pax in Engl. Jahrb.* xxxiii. 285 *and* xxxiv. 63. A much-branched leafless very spiny succulent 4–8 in. high. Stems or branches ¼–½ in. thick when dried, apparently cylindric, with several spiral series of tubercles or several tuberculate angles, each tubercle bearing 1 spreading grey spine ⅓–¾ in. long, with or without a pair of small or minute prickles ⅙–1 lin. long at its base, on a more or less 3-lobed shortly decurrent horny grey shield. Leaves very rudimentary, scale-like, soon deciduous. Involucres 3 together in the axils of the shields, sessile or on peduncles ½–⅔ lin. long, bearing a pair of oblong or ovate toothed bracts at their apex, cup-shaped, 1¼–1¾ lin. in diam., yellow, with 5 glands and 5 large broadly cuneate or cuneate-obovate fringed lobes; glands variable, contiguous or separated, sometimes even on the same involucre, ½–¾ lin. in their greater diam., varying from subquadrate to transversely oblong, somewhat undulating, from the side margins being recurved. Ovary sessile or shortly pedicellate, perhaps exserted in fruit, glabrous; styles about 1 lin. long, united for ⅓–½ their length, slender, with more or less thickened entire tips.—*E. triacantha*, Pax in Ann. Istit. Bot. Roma, vi. 186, not of Ehrenberg. *E. xylacantha*, Pax in Engl. Jahrb. xxxiv. 79.

Nile Land. Gallaland: Arussi Country, at Gorobube, *Ellenbeck*, 1974! Somaliland: between Berbera and Harar without precise locality, *Ruspoli & Riva*, 31! 354! and 324 ex *Pax*.

Dr. Pax has founded two species upon this plant and placed them in two different groups, characterised by the presence or absence of the pair of small prickles at the base of the spine; but as in nearly all the species having these prickles (which are really the stipules of the rudimentary leaves), they are sometimes well developed, sometimes reduced to almost imperceptible points, there is no specific distinction.

121. **E. schizacantha,** *Pax in Ann. Istit. Bot. Roma,* vi. 187. Succulent, leafless and spiny, up to 4 ft. high. Main stem fleshy 1½–2 in. thick, densely covered throughout with ascending-spreading branches 2–3¼ in. long and ⅙–¼ in. thick when dried, somewhat 4-angled, from opposite pairs of prominent teeth 1–1½ lin. long, each with a solitary spine 3–10 lin. long, forked at the apex, with the forks straight and much shorter than the shaft and a pair of recurved prickles 1–2 lin. long at the base, on long linear-decurrent horny shields. Flowers and fruit unknown.—Pax in Engl. Jahrb. xxxiv. 80.

Nile Land. Somaliland: Web Ruspoli (Elba), *Riva,* 697 ! 764.

Closely allied to *E. glochidiata,* but the peculiar habit and longer spines with straight (not recurved) forks readily distinguish it. With age the surface of the spines decomposes so as to make them sometimes appear to be pubescent.

122. **E. glochidiata,** *Pax in Ann. Istit. Bot. Roma,* vi. 187. A succulent branching leafless spiny shrub 1½–3 ft. high, glabrous. Branchlets slender, about ¼ in. thick in the dried specimens, ascending or spreading, 4-angled, with nearly flat sides; angles not very prominent, not sinuate nor distinctly toothed. Leaves not seen, probably scale-like. Main spines solitary, forked at the tips, ½–¾ in. apart, horizontally spreading, 2½–4 lin. long, with the forks shorter than the shaft, widely diverging-recurved and with a pair of diverging-ascending prickles ½–1 lin. long at the base, brown or grey, on a long linear grey or brown shield decurrent below the spines as a horny border nearly to the group of spines below. Flowering-eyes touching the apex of the shields. Involucres 3 together, sessile, 2½–3 lin. in diam., very shallowly cup-shaped or almost saucer-shaped when fully developed, glabrous, apparently red or purplish, with a spreading slightly 5-notched continuous rim-like gland or margin surrounding 5 contiguous broad transversely oblong fringe-toothed lobes. Ovary (immature) glabrous, without a distinct calyx, seated on a short and very stout pedicel, probably exserted at maturity; styles 1 lin. long, shortly united at the base, recurved-spreading, rather slender, entire and very slightly thickened at the apex.—Pax in Engl. Jahrb. xxxiv. 79.

Nile Land. Somaliland: Web Karanle, *Ruspoli & Riva,* 1018! 1122; Maju to Aroris, *Ellenbeck,* 1075!

In all structural characters this plant is a *Synadenium* and only differs from that genus in its habit.

123. **E. furcata,** *N. E. Br.* A succulent leafless spiny perennial. Branches when dried about 2 lin. in diam., apparently 4-angled, glabrous; angles compressed, produced into deltoid-subulate or spine-like horny-margined tubercles 2–5 lin. long and ½–¾ in. apart, forked into 2 small spines ½–¾ lin. long at the apex and bearing a pair of slender dark brown spines 1–1½ lin. long at the base, with the dark brown horny margin of the tubercles decurrent to about half-way to the tubercle below. Cymes arising from the axils of the small pair of spines, solitary or 2 together, pedunculate, bearing 3 involucres, glabrous; peduncles 2–3 lin. long, with the 2 lateral branches 1½ lin. long. Bracts ⅔ lin.

long, oblong, toothed or lobed at the subtruncate apex. Involucres $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., with the central one shortly pedunculate, broadly obconic or funnel-shaped, and the lateral pair subsessile between their bracts, and more cup-shaped, glabrous, with 4–5 glands and 4–5 broadly cuneate fringed lobes; glands $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire, contiguous or perhaps sometimes more or less united. Ovary (young) not exserted, glabrous; styles $\frac{3}{4}$ lin. long, shortly united at the base, entire and not thickened at the apex.

Nile Land. British East Africa: without locality, *Kässner !*

The only specimen seen consists of 4 pieces of stem 3–4 in. long, apparently split down the middle, which are mixed with a specimen of *E. taitensis*, Pax, in the British Museum, but have evidently got misplaced, as other sets of Kässner's do not contain this species mixed with *E. taitensis*. It is closely allied to *E. glochidiata*, Pax, but differs in having pedunculate cymes and the stem-angles produced into spine-like tubercles which are fleshy with horny margins at the basal $\frac{2}{3}$, whilst in *E. glochidiata* the slender forked spine arises direct from the toothless angle.

124. **E. uhligiana,** *Pax in Engl. Jahrb.* xliii. 86. A dwarf leafless spiny succulent, apparently about 4–8 in. high, branching into several simple or branched stems $\frac{1}{4}$–$\frac{1}{3}$ in. thick when dried, interruptedly 4-angled, with the angles formed of very prominent compressed acute teeth with narrow horny grey margins (shields) more or less prolonged into a sort of neck supporting the spines and decurrent $\frac{1}{2}$–$\frac{3}{4}$ of the way down to the tooth below. Leaves minute, rudimentary, scale-like. Spines 3–6 lin. long, diverging, grey, with a pair of prickles $\frac{1}{4}$–2 lin. long at the base of the tooth. Involucres 1–3 together (really in 3-flowered cymes), sessile in the axils of the teeth, $1\frac{1}{3}$ lin. in diam., cup-shaped, glabrous, with the erect (? spreading when alive) rim divided into 5–7 lobes (glands) by cut-like notches. Ovary and young capsule subsessile, not wholly exserted, glabrous; styles $\frac{3}{4}$ lin. long, slender, free nearly to the base, recurved, shortly 2-lobed at the apex.

Nile Land. British East Africa: on very dry rocks at Ngomeni, *Scott-Elliot*, 6271!

Mozamb. Distr. German East Africa: hill near Ngaruka, *Uhlig*, 227! near Mwembe, *Uhlig*, 88! Ngrimasi Mountain, *Merker*, 584!

Very closely allied to *E. Schinzii*, Pax, but the spines and horny margins of the teeth are grey (brown on *Scott-Elliot's* specimen, which otherwise seems to be this species) and the apex of the teeth is much more acute and more prolonged than in *E. Schinzii*. This species, by the short union of the basal part of the two spines into one, forms a distinct connecting-link between the single-spined species, such as *E. triaculeata* and *E. monacantha*, by means of *E. furcata* and *E. schizacantha* on the one hand and the large series of distinctly 2-spined species on the other hand.

125. **E. Schinzii,** *Pax in Bull. Herb. Boiss.* vi. 739. A dwarf spiny leafless succulent. Stems 4–8 in. high, simple or much-branched, 4-angled, 4–5 lin. square, slightly channelled down the sides, with the opposing angles constricted so as to form opposite teeth or lobes $\frac{1}{4}$–$\frac{3}{4}$ in. apart, with their upper slope nearly truncate and that below the spines gradual, margined by the narrow horny brown shields, which are not produced beyond the fleshy apex of the tooth into a sort of neck

supporting the spines and extend $\frac{1}{2}$–$\frac{2}{3}$ of the way down to the tooth below, with a pair of spines and a pair of prickles to each tooth. Spines 2–6 lin. long, diverging, brown; prickles $\frac{1}{4}$–1 lin. long, sometimes nearly or quite obsolete. Involucres 3 together, sessile in the axils of the teeth, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., shallowly cup-shaped, glabrous, bright yellow, with 5 glands and 5 broadly obovate fringed lobes; glands $\frac{3}{4}$–1 lin. in their greater diam., transversely oblong, entire, with the inner margin turned up in a slight ridge or the middle of it incurved and forming a slight lip. Ovary sessile, glabrous; styles 1–$1\frac{1}{4}$ lin. long, shortly united at the base, more or less thickened at the apex, entire or minutely bifid.—Pax in Engl. Jahrb. xxxiv. 82.

Mozamb. Distr. Tropical South Africa, *Baines!* Rhodesia: near Buluwayo, 4469 ft., *Eyles*, 1247! *Rand*, 396!

Also in South Africa.

126. **E. torta,** *Pax & K. Hoffm. in Engl. Jahrb.* xlv. 240. A dwarf succulent, leafless and spiny, about 4 in. high, with numerous stems erect from a tuberous rootstock. Stems probably about $\frac{1}{4}$ in. in diam. when alive, much less dried, unbranched, 4-angled and more or less twisted, glabrous; angles toothed, with horny brown margins interrupted at the base of the teeth or continuous; teeth $2\frac{1}{2}$–5 lin. apart, with their upper slope very short and nearly truncate and that below the spines gradual. Leaves rudimentary, minute, scale-like. Spines in widely diverging pairs 1 lin. long at the apex of the teeth and a pair of prickles $\frac{1}{2}$–$\frac{2}{3}$ lin. long immediately in front of them, directed inwards on either side of the stem-angles. Flowers and fruit absent from the type specimens.

Mozamb. Distr. German East Africa: Tabora, *Trotha*, 167!

127. **E. angustiflora,** *Pax in Engl. Jahrb.* xxxiv. 82. A dwarf much-branched very spiny leafless succulent about 1 ft. high or less. Branches $\frac{1}{4}$–$\frac{1}{2}$ in. in diam. (less when dried), mostly 4-angled, with the opposing angles constricted so as to form opposite teeth or lobes $\frac{1}{4}$–$\frac{2}{3}$ in. apart and nearly truncate at the top and sloping inwards below the spines to form the constriction, sometimes with only 3 spirally twisted toothed angles, glabrous. Leaves rudimentary, $\frac{1}{2}$ lin. long and nearly as broad, deltoid-ovate, acute; soon deciduous. Spines in pairs at the apex of the teeth, 2–$3\frac{1}{2}$ lin. long, slender but very rigid, diverging, dark brown, with a pair of prickles $\frac{1}{2}$–1 lin. long at their base or sometimes nearly obsolete, seated on narrow horny bright chestnut-brown shields, decurrent $1\frac{1}{2}$–3 lin. below the spines, but never forming a continuous horny margin to the angles. Flowering-eyes nearly or quite touching the apex of the shields. Cymes on peduncles $\frac{1}{2}$–1 lin. long, glabrous, very immature in the specimens seen, with 3 involucres, the central on a distinct peduncle $\frac{1}{2}$–$\frac{2}{3}$ lin. long, subglobose and $\frac{2}{3}$–$\frac{3}{4}$ lin. in diam., but evidently only in bud, glabrous with 5 glands and 5 cuneately subquadrate fringed lobes; glands immature $\frac{1}{3}$ lin. broad, half-circular; lateral involucres in very young bud.—*E. Schinzii,* Pax in Engl. Jahrb. xxx. 341, not of Bull. Herb. Boiss. vi. 739.

Mozamb. Distr. German East Africa: Ubungu; on the Olunga Mountains, 4900 ft., *Goetze*, 1095!

Described from the type. This is extremely like *E. Schinzii* in appearance, but the pedunculate cymes, with the central involucre also pedunculate, easily distinguish it from that species.

128. **E. tetracanthoides,** *Pax in Engl. Jahrb.* xxx. 342. A leafless spiny succulent, 8–12 in. high and up to 2 ft. in diam. Branches 4–5 lin. in diam. when dried, 5–7 lin. when alive, 4-angled, glaucous. Angles subcompressed, crenate or with broadly rounded teeth. Leaves rudimentary, scale-like, deltoid, acute. Spines 1–2 lin. long, in pairs $\frac{1}{4}$–$\frac{1}{3}$ in. apart, diverging, grey, with a pair of minute and often recurved prickles near their base, on horny grey shields decurrent nearly or quite to the flowering-eyes below, occasionally forming continuous horny margins to the stem-angles. Flowering-eyes touching the apex of the shields but not enclosed in them. Cymes solitary, probably sessile, with 3 involucres, but very immature.—Pax in Engl. Jahrb. xxxiv. 82.

Mozamb. Distr. German East Africa: Livingstone (Kinga) Mountains, *Goetze*, 1004!

129. **E. cœrulans,** *Pax in Bull. Herb. Boiss.* vi. 739. A spiny leafless succulent, apparently with a large fleshy irregular or tuberous rootstock, producing numerous erect unbranched stems 1–2 in. long and about $\frac{1}{3}$ in. thick, thinner when dried, 4-angled, glabrous, apparently light green; angles scarcely toothed or tuberculate, with obovate grey horny shields 2–$2\frac{1}{2}$ lin. long and $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, 2–4 lin. apart, pointed below, subtruncate at the apex, bearing 2 pairs of grey spines, with the upper pair minute or up to 1 lin. long and the lower about 2 lin. long, straight, diverging. Leaves rudimentary, minute and scale-like. Flowering-eyes at the apex of the spine-shields. Involucres 3 together, crowded, sessile, 2 lin. in diam., cup-shaped, glabrous, with 5 or rarely 4 glands and 5 subquadrate fringed lobes; glands contiguous, spreading, 1–$1\frac{1}{2}$ lin. in their greater diam., transversely oblong, entire, yellow. Ovary very young, sessile, glabrous; styles 1 lin. long, shortly united at the base, slender, entire at the apex. Mature ovary and capsule not seen.—Pax in Engl. Jahrb. xxxiv. 81, 375.

Lower Guinea. Angola: Humpata, *Miss Fritzsche*, 218! *Dekindt*, 829.

The type, which I have not seen, is described as having stems up to $3\frac{1}{4}$ in. long, but Miss Fritzsche's specimen, named *E. cœrulans* by Dr. Pax, otherwise agrees with the original description.

130. **E. tortistyla,** *N. E. Br.* Probably dwarf, succulent, leafless, spiny, glabrous. Branches of the only specimen seen 2–$3\frac{1}{2}$ in. long, $\frac{1}{4}$ in. or less thick, subcylindric? or obscurely 4-angled; angles not evident except by the arrangement of the spine-pairs, and certainly rounded, not sinuate. Leaves not seen, probably rudimentary and scale-like. Spines $\frac{1}{2}$–$2\frac{1}{2}$ lin. long, in pairs on small ovate or elliptic horny shields 3–5 lin. apart, arranged in opposite pairs in 4 vertical series, greyish. Flowering

eyes at the apex of the branches close to the spine-shields, lower down at 2–3 lin. above them. Cymes sessile, with 3 involucres, 2 of them on lateral peduncle-like branches $\frac{1}{2}$–1 lin. long. Bracts small, membranous, oblong, acute or toothed at the apex. Involucre $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., cup-shaped, with a rim-like mark around the middle when hermaphrodite, glabrous, with 5 glands and 5 quadrate fringed lobes; glands $\frac{2}{3}$–1 lin. in their greater diam., transversely linear-oblong, erect and closely contiguous in fruit, probably spreading in flower. Capsule immature, $1\frac{2}{3}$ lin. in diam., glabrous, with a slight rim-like calyx at its base, erect on a pedicel shorter than the involucre; styles $\frac{2}{3}$ lin. long, united at the base, then recurved and curled like a cork-screw, slender, thickened at the apex.

Mozamb. Distr. Rhodesia: Victoria, *Monro*, 490!

131. **E. brevis,** *N. E. Br.* Perennial, succulent, leafless, spiny. Rootstock a tuber, sometimes several inches in diam. Stems numerous, erect, 2–3 in. high, slender, 2–$2\frac{1}{2}$ lin. in diam., 3-angled, glabrous, yellowish-green; angles acute, more or less sinuate-toothed. Leaves very rudimentary, scale-like, about $\frac{1}{3}$ lin. long and $\frac{1}{2}$ lin. broad, broadly deltoid. Spines 1–2 lin. long, in pairs 4–6 lin. apart, widely diverging and dilated at the base so as to form horny shields not longer than their breadth at the base, and bearing on the upper margin a semicircular leaf-scar. Flowering-eyes in the axil of and closely contiguous to the spine-shields. Cymes with peduncles 3–5 lin. long, at first with 1 sessile male involucre, ultimately developing into a simple 2-branched cyme, with fertile involucres on branches $\frac{1}{4}$–$\frac{1}{3}$ in. long, glabrous. Bracts $\frac{2}{3}$–$1\frac{1}{2}$ lin. long, with the lower rounded and the upper obovate, very obtuse or rounded at the apex, apiculate, denticulate. Involucres when fully developed and fertile about 2 lin. in diam. (developed males not seen), cup-shaped, glabrous, yellowish, with 5 glands and 5 rather large erect transversely oblong fringe-toothed lobes; glands contiguous, about 1 lin. in their greater diam., transversely oblong, entire, minutely granulate on the upper surface. Ovary acutely 3-angled, glabrous, with a rudimentary rim-like calyx at its base, exserted on a moderately stout recurved pedicel about $\frac{1}{4}$ in. long; styles $\frac{3}{4}$ lin. long, very shortly united at the base, spreading, bifid at the apex. Capsule and seeds not seen.

Lower Guinea. Angola: in shrub-grown thickets and pasturage above the torrent of the River Cuba Quembo, rare, *Gossweiler*, 2595! not uncommon here and there at Kassuango thickets, *Gossweiler*, 3262!

132. **E. imitata,** *N. E. Br.* Rootstock a globular tuber. Stems numerous, erect, 2–3 in. high, slender, $\frac{1}{8}$–$\frac{1}{6}$ in. thick when dried, terete at the base, 3-angled above, glabrous, yellowish-green; angles acute, sinuate-toothed. Leaves rudimentary, scale-like. Spines $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, in pairs 4–5 lin. apart, dilated at the base, forming shields (including the semicircular leaf-scar, which sometimes has a minute prickle (stipule) on each side of it) not longer than broad. Flowering-eyes in the axils of and close to the spine-shields. Cymes subsessile, at first consisting of a solitary involucre, ultimately of three. Bracts about $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin.

broad, oblong or subrectangular, toothed at the truncate apex, often keeled down the back, glabrous. Involucre $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 subquadrate or transversely oblong toothed lobes; glands subcontiguous, $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., narrowly transverse-oblong, entire. Ovary acutely 3-angled, glabrous, with a rudimentary rim-like calyx at its base, on a very short pedicel and only partly exserted from the involucre; styles about $\frac{1}{2}$ lin. long, united nearly to the middle, then spreading, entire at the apex. Capsule and seeds not seen.

Lower Guinea. Angola: between granite rocks in mixed woods on the right bank of the River Cutato, near Soba Cuniunga, rather rare, *Gossweiler*, 1897!

133. **E. Johnsonii,** *N. E. Br.* A succulent leafless spiny perennial 6–9 in. high. Branches 3-angled, flexuous, $\frac{1}{4}$–$\frac{1}{3}$ in. thick when dried, "green, with a white stripe down the centre of each face" (*Johnson*), glabrous; angles with deltoid tubercles $\frac{2}{3}$–$\frac{3}{4}$ in. apart, bearing a pair of diverging grey needle-like spines 2–4 lin. long on narrow horny shields, decurrent 2–5 lin. below the spines. Peduncles solitary in the axils of the upper tubercles, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, 1-flowered in the specimen seen, but probably ultimately 3-flowered. Bracts about $\frac{3}{4}$ lin. long, broadly ovate, obtuse, apiculate. Involucre sessile, 2 lin. in diam., obconic cup-shaped, glabrous, with 5 glands and 5 broadly cuneate or transversely elliptic fringed lobes; glands $\frac{3}{4}$–1 lin. in their greater diam., erect, transversely linear-oblong with parallel, nearly straight margins, sometimes slightly 2-lipped. "Flowers (glands?) pinky-yellow" (*Johnson*). Ovary much exserted on a recurved pedicel, glabrous; styles $\frac{2}{3}$ lin. long, united at the base into a sort of nipple, minutely 2-lobed at the apex. Capsule and seeds not seen.

Mozamb. Distr. Portuguese East Africa: Mozambique, at Cherinda, *Johnson!*

134. **E. taitensis,** *Pax in Engl. Jahrb.* xxxiv. 83. A bush $1\frac{1}{2}$–2 ft. high, leafless, spiny, succulent above, becoming woody below. Stems and branches slender, about $\frac{1}{6}$–$\frac{1}{3}$ in. in diam. when dried, with opposite or alternate rather distant ascending or erect branches, 4-angled, but the older parts subterete and the angles very slightly prominent except at the short and very broadly deltoid teeth. Leaves very rudimentary, minute, scale-like. Spines slender, blackish, a pair 1–$2\frac{1}{2}$ lin. long at the apex of each tooth and a pair of prickles $\frac{1}{3}$–$\frac{3}{4}$ lin. long (or sometimes abortive) $\frac{3}{4}$–2 lin. above them, on long linear dark brown horny shields decurrent nearly to the shields below, but not forming continuous horny margins to the stem-angles. Flowering-eyes at the apex of the shields in the axils of the small prickles. Cymes sessile or subsessile, solitary, ultimately with 3 involucres, glabrous. Involucres 1–$1\frac{1}{4}$ lin. in diam., funnel-shaped or sometimes somewhat bowl-shaped, glabrous, with the glands united into a slightly 5-crenate rim or here and there separated by slight cut-like notches, surrounding 5 broad transverse fringed lobes. Ovary 3-lobed as seen from above, exserted on a pedicel as long as the involucre, glabrous; styles $\frac{1}{2}$–$\frac{2}{3}$ lin. long, shortly united into a

cone at the base, then spreading-recurved, thickened at the apex. Capsule about $1\frac{1}{4}$ lin. in diam. Seeds not seen.

Nile Land. British East Africa: Taita district, at Buitchuma, *Hildebrandt*, 2859! Inepangu ma chumpe swano, *Kässner*, 430! Voi, *Mildbraed*, 12!

135. **E. heterochroma,** *Pax in Engl. Pfl. Ost-Afr. C.* 242. A spiny succulent leafless bush $1\frac{1}{2}$–6 ft. high, branching at the base. Branches ascending, when young $\frac{1}{2}$–1 in. in diam., less when dried, 4–5-angled, usually with distant slight constrictions, sides concave, becoming nearly flat with age, glabrous, light green, slightly glaucous; angles slightly compressed, with the margins even or more or less distinctly sinuate-toothed, sometimes on the same branch and the spine-shields sometimes united into a continuous dark brown or grey horny border, sometimes interrupted at the flowering-eyes. Leaves rudimentary, scale-like, about $\frac{3}{4}$ lin. long, ovate, acute. Spines $\frac{1}{4}$–3 lin. long, sometimes obsolete, in pairs $\frac{1}{4}$–$\frac{3}{4}$ in. apart, diverging, with or without a pair of minute prickles or points near their base, dark grey. Flowering-eyes 1–$2\frac{1}{2}$ lin. above the spine-pairs. Cymes sessile or subsessile, solitary, with 3 or fewer involucres. Central involucre male, sessile, deciduous, lateral on peduncles (cyme-branches) $\frac{1}{2}$–1 lin. long, hermaphrodite, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., somewhat obconic, glabrous, with 5–6 subquadrate or transversely rectangular toothed lobes; glands contiguous or only separated by cut-like notches or united into a continuous rim, when separate $\frac{2}{3}$–1 lin. in their greater diam., transversely oblong, entire, yellow. Capsule about 2 lin. in diam., 3-angled or somewhat 3-lobed as seen from above, glabrous, exserted much beyond the involucre on a slender curved pedicel $\frac{1}{4}$ in. long; styles $\frac{2}{3}$–1 lin. long, shortly united at the base, then spreading, slender, with thickened or subcapitate tips. Seeds smooth.—Pax in Engl. Jahrb. xxiii. 532, and xxxiv. 83; Volkens in Notizbl. Königl. Bot. Gart. Berlin, ii. 266; Berger, Sukk. Euphorb. 60. *E. Stuhlmannii*, Schweinf. ex Volkens in Notizbl. Königl. Bot. Gart. Berlin, ii. 267, not of Pax; Pax in Engl. Jahrb. xxxiv. 70 (not of xxiii. 535). *E. impervia*, Berger, Sukk. Euphorb. 64. *E. Stapfii*, Berger, Sukk. Euphorb. 59.

Nile Land. Uganda: cultivated at Entebbe, *Brown*, 227! Menjo, *Stuhlmann*, 1301! British East Africa: Gimba Mountain, near Voi, *Uhlig!*

Mozamb. Distr. German East Africa: Kilimanjaro; by the Himo River, 2900 ft., *Volkens*, 1759! near Rorchoto Village, *Uhlig*, 242! Usambara; steppe, east of Pare Mountains, 2200 ft., *Uhlig*, 811A! near Pangani, *Stuhlmann*, 70! and without precise locality, *Fischer*, 182!

Var. *mitis*, N. E. Br. Stems $\frac{1}{4}$–$\frac{1}{3}$ in. in diam. in the type, but having been preserved in alcohol are much shrunk, 4-angled, with flattish sides; angles not toothed, with the narrow linear spine-shields sometimes quite separate, sometimes united into a continuous horny dark brown margin to the angles, spineless or occasionally bearing a very minute pair of prickles below the leaf-scars. Involucre about 1 lin. in diam. Capsule $1\frac{3}{4}$ lin. in diam., exserted on a recurved pedicel $\frac{1}{6}$ in. long; styles $\frac{1}{3}$ lin. long. Otherwise as in the type.—*E. mitis*, Pax in Engl. Jahrb. xxxiv. 70.

Mozamb. Distr.—German East Africa: at the foot of the Pare Mountains, between Madji-ya-juu and Sengina, 2200 ft., *Engler*, 1613!

Partly described from living plants cultivated at Kew, which were sent from Uganda by Mr. E. Brown.

E. heterochroma is placed by Pax in a group supposed to be characterised by the presence of 4 spines to each spine-shield, whilst *E. Stuhlmannii* is placed in another group having only 2. But the 4 spines in this, as in all other cases, are composed of the usual pair of spines developed below each leaf and a pair of small prickles or rarely spines (really stipules) placed one on each side of the leaf-scar. These prickles are sometimes well developed, sometimes quite absent on the same branch, and I find them to be, in most cases, quite useless for distinctive purposes. *E. heterochroma* is a case in point, for on some parts of the specimens composing the type gathering the prickles are well developed, and on the other parts (even of the same branch) they are quite absent. They are absent from *Fischer*, 182, and from the type specimen of *E. Stuhlmannii*, in which the spines are reduced to mere points, but that is certainly specifically identical with *E. heterochroma*. The species is very distinct from all those most nearly allied to it and easily recognised by its long-exserted small capsule. *Goetze*, 463 and 465, from Uhehe, German East Africa, are also quoted by Pax in *Engl. Jahrb.* xxviii. 421, as belonging to *E. Stuhlmannii*. I have not seen the specimens, but as they are stated to belong to a tree 6–36 ft. high the identification seems doubtful. Var. *mitis* I believe to be merely a more or less starved condition of the plant.

136. **E. tetracantha,** *Rendle in Journ. Bot.* 1896, 130. A dwarf leafless densely spiny succulent, about 6 in. high, branching from the base into many 4-angled stems about $2\frac{1}{2}$ lin. thick when dried; angles not very prominently toothed, with continuous or slightly interrupted horny grey margins. Spines in groups of 4, of which the upper pair are 2–6 lin. long and the lower pair 6–10 lin. long, all needle-like, ascending-spreading and slightly diverging, dark grey. Flowering-eyes in the axils of the shorter pairs of spines. Involucres 3 together, very small, sessile (really forming a sessile cyme), with minute scale-like bracts at their base, obconic-campanulate, about 1 lin. in diam. and scarcely as long, most minutely scaberulous, with 5 glands and 5 subquadrate shortly toothed lobes; glands $\frac{1}{2}$–$\frac{3}{5}$ lin. in their greater diam., apparently suberect, transverse, with the outer margin much infolded at the middle, so as to form a deep notch there, and the inner margin raised into a slight rim. Ovary (not seen) on a pedicel $\frac{1}{2}$ lin. long; styles undivided (*Rendle*).—Pax in Engl. Jahrb. xxxiv. 375.

Nile Land. Somaliland: Shebele, *Donaldson Smith!*

137. **E. subsalsa,** *Hiern in Cat. Afr. Pl. Welw.* i. 948. A succulent leafless spiny shrub, up to 4 ft. high, with numerous stems arising from the same base, sometimes flowering when less than 1 ft. high. Branches $\frac{1}{3}$–$\frac{1}{2}$ in. thick when dried, 4-angled, glabrous, light green; angles somewhat compressed, toothed, with interrupted or occasionally subcontinuous horny brown or dark grey margins, from the long-decurrent narrow spine-shields. Spines stoutly needle-like, in double pairs, with the larger pairs $\frac{1}{3}$–$\frac{7}{8}$ in. apart, 2–6 lin. long, divergent and the small pair at their base $\frac{1}{2}$–2 lin. long, widely spreading, brown or dark grey. Leaves rudimentary, scale-like, minute. Involucres 3 together in the axils of the tubercles along the terminal part of the branches, sessile, about $1\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5

cuneately subquadrate lobes, fringe-toothed along their truncate top; glands about $\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire, yellowish. Ovary glabrous; styles about $1\frac{1}{4}$ lin. long, shortly united at the base, thickened and somewhat capitate at the apex. Capsule not seen, very shortly pedicellate, shortly exserted, $\frac{1}{8}$ in. long, glabrous; styles united for $\frac{1}{3}$ of their length, entire at the apex (*Hiern*).—*E. heteracantha*, Pax in Engl. Jahrb. xxxiv. 83.

Lower Guinea. Angola: Mossamedes; between Embuluco and Kasimba, *Gossweiler*, 1723! near the River Maiomba at Pedra de Sal, frequent, *Welwitsch*, 642! Benguella; decomposed granite rocks some 20 miles from the ocean, *Gossweiler!* Huilla, *Antunes*, 129!

138. **E. nigrispina,** *N. E. Br.* A succulent leafless spiny bushy plant. Branches when dried $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., 4-angled, apparently with nearly flat sides, angles with continuous horny dark brown margins, perhaps grey with age, glaucous. Spines $\frac{1}{3}$–$\frac{2}{3}$ in. long, needle-like, blackish, in pairs $\frac{1}{3}$–$\frac{2}{3}$ in. apart, widely diverging, with a pair of minute prickles $\frac{1}{4}$ lin. long or less just under the flowering-eyes, which are seated 1–2 lin. above the base of the spines. Involucres 3 together, sessile, $1\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with the glands united into a continuous rim having 5 slight notches, but not distinctly lobed, and the membranous inner lobes distant, broadly cuneate or subquadrate, toothed. Capsule fallen away, erect, its pedicel not exserted from the involucre, stout, with a rudimentary 3-lobed or 3-angled calyx at its apex.

Nile Land. Somaliland: Web Karanle, *Riva*, 929!

139. **E. quadrangularis,** *Pax in Engl. Jahrb.* xix. 119. Branches or stems succulent, leafless, spiny, 4–5 lin. in diam. when dried, apparently 4-angled and glaucous, angles much compressed, toothed; teeth 1 lin. or less long, broadly deltoid, equally sloping above and below from the apex. Leaves rudimentary, about $\frac{3}{4}$ lin. long, ovate, acute, soon deciduous. Spines 1–2 lin. long, slender, in pairs 5–6 lin. apart, diverging, dark grey, with a pair of minute prickles beside the leaf-scars above them, on narrow horny grey shields decurrent in an acute point nearly or quite to the flowering eyes below, so as to form a nearly or quite continuous narrow horny margin $\frac{1}{5}$–$\frac{1}{3}$ lin. broad to the stem-angles. Flowering-eyes about 2 lin. above the spine-pairs. Cymes sessile or subsessile, at first with 3 involucres, but the sessile male central one soon falling away, leaving the lateral hermaphrodite pair diverging on cyme-branches $\frac{1}{2}$–$\frac{3}{4}$ lin. long, glabrous. Bracts half as long as the involucre, scale-like, thin. Involucre $2\frac{1}{2}$ lin. in diam., obconic-cup-shaped, glabrous, with a dark purple crinkled or undulating rim, formed of 5 broad transverse entire glands, overlapping or only separated by shallow cuts, having a powdery (yellowish?) substance on their inner surface, surrounding 5 broad transverse denticulate purple lobes. Ovary included in the involucre, subsessile, with the calyx reduced to a mere rim, glabrous; styles about $1\frac{1}{4}$ lin. long, slender, united at the base, then ascending and revolute at the tips, with slightly

thickened entire stigmas. Capsule and seeds not seen.—Pax in Engl. Jahrb. xxxiv. 84; Berger, Sukk. Euphorb. 60.

Mozamb. Distr. German East Africa: Itarige, *Fischer*, 519!
Described from the type in Berlin Herbarium.

140. **E. isacantha,** *Pax in Engl. Jahrb.* xxxiv. 82. A succulent leafless spiny bush or shrublet, probably dwarf. Branches of the dried specimen 3–7 in. long, 2–4 lin. thick, somewhat 4-angled, subtuberculate, glabrous. Leaves rudimentary, scale-like, about $\frac{2}{3}$ lin. long, ovate-oblong, acute. Spines in groups of 4 on each spine-shield, 2 directed upwards and 2 downwards, all equal, 2–3 lin. long, slender, widely diverging, brown, on narrow horny spine-shields decurrent to an acute point 1–2 lin. below the spines, but not forming a continuous border. Flowering-eyes touching the apex of the spine-shields. No attached flowers, but a cyme mingled with the spines and probably belonging to the plant, is sessile, with 3 involucres on rather slender peduncles $\frac{1}{8}$ in. long. Involucres $1\frac{1}{2}$ lin. in diam., obconic, minutely puberulous; glands too decayed for description, but apparently very closely contiguous or united into a continuous rim.

Mozamb. Distr. German East Africa: Ungoni; Mgasa Valley, *Busse*, 949!
Described from the type. The arrangement of the subequal spines is unlike that of any other species I have seen.

141. **E. Nyassæ,** *Pax in Engl. Jahrb.* xxxiv. 375. A succulent spiny leafless bush about 18 in. or less high. Stems or branches $\frac{1}{4}$–$\frac{1}{3}$ in. in diam. when dried and $\frac{1}{3}$–$\frac{1}{2}$ in. when alive, apparently subcylindric and spirally tuberculate or perhaps subangular. Tubercles not very prominent, each with a horny grey shield, elongated triangular in outline, $\frac{1}{8}$–$\frac{1}{4}$ in. long, bearing 2 pairs of diverging grey spines, with the lower pair 1–$2\frac{1}{2}$ lin. long and the upper $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Leaves very rudimentary, scale-like. Flowering-eyes touching the apex of the shields. Cymes solitary, sessile, with 2 lateral involucres on branches or peduncles $\frac{3}{4}$ lin. long and a central sessile deciduous one, glabrous. Bracts scale-like, not half as long as the involucre, ovate, obtuse, membranous. Involucres $1\frac{3}{4}$ lin. in diam., funnel-shaped, glabrous, with 5 glands and 5 transversely oblong minutely toothed lobes; glands contiguous, $\frac{3}{4}$–1 lin. in their greater diam. and twice as broad as long, transversely oblong or subrectangular, entire, dark purple. Ovary 3-angled, glabrous, included, becoming partly or wholly exserted in fruit; styles $1\frac{1}{4}$ lin. long, united at the basal third, then recurved, slender, minutely bifid at the apex.—*E. tetracantha*, Pax in Engl. Jahrb. xxx. 341, and xxxiv. 81, 375, not of Rendle.

Mozamb. Distr. German East Africa: Unyika, near Manayeme's Village, 4900 ft., Goetze, 1443!

142. **E. Erlangeri,** *Pax in Engl. Jahrb.* xxxiii. 286. A leafless spiny branching succulent shrub 6–10 ft. high. Branches alternate or opposite, very slender, not more than $\frac{1}{8}$ in. thick in the specimen seen, cylindric (or slightly angular?), with 4–5 slight furrows, along which,

on old parts, the bark seems to separate into 4–5 ribbon-like strips, bearing pairs of spines without spine-shields scattered along them, glabrous, brown, becoming dark grey. Leaves rudimentary, minute. Spines $\frac{1}{2}$–1 lin. long, in pairs $\frac{1}{4}$–$\frac{1}{2}$ in. apart, slightly diverging, recurved, dark brown or dark grey. Flowering-eyes in the axils of the spine-pairs. Involucres 3 together, sessile or subsessile, with the middle one usually male, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam., obconic-cup-shaped, glabrous, with a spreading subtruncately 4–5-lobed glandular rim about $\frac{1}{2}$ lin. broad, the glands being united at the basal part, surrounding 4–5 erect broad transverse fringed lobes. Ovary (young) subsessile, glabrous; styles $\frac{3}{4}$ lin. long, free, slender, filiform, entire at the apex. Fruit not seen.—Pax in Engl. Jahrb. xxxiv. 69; Berger, Sukk. Euphorb. 60.

Nile Land. Somaliland: Gara Libin; Arbaroni, *Ellenbeck*, 2218!

143. **E. Ellenbeckii,** *Pax in Engl. Jahrb.* xxxiii. 285. A leafless spiny succulent of unknown habit. Stems or branches of the type specimen 2–$2\frac{1}{2}$ in. long and 5 lin. thick, but probably stouter when alive, apparently cylindric, with about 6 spiral series of grey shield-shaped spine-shields on very slightly raised tubercles. Leaves not seen, doubtless rudimentary. Spines 4 on each spine-shield, arranged nearly in a transverse line, with the 2 outer 1–$1\frac{1}{2}$ lin. long and the 2 inner 3–9 lin. long, slender, greyish. Flowers and fruit unknown.—Pax in Engl. Jahrb. xxxiv. 81.

Nile Land. Somaliland: Boran, at Turro Gumbi, *Ellenbeck*, 2099!

144. **E. inæquispina,** *N. E. Br.* Probably dwarf and branching, succulent, leafless, very spiny. Branches cylindric, $\frac{1}{4}$–$\frac{1}{3}$ in. thick when dried, covered with crowded roundish or obovate horny spine-shields 1–$1\frac{1}{2}$ lin. long, each bearing a pair of spines, at first brown, soon becoming grey. Spines very unequal, some pairs scarcely more than $\frac{1}{8}$ in. long, others up to $\frac{3}{4}$ in. long, all needle-like, straight, horizontally spreading, not very diverging. Leaves very rudimentary, minute. Flowers and fruit not seen.

Nile Land. Somaliland: Webi, *Robecchi-Bricchetti*, 283!

Although the specimen is incomplete, the cylindric stems, crowded shields, and long unequal spines, readily distinguish this from all other known species except *E. Ellenbeckii*, from which it differs in the spine-shields not being 3-lobed, and an entire absence of a pair of prickles at the base of the spines.

145. **E. golisana,** *N. E. Br.* Perennial, succulent, spiny, leafless, about 3 in. high, with stout fibrous roots. Stems erect, branching, densely crowded, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, several-angled, glabrous; angles with continuous horny dark brown margins, raised into closely set small tubercles, each bearing a pair of needle-like dark brown spines $\frac{1}{3}$–$\frac{1}{2}$ in. long. Leaves none or very minute. Peduncles solitary in the axils of the spines, about $1\frac{1}{2}$ lin. long, slender, 3- or fewer-flowered, glabrous. Bracts scarcely $\frac{1}{2}$ lin. long, oblong, toothed at the apex, glabrous. Involucres shortly pedunculate or subsessile, about 1 lin. in diam., obconic, glabrous outside, with 5 glands and 5 subquadrate lobes fringe-

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toothed at the top; glands $\frac{1}{3}$–$\frac{2}{5}$ lin. in their greater diam., transverse, somewhat kidney-shaped, entire. Young ovary glabrous; styles $\frac{1}{3}$ lin. long, united at the base, very minutely bilobed at the apex. Capsule and seeds not seen.

Nile Land. Somaliland: Golis Range, *Drake-Brockman*, 300!

146. **E. Phillipsiæ,** *N. E. Br. in Gard. Chron.* 1903, xxxiii. 370. A succulent leafless spiny branching perennial about 6 in. high. Stems and branches (excluding the spines) $\frac{3}{4}$–$1\frac{1}{4}$ in. thick, 9-angled, glabrous, bright deep green, not glaucous; angles with slightly prominent tubercles 1–2 lin. apart, bearing 2 diverging chestnut-brown spines $\frac{1}{2}$–8 lin. long on horny chestnut-brown shields decurrent nearly or quite to the next pair of spines below, but not forming a perfectly continuous horny border. Involucres usually 2–4 in a subsessile cyme or cluster or occasionally solitary in the axils of the tubercles, subsessile or shortly pedunculate, $\frac{3}{4}$ lin. in diam., obconic, glabrous, with 4–5 glands and 5 minute transversely rectangular fringed lobes; glands $\frac{1}{4}$–$\frac{1}{2}$ lin. in their greater diam.., transversely oblong, entire, light orange-yeilow. Ovary much exserted on a recurved pedicel, glabrous; styles 1 lin. long, united at the basal third, recurved-spreading, bifid at the apex, with the stigmas spirally coiled. Capsule and seeds not seen.—Berger, Sukk. Euphorb. 87.

Nile Land. British Somaliland, *Mrs. Lort Phillips!*

Described from a living plant cultivated in Cambridge Botanic Garden.

147. **E. Dinteri,** *Berger in Monatschr. für Kakteenk.* xvi. 109. A very spiny leafless succulent. The largest specimen seen is about 18 in. high, but may have been taller or possibly a branch off a large plant, with the main piece 3 in. in diam. at the base. Branches in superposed whorls of 3–5, spreading-upcurved, $1\frac{1}{2}$–2 in. in diam., cylindric, with 7–8 more or less spirally twisted and often zigzag compressed angles having continuous horny margins, which, together with the spines, are brown on the young growth, soon becoming greyish-white, glabrous. Leaves rudimentary, scale-like, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, deltoid, acute, deciduous. Spines $\frac{1}{2}$–$\frac{3}{4}$ in. long, in pairs $\frac{1}{4}$–$\frac{1}{3}$ in. apart, diverging and in dried specimens intermingled. Flowering-eyes placed midway between the spine-pairs. Flowers and fruit unknown. Seeds $\frac{1}{4}$ in. long and $\frac{1}{5}$ in. in diam., ellipsoid, obtusely 3-angled, smooth, brownish-grey, from being densely dusted with brown on a grey ground, with faint longitudinal lines.—Berger, Sukk. Euphorb. 83; Dinter, Deutsch Südw.-Afr. 12, 90.

Lower Guinea. German South-West Africa, *Dinter!*

The type specimen is without locality or number, but Mr. Dinter at the place quoted mentions Salem and Pforte in Hereroland, and Inachab in Great Namaqualand (South Africa) as localities for the plant under *Dinter*, 200.

Described from the type specimen, kindly lent to Kew by Mr. Alwin Berger, who informs me that the plants figured as *E. virosa?* in Engler & Prantl, Pflanzenfam. iii. 5, 109 (plate), and Engl. Pflanzenreich, iv. 38, iii. ii. 317 (plate), have been supposed to represent *E. Dinteri*, but not only are they utterly different from it, but may possibly represent two very distinct species. The *E. Dinteri*

mentioned in several places in Marloth, Kapland, according to a photograph so named, sent by Dr. Marloth to Mr. Berger, is a totally different plant with unbranched stems and much smaller or no spines, and is apparently the same as that above quoted in Engler's Pflanzenreich.

148. **E. griseola,** *Pax in Engl. Jahrb.* xxxiv. 375. A succulent bush, spiny and leafless. Branches less than 5 lin. in diam., elongated, decumbent, 5-angled; angles sinuate-toothed, with continuous grey horny margins; teeth about 4–5 lin. apart. Spines 3–4 lin. long, in pairs, grey, with black tips, with a pair of minute prickles at their base. Involucre not described. Capsule small, about 1 lin. long and twice as much in diam., deeply 3-lobed as seen from above, with keeled lobes.

The above is the original description of this plant, which was collected in South Africa at Lobatsi, in Bechuanaland (*Marloth*, 3413), and which I have not seen. But a specimen collected in Rhodesia and named by Pax as being a variety of *E. griseola* is as follows:

Plant up to 3 ft. high. Branches (dried) $\frac{1}{3}$ in. in diam., 5-angled; angles acute, toothed, with continuous horny grey margins and concave faces between them; teeth $2\frac{1}{2}$–5 lin. apart. Leaves rudimentary, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, ovate, acute, recurved, soon deciduous. Spines 3–4 lin. long, in pairs, widely diverging, grey, often blackish at the tips, with or without a pair of very minute or rudimentary prickles at their base. Cymes on peduncles $\frac{1}{2}$–$\frac{3}{4}$ lin. long and $\frac{1}{2}$ lin. thick, with 3 involucres. Bracts scale-like, oblong, rounded, minutely toothed. Involucre $1\frac{1}{2}$ lin. in diam., somewhat funnel-shaped, glabrous, with 5 glands and 5 erect subquadrate fringed lobes overtopping them; glands contiguous, $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire. Ovary and capsule not seen.

Mozamb. Distr. Rhodesia: Matoppo Hills, 5000 ft., *Engler*, 2860B!

149. **E. polyacantha,** *Boiss. Cent. Euphorb.* 25. A succulent leafless spiny shrub 5 ft. high. Branches about $\frac{1}{2}$–$\frac{3}{4}$ in. thick when dried, 4–5-angled usually with slight constrictions $\frac{3}{4}$–$1\frac{1}{2}$ in. apart, glabrous; angles compressed, with small rounded teeth or crenations and continuous horny dark grey margins. Spines 1–$2\frac{1}{2}$ lin. long, in pairs about 2 lin. apart, widely diverging, often curved upwards, dark grey. Cymes arising midway between the spine-pairs, with 1–3 involucres, sessile. Bracts 1 lin. long, broadly ovate, obtuse, denticulate. Involucres sessile, 2 lin. in diam. or the lateral rather smaller, cup-shaped, glabrous, with 5 glands and 5 erect broadly cuneate or transverse fringed lobes; glands $\frac{1}{2}$–1 lin. in their greater diam., transversely oblong, entire. Ovary included, with a slightly 3-lobed calyx at its base, on a very short pedicel, glabrous; styles about 2 lin. long, united to the middle and the united part included in the involucre, free part recurved-spreading, with 2 thickened lobes at the apex. Capsule and seeds not seen.—Boiss. in DC. Prodr. xv. ii. 84; Pax in Engl. Jahrb. xxxiv. 70, partly. *E. tetragona*, A. Rich. Tent. Fl. Abyss. ii. 238, not of Haworth.

Nile Land. Abyssinia: stony sides of mountains in a hot valley near Jelajeranne, *Schimper*, 1790! Adowa, *Quartin-Dillon and Petit*, 416!

Var. *Rosei*, Pax in Engl. Jahrb. xxxix. 632. About 3 ft. high, with ascending 4-angled branches. Capsule brown.

Nile Land. Harar: Haramaja, 6500 ft., *Rosen* ex *Pax*.

150. **E. quinquecostata,** *Volkens in Notizbl. Königl. Bot. Gart. Berlin*, ii. 266. A small leafless succulent minutely spiny tree 10–15 ft. (*Volkens*, but on the label 18–21 ft.) high, with a rounded crown of incurved intermingled branches. Branchlets 4–5-angled, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam. when dried, dark green, not glaucous; angles compressed, comparatively thick, with rounded teeth or crenations 2–4 lin. apart and 1–1$\frac{1}{2}$ lin. long. Leaves very rudimentary, $\frac{1}{3}$ lin. long, scale-like, soon deciduous. Spines very small, $\frac{1}{4}$–1 lin. long, prickle-like or obsolete, on somewhat horny shields, which are sometimes separate, sometimes decurrent to the shields below, forming continuous subhorny margins and with age appear to corrode into thickened dark grey hardened edges to the stem-angles. Involucres solitary (perhaps ultimately 3 together) in the axils of the teeth, sessile, 1$\frac{1}{2}$–1$\frac{3}{4}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 subquadrate denticulate lobes; glands contiguous, 1$\frac{3}{4}$–2 lin. in their greater diam., transversely elliptic-oblong, entire, very convex, with the ends somewhat deflexed, yellow. Ovary and capsule not seen, the involucres present on the type being all male and probably the central of gradually developed sessile 3-involucred cymes, as is not infrequently the case in other species.—Pax in Engl. Jahrb. xxxiv. 71; Berger, Sukk. Euphorb. 63.

Mozamb. Distr. German East Africa: on the steep slopes of Lake Jalla in Kilimanjaro region, 2900–3200 ft., *Volkens*, 407!

151. **E. opuntioides,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 945. A succulent spiny leafless perennial of dwarf habit, branching at the base or perhaps the branches arise from a short basal stem. Branches ascending or decumbent, about 6 in. long, flat (2-angled) and apparently not very thick, constricted into elliptic or orbicular joints $\frac{3}{4}$–1 in. in diam., somewhat resembling those of an *Opuntia* in miniature, glaucous-green; margins shallowly sinuate-toothed or subcrenate with continuous horny brown edges. Spines in pairs, diverging and slightly ascending, 1$\frac{1}{4}$–2 lin. long, dark brown or grey. Flowering-eyes 1$\frac{1}{2}$–2 lin. above the spine-pairs. Cymes solitary, pedunculate, with 1–3 involucres; peduncle stout, about 1$\frac{1}{2}$ lin. long. Bracts suborbicular, about 1$\frac{1}{2}$ lin. in diam., slightly denticulate at the apex. Involucres sessile, 2–2$\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 short broad transverse fringed lobes; glands $\frac{3}{4}$–1$\frac{1}{3}$ lin. in their greater diam., transverse, narrow, slightly concave on the inner margin, very broadly rounded on the outer margin, entire. Ovary sessile, glabrous, and together with the united part of the styles included in the involucre; styles about 1 lin. long, united for half their length, with spreading bifid arms. Capsule about $\frac{1}{3}$ in. in diam., sessile, with its base surrounded by the involucre, glabrous. Seeds (young) subglobose.

Lower Guinea. Angola: Pungo Andongo; on rocks by the banks of the River Cuanza, near Candumba, *Welwitsch*, 638!

152. **E. bellica,** *Hiern in Cat. Afr. Pl. Welw.* i. 945. A stout leafless spiny succulent bush 3–5 ft. high, glaucous-green, very glaucous when young. Trunk branched from the base; branches crowded, ascending

curved at the base; branchlets probably 3–4-angled, with a rather small central solid part (split down the middle in the specimen seen), divided by deep constrictions into many elliptic or orbicular segments 1–1½ in. long and 1½–1¾ in. broad, glabrous; angles wing-like, somewhat sinuate-toothed and with a dark brown continuous horny border along the margins. Leaves rudimentary, scale-like, soon deciduous. Spines ⅓–¾ in. long, rather stout, in pairs 4–7 lin. apart, diverging, dark brown. Flowering eyes situated exactly midway between the spine-pairs. Flowers and fruit unknown.—*E. Dekindtii*, Pax in Engl. Jahrb. xxxiv. 73, 375.

Lower Guinea. Angola: Mossamedes; frequent on sandy maritime hills from Giraul to Cabo Negro, *Welwitsch*, 643. Huilla, *Dekindt*, 1030.

This is allied to *E. opuntioides*, Welw., but evidently has more angles and the spines are much stouter and longer. In *E. opuntioides* the flowering eyes are 1½–2 lin. above the spine pairs, not midway between them, but below that point. I have not seen a specimen of *E. Dekindtii*, Pax, which is referred by him to this species, but from the description it would seem to belong here.

153. **E. infausta,** *N. E. Br.* A succulent leafless spiny bush about 5 ft. high, glabrous in all parts. Branches 5–12 in. long, ½–1 in. thick, 4–5- (rarely 6-) angled, with or without slight constrictions; angles slightly compressed, usually even or but slightly tuberculate, with a continuous horny dark grey border less than 1 lin. broad, bearing pairs of spines 1½–3 lin. apart; spines subequal or unequal, 1–3½ lin. long, dark grey or blackish. Cymes solitary in the axils of the spine-pairs, sessile, subsessile or very shortly pedunculate, with 3 involucres, 2 on very short branches. Bracts ½ lin. long, elliptic or suborbicular. Involucres sessile, 1¼–1½ lin. in diam., cup-shaped, with 5 glands and 5 transverse or broadly cuneate fringed lobes; glands ⅔–¾ lin. in their greater diam., transversely oblong, entire. Ovary globose-trigonous, on a distinct pedicel nearly or quite as long as the ovary, glabrous; styles ¾–1 lin. long, united at the base only and the united part exserted from the involucre, arms recurved-spreading, with 2 small thickened lobes at the apex. Capsule 1½ lin. in diam., with its base just exserted from the involucre. Seeds ¾ lin. long, ellipsoid, with the inner face obscurely angular, marked with a brown median line, minutely scrobiculate-tuberculate, greyish-white.—*E. polyacantha*, Penzig in Atti Congr. Bot. Genova, 1892, 359; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 323; Pax in Engl. Jahrb. xxxiv. 70, and Berger, Sukk. Euphorb. 62, partly, not of Boiss. *E. Thi*, Pax in Engl. Jahrb. xxxiv. 77, partly, not of Schweinf.

Nile Land. Eritrea: near Acrur, 6000 ft., *Schweinfurth*, 1008! 1694! near Geleb, 5500–6000 ft., *Schweinfurth*, 1094! 1233! 1248! 1438!

This has hitherto been associated with *E. polyacantha*, Boiss., and *E. Thi*, Schweinf., but it distinctly differs from both in its ovary being as broad as long, seated on a pedicel as long as itself, and the shorter styles are united at the base only, not to half-way up as in those species.

154. **E. fraterna,** *N. E. Br.* A succulent spiny leafless perennial 3–6 in. high. Branches arising from and articulated to a short basal stem, at first erect, soon spreading or decumbent at the base with the terminal part curved upwards, in the specimens seen 4–6 in. long, 4-6-

angled, constricted at intervals into oblong or suborbicular joints $\frac{1}{2}$–$1\frac{1}{2}$ in. long and $\frac{1}{2}$–$1\frac{1}{4}$ in. in diam., glabrous; angles compressed, faintly or deeply sinuate-toothed according to vigour, with continuous horny dark brown or grey borders connecting the spine-pairs; teeth (when prominent) up to 2 lin. long, $1\frac{1}{4}$–4 lin. apart; spines diverging, $\frac{3}{4}$–4 lin. long, with or without a pair of minute straight prickles at their base, dark brown, becoming grey. Cymes solitary in the axils of the teeth, sessile, with 1–3 involucres. Bracts suborbicular, about $1\frac{1}{2}$ lin. in diam. Involucres sessile, 2–$2\frac{1}{2}$ lin. in diam., broadly and shallowly obconic, glabrous, with 5 glands and 5 transversely oblong or subquadrate fringed lobes; glands $\frac{3}{4}$–1 lin. in their greater diam., transversely oblong, entire, 2-lipped, in dried flowers often appearing very narrow (transversely) with the lips folded together, yellow. Ovary sessile and together with the united part of the styles included in the involucre, glabrous; styles nearly $1\frac{1}{4}$ lin. long, united at the basal third, with recurved-spreading arms, bifid at the apex. Capsule sessile and its base included in the involucre, only seen in an immature state.—*E. polyacantha*, Hiern in Cat. Afr. Pl. Welw. i. 946, not of Boiss.

Lower Guinea. Angola: Huilla; *Dekindt*, 1030! in elevated rocky places between Lopollo and Nene, 500 ft., *Welwitsch*, 640! Pungo Andongo; frequent on rocks throughout the Præsidium, *Welwitsch*, 639!

Welwitsch has noted on his label with 639 that the plant is "1–$1\frac{1}{2}$ ft. high," but his specimens do not show those proportions, being only about 6 in. high, and appear to me to be conspecific with his 640.

Pax in Engl. Jahrb. xxxiv. 375 has considered this plant to be *E. heteracantha*, Pax, but that species is identical with *E. subsalsa*, Hiern, and quite distinct from *E. fraterna*.

155. **E. Thi,** *Schweinf. in Verhandl. Zool.-Bot. Gesellsch. Wien*, xviii. 660. A succulent leafless spiny bush 2–4 ft. high, branching from the base, glabrous in all parts. Branches erect, $\frac{3}{4}$–$1\frac{3}{4}$ in. (or more?) in diam., 4–6-angled, constricted at intervals of $\frac{3}{4}$–$2\frac{1}{2}$ in.; angles compressed, more or less lobed by the stem-constrictions, with continuous horny dark grey margins. Spines very unequal on the same stem, stout, some 2–3 lin. long, others 4–9 lin. long, in pairs 2–6 lin. apart, straight, diverging, dark grey. Cymes solitary in the axils of the spines, subsessile, with 3 involucres. Bracts $\frac{3}{4}$–1 lin. long, broadly ovate, obtuse. Involucres about 2 lin. in diam., cup-shaped, with 5 glands and 5 broadly cuneate fringed lobes; glands about $\frac{3}{4}$ lin. in their greater diam., transversely oblong, entire. Ovary oblong-trigonous, much longer than broad, with a very short pedicel; styles about $1\frac{3}{4}$ lin. long, united for almost half their length, with recurved-spreading arms bifid at the apex, the ovary and half of the united part of the style included in the involucre. Capsule, with the exception of its base, exserted, $1\frac{1}{2}$ lin. in diam., globose-trigonous. Seeds $\frac{3}{4}$ lin. long, ellipsoid, with the inner face obscurely angular and marked with a brown median line, minutely scrobiculate-tuberculate, brown.—Pax in Engl. Jahrb. xxxiv. 77, partly; Berger, Sukk. Euphorb. 63.

Nile Land. Nubia: between Suakin and Berber; in Wady Haratreb, *Schweinfurth*, 832! and at Singat, *Schweinfurth*, 211!

Var. *subinarticulata*, N. E. Br. Stems and branches more slender, $\frac{1}{3}$–$\frac{3}{4}$ in. in diam. when dried, 4–5-angled, less conspicuously constricted. Spines usually smaller and 1–4 lin. (but sometimes up to 7 lin.) long. Otherwise as in the type, but capsule and seeds not seen.—*E. polyacantha*, var. *subinarticulata*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 323.

Nile Land. Eritrea: between Suakin and Berber in Wady Teehke, *Schweinfurth*, 203! 204! 339, and at Singat, *Schweinfurth*, 210! Abyssinia: Tigre; Goelleb, 4000 ft., *Schimper*, 1264!

156. **E. buruana,** *Pax in Engl. Jahrb.* xxxiv. 85. A succulent spiny leafless bush about $1\frac{1}{2}$–2 ft. high. Branches of the type 10–13 in. long, 1–$1\frac{1}{2}$ in. in diam. at the thickest part, with the lower part gradually thickening upwards to or above the middle, and the upper part with 2–3 narrow neck-like constrictions between 2–3 dilated irregularly orbicular segments not much longer than broad, 3-angled, glabrous; angles wing-like, sometimes wavy, sinuate-toothed. Leaves rudimentary, minute, scale-like. Spines unequal, 2–8 lin. long, in pairs $\frac{1}{3}$–$\frac{3}{4}$ in. apart, widely diverging, brownish-grey, on horny shields extending above the spines to the flowering-eye and also shortly below them on the teeth of the angles, but not forming a horny border to the base of the teeth. Flowering-eyes $1\frac{1}{2}$–3 lin. distant from the base of the spines. Flowers unknown.

Nile Land. British East Africa: steppe near Maketau, west of the Bura Mountains, *Uhlig*, 47! between Taveta and the Bura Mountains, *Engler*, 1930A!

157. **E. breviarticulata,** *Pax in Engl. Jahrb.* xxxiv. 84. A stout succulent leafless bush 2–3 ft. high, much branched from the base, armed with very long spines. Branches erect or ascending, very deeply constricted into subsagittate-ovate or -reniform segments 2–3 in. long and $2\frac{1}{2}$–$3\frac{1}{2}$ in. in diam., and probably larger, 3-angled, with a solid central part $\frac{3}{4}$–1 in. thick, glabrous; angles much compressed, wing-like, 1–$1\frac{1}{2}$ in. broad and $\frac{1}{6}$–$\frac{1}{4}$ in. thick, with continuous horny greyish-white wavy margins. Leaves rudimentary, scale-like, about $\frac{1}{3}$ lin. long and $\frac{1}{2}$ lin. broad, ovate. Spines very stout, $\frac{1}{2}$–$2\frac{1}{2}$ in. long and 1–$1\frac{1}{2}$ lin. thick at the base, in pairs $\frac{3}{4}$–$1\frac{1}{2}$ in. apart, widely diverging, pale brown or greyish. Flowering-eyes seated midway between the spine-pairs. Cymes 3 together, with peduncles 1–2 lin. long, sometimes bearing only a male sessile involucre, sometimes with 2 lateral involucres on cyme-branches 2 lin. long, glabrous. Bracts about $1\frac{1}{4}$ lin. long, suborbicular, concave, thin. Involucres $\frac{1}{4}$ in. in diam. with 5 glands and 5 subquadrate denticulate lobes; glands contiguous, $1\frac{1}{4}$–$1\frac{1}{3}$ lin. in their greater diam., transverse, elliptic-oblong, entire, not rugulose on their upper surface. Ovary subsessile, included in the involucre, somewhat acutely 3-angled, glabrous, without a distinct calyx; styles $1\frac{1}{2}$ lin. long, united for half their length, then very spreading, 2-lobed at the apex. Capsule and seeds not seen.

Mozamb. Distr. German East Africa: steppe to the east of the Pare Mountains, *Uhlig*, 815!

This species only differs from *E. grandicornis*, Goebel, in its rather longer spines, pedunculate cymes, and the involucre glands not rugulose on their upper surface.

But it is quite possible that when the female involucres of *E. grandicornis* are developed a peduncle may also develop, and that when better known *E. breviarticulata* will prove to be identical with the latter species.

158. **E. Wakefieldii,** *N. E. Br.* A succulent leafless spiny branching perennial, with stout fibrous roots, glabrous. Branches 3-angled, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam. when dried; angles compressed, with deltoid acute teeth or lobes $\frac{1}{4}$–$\frac{1}{3}$ in. apart, without horny margins, bearing at their apex a pair of diverging blackish spines $1\frac{1}{2}$–2 lin. long, which have 2 very minute points at their base. Flowers and fruit not seen.

Nile Land. British East Africa: Ribe, near Mombasa, *Wakefield!*

159. **E. Robecchii,** *Pax in Ann. Istit. Bot. Roma*, vi. 186. A succulent leafless spiny much-branched shrub (or tree?). Branches and branchlets in distant groups or somewhat whorled, acutely 3-angled and more or less twisted, $\frac{1}{3}$–1 in. in diam.; branchlets very much recurved; angles acute, toothed; teeth $\frac{3}{4}$–$1\frac{1}{4}$ in. apart, $1\frac{1}{2}$–2 lin. long, broadly deltoid, equally sloping upwards and downwards from their apex. Leaves rudimentary, minute, scale-like. Spines 1–$1\frac{1}{2}$ lin. long, in pairs, diverging, grey, on narrow horny grey shields decurrent down both slopes of the teeth, but scarcely beyond. Flowering-eyes about 2 lin. above the spines, enclosed in the shields. Involucres (not seen) 3 together, about $2\frac{1}{2}$ lin. in diam., glabrous, with transversely ovate glands and fringed lobes (*Pax*).—Pax in Engl. Jahrb. xxxiv. 72.

Nile Land. Somaliland: Ogaden, *Robecchi-Bricchetti*, 287! 332, 370; by the River Milmil, *Riva*, 1169, ex *Pax*.

The above description, with the exception of that of the involucres, is based entirely upon Robecchi-Bricchetti, 287; the other numbers quoted by Pax I have not seen. The number 1061, however, collected by Riva near the River Milmil, also quoted by Pax under *E. Robecchii*, belongs to a perfectly distinct species. The specimen seen of 1061 is very fragmentary, consisting of a section of an obtusely 5-angled stem $1\frac{1}{4}$ in. in diam. and a longitudinal surface slice from a branch and branchlet, which is scarcely or very obtusely angular, not obviously toothed, quite spineless, with small shields about $\frac{1}{4}$ in. long, shaped like the sole of a boot, enclosing the flowering-eye and not very horny; the branchlet also is ascending, not at all recurved. From this I suspect that two species have been included by Pax under the name *E. Robecchii*.

160. **E. Dawei,** *N. E. Br.* "A small tree, usually palm-like owing to loss of lower branches" (*Bagshawe*), 20–30 ft. high (*Dawe*), nearly leafless, spiny. Branchlets succulent, flat and thin in the specimens seen, but stated by *Dawe* to be also 3-winged, constricted into oblong or oblanceolate-oblong segments 4–8 in. long and $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad or perhaps larger, very obtuse or slightly notched at the apex, with the lateral branches usually narrowed to a short stalk-like base, even or sinuate-toothed at the margins, glabrous, apparently glaucous. Leaves rudimentary or very small, recurving between the spines, $1\frac{1}{2}$–2 lin. long, elliptic or suborbicular, with the margins much recurved and the upper side very convex, somewhat rigid, glabrous, soon deciduous. Spines 1–2 lin. long, in pairs $\frac{1}{3}$–$\frac{3}{4}$ in. apart, diverging, brown, becoming blackish-brown and finally grey, on narrow horny shields, which are

usually separate and more or less extending above and below the spines into an acute point, but sometimes in places connected by a continuous horny border. Flowering-eyes touching the spine-shields, 1–2 lin. above the spines, producing 1–3 or more cymes, crowded along the margins. Cymes 5–6 lin. long, pedunculate, glabrous, bearing 3 involucres, with the middle one sessile and the lateral on branches $1\frac{1}{2}$–2 lin. long; peduncle 1–$1\frac{1}{2}$ lin. long. Bracts about 1 lin. long and broad, scale-like, broadly ovate, obtuse. Involucre 2 lin. in diam., cup-shaped, glabrous, with 5 glands and 5 erect deltoid acute or toothed lobes; glands not contiguous, $\frac{3}{4}$–1 lin. in their greater diam., transversely oblong, with a slightly raised margin all round. Ovary with a calyx at its base of 3 deltoid lobes cut into 2–4 filiform segments, exserted on a stout angular and somewhat furrowed pedicel 2–$2\frac{1}{2}$ lin. long, and curved to one side, glabrous; styles 1 lin. long, united at the basal third, with stout spreading arms, channelled on the upper side, shortly 2-lobed at the apex. Capsule not seen, but probably rather fleshy.

Nile Land. Uganda: Toro district, 2600–4000 ft.; Barule, *Dawe*, 677! Wimi River, *Bagshawe*, 1019!

161. **E. angularis,** *Klotzsch in Peters, Reise Mossamb. Bot.* 92. A succulent leafless spiny bush, about "16 feet high, with thick stems and radiating ascending branches" (*Kirk*), glabrous. Branches deeply constricted into joints 3-8 in. long and 2–$4\frac{1}{2}$ in. in diam., broadly 3-winged, with a rather small solid central part; wings 1–$2\frac{1}{2}$ in. broad, wavy and irregularly lobed or sinuate, with continuous grey horny margins. Leaves rudimentary, scale-like, rigid, 1–$1\frac{1}{2}$ lin. long, subquadrate, obtusely pointed or rounded at the apex, strongly recurved, very concave lengthwise, central part deciduous, leaving 2 small rigid hooks partly recurved between the bases of the spines. Spines 2–5 lin. long, in pairs $\frac{1}{2}$–1 in. apart, diverging, grey. Flowering-eyes $\frac{1}{4}$–$\frac{1}{2}$ in. above the spines. Cymes solitary or 2 together, with stout peduncles $\frac{1}{2}$–2 lin. long, bearing 3 involucres, with the lateral on stout branches 1–2 lin. long, glabrous. Bracts suborbicular, concave, about $1\frac{1}{2}$–2 lin. in diam., entire or slightly denticulate. Involucre $2\frac{1}{2}$–$3\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 rectangular or subobovate erect denticulate lobes; glands contiguous, $1\frac{1}{2}$–2 lin. in their greater diam., transversely elliptic-oblong, but with the inner margin less curved than the outer and more or less upcurved, deflexed at each end and in fruit becoming wavy along the outer margin. Ovary sessile and together with the greater part of the styles included in the involucre, glabrous, with a shortly 3-lobed cupular calyx at its base; styles 2 lin. long, united for half their length, slightly spreading above, entire, with thickened truncate rugose stigmas, slightly excavated on the upper side. Capsule just exserted from the involucre, erect, 3 lin. high and 6–7 lin. in diam., very truncate at the apex and base, very deeply 3-lobed as seen from above, the much compressed lobes subquadrate in outline viewed sideways, not fleshy, with subwoody cell-walls $\frac{1}{4}$ lin. thick, glabrous, red, having a persistent somewhat fleshy 3-lobed calyx at the base, its lobes about 1 lin. long, ovate, obtuse or

acute, entire or perhaps toothed; styles not seen. Seeds 1½ lin. in diam., globose, not compressed, with a raised line in a slight groove along one side and a small pit at one end, smooth, surface dull grey.—*E. crispata*, Lemaire in Illust. Hort. 1857, Miscell. 71, not of Horn. *E. fimbriata*, Hort. ex Lemaire, l.c., not of Scop. *E. lemaireana*, Boiss. in DC. Prodr. xv. ii. 81; Pax in Engl. Jahrb. xxxiv. 73. *E. abyssinica*, var. *mozambicensis*, Boiss. in DC. Prodr. xv. ii. 84. *E. Nyikæ*, Werth, Veget. Ins. Sansib. 31, 32, 50, fig. 3, not of Pax.

Mozamb. Distr. Zanzibar, *Richard* ex *Lemaire*. Portuguese East Africa: Lower Zambesi, Shiramba, *Kirk* (drawing 361)! Lupata, *Kirk!* Goa Island, *Peters!*

E. angularis is described as having a simple unbranched stem the height of a man, but the small fragment of which the type in the Berlin Herbarium consists seems identical with Kirk's Lupata specimen, which is branched.

162. **E. Nyikæ,** *Pax in Engl. Pfl. Ost-Afr. C.* 242. A tree up to 45 ft. high, when young branching horizontally from the ground, when old with a cylindric naked trunk, surmounted by a rounded crown of curved ascending branches (*Volkens*), succulent, leafless, spiny. Branches 3–4-angled or occasionally flat, constricted into orbicular, elliptic, ovate or oblong segments 2–8 in. long, 2–3 in. in diam., with the central solid part about ⅓ in. thick in young branches, thinning to almost a mere junction of the angles at the apex, glabrous, glaucous; angles wing-like, very thin, about ⅓ lin. thick in dried specimens and scarcely thicker at their junction with the centre than elsewhere, more or less sinuate-toothed and wavy at their margins. Leaves rudimentary, scale-like. Spines 1–4 lin. long, in pairs ¼–¾ in. apart, rather slender, widely diverging, grey, usually on separate narrow linear horny grey shields, but occasionally with the shields connected into a horny margin to the stem-wings. Flowering-eyes 2–3 lin. above the spine-pairs. Cymes with peduncles 1–2 lin. long, bearing 1 sessile central involucre and 2 on lateral branches 1–1½ lin. long, glabrous. Bracts about 1⅓ lin. long, suborbicular, entire, thin. Involucre 2½–3¼ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 rectangular, oblong or subquadrate denticulate lobes; glands subcontiguous, 1¼–1¾ lin. in their greater diam., transversely elliptic-oblong, entire. Ovary subsessile or shortly pedicellate and included in the involucre, glabrous, with a distinct calyx at its base, having 3 acute lobes ⅓–½ lin. long; styles about 1¼ lin. long, very shortly united at the base into a stout cone, then recurved-spreading, rather slender, 2-lobed or somewhat knob-like at the apex. Capsule exserted on a pedicel about as long as the involucre, erect, about ¼ in. high and ½ in. in diam., truncate or subtruncate at the base and broadly rounded to subtruncate at the top viewed sideways, very deeply 3-lobed as seen from above, with compressed slightly keeled lobes, having a slight hump on their dorsal margin. Seeds not seen.—Pax in Engl. Jahrb. xxiii. 533 and xxxiv. 73; Volkens in Notizbl. Königl. Bot. Gart. Berlin, ii. 265; Berger, Sukk. Euphorb. 41. *E. Volkensii*, Werth, Veget. Ins. Sansib., 50 (in Mitth. Semin. Orient. Sprachen, 1901, Abtheil. iii.), not of Pax. *E. Neovolkensii*,

Pax in Engl. Jahrb. xxxiv. 74. *E. Bussei*, Pax in Engl. Jahrb. xxxiii. 286 and xxxiv. 73; Berger, Sukk. Euphorb. 53.

Mozamb. Distr. Zanzibar, *Werth!* *Sacleux*, 856! German East Africa: Usambara; near Magila, *Volkens*, 51! plains south of Kilimanjaro, *Sacleux*, 1310! also on the steppe region and mountains of Usambara and Pare, ex *Volkens*, and without precise locality, *Busse*, 317!

The type specimens of *E. Nyikæ*, *E. Neovolkensii*, and *E. Bussei* are specifically identical; each consists of a very short terminal piece of a branch, 3-winged in *E. Bussei*, flat and 2-winged at the base and 4-winged at the apex in *E. Nyikæ*, 4-winged throughout in *E. Neovolkensii*, and the wings very thin in all. The plant quoted and figured by Werth (Veget. Ins. Sansib. 31, 32, 50, &c., fig. 3) as *E. Nyikæ* is probably *E. angularis*, Klotzsch. That quoted as *E. Nyikæ* by Pax in Ann. Istit. Bot. Roma, vi. 186, from Somaliland, is probably a distinct species; I have not seen it.

163. **E. mbaluensis,** *Pax in Engl. Jahrb.* xxxiv. 85. A leafless spiny succulent shrub or tree. Branches constricted into segments, 3-angled, with a small solid central part; angles wing-like, 1–1¼ in. broad, rather thick, crisped-toothed, with continuous horny grey margins. Spines 2–3 lin. long, ½ lin. thick at the base, in pairs, with a pair of minute prickles at their base, having the withered remains of the minute crest-like leaf between them. Involucres densely crowded along the angles at the apex of the branches, shortly pedunculate, 2½ lin. in diam., with transversely ovate (? oblong or elliptic) glands and broad scale-like bracts.

Mozamb. Distr. German East Africa: Pangani (Unguru); lower slopes of Mbalu Mountain, *Engler*, 1472c.

Of this I have not seen a specimen.

164. **E. kamerunica,** *Pax in Engl. Jahrb.* xxxiv. 75. A tree up to 20 ft. high. Branches succulent, spiny, probably leafless, 3 in. or more in diam., 3–5- (usually 4-) angled, with a solid central part ½–¾ in. thick, glabrous, bright green; angles wing-like, sinuate-toothed. Leaves rudimentary, scale-like. Spines 1–2 lin. long, stout, in pairs ⅔–1 in. apart, diverging, usually with a pair of minute prickles near their base, dark brown, on horny ovate dark brown shields about ¼ in. long, obtusely pointed below the spines. Flowering-eyes 2–3 lin. above the base of the spines, shortly separated from the shields. Involucres 5–7 together in a dense cluster, on peduncles (branches of subsessile cymes) 1–1½ lin. long, bowl-shaped, about ⅓ in. in diam, glabrous, with 5 glands and 5 broadly cuneate long-fringed lobes; glands subcontiguous, 1½ lin. in their greater diam., reniform or half-circular, entire. Ovary included, shortly pedicellate, glabrous, with a calyx at its base cut into about 7–9 linear or filiform segments ¾–1½ lin. long, mostly as long as or longer than the ovary; styles 1½ lin. long, free to the base, widely recurved-spreading, rather slender, subcapitate at the apex.

Upper Guinea. Cameroons: Barombi, *Preuss*, 511!

Described from the type, in the Berlin Herbarium.

165. **E. kibwezensis,** *N. E. Br.* A tree 20–30 ft. high, leafless, spiny, succulent. Flowering branches 2½–4½ in. in diam., with 3–4

wing-like angles 1–2¼ in. broad and 1 lin. or more thick and a small solid central part scarcely ½ in. in diam. when dried, apparently very glaucous, with the angles more or less sinuate and somewhat wavy, and with a continuous horny light brown margin. Spines 2–3 lin. long, in pairs, diverging, with or without a very minute pair of prickles at their base, light brown with darker tips. Leaves rudimentary, scale-like, about ½ lin. long and 1 lin. broad, transverse, somewhat semicircular, wavy or crisped. Cymes subsessile or very shortly pedunculate, several together, forming dense clusters, each composed of 9–18 involucres, crowded along the angles of the terminal branches. Involucres about 3½ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 transversely oblong minutely toothed lobes; glands contiguous, 1½ lin. in their greater diam., transversely oblong or elliptic-oblong, somewhat 2-lipped when dried, entire, yellow. Ovary subsessile, included in the involucre, with a small cupular or rim-like calyx at its base, glabrous; styles 1¼ lin. long, united at the basal half, then spreading, with minutely 2-lobed or rather channelled stigmas. Capsule and seeds not seen.

Nile Land. British East Africa: Kibwezi, *Scheffler*, 223!

166. **E. ussanguensis,** *N. E. Br.* A succulent spiny leafless tree 25–30 ft. high, with a small crown. Branches strongly constricted at varying intervals, forming ovoid-conical segments 1¼–4½ in. long, 3–4 in. or more in diam., broadest at the base, 5-angled, with a small central solid part, glabrous, green; angles broadly wing-like, much compressed, about ¼ in. thick, with continuous horny brown margins having peculiar fold-like sinuations midway between the pairs of spines. Leaves not seen, probably scale-like. Spines 1–4 lin. long, in pairs ½–¾ in. apart, stout, not very divergent, brown. Flowering-eyes in the sinuations, ¼–⅓ in. above the spine-pairs. Cymes sessile, very crowded along the angles at the ends of the branches, each with 3 sessile involucres, glabrous. Bracts 1¾–2 lin. in diam., suborbicular, concave, thin. Involucres ¼ in. in diam., cup-shaped, glabrous, with 5 glands and 5 cuneately subquadrate truncate denticulate lobes; glands contiguous, 1½ lin. in their greater diam., transversely elliptic or rather narrowly oblong, 2-lipped, entire, decurved at each end. Ovary sessile and together with the united part of the styles included in the involucre, with a very small cupular shortly 3-lobed calyx at its base; styles about 1½ lin. long or less, united for half their length, spreading above, with thickened entire minutely tuberculate stigmas.—*E. Nyikæ*, Pax in Engl. Jahrb. xxx. 342, not of elsewhere. *E. angularis*, Pax in Engl. Jahrb. xxxiv. 76 (excluding all synonyms, except *E. Stuhlmanni*, Goetze & Engl.), not of Klotzsch. *E. Stuhlmanni*, Goetze & Engl. Veget. Deutschostafr. tt. 14 and 16.

Mozamb. Distr. German East Africa. Usungu, north of the Kinga (Livingstone) Range, *Goetze*, 1008!

This is closely allied to *E. controversa*, N. E. Br., but differs in the fold-like sinuations of the angles and in having very short tooth-like (not long and linear) calyx-lobes under the ovary.

167. **E. abyssinica,** *Gmelin, Syst. Nat. ed.* 13, ii. (vii.) 759. A large tree, with leafless spiny succulent branches. Young unbranched plants 6 in. in diam., 8-angled, becoming branched and cylindric and woody with age; main branches whorled, frequently 8-angled, with alternate branchlets all curved-ascending, forming a large obconic flat-topped crown; branchlets with numerous constrictions, forming broad rounded scollops to the wing-like angles; margin of the scollops apparently even. Spines in groups of 5, "four on the sides and one in the centre, scarce half an inch long, fragile and of no resistance, but exceedingly sharp and pointed" (*Bruce*), but in the figure represented as being in pairs and widely diverging. Cymes crowded at the top of the branchlets. Involucres with 5 transversely elliptic yellow glands. Capsule with a distinct fleshy 3-lobed calyx at its base, exserted on a stout pedicel, 3-angled, glabrous, at first green, becoming deep crimson streaked with white, apparently with thick woody cell-walls. Seeds globose.—Raeuschel, Nomencl. Bot. ed. 1797, 139. *Kolquall*, Bruce, Travels, v. 41, with 2 plates. *E. officinarum*, var. *Kolquall*, Willd. Sp. Pl. ii. 884.

Nile Land. Eritrea: on Taranta Mountain, *Bruce.*

In books and gardens several species have been mistaken for *E. abyssinica*, Gmel., but none of them agree with Bruce's description of the plant from Taranta Mountain, upon which the species was founded. Unfortunately Bruce's description does not accord (as to the spines) with his figures, but it is quite possible, that the latter was not made from the Taranta plant, since it is very evident that he confused other species with it, as may be seen from his remark: "As we went west, the tree turned poor, the branches were few, seldom above 2 or 3 ribs or divisions, and these not deeply indented, whereas those of Taranta had frequently eight." So that until good specimens of the plant are obtained from Taranta Mountain, which no subsequent collector seems to have visited, no accurate description of the plant can be given. Bruce states that "the only use the Abyssinians make of this is for tanning hides, at least for taking off the first hair."

168. **E. controversa,** *N. E. Br.* A tree, succulent, leafless, spiny. Flowering branches 4-angled, $1\frac{1}{2}$–$3\frac{1}{2}$ in. square from angle to angle, constricted into lanceolate, ovate, elliptic or suborbicular segments, with the central solid part nearly $1\frac{1}{2}$ in. square in the only section seen and about as thick as the wing-like angles are broad; angles about $\frac{1}{4}$ in. thick at the even (not sinuate-toothed) margins. Spine-shields separate, but sometimes crowded. Spines (sometimes rudimentary or absent on the flowering branches) $\frac{1}{2}$–2 lin. long, stout, rigid, in pairs 4–9 lin. apart, not very diverging, dark brown, on triangular-obovate horny shields 2–3 lin. long and broad, shortly decurrent and obtusely rounded below the spines, sometimes, together with the flowering-eyes, crowded into a contiguous series, but not really united into a continuous horny margin to the angles. Flowering-eyes rather large, touching the spine-shields. Cymes crowded, 2–3 from each flowering-eye, on peduncles 1–$1\frac{1}{2}$ lin. long, each with 3 involucres. Bracts 2–$2\frac{1}{2}$ lin. long, suborbicular, concave, keeled on the back, toothed on the margin. Involucres sessile, 3–4 lin. in diam., cup-shaped, with 5–6 glands and 5–6 subrectangular fringed lobes; glands $1\frac{1}{2}$–$2\frac{1}{4}$ lin. in their greatest diam., transverse, somewhat

kidney-shaped, very unequally 2-lipped, entire with the margin of the large outer lip rounded, very obtuse or folded as if pinched together at the apex, often reflexed at the sides. Ovary sessile within the involucre, with 3 linear calyx-lobes 1–1¼ lin. long at its base, glabrous; styles only partly exserted from the involucre, 2 lin. long, free to the base, with thickened or subcapitate scarcely lobed stigmas. Capsule (*Boissier*) depressed-trigonous, 6–7 lin. in diam., with the hard woody cell-walls 2 lin. thick. Seeds 1¼ lin. in diam., subcompressed-globose, smooth *Boissier*).—*E. abyssinica*, A. Rich. Tent. Fl. Abyss. ii. 239; Boiss. in DC. Prodr. xv. ii. 84, not of Gmelin or Raeuschel.

Nile Land. Abyssinia: Mai Gouagoua, *Quartin-Dillon!* and without precise locality, *Schimper*, 934!

This is one of the species that has been mistaken for *E. abyssinica*, Gmel. Although it bears some resemblance to one of Bruce's figures, and like Bruce's plant is called "kolquall" by the natives, yet it totally disagrees with Bruce's description of *E. abyssinica* as to its spines and number of stem-angles. The name "kolquall" and its variants also appears to be indiscriminately given to several species of tree-like Euphorbias and is without value for specific determination. The true *E. abyssinica* would appear to belong to the coast-region, whilst *E. controversa* is from the interior. A. Richard (*Tent. Fl. Abyss.* ii. 239) mentions that Quartin-Dillon, in a note, has stated that it differs in several particulars from Bruce's account of the plant, and is not used for tanning, but the wood is used for building purposes, &c., which also indicates that it is a different species from Bruce's plant.

169. **E. Murieli,** *N. E. Br.* A large tree with a stout trunk and a large dense obconic flat-topped crown of succulent leafless spineless branches about as broad as the tree is high. Branches all ascending, subparallel, alternately branching, slightly constricted at regular or irregular intervals, but the joints so formed are of equal diameter throughout, 4-angled, with flattish or shallowly concave faces or occasionally 5-angled with narrower channels between the angles, but always with the solid central part twice or more than twice as broad as the narrowly wing-like or slightly compressed angles, in the branchlet seen 1–1½ in. square; angles with even margins, glabrous. Leaves rudimentary, less than 1 lin. long and about 1 lin. broad, triangular, acute, perhaps sometimes larger, as the specimen seen is very imperfect. Spines none on the specimen and not evident on a photograph; spine-shields horny, containing the flowering-eyes, 2⅓–3½ lin. long and 2 lin. broad, oblong, 3–5 lin. apart, not connected by a horny border. Cymes in dense masses at the ends of the branchlets, with peduncles ½–⅞ in. long, bearing 3 involucres, with the lateral on branches ¼–⅓ in. long, glabrous. Bracts thin, suborbicular, about 1½ lin. in diam., very obtuse, concave. Involucres about ¼ in. in diam., cup-shaped, glabrous, probably yellow, with 5 glands and 5 short broad transverse fringed lobes; glands erect in dried flowers, contiguous or subcontiguous, about 1½ lin. in their greater diam., transverse, reniform, with the inner margin turned in, forming a lip, and the outer margin wavy or somewhat recurved at the sides. Capsule exserted on a stout pedicel 2½–3 lin. long and curved to one side, about ¼ in. long and ⅓ in. in diam., obtusely 3-angled seen from above, fleshy, with rather thin woody walls to the

cells, glabrous, with 3 fleshy reflexed calyx-lobes at the base 1½–2½ lin. long, cut to the middle into about 3 filiform segments. Seeds slightly compressed, subglobose, about 1½ lin. in diam., smooth, with a slight dark brown furrow along one margin, dark brown, faintly dotted with lighter brown and with a lighter brown margin to the obtuse edge formed by compression.

Nile Land. Sudan: near the Bahr-el-Jebel, *Muriel*, E!

Described from a small branch and some fruiting cymes, accompanied by an excellent photograph. Besides the difference in the branches, the long cyme-peduncles and small fruit readily distinguish this from its allies.

170. **E. grandis,** *Lem. Ill. Hort.* iv. *Miscell.* 101, 107. Arborescent, 15–20 (or probably more) ft. high, leafless, spiny. Branches fleshy, usually whorled, curved-ascending or suberect, usually 6- (sometimes 5-) angled, 3–8 in. in diam. and 1–5 in. from angle to angle, constricted into elliptic or more or less conical joints mostly 3–8 but sometimes up to 18 in. long, glabrous, deep green; angles wing-like, with triangular or ultimately broadly concave channels ¾–1½ in. deep between them, even or very faintly sinuate-toothed along the margins. Leaves rudimentary, scale-like, 1–1¼ lin. long, deltoid-ovate, acute, with smaller obtuse scale-like stipules at their base, soon deciduous. Spines usually ¼–3 lin. long, sometimes nearly obsolete, in pairs 5–11 lin. apart, diverging, on rhomboid-orbicular or rhomboid-ovate horny shields 2–3 lin. long and 2–2½ lin. broad, both spines and shields at first green, becoming light rusty-brown and finally grey. Flowering-eyes touching the apex of the shields. Flowers and fruit not seen.—*E. abyssinica,* Lem. Ill. Hort. iv. Miscell. 71, 101, 107, not of Gmelin or Raeuschel. *E. richardiana,* Baill. Adansonia, i. 105. *E. neutra,* Berger, Sukk. Euphorb. 71.

Nile Land. Abyssinia, introduced into cultivation by *Petit* and *Quartin-Dillon*; described from a living plant cultivated at Kew for many years under the name of *E. abyssinica*!

171. **E. intercedens,** *Pax in Engl. Jahrb.* xxxiv. 75. A succulent spiny leafless tree 12–25 ft high, with a trunk 4½–10 ft. high. Branches 1¼–2 in. in diam., 4-angled, slightly constricted at distant intervals, with a central solid part ½–¾ in. thick, glabrous; angles much compressed, wing-like, shallowly sinuate-toothed, with a continuous horny margin. Spines 1–3 (4, *Pax*) lin. long, in pairs 5–8 lin. apart, horizontally diverging, grey. Flowering-eyes 1½–2 lin. above the base of the spine-pairs. Involucres in clusters, crowded along the angles at the tips of the branches, nearly sessile, about 2¾ lin. in diam., cup-shaped, with 5 contiguous transverse entire glands.

Mozamb. Distr. German East Africa: on the lower part of Mbalu Mountain, *Engler,* 1472B!

Of this I have only seen a photograph of the type.

172. **E. Reinhardtii,** *Volkens in Notizbl. Königl. Bot. Gart. Berlin,* ii. 263. A tree 40–50 ft. high, with a trunk 12–15 in. thick, branching

about 10 ft. from the ground into a dense obconic flat-topped crown of succulent spiny leafless branches, glabrous. Branches constricted into segments 8–12 in. long, with the terminal or flowering segments broadest at the base, tapering upwards or conical in general outline, 3–5- (usually 4-) angled, with the central solid part $1\frac{1}{4}$–$1\frac{2}{3}$ in. square and the angles wing-like and 1–$1\frac{1}{3}$ in. broad. Spines up to 5 lin. long, stout and about $\frac{1}{8}$ in. thick at the base, in pairs $\frac{3}{4}$–$1\frac{1}{3}$ in. apart, diverging, those on the flowering segments gradually smaller and often disappearing. Flowering-eyes placed a little above the spine-pairs. Involucres 4–9 in a cluster (really composed of 2–3 subsessile or sessile cymes), sessile or very shortly pedunculate, about $\frac{1}{4}$ in. in diam. and about as deep, fleshy, tubular-campanulate, slightly constricted at the middle, with 5 glands and 5 fringed lobes; glands distant, about $\frac{1}{8}$ in. in their greater diam., transversely elliptic, entire, with the inner margin incurved. Capsule as large as a cherry, depressed-globose, not 3-angled or lobed, red; styles bifid at the apex.—Pax in Engl. Jahrb. xxxiv. 75, partly; Berger, Sukk. Euphorb. 66.

Mozamb. Distr. German East Africa: Usambara, *Holst*, 8821, partly, ex *Volkens*.

I have not seen the type of this species, and as no details are given concerning the toothing of the stem-angles, spine-shields, accurate position of flowering-eyes, calyx, &c., I am unable to place it in the key, but it seems allied to *E. intercedens*.

173. **E. similis,** *Berger, Sukk. Euphorb.* 69, *fig.* 15. Arborescent, 20–30 ft. high, leafless or with foliage-leaves, spiny. Branches erect, subparallel, probably forming an obconic crown, fleshy, usually 4- (sometimes 5-) angled, slightly constricted into parallel-sided segments 6–18 in. long, 2–5 in. square, becoming thicker with age, deep green, not tinted with blue nor glaucous on the younger parts; angles wing-like, rather thin and not more than $1\frac{1}{4}$ lin. thick at the edge on the younger branches, except at the spine-shields, straight or wavy, nearly even or slightly sinuate-toothed at the margins, when young separated by broad triangular channels $1\frac{1}{4}$–$1\frac{1}{2}$ in. deep, with age growing out into flat faces, their sides marked by a slightly prominent longitudinal rib nearly midway between the margin and centre, from which slightly prominent ribs obliquely ascend to the spine-shields. Leaves sometimes rudimentary and scale-like, $1\frac{1}{2}$ lin. long, deltoid, subulate-acuminate, recurved, sometimes developed into a linear-cuneate or cuneate-oblanceolate sessile foliage-leaf $\frac{3}{4}$–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–8 lin. broad, with a short subulate point at the apex, deciduous, with small hard auricle-like persistent or deciduous blackish-brown stipules at the base. Spines $1\frac{1}{2}$–2 lin. long, in pairs $\frac{3}{4}$–$1\frac{1}{6}$ in. apart, diverging, distinctly deflexed, blackish, on suborbicular blackish spine-shields $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long and $1\frac{1}{2}$–$1\frac{3}{4}$ lin. broad. Flowering-eyes $\frac{1}{4}$–$\frac{1}{3}$ in. above the spine-shields and quite separate from them, with 1 or 2 small blackish-brown scales about or covering them. Flowers and fruit not seen.—*E. natalensis,* Hort. ex Berger, Sukk. Euphorb. 71.

Tropical Africa? Country unknown, but possibly a native of South Africa. Described from a living plant long cultivated at Kew!

This has been cultivated as *E. abyssinica*.

174. **E. tenebrosa,** *N. E. Br.* Arborescent, 20–30 ft. high, spiny, with or without small foliage-leaves. Branches erect, subparallel, probably forming an obconic crown, fleshy, usually 4- (sometimes 5-) angled, constricted into subparallel-sided segments 6–15 in. long, 2–4½ in. square, dark sap-green, without any bluish or glaucous tint on the young parts; angles wing-like, ⅙–¼ in. thick at the edge, straight or wavy, with distinctly crenate-dentate margins and marked on the sides with very prominent oblique ribs ascending from the centre to the spine-shields, when young separated by broad triangular channels 1–1¾ in. deep, with age growing out into flat faces. Leaves sometimes rudimentary and scale-like, 1½–2 lin. long, broadly deltoid, acute; sometimes growing out into cuneate-obovate or more or less spathulate foliage-leaves ¾–1¼ in. (or more?) long, ⅓–⅔ in. broad at the top, obtuse to emarginate with an apiculus in the notch at the apex, tapering to a sessile base, acutely keeled on the midrib beneath, glabrous on both sides, deciduous, with small persistent rigidly horny dark brown auricle-like stipules at their base. Spines 1–2 lin. long, in pairs ¾–1⅓ in. apart, diverging, slightly deflexed, very dark brown, on small, somewhat obcordate horny shields 2 lin. long, 2½–3 lin. broad, blackish-brown, with the leaf-scar paler. Flowering-eyes sunk in the depressions between the teeth 2–3 lin. above the spine-shields and quite separate from them, surrounded or covered by minute blackish-brown scales. Flowers and fruit not seen.

Tropical Africa. Country unknown. Described from a living plant long cultivated at Kew!

This is another of the plants cultivated in gardens as *E. abyssinica.*

175. **E. confertiflora,** *Volkens in Notizbl. Königl. Bot. Gart. Berlin,* ii. 266. A leafless spiny succulent bush up to 3 ft. high. Branches 4-angled; angles wing-like, ¾ in. broad, cuneate in transverse section. Spines 2½ lin. long, in pairs about 5 lin. apart, diverging, on shields which taper to an acute point below. Involucres 3 together, crowded, sessile, about ¼ in. in diam., shortly and broadly funnel-shaped, with 5 glands and 5 fringed lobes; glands contiguous, about 1½ lin. in their greater diam., transversely oblong, with slightly deflexed ends, punctate. Ovary sessile, with a minute 4-toothed calyx at its base; style-branches forked at the upper third.—Pax in Engl. Jahrb. xxxiv. 74; Berger, Sukk. Euphorb. 61.

Mozamb. Distr. German South-west Africa: Usambara, *Holst,* 8821, partly, ex *Volkens.*

176. **E. disclusa,** *N. E. Br.* Arborescent, 15–30 (or more?) ft. high, leafless, spiny. Branches erect, subparallel, probably forming an obconic crown, fleshy, usually 4- (sometimes 5-) angled, constricted into slightly conical or nearly parallel-sided segments 6–15 in. long, 2–4 in. square, thicker with age, light and somewhat bluish-green on the young parts; angles wing-like, ⅙–¼ in. thick at the edge, straight or wavy, with even or very faintly sinuate-toothed margins, when young separated by broad triangular channels ¾–1¾ in. deep, with age growing

out into flat faces. Leaves rudimentary, scale-like, $\frac{1}{2}$–$1\frac{1}{2}$ lin. long, $1\frac{1}{2}$–2 lin. broad, transverse, broadly rounded, wavy, recurved, brown. Spines 1–$3\frac{1}{2}$ lin. long, in pairs $\frac{2}{3}$–1 (usually $\frac{3}{4}$) in. apart, diverging, not deflexed, dark brown, becoming grey with age, on elliptic or orbicular horny shields 3–5 lin. long and $2\frac{1}{2}$–3 lin. in diam., at first chestnut-brown, at least on the part below the spines, finally uniformly light brown. Flowering-eyes touching the spine-shields but scarcely included in them, transverse, broader than long. Cymes sessile, 3 together at each flowering-eye. Involucres sessile, about 4 lin. in diam., broadly cup-shaped, glabrous, with 5–6 glands and 5–6 ovate long-fringed lobes; glands not contiguous, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in their greater diam., transverse, semicircular. Ovary, capsule, and seeds not seen.—*E. Candelabrum*, Berger, Sukk. Euphorb. 73, not of Trémaux.

Tropical Africa. Native country unknown, but probably Eritrea, as some fragments distributed by Schweinfurth under No. 1351, from Acrur, collected in March, 1892, appear to belong to this species. See note under *E. acrurensis*. Described from a living plant, long cultivated at Kew!

This is in cultivation under the names *E. abyssinica* and *E. Candelabrum*, but is totally different from either species. Only the central male involucre has developed at Kew, the lateral bisexual involucres failing to develop.

177. **E. neglecta,** *N. E. Br.* An arborescent succulent, 20 ft. or more high under cultivation, branching irregularly from the base or upper parts, probably forming an obconic crown. Branches erect, sub-parallel, constricted into segments 8–20 in. long, which are sometimes of equal diameter throughout, sometimes more or less tapering upwards, 2–6 in. in diam., 4–5-angled, dark green, when young distinctly mottled with lighter green; angles wing-like, 1–$2\frac{3}{4}$ in. broad, much compressed, with an acute channel (flattened with age) between them, sinuate-toothed, the teeth $\frac{3}{4}$–$1\frac{1}{2}$ in. apart. Leaves well developed, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, cuneately oblanceolate, acute or rounded and apiculate at the apex, gradually tapering from much above the middle to the sessile base, glabrous on both sides. Spines $\frac{3}{4}$–$1\frac{1}{2}$ lin. long, in pairs, diverging and slightly deflexed, grey, on small orbicular-obovate horny grey shields $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowering-eyes $\frac{1}{8}$–$\frac{1}{3}$ in. above the shields and not connected with them by a horny border. Flowers and fruit not seen. —*E. abyssinica*, Berger, Sukk. Euphorb. 67, fig. 14, not of Gmel.

Tropical or **South Africa.** Origin unknown. Described from a living plant long cultivated at Kew under the name of *E. abyssinica*.

178. **E. Winkleri,** *Pax in Engl. Jahrb.* xxx. 342. A tree 80–90 ft. high, with a thick trunk and a small regularly branched crown. Ultimate branches $1\frac{3}{4}$–4 in. in diam., with 3 wing-like much compressed sinuate or nearly even-margined angles $\frac{3}{4}$–2 in. broad and a very small solid centre, succulent. Leaves 1–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{8}$ in. broad, oblong or elliptic, obtusely rounded at the apex and cuneately rounded into a petiole 1–$1\frac{1}{2}$ lin. long, entire, with revolute margins and an acute midrib beneath, probably somewhat fleshy, glabrous on both sides. Spines $\frac{1}{2}$–$1\frac{1}{2}$ lin. long or probably larger on the older parts, sometimes wanting at the flowering parts, in pairs $\frac{1}{2}$–$\frac{3}{4}$ in. (probably more) apart,

slightly diverging, on small obovate horny shields about $\frac{1}{5}$ in. long, dark brown. Flowering-eyes at the apex of the shields. Involucres in small dense clusters of 6–9 (really of 2–3 sessile cymes), closely sessile, about $\frac{1}{3}$ in. in diam., broadly cup-shaped, glabrous, with 5 glands and 5 transversely oblong fringed lobes; glands not contiguous, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in their greater diam., transverse, reniform or somewhat half-circular, yellow. Ovary only seen in a very young condition, glabrous, with a distinct calyx cut into several linear segments; styles free to the base, very stout, apparently entire.—Pax in Engl. Jahrb. xxxiv. 73.

Mozamb. Distr. German East Africa: Livingstone (Kinga) Range, on Lipanye Mountain, 8000 ft., *Goetze*, 1000 !

Described from the type specimen.

179. **E. obovalifolia,** *A. Rich. Tent. Fl. Abyss.* ii. 239. A tree with succulent branches, spiny, only a few terminal branchlets seen, constricted into segments 2–$4\frac{1}{2}$ in. long and $\frac{1}{2}$–$2\frac{1}{2}$ in. broad, which are 3-angled, with a rather small solid central part, glabrous; angles wing-like, sinuate-toothed; teeth $\frac{1}{4}$–$\frac{1}{2}$ in. apart and 1–3 lin. long. Leaves large, petiolate, thin when dried, $\frac{3}{4}$–5 in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, oblong, elliptic-oblong or elongated obovate, very obtuse or rounded at the apiculate apex, obtuse or abruptly or gradually cuneate at the base, glabrous on both sides, deciduous; petiole $1\frac{1}{2}$–5 lin. long. Spines 1–3 lin. long, in pairs, diverging, brown (sometimes absent), on small ovate horny shields, scarcely or but shortly decurrent below the spines. Flowering-eyes about 2 lin. above the spine-pairs, not connected with the shields by a horny border. Cymes sessile, ultimately with 3 involucres, glabrous. Bracts $1\frac{3}{4}$ lin. long, elliptic-oblong, concave, minutely denticulate. Involucres (in the specimens seen, only the male developed) about $2\frac{1}{4}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 erect transversely oblong fringed lobes; glands rather distant, $\frac{2}{3}$–$\frac{5}{6}$ lin. in their greater diam., transversely oblong with recurved ends, 2-lipped from the short infolding of the inner margin.—Boiss. in DC. Prodr. xv. ii. 80; Pax in Engl. Jahrb. xxxiv. 68. *E. abyssinica*, Engl. Hochgebirgsfl. Trop. Afr. 286; Pax in Engl. Jahrb. l.c. 77, partly, not of Gmelin. *E. amplophylla*, Pax in Ann. Istit. Bot. Roma, vi. 186, and in Engl. Jahrb. xxxiv. 72.

Nile Land. Eritrea: Shohos, *Quartin-Dillon & Petit!* Abyssinia: Aba Gerima, *Schimper*, 793 of 1862 collection ex *Engler;* Begemeder; at Herroe Gottes Gorgis, near Gafat, 8300–8400 ft., *Schimper*, 793 of 1863 collection! Shireh Province, *Quartin-Dillon*, ex *Richard*. Somaliland: between Alghe and Oi, *Riva*, 1481! and 1636 ex *Pax*.

The specimens of *E. amplophylla*, Pax, consist of barren branches with leaves only, and do not seem to differ in any way except vigour from Schimper's 793, the teeth on the angles of the young branch being $\frac{1}{2}$–1 in. apart and the leaves 2–8 in. long. The type of *E. obovalifolia* consists of two narrow strips about $4\frac{1}{2}$ in. long cut from the angles of the stem and pressed with the edge upwards, so that the prominence of the teeth on the angles is quite obliterated.

180. **E. bilocularis,** *N. E. Br.* A tree 25–40 ft. high, succulent, leafless, spiny. Branches or branchlets seen 2–$2\frac{3}{4}$ in. in diam., 4-angled,

with a small solid central part, glabrous; angles wing-like, scarcely toothed. Spines $\frac{1}{4}$ in. long, in pairs about $\frac{3}{4}$ in. apart, diverging, dark brown. Flowering-eyes about $\frac{1}{4}$ in. above the spine-pairs. Cymes 3–6 from each flowering-eye, with peduncles 3–5 lin. long, each with 1 sessile involucre or 1 sessile and 1 or 2 shortly pedunculate involucres, glabrous. Bracts thin, submembranous, adpressed to the involucres, $\frac{1}{4}$ in. long, $\frac{1}{3}$ in. broad, broadly rounded. Involucres about 4 lin. in diam. and 2–$2\frac{1}{2}$ lin. deep, cup-shaped, glabrous, with 5 glands and 5 transversely oblong fringed lobes; glands not contiguous, $1\frac{1}{2}$–2 lin. in their greater diam., transverse, reniform or somewhat half-circular, slightly 2-lipped, entire, more or less undulate when dried. Ovary sessile, included in the involucre, compressed, 2-celled, fleshy, glabrous, with a calyx divided into several linear or linear-filiform segments as long as the ovary; styles 2, about $1\frac{3}{4}$ lin. long, moderately stout, shortly united at the base, then recurved-spreading, entire at the apex.

Nile Land. British East Africa: Kibwezi, *Scheffler*, 335!

Closely related to *E. calycina*, N. E. Br., and having the same kind of conspicuous calyx, but the involucre is larger, the ovary is sessile, included in the involucre, and appears to be constantly 2-celled, and the 2 styles are longer and stouter than in *E. calycina*.

181. **E. acrurensis,** *N. E. Br.* Arborescent, succulent, spiny. Branches of the dried specimens seen 7-angled and about $4\frac{1}{2}$ in. in diam., with the solid central part about 1–$1\frac{1}{4}$ in. thick and much less in diam. than the angles are broad (seedling plant 3-angled and 1–$1\frac{1}{4}$ in. in diam.); angles wing-like, 2 in. broad and 2 lin. thick at the edge in the dried specimen, with triangular channels $1\frac{3}{4}$ in. deep between them. Leaves not seen. Spines $1\frac{1}{2}$–5 lin. long, in pairs, diverging, stout at the base, blackish-grey on the seedling, becoming grey with darker tips with age, on suborbicular horny shields 3–4 lin. in diam. on the mature branch, much smaller on the seedling, not connected by a horny border along the angles, becoming grey with age, with the flowering-eye touching or subincluded in their apical part. Cymes (detached, but distributed with the stem-sections) on peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long, bearing 3 involucres, the middle one sessile and the two lateral on cyme-branches 1 lin. long, glabrous. Bracts thin, adpressed, broken, but apparently suborbicular and about 3 lin. long and $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, very concave. Involucres $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., cup-shaped, golden-yellow (*Schweinfurth*), with 5–8 glands and 5–8 transversely rectangular fringed lobes, glabrous; glands $1\frac{1}{2}$–2 lin. in their greater diam., erect in dried flowers, transverse, reniform, with the middle of the inner margin turned in and forming a small lip, or crescent-shaped, with the inner margin concave, in dried specimens with the outer margin more or less incurved. Ovary subsessile and included when young, in fruit exserted and curved to one side on a short stout pedicel, glabrous; perianth fleshy, with 3 lobes 2–$2\frac{1}{2}$ lin. long, deeply cut into 2 or more filiform segments or entire and subulate-acuminate, in fruit reflexed and the segments often broken off; styles $1\frac{3}{4}$–2 lin. long, shortly united at the base, rather stout, slightly thickened and minutely 2-lobed at the apex. Capsule 5–6 lin.

long and 8–10 lin. in diam., deeply 3-lobed as seen from above (globose-triangular and reddish when alive, *Schweinfurth*), glabrous; cell-walls very thick and woody. Seeds slightly compressed-subglobose, $1\frac{3}{4}$–2 lin. in diam., with a slight furrow on one side, smooth, light grey or whitish, slightly marbled, with a dull surface.—*E. abyssinica*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 317, partly; Pax in Engl. Jahrb. xxxiv. 77, partly.

Nile Land. Eritrea: vicinity of Acrur, *Schweinfurth*, 1351, partly!

There appears to be some confusion with regard to the succulent tree-like Euphorbias growing in Eritrea which Schweinfurth and others have referred to *E. abyssinica*. None of the specimens which I have seen belong to that species. Schweinfurth and also Pax certainly include two or more species under that name. The former states that it varies in appearance, growing 10 to 30 ft. in height, sometimes with a short trunk and a large crown of longer branches, sometimes with the trunk as tall as the obconic flat-topped crown. Seedling plants are 3- soon becoming 4-angled. Young unbranched trunks are sometimes up to 9-angled. The main branches are 4–6 in. in diam. and 6–9-angled and the secondary branches about 5-angled. Leaves of young shoots and seedlings are up to $\frac{3}{4}$ in. long, oblanceolate, slightly cuspidate at the apex, cuneate at the base, passing into a petiole. The spines are rarely more than 4 lin. long, grey with black tips, in pairs about 7 lin. apart. I do not know if this description refers to the Acrur plant or not, as I have not seen leaves of the plant I describe, but only a seedling plant, with stem-sections and loose flowers and fruit. I therefore restrict my description of *E. acrurensis* to the Acrur plant with 6–7- or more angled stems, to which I suppose the pedunculate cymes distributed with the stem-sections may belong, *Schweinfurth & Riva*, 1351, collected in 1892 (not 1891). Unfortunately fragments with sessile fruiting cymes have also been distributed under the same number and date, but the structure of the spine-shields and flowering-eyes on the scraps of stem-angle with these fragments and that of the cymes and involucres is identical with those of *E. disclusa*, N. E. Br., to which species I believe they belong. *Schweinfurth* 1351 of the 1891 collection is probably a variety of *E. Erythrææ*, N. E. Br. All these have been distributed as *E. abyssinica*, Raeuschel, from which they differ totally in having the branches constricted into parallel-sided or slightly conical (not elliptic or orbicular) segments.

182. **E. Erythrææ,** *N. E. Br.* Arborescent, succulent, leafless, spiny. Branches ascending like the arms of a candelabrum, slightly constricted into subparallel-sided joints of unequal length, 2–3 in. in diam. and 5–7-angled in the specimens seen (but according to Berger up to $4\frac{1}{3}$ in. in diam., and at first 3-angled, becoming 4-angled), with the solid central part 1–$1\frac{1}{2}$ in. thick and as much or more in diam. as the angles are broad, dark sap-green; angles wing-like, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad and $1\frac{1}{2}$–2 lin. thick at the edges, straight or wavy, with even or scarcely toothed margins and separated by triangular channels $\frac{2}{3}$–1 in. (or perhaps more) deep, growing out into flat faces with age. Leaves rudimentary, scale-like. Spines $1\frac{1}{2}$–$4\frac{1}{2}$ lin. long, stout, in pairs $\frac{1}{3}$–$\frac{1}{2}$ in. apart, diverging, on suborbicular shields 2–3 lin. long and broad, closely placed, but not connected by a horny border, brown, becoming grey. Flowering-eyes touching or merged into the spine-shields. Flowers and fruit not seen nor described.—*E. Candelabrum*, var. *Erythræa*, Berger, Sukk. Euphorb. 73.

Nile Land. Eritrea; Harassa Valley, *Schweinfurth*, 226! 227! and cultivated specimen!

Probably *Schweinfurth* 816 from Keren belongs here, but I have only seen 2 transverse stem-sections, each with 5 angles; they have the characteristic thick central part of this species. I also think that *E. abyssinica*, var. *tetragona*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 319, and Berger, Sukk. Euphorb. 69, may be a variety of this plant. It was collected in Eritrea on the High Plateau of Haigett, *Schweinfurth*, 1351 of his 1891 (not 1892) collection, but I have only seen 9 transverse stem-sections, 2 with 3 angles and 7 with 4 angles. Berger states that his var. *Erythrææ* is at first 3-angled, becoming 4-angled, but the branch of the type which he obligingly communicated to Kew has 5 angles and is absolutely identical with Schweinfurth, 226. It is one of the plants that have been in cultivation for many years under the name of *E. abyssinica*. The relatively thick solid central part in proportion to the breadth of the angles of the stem at once distinguishes *E. Erythrææ* from *E. acrurensis* and *E. disclusa*.

183. **E. calycina,** *N. E. Br.* A succulent spiny leafless tree 30 ft. high. Branches $1\frac{3}{4}$–$3\frac{1}{2}$ in. in diam., very slightly constricted at intervals of 5–7 in. or more, 4-angled, with a small central solid part $\frac{1}{3}$–$\frac{2}{3}$ in. in diam., glabrous. Angles much compressed, wing-like, 2–3 times as broad as the central part is thick, with nearly even or but faintly sinuate margins. Leaves scale-like. Spines $\frac{1}{2}$–2 lin. long, sometimes obsolete, in pairs $\frac{1}{2}$–$\frac{3}{4}$ in. apart, subparallel or not very divergent, brown, on oblong or suborbicular horny brown shields, which are not decurrent nor connected by a horny border along the angles. Flowering-eyes united with or embraced by the shields. Cymes on peduncles $\frac{1}{2}$–$\frac{3}{4}$ in. long, bearing a central sessile male involucre and 2 lateral mostly hermaphrodite involucres on short branches $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, glabrous. Bracts about 2 lin. long, suborbicular, concave, thin. Involucres 3–$3\frac{1}{2}$ lin. in diam. and $1\frac{1}{2}$ lin. deep, shallowly and broadly cup-shaped, glabrous, with 5 glands and 5 broad transverse fringed lobes; glands subcontiguous, $1\frac{1}{4}$–$1\frac{2}{3}$ lin. in their greater diam., transverse, reniform, two-lipped, with the ends decurved, and (in the dried specimens seen) undulated on the margins, entire. Ovary or young fruit exserted just beyond the stamens, on a pedicel as long as the involucre, trigonous-globose, glabrous, with a conspicuous calyx at its base cut into 6–9 or more linear or filiform segments 1–$1\frac{1}{2}$ lin. long; styles 3, about 1–$1\frac{1}{4}$ lin. long, shortly united at the base, strongly recurved, rather slender, thickened or minutely 2-lobed at the apex. Capsule and seeds not seen.—*E. Candelabrum*, Pax in Engl. Jahrb. xxxiv. 76, not of Trém.

Nile Land. Soudan: Meshra el Rek, by the Ghazal River, *Schweinfurth*, 1259! Mittu: near Legbi, *Schweinfurth*, 2824A!

The very small central portion of the branches at once distinguishes this from *E. Candelabrum*, Trém.

184. **E. Barteri,** *N. E. Br.* A candelabrum-like tree, 20 ft. high, leafless, spiny. Branches probably 4-angled; the only specimen seen consists of a piece 1 ft. long, with 2 angles, constricted into 5 narrowly elliptic joints $1\frac{1}{4}$–$3\frac{1}{2}$ in. long and $\frac{5}{6}$–$1\frac{3}{4}$ in. broad, glabrous; angles wing-like, with even (not at all sinuate-toothed) margins. Spines 1–2 lin. long, in pairs $\frac{1}{4}$–$\frac{1}{2}$ in. apart, sometimes with another pair of minute or rudimentary spines or points $\frac{1}{2}$–$\frac{3}{4}$ lin. above them, diverging, dark brown, on horny brown orbicular shields, 1–$1\frac{1}{2}$ lin. in diam., becoming grey with age.

Flowering-eyes touching the shields, producing 2–3 cymes with peduncles 2–3 lin. long, each bearing 3 involucres, with the lateral on branches $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, glabrous. Bracts membranous, suborbicular, about $1\frac{1}{2}$ lin. in diam., obtuse or apiculate, entire or minutely denticulate, glabrous. Involucre subsessile or very shortly pedunculate, $3\frac{1}{2}$–4 lin. in diam. and $1\frac{1}{2}$ lin. deep, shallowly cup-shaped, glabrous, with 5 glands and 5 short transverse fringed lobes; glands contiguous, about $1\frac{3}{4}$ lin. in their greater diam., reniform or transversely oblong, entire, unequally 2-lipped or with the inner margin turned up. Ovary subsessile, only partly exserted from the involucre, glabrous, with a calyx of about 5 filiform segments $\frac{2}{3}$–1 lin. long; styles 1 lin. long, united at the base, thickened and 2-lobed at the apex. Fruit and seeds not seen.

Upper Guinea. Northern Nigeria: Nupe; at Ketsa Rock, *Barter*, 1012!

185. **E. garuana,** *N. E. Br.* A succulent leafless spiny bush, grown as a hedge plant, about 6 ft. high, probably attaining much larger dimensions and perhaps becoming a tree. Branch of the specimen seen 10 in. long, 1 in. (and probably more) in diam., constricted into 5 oblong or narrowly elliptic segments $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 4-angled, with the solid central part about as thick as the wing-like angles are broad; angles not toothed or sinuate at the margins. Spines 1–$1\frac{1}{2}$ lin. long, in pairs, diverging, with or without a pair of minute auricles (not prickles) at their base and almost touching them, blackish-brown, on small subhorny broadly obovate blackish-brown (possibly discoloured in drying) shields 2–3 lin. apart, apparently deciduous. Flowering-eyes touching the spine-shields, producing 1–3 cymes on peduncles 4–$4\frac{1}{2}$ lin. long, bearing 3 involucres, with the central male and the lateral bisexual, glabrous. Bracts suborbicular, about 2 lin. in diam., very concave. Involucres 3–$3\frac{1}{2}$ lin. in diam. when fully developed, about $1\frac{1}{4}$–$1\frac{1}{3}$ lin. deep, broadly and shallowly cup-shaped, glabrous, with 5 glands and 5 subquadrate deeply fringed lobes; glands contiguous, $1\frac{3}{4}$–2 lin. in their greater diam., transverse, somewhat half-circular, entire, apparently deflexed at the ends. Ovary (very young, only seen in very immature bisexual involucres) glabrous, with a calyx at its base, cut into several filiform segments; styles 3, rather more than 1 lin. long, probably longer when mature, very shortly united at the base, stout, bifid at the apex. Capsule and seeds not seen.

Upper Guinea. Cameroons: Garua, *Ledermann*, 5140!

The spine-shields of this species are softer and less horny than in any other I have seen; also they appear to be quickly deciduous from all but the one or two terminal segments of the branches.

186. **E. Candelabrum,** *Trémaux ex Kotschy in Mittheil. Geogr. Gesells. Wien*, i. *Abhandl.* 169 (*extract, Allgem. Ueberbl. Nilländ*, 13). A tree 25 ft. high, with a short trunk of hard wood up to 3 ft. in diam., divided into a mass of crowded branches forming a dome-shaped crown 20–25 ft. in diam. Branchlets fleshy, 3–5- (often 4-) angled, constricted at intervals and 1–$1\frac{1}{4}$ in. broad across each face, glabrous, green; angles slightly compressed, but not wing-like, with shallowly concave

sides between them and a proportionately very thick solid central part, sinuate-toothed, with the teeth $\frac{1}{3}$–$\frac{1}{2}$ in. apart. Spines 1–2 lin. long, in pairs, widely diverging, on rounded horny cushions, which are not decurrent. Flowers and fruit unknown.—Boiss. in DC. Prodr. xv. ii. 84. *E. canariensis*, Trémaux, Voy. Soudan Orient. Atlas, tt. 13–14, with description.

Nile Land. Eastern Soudan: mountains of Dar Foq (Mountain of Kaçane), *Trémaux.*

The above is compiled from Trémaux's figure and description. I have not seen a specimen of it. Those referred to this species by Pax, Schweinfurth, Hiern and Berger cannot belong to it, on account of their different habit, much broader wing-like angles, and much smaller solid central part. Possibly the plant collected by Cienkowsky in Fosoki, quoted by Schweinfurth (*Beitr. Fl. Aethiop.* 36), may be the true *E. Candelabrum*, but I have not seen it.

187. **E. platyacantha,** *Pax in Engl. Jahrb.* xxxiv. 84. A succulent spiny leafless tree 30–40 ft. high, with a rounded crown. The type specimen consists of a terminal branch constricted 6 in. below the apex, $\frac{3}{4}$–$1\frac{1}{6}$ in. square, 4-angled, with a solid central part about $\frac{1}{2}$ in. square; angles wing-like, even or scarcely toothed. Leaves rudimentary, scale-like. Spines 3–4 lin. long, in pairs $\frac{1}{4}$–$\frac{1}{2}$ in. apart, widely diverging, with a pair of recurved prickles $\frac{1}{2}$–$\frac{3}{4}$ lin. long immediately above them, on narrow grey horny spine-shields, decurrent to $\frac{1}{2}$ or $\frac{3}{4}$ of the way down to the shield below. Flowering-eyes in the axils of the small prickles. Flowers and fruit unknown.—*E. Stuhlmanni*, Goetze & Engl. Veget. Deutschostafr. t. 15?

Mozamb. Distr. German East Africa: Uhehe; by the River Ruaha, *Goetze*, 465!

188. **E. quadrialata,** *Pax in Engl. Jahrb.* xxxiii. 286. A tree up to 60 ft. high, narrowly pyramidal, with a cylindric trunk and distant or irregular groups of stout ascending cylindric branches, naked below, ending in large rounded brush-like dense heads of secondary and tertiary branches, succulent, leafless, spiny, glabrous. Secondary branches spreading, with distant groups of branchlets, $\frac{2}{3}$–1 in. in diam., with 3–4 wing-like angles, apparently not glaucous; angles thin, slightly toothed or nearly even. Leaves minute, rudimentary. Spines 1–3 lin. long, slender, in pairs 3–5 lin. apart, diverging, dark grey, on small ovate horny shields 1–$1\frac{1}{2}$ lin. long, shortly acute below the spines, grey. Flowers and fruit unknown.—Pax in Engl. Jahrb. xxxiv. 74 (excl. Stuhlmann's specimen); Berger, Sukk. Euphorb. 74.

Mozamb. Distr. German East Africa: near Magofu, in Western Useguha, *Busse*, 319!

The specimen collected in Usaramo by Stuhlmann (8957) quoted by Pax in Engl. Jahrb. xxxiv. 74, as belonging to this species appears to me to be distinct. It is differently and very sparingly branched; the branches are flat or 3-angled and the angles much more prominently toothed, with the teeth equally sloping above and below from their apex, whilst in *E. quadrialata* the upper slope is very short and steep (subtruncate) and the lower long and gradual, the whole tooth scarcely projecting $\frac{1}{2}$ a line when most prominent.

189. **E. hermentiana,** *Lemaire in Ill. Hort.* 1858, *Miscel.* 63. A succulent spiny bush (2–3 ft. high in the plants seen) or perhaps finally a tree, with whorls or clusters of strictly erect straight branches parallel with the stem. Branches 3–4-angled, constricted at varying intervals, 1–2 in. broad across each face, dark green, with a somewhat feathered stripe or irregular marbling of whitish-green down each face, especially on the young branches; angles compressed, sinuately toothed, with the teeth $\frac{1}{4}$–$\frac{1}{2}$ in. apart and projecting 1–2 lin., bearing a pair of widely diverging dark brown (finally grey) spines 2–3 lin. long, on small ovate horny shields. Leaves soon deciduous, thickly herbaceous, scarcely fleshy, on some plants small and not more than $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. broad, elliptic-oblong, on others $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, oblanceolate or somewhat spathulate-lanceolate, obtuse, apiculate, tapering from much above the middle to the sessile base, glabrous, light green. Flowers and fruit unknown.—Boiss. in DC. Prodr. xv. ii. 82; Pax in Engl. Jahrb. xxxiv. 72, partly ; Berger, Sukk. Euphorb. 50, fig. 13.

Lower Guinea. Gaboon, described from living plants cultivated at Kew!

The plant collected by Laurent in the Lower Congo region, said to be used for hedges by the natives, referred to *E. hermentiana* by Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 53, is probably a distinct species; I have not seen it.

190. **E. conspicua**, *N. E. Br.* A succulent tree 15–50 ft. high, leafless and spiny, with a trunk 1–$2\frac{1}{2}$ ft. thick. Branches and branchlets more or less whorled, radiately spreading and ascending-curved, with the trunk and main branches 3–8-angled, narrowed to the distant constrictions ; branchlets mostly 3-angled, 1–$1\frac{1}{2}$ in. broad across each face; angles wing-like, sinuately toothed, with the teeth $\frac{1}{2}$–$1\frac{1}{2}$ lin. apart and projecting $1\frac{1}{2}$–2 lin., bearing a pair of dark brown diverging spines 1–3 lin. long on a dark brown horny shield which is decurrent to an acute point $1\frac{1}{2}$–3 lin. below the spines. Flowering-eyes 2–$2\frac{1}{2}$ lin. above the spines, separate or sometimes connected with the spine-shields by a horny border. Cymes 1–3 at each eye, crowded at the ends of the branchlets, with stout glabrous peduncles about 5 lin. long. Involucres apparently $2\frac{1}{2}$–3 lin. in diam., but all damaged by insects on the specimens seen, red (*Welwitsch*).—*E. Candelabrum*, Welw. in Annaes Conselho Ultramar. Lisb. no. 24 (1856), 251, n. 5; Hiern in Cat. Afr. Pl. Welw. i. 946. *Euphorbia*, Monteiro, Angola, i. 24, 27, 29, t. 1.

Lower Guinea. Angola: Loanda, *Welwitsch*, 641! coast region to about 20 miles inland, plentiful, ex *Monteiro*.

Probably *Welwitsch*, 637 and 641B, from near Mangue and Candumba in Pungo Andongo, and 636 from the Chella Mountains in Bumbo, also belong to this species, but good flowering and fruiting material are wanting for correct identification.

Imperfectly known species.

191. **E. berotica,** *N. E. Br.* A dwarf succulent shrub about 2 ft. high, leafless and spineless. Rootstock thick, horizontal. Stems and branches erectly spreading, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. thick in the specimen seen, glabrous, yellowish-green, glaucous ; branches apparently few (the specimen is 13 in. long and bears 2 branches below the middle), alternate,

not jointed to the stem, terete, marked with small alternate leaf-scars. Leaves not seen, doubtless rudimentary. Flowers and fruit not seen. —*E. Tirucalli*, Hiern in Cat. Afr. Pl. Welw. i. 949, partly, not of Linn.

Lower Guinea. Angola: Mossamedes; on the red-sand rocks close to the Rio de Sal at the base of the Serra de Montes Negros, in front of Boca de Rio Bero, *Welwitsch*, 633!

The dwarf habit and absence of constrictions or indication of articulation at the junction of the branches with the stem at once distinguish this from *E. rhipsaloides*, Welw., with which Hiern united it.

192. **E. Cactus,** *Schweinf. in Bull. Herb. Boiss.* vii. *App.* ii. 321, *partly* (*? of Ehrenb. ex Boiss. in DC. Prodr.* xv. ii. 82). Stems numerous, branching from the base or densely tufted, 4½–6 ft. high (*Courbon*) or up to 10 ft. high (*Terracciano*), succulent, sometimes as thick as the arm, 3–4- (rarely 5-) angled (*Courbon*), subcylindric at the base, then 4-angled and only becoming 3-angled at the apex (*Terracciano*), with the faces slightly concave or slightly convex and always continuous (*i.e.*, probably not interrupted at the constrictions of the branch) and the angles irregularly sinuate or lobed. Spines longer than those of *E. canariensis*, yellowish or blackish-red, becoming whitish with age (*Courbon*).—Terracciano in Ann. Istit. Bot. Roma, v. 98; Pax in Engl. Jahrb. xxxiv. 76, partly. *E. virosa*, Courbon in Ann. Sc. Nat. 4me sér. xviii. 148, not of Willdenow.

Nile Land. Eritrea: Abd-el-Kader Peninsula, *Schweinfurth & Riva*, 229! Mkullo, near Massowa, *Schweinfurth*, 1762. Dessi Island, in Annesley Bay, *Courbon*. Midir Island, in Hamfila Bay, *Terracciano*.

Of this plant I have only seen a flowerless scrap of *Schweinfurth & Riva's* 229, quite insufficient for either description or comparison with the Arabian *E. Cactus*, Ehrenb., with which it has been identified. The identification may be correct, but until good flowering specimens of both the Arabian and African plants are procured and compared (for all I have seen are very scrappy) and their identity confirmed, the determination of the plant from Eritrea must remain doubtful, since many of these succulent species are very similar in general appearance, but quite distinct in floral structure, especially as to the calyx, ovary, and styles of the female flower.

193. **E. conformis,** *N. E. Br.* Apparently a dwarf succulent leafless and spineless plant. Stems or branches repeatedly forked, terete, jointed, glabrous, glaucous, rigid and fragile; branchlets widely diverging. Flowers unknown.—*E. viminalis*, Hiern in Cat. Afr. Pl. Welw. i. 944, not of Burm. f.

Lower Guinea. Angola: Mossamedes; on the inner slopes of the Serra de Montes Negros, rare, *Welwitsch*, 631!

194. **E. Fleckii,** *Pax in Bull. Herb. Boiss.* vi. 738. A leafless bush, dichotomously branched. Branches up to 2½ lin. thick, terete, fleshy, jointed. Involucres at the apex of the branches, about 2½ lin. in diam., glabrous, with transversely ovate (oblong or elliptic?) glands. Bracts scale-like, ovate, acute.

Lower Guinea. German South-west Africa: near the River Kuisib, hanging like cords from the rocks, *Fleck*, 448A, 459A, 466A.

195. **E. franckiana,** *Berger*, *Sukk. Euphorb.* 78, *fig.* 19. A leafless spiny succulent bush 2–3 ft. high. Branches erect, curved at the base, 3–4-angled, constricted into segments $1\frac{1}{4}$–$2\frac{1}{2}$ in. long and 1–$1\frac{1}{3}$ in. thick, usually slightly narrowed upwards from a broader base, with the sides channelled when young, soon becoming flat with age, green or grey-green; angles, apart from the constrictions, slightly sinuate-toothed, with continuous horny grey margins. Spines 1–4 lin. long, in pairs 4–5 lin. apart, diverging, with a minute pair of points at their base, at first brown, soon becoming grey. Flowering-eyes about 2 lin. above the spine-pairs. Flowers not described.

Country unknown, but probably either from Tropical or South Africa; only known from cultivated plants!

196. **E. guineensis,** *Brot. in Bot. Zeit.* i. 561, *name only.*

197. **E. hararensis,** *Pax in Engl. Jahrb.* xxxix. 632. A large succulent tree, up to 60 ft. high, branching from the base, with the main branches ascending at an angle of about 60° and the smaller branches spreading-descending, slightly constricted at rather long intervals, 4-angled, with the angles scarcely winged.

Nile Land. Abyssinia: Harar; Karssa, 6400 ft., *Rosen,* only known from a photograph.

198. **E. Kelleri,** *Pax in Bull. Herb. Boiss.* vi. 739. A shrub, pubescent on the young branches, becoming glabrous. Leaves $1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, spathulate-linear, subobtuse, apiculate, with a petiole about $\frac{1}{2}$ lin. long, glaucescent. Involucres in the axils of the upper leaves or 3 together at the apex of the branchlets, often with 2 unequal leaves and 2 spathulate yellowish bracts under them, cup-shaped, about $\frac{1}{4}$ in. in diam., with transversely ovate (oblong?) glands and fringed lobes.

Nile Land. Somaliland: Abdallah, *Keller,* 224.

Var. *β latifolia,* Pax in Bull. Herb. Boiss. vi. 740. Leaves 1 in. long, $\frac{2}{3}$ in. broad, obovate-spathulate, obtuse; otherwise as in the type.

Nile Land. Somaliland: Abdallah, *Keller,* 222.

199. **E. mamillosa,** *Lem. Ill. Hort.* 1855, *Miscell.* 69, *in note.* Succulent, leafless, spiny, about 5–6 in. high, very much branched. Branches tuberculate, with the tubercles crowded, spirally arranged, elongated, conical, dilated at the base, somewhat compressed laterally, cylindric at the apex, bearing a very small roundish-deltoid scale-like leaf and a pair of spines, which are subconnate at the base then diverging. Flowers axillary, only seen in bud and not described.—Boiss. in DC. Prodr. xv. ii. 80; Pax in Engl. Jahrb. xxxiv. 66. *Anthacantha mamillosa,* Lem. l.c. 69.

Country unknown; probably from Tropical or South Africa. No specimen seen.

200. **E. Menelikii,** *Pax in Engl. Jahrb.* xxxix. 632 A stout broad succulent tree up to 60 ft. high, branching nearly from the base. Branches curved, ascending, constricted into segments about as long as broad, 3-winged.

Nile Land. Abyssinia: South Shoa, at Gennet, 7800 ft., *Rosen.*

Originally described from a photograph, from which alone it is known.

201. **E. obconica,** *Bojer, Hort. Maurit.* 287. An undershrub with spiny stems.

Nile Land. Mombassa Island and Pemba Island, ex *Bojer.*

202. **E. rhipsalioides,** *Lem. Ill. Hort.* 1857, *Miscell.* 72, *not of Welw.* Succulent, much resembling *Rhipsalis Cassytha*, Gærtn., and *Euphorbia Tirucalli*, Linn., but differing from the latter in bearing on the very young branchlets solitary ovate-lanceolate leaves about $\frac{3}{4}$ in. long.

Tropical Africa ? Formerly cultivated in the Jardin des Plantes, Paris; no specimen appears to have been preserved.

203. **E. sancta,** *Pax in Engl. Jahrb.* xxxix. 632. A tall tree about 45 ft. high, with a naked stem and a loose rounded crown. Branches curved-ascending, succulent, constricted into suborbicular segments about as long as broad, 3–4-angled; angles wing-like, crenate.—*E. Stuhlmanni*, Goetze & Engl. Veget. Deutschostafr. tt. 14 and 16, not of Schweinfurth.

Nile Land. Abyssinia: Chercher Mountains at Deru, 7300 ft., and in the sacred groves of Jagallo in the province of Godjam, *Rosen* ex *Pax.*

Originally described from a photograph; no specimen preserved.

204. **E. Sereti,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 290. A candelabriform plant. Branches constricted into obovate (? ovate and tapering upwards) segments 2–2$\frac{3}{4}$ in. long, 4–5-angled; angles wing-like, more than $\frac{3}{4}$ in. wide at their broadest part, rather thick, undulated at the margins. Spines 1–5$\frac{1}{2}$ lin. long, horizontal, diverging, spine-shields not described. Flowering-eyes seated a little above the spines. Cymes solitary or 2 together, with peduncles about 2 lin. long, bearing 1–3 involucres, the lateral on peduncles (cyme-branches) 1 lin. long. Involucre not described, its glands transversely oval. Ovary exserted. Capsule deeply 3-lobed as seen from above, glabrous; lobes compressed, about 2$\frac{1}{2}$ lin. high and broad and 1$\frac{3}{4}$ lin. thick. Seeds globose, 1$\frac{1}{4}$ lin. in diam., dotted with blackish-brown.

Lower Guinea. Lower Congo: Rocks of N'Goi, *Seret* ex *De Wildeman.*

205. **E. Antunesii,** *Pax in Engl. Jahrb.* xxxiv. 79, from Huilla in Angola, *Antunes* 72! is *Tavaresia Barklyi*, N. E. Br., an Asclepiad.

5. **ELÆOPHORBIA**, Stapf in Hook. Ic. Pl. t. 2823.

Floral structure exactly as in *Euphorbia*, from which it only differs by its fruit, as follows: Ovary (female flower) without a perianth. Fruit fleshy, indehiscent, with a thick flesh enclosing a hard bony 3-celled endocarp or "stone," marked with a slender groove down the back of each cell and having a pore at the base and 3 pores near the apex between the grooves. Seed solitary in each cell of the "stone," sometimes 1 or 2 cells are abortive; testa thin, crustaceous; albumen copious, somewhat fleshy; cotyledons flat, thick and fleshy, elliptic, notched at the base.—A tree, with succulent angular branches, becoming round and woody with age. Leaves alternate, fleshy, entire, with a pair of spines at their base. Peduncles axillary, simple or once forked.

Species 1, endemic.

1. **E. drupifera,** *Stapf in Hook. Ic. Pl.* xxix. *t.* 2823. A tree 40–50 ft. high, with milky juice. Young branches rather obscurely 4–6- (often 5-) angled, fleshy, becoming cylindric and woody with age, armed at the angles with pairs of spines. Leaves alternate at the terminal part of the branches, thick and fleshy, glabrous, deciduous; petiole $\frac{1}{3}$–$\frac{7}{8}$ in. long, stout; blade 3–8$\frac{1}{4}$ in. long, 1$\frac{1}{2}$–3$\frac{1}{2}$ in. broad, usually elongated cuneate-oblong, sometimes obovate or cuneately obcordate, obtusely rounded or occasionally (from injury?) notched at the apex, acutely and somewhat abruptly cuneate into the petiole from $\frac{3}{4}$–1 in. above the base or gradually tapering into it, entire. Stipules a pair of stout spines 1–2 lin. long; "these [continue to] grow after the leaf has fallen and become very conspicuous as the cicatrices are very plainly marked" (*Johnson*). Peduncles usually 3 together, sometimes solitary, in the axils of the young leaves, $\frac{1}{2}$–1$\frac{1}{2}$ in. long, simple or once forked, with a sessile involucre in the fork and branches $\frac{1}{3}$–1 in. long, moderately stout, glabrous. Bracts opposite, close under the involucres, $\frac{1}{8}$–$\frac{1}{6}$ in. long, $\frac{1}{8}$–$\frac{1}{5}$ in. broad, broadly ovate, acute or obtuse, concave, keeled down the back, glabrous, with buds in their axils. Involucre shallowly cup-like, about $\frac{1}{8}$ in. deep and $\frac{3}{8}$–$\frac{2}{5}$ in. in diam., with 5 transversely oblong entire spreading glands alternating with and outside of 5 erect transverse lobes $\frac{3}{4}$–1 lin. long, 2–2$\frac{1}{2}$ lin. broad, minutely denticulate-ciliate along the truncately rounded top, enclosing a dense cushion-like mass of stamens (male flowers) and bracteoles, with or without a central ovary (female flower). Bracteoles variably connate below, cuneate or irregular in form, variably toothed or cut, glabrous. Stamens without a perianth, glabrous. Ovary erect, confluent with the stout pedicel, which does not exceed the stamens, without a calyx, glabrous, its cells with thick fleshy walls; stigma subsessile, with 3 short spreading obtuse channelled lobes. Fruit shortly exserted beyond the remains of the stamens, varying in size from that of a cherry up to that of a walnut, ellipsoid or subglobose, obtuse, fleshy, with a hard stony 3-celled endocarp, indehiscent.—Stapf in Johnston, Liberia, ii. 646. *Euphorbia drupifera*, Thonn. in Schum. & Thonn. Beskr. Guin. Pl. 250; Boiss. in DC. Prodr. xv. ii. 80; Pax in Engl. Jahrb. xxxiv. 68; Berger, Sukk

Euphorb. 36, fig. 8. *E. grandifolia*, Haw. Syn. Pl. Succ. 130. *E. toxicaria*, Afzel.? ex Steud. Nomencl. Bot. ed. 2, i. 615. *E. Renouardi*, Pax in Bull. Mus. Hist. Nat. Paris, viii. 61, and in Engl. Jahrb. xxxiv. 68. *E. Juvoklanti*, Pax in Engl. Jahrb. xliii. 86.

Upper Guinea. Guinea, *Thonning*. Sierra Leone, *cultivated specimen!* Gold Coast: common on the Accra Plains, *Johnson*, 605! 1053! Kpong, *Farmar*, 480! Dahomey, *Poisson*. Cameroons: Bare, *Ledermann*, 1239! Mashita, *Ledermann*, 5343! Bebao, *Tessmann*, 597! Togo; *Kersting*, 24! *Doering*, 307!

Lower Guinea. Congo Region, *Lecomte* (ex *Pax*).

Mr. Johnson notes that the flowers are greenish and the plant produces "paste rubber." It closely resembles *Euphorbia Teke*, Schweinf. Probably *Welwitsch*, 645, from the Island of St. Thomas, and 645B, from Princes Island, belong to this species, but the specimens consist of a few leaves only. See Hiern in Cat. Afr. Pl. Welw. i. 944.

The Berlin Herbarium contains a specimen of *Euphorbia grandifolia*, Haw., cultivated at Berlin in 1858, from Sierra Leone, which is most probably correctly named, and although there are neither flowers nor fruit upon it, the character of the spines, leaf-scars, and form and apiculation of the leaves agree so exactly with those of *Elæophorbia drupifera* as to leave no doubt that *Euphorbia grandifolia*, Haw., is a synonym of that species. The only other known plants with which it might be confused are *Euphorbia Teke*, Schweinf., and *E. leonensis*, N. E. Br., from Sierra Leone, but the spines, leaf-scars, and apiculation of the leaves are not quite the same as in the former, and the latter differs in its subsessile cymes. Structurally also, when not in fruit, the thick fleshy walls of the young ovary will always distinguish *Elæophorbia* from the Euphorbias, in which they are much thinner and less fleshy.

6. DICHOSTEMMA, Pierre in Bull. Soc. Linn. Paris, 1896, 1259.

Apparent flower consisting of an entire cup-like 4-angled involucre, divided into 4 compartments by 4 thick cuneate-obovate partition-like glands, without a gland or glands on or around its margin and without inner lobes in the compartments; sometimes all the involucres of an inflorescence male, containing a group of 5–10 stamens (really male flowers as in *Euphorbia*, each with a small cup-like perianth just above the articulation) in each compartment, mingled with a similar number of bracteoles; sometimes the terminal involucre of some of the branchlets bisexual, with a 4-angled 4-celled pedicellate ovary (really a female flower, as in *Euphorbia*, with a small cup-like 4-angled perianth at the base of the ovary) erect in its centre, surrounded by the 4 compartments full of stamens; ovule solitary in each cell, pendulous; styles 4, united at the base, stout, emarginate or shortly bifid at the apex. Fruit a 4-celled capsule; cells separating at maturity from the central persistent axis and opening along their inner face into 2 hard valves. Seeds ellipsoid or subglobose, without a caruncle; testa crustaceous; embryo straight, with flat cotyledons, enclosed in copious albumen.—A small tree with milky juice. Leaves alternate, simple, exstipulate or the stipules very rudimentary. Panicles terminal, unisexual or bisexual.

Species 1, endemic.

In structure the involucre really consists of 8 bracts more or less fused together: an outer series of 4, forming 4 pocket-like cavities at the corners containing the

stamens, and an inner series of 4 alternating with the outer and converted into glands, surrounding in some of the terminal involucres a perfect female flower, in the others a very rudimentary abortive female flower, reduced to a very short solid square central body.

1. **D. glaucescens,** *Pierre in Bull. Soc. Linn. Paris*, 1896, 1260. A small slender tree (*Bates*), said to be climbing (*Pierre*), 18–25 ft. high, with milky juice. Leaves alternate, coriaceous, glabrous, apparently shining above, with or without (at least not always visible on dried specimens) a glaucous bloom beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long; blade $2\frac{3}{4}$–$6\frac{1}{4}$ in. long, 1–$2\frac{1}{3}$ in. broad, oblong, elliptic-oblong or slightly obovate-oblong, abruptly to somewhat gradually acuminate into an obtuse linear tail-like point $\frac{1}{4}$–$\frac{1}{2}$ in. long at the apex, acutely or roundedly cuneate at the base; midrib impressed above, prominent beneath; primary veins 6–8 on each side of the midrib, connected in a series of broad loops 1–2 lin. from the margin, prominent beneath. Panicle terminal 3–16 in. long, pyramidal with numerous branches or (on weak shoots) corymb-like with few branches, all parts, including the involucres, covered with minute dense and somewhat powder-like but persistent tomentum, or the branches becoming more or less glabrous; branches usually 2–$4\frac{1}{2}$ in. long, smaller on weak specimens, 2–4 times forked, ascending or ascending-spreading. Bracts falling off before the involucres mature, leaving conspicuous opposite scars, deeply concave-oblong, obtusely rounded at the apex, 1–$1\frac{1}{3}$ lin. long, 1 lin. broad. Involucres of a panicle all male or the terminal one of some of the branchlets bisexual, cup-like, obtusely 4-angled, truncate, about $\frac{1}{10}$ in. deep and $\frac{1}{6}$–$\frac{1}{5}$ in. square when fully expanded, green (*Bates*), when dried slightly fulvous or greyish-brown, with the partition-like glands blackish. Male flowers glabrous; perianth $\frac{1}{4}$ lin. long, cup-like, slightly and irregularly toothed. Female flower erect from the centre of the involucre on a stout pedicel $\frac{3}{4}$–1 lin. long, everywhere covered with minute tomentum like that on the involucre; perianth very shortly cupular, about $\frac{1}{3}$ lin. long, obtusely 4-angled, truncate, minutely ciliate; ovary obtusely 4-angled; styles 4, stout, recurving over the top of the ovary, channelled on their upper side, emarginate or shortly bifid at the apex. Fruit $\frac{2}{3}$–$\frac{3}{4}$ in. long and 1–$1\frac{1}{4}$ in. in diam., depressed, with 4 obtusely rounded lobes, covered with minute tomentum, brown or dull purple. Seeds ellipsoid or sub-globose, 5–$5\frac{1}{2}$ lin. long, 4–5 lin. thick, smooth, without a caruncle, brown.—*D. amplum*, Pax in Engl. Jahrb. xliii. 325. *Dichostema Zenkeri*, Pax in Engl. Jahrb. xxviii. 25.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1774! 1842! 2564! 2564A! 3012! 3549!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 126! Libreville, *Klaine*, 281! 1221! Angom, *Bates*, 555!

South Central. Belgian Congo: Yambuya, on the River Aruwimi, *Mildbraed*, 3306!

The dense indumentum on the inflorescence, although somewhat powder-like, does not rub off. It does not consist of hairs or powder, but of very minute globose-inflated cells, as seen under a compound microscope. I can find no distinction

whatever between *D. glaucescens* and *D. Zenkeri*. With regard to *D. amplum*, some mistake in measurement must have been made, as Dr. Pax bases its distinction upon its larger involucres and looser inflorescence. The involucre is described as "8–9 mm." (about 4 lin.) in diam. By the courtesy of the Berlin authorities I have been able to examine the type specimen, and find the involucre is not more than 5 mm. ($2\frac{1}{2}$ lin.) square when fully expanded and not any larger than the fully expanded involucres of the type of *D. glaucescens*, in which they are mostly immature, and consequently smaller. The panicle is more lax and its branches more spreading in *D. amplum* than in the type of *D. glaucescens*, but different specimens vary in this character and I can find nothing else either in stem, leaf, or flowers to distinguish them.

7. **ANTHOSTEMA**, A. Juss.; Benth. et Hook. f. Gen. Pl. iii. 261.

Flowers unisexual, one or a few females in each cyme or the cymes entirely male. Common involucre terminating each cyme-branch, composed of 4 bracts bearing large rhomboid flattened glands on their infolded margins and more or less united at their sides, so that dorsally it appears 4-lobed, enclosing 4 involucres containing stamens (male flowers) and spreading in half a circle, with or without a single ovary (female flower) on the inner side of its base. Involucre of male flowers consisting of 7–13 (often 8) free bracts in 2–3 series, with the 3–4 outer larger and enclosing the others, all with inrolled or incurved margins. Male flowers 7–13 (often 8) in each involucre, each consisting of a single stamen with a cup-like perianth at its base, jointed to the pedicel and soon falling away from it; anthers as broad or broader than long, 2-celled, opening longitudinally. Female flowers solitary, not enclosed in an involucre, shortly pedicellate; perianth cup-like, 3-(rarely 4-)lobed; ovary 3-angled, 3-celled, with a solitary pendulous ovule in each cell; style stout, with 3 short spreading branches, slightly thickened at the entire subtruncate stigmatic tips. Fruit as in *Euphorbia*, 3-lobed.—Trees. Leaves alternate, entire; stipules not seen, apparently very deciduous, leaving a small or indistinct scar. Cymes axillary, small, subsessile, rather dense, much-branched, with small opposite often deciduous bracts and the flowering bracts connate in groups of 4, enclosing the male involucres and spreading in a somewhat fan- or half-saucer-like manner, sometimes on one side of a female flower.

Species 3, one in Madagascar.

Leaves elliptic-oblong, cuneate at the base, with a curved outline to the margins	1. *A. senegalense.*
Leaves oblong, rounded at the base, with parallel margins	2. *A. aubryanum.*

1. **A. senegalense,** *A. Juss. Euphorb. Gen. Tent.* 57, *t.* 18, *fig.* 60. A tree. Branches glabrous. Leaves alternate, thinly coriaceous, glabrous, not shining above; petiole $\frac{1}{3}$–$\frac{2}{5}$ in. long; blade 3–5 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, oblong-elliptic or oblong-lanceolate, acuminate (sometimes somewhat abruptly) into an obtuse or acute point, broadly or acutely cuneate into the petiole at the base; midrib slightly impressed above, prominent beneath; veins numerous, very widely spreading, very slightly prominent beneath. Cymes axillary, sessile, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam.,

rather dense, with glabrous or very minutely puberulous branches. Bracts $\frac{2}{3}$–$\frac{3}{4}$ lin. long, $\frac{3}{4}$–1 lin. broad, orbicular-ovate, obtuse, glabrous, very minutely ciliate, deciduous. Lobes of the common involucre about $\frac{3}{4}$ lin. long, ovate or broadly rounded, obtuse, very minutely or somewhat powdery-puberulous. Involucre of male flowers about 1 lin. long, with free oblong segments, obtuse, acute or more or less toothed at the apex and with incurved margins, powdery-puberulous on the back. Perianth of male flowers $\frac{1}{5}$ lin. long, cup-like, irregularly 4-toothed, ciliate. Female flower on a very stout pedicel $\frac{3}{4}$–1 lin. long; calyx $\frac{3}{4}$–1 lin. long, 3-lobed nearly to half-way down, with broad deltoid-ovate acute lobes or truncate with 3 acute teeth, glabrous and minutely ciliate or minutely puberulous; ovary glabrous. Fruit about $\frac{7}{8}$ in. in diam., deeply 3-lobed; lobes nearly circular in outline as seen from above, very obtusely rounded.—A. Juss. in Ann. Sc. Nat. 1824, i. 165; Boiss. in DC. Prodr. xv. ii. 188; Stapf in Johnston, Liberia, ii. 648.

Upper Guinea. Senegambia, *Heudelot*, 592! Liberia: Grand Bassa, *Dinklage*, 1769! Sierra Leone: Samu country near Daragbe, *Scott-Elliot*, 4301!

2. **A. aubryanum,** *Baill. Adansonia*, v. 366. A tree 30–40 ft. high. Branches glabrous. Leaves alternate, thinly coriaceous, shining above; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. long; blade 3–6 in. long, $\frac{7}{8}$–$1\frac{3}{4}$ in. broad, oblong, with nearly parallel sides to about $\frac{3}{4}$ of the way up, obtusely acuminate, rounded at the base; midrib impressed above, prominent beneath; veins numerous, nearly horizontally spreading, slightly prominent beneath. Cymes axillary, sessile, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., rather dense, glabrous or excessively finely puberulous on parts of the branches. Bracts 1 lin. or less long and as broad or broader, broadly ovate or rounded, subacute or obtuse, concave, minutely ciliate. Lobes of the common involucre $\frac{3}{4}$–1 lin. long, oblong, obtuse. Involucre of male flowers about $\frac{1}{10}$ in. long, with free oblong obtuse segments, incurved at the margins, very minutely puberulous. Perianth of male flowers $\frac{1}{4}$ lin. long, cup-like, irregularly toothed, ciliate. Female flower on a very stout pedicel $\frac{1}{2}$–$\frac{2}{3}$ lin. long; perianth about $\frac{3}{4}$ lin. long, 3- (rarely 4-) lobed to below the middle, minutely puberulous to nearly glabrous; ovary glabrous. Fruit 1–$1\frac{1}{6}$ in. in diam., deeply 3-lobed; lobes ovate in outline as seen from above, obtuse.

Upper Guinea. Lagos: in a swamp between Ajitete and Addo, *Millen*, 178!

Lower Guinea. Princes Island, *Mann*, 1122! Gaboon, *Duparquet*, 165; *Aubry-Lecomte.*

8. **BUXUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 266.

Flowers monœcious. Disc 0. Male flower: Perianth-segments 4, imbricate, in 2 series. Stamens 4, opposite the sepals; filaments absent or present, free, fleshy; anthers dorsifixed near the base, oblong, at length recurved; cells parallel, introrse, dehiscing longitudinally. Rudimentary ovary globose (obtusely 3-lobed in some extra-African species) or absent. Female flower: Perianth-segments 4–6, strongly imbricate, the outer smaller. Ovary 3-celled; styles short, thick, usually distant from one

another; ovules 2 in each cell, pendulous from the apex but distant from the outer angle; raphe dorsal. Capsule ovoid, loculicidal; valves 2-horned with the persistent styles; pericarp woody; endocarp cartilaginous. Seeds oblong or ellipsoid, with a small strophiole; testa crustaceous, shining, usually black; albumen rather fleshy; cotyledons oblong.—Trees or shrubs, much-branched, usually glabrous. Leaves evergreen, opposite, shortly petiolate, penninerved. Racemes or cymes axillary, sessile or shortly pedunculate. Bracts resembling the perianth-segments. Flowers sessile or shortly pedicellate, the terminal one female, the remainder male.

About 21 species, 6 from temperate and montane regions of the northern hemisphere, 3 from Tropical Africa, 1 each from Madagascar and South Africa, the remainder West Indian.

Anthers sessile; rudimentary ovary absent from the male flowers.	
Leaves rhomboid-oblanceolate to narrowly oblanceolate, rounded at the apex, under 1 in. long and about $\frac{1}{3}$ in. broad	1. *B. benguellensis.*
Leaves lanceolate or almost ovate-lanceolate, gradually tapered to an obtuse or subacute apex, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad	2. *B. nyasica.*
Anthers exserted, borne on filaments about $1\frac{1}{2}$ lin. long; rudimentary ovary present in the male flowers .	3. *B. Hildebrandtii.*

1. **B. benguellensis,** *Gilg in Engl. Jahrb.* xxviii. 115. A tree or shrub, glabrous in all its parts; branchlets tetragonous, longitudinally sulcate. Leaves rhomboid-oblanceolate to narrowly oblanceolate, gradually narrowed into a very short petiole, obtuse at the apex, less than 1 in. long, about $\frac{1}{3}$ in. broad, subchartaceous to almost coriaceous, shining on the upper surface, dull below; nerves close, parallel, distinct above but not below. Flowers not known.

Lower Guinea. Angola: Huilla, *Antunes,* 46A! 248!

Var. *hirta,* Hutchinson in Kew Bulletin, 1912, ined. Branchlets rather densely and shortly pubescent; under surface of the leaves sparingly pubescent. Male flowers solitary in each leaf-axil, subsessile, surrounded by 3 or 4 small scaly bracts. Perianth-segments 4, decussate, ovate-elliptic, obtuse, $\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad, slightly coriaceous in the middle, membranous towards the margin, glabrous. Stamens 4; anthers sessile, $\frac{3}{4}$ lin. long, glabrous. Rudimentary ovary absent.

Lower Guinea. Angola: 10 miles north of the mouth of Lifuni River, *Gossweiler,* 4901!

2. **B. nyasica,** *Hutchinson in Kew Bulletin,* 1912, *ined.* A shrub or tree; branches subterete, slightly grooved, glabrous; young branchlets somewhat compressed, glabrous. Leaves lanceolate or subovate-lanceolate, gradually tapered to an obtuse or subacute apex, cuneate at the base, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, entire, thinly coriaceous, slightly shining above, dull below, glabrous on both surfaces; lateral nerves about 15 on each side, spreading from the midrib at an angle of 45°, looped and forming an intramarginal nerve about $\frac{1}{4}$ lin. from the margin, visible on both surfaces; petiole very short. Flowers axillary, a male and female in the lower, often only a pair of females in the

upper axils, each sex supported by a pedicel about 1 lin. long, the latter covered by small overlapping triangular bracts. Male flowers: Perianth-segments 4, broadly ovate-triangular, slightly keeled on the back, about ½ lin. long, glabrous, membranous towards the margin. Stamens 4; anthers sessile, acute, nearly 2 lin. long, ½ lin. broad across the back. Rudimentary ovary absent. Female flowers: Perianth-segments as in the male. Ovary glabrous; styles 3, spreading, bifid, sulcate and stigmatose on the inner face, 1¾ lin. long, glabrous. Capsule and seeds not known.

Mozamb. Distr. Nyasaland: Shire Highlands; Mlanji, *Scott-Elliot*, 8603 (in Berlin Herbarium)!

3. **B. Hildebrandtii,** *Baill. Adansonia*, xi. 268. A tree about 20 ft. high, much branched, glabrous in all its parts (excepting the bracts and perianth-segments); branchlets pale green, angular or slightly ridged. Leaves obovate or oblanceolate, rounded and very slightly mucronate or often emarginate at the apex, gradually narrowed to an acute base, 1–2½ in. long, ¼–1 in. broad, coriaceous, with recurved margins, more or less glaucous and dull when dry, finely punctate on both surfaces; lateral nerves numerous, forming an intramarginal nerve about ½ lin. from the margin, indistinct below, fairly conspicuous but only slightly raised above; petiole very short. Male flowers in axillary, very shortly pedunculate or subsessile clusters, each cluster with a terminal solitary female; peduncle up to ¾ lin. long; bracts opposite, lanceolate, coriaceous, boat-shaped, 1 lin. long, minutely puberulous on the margin. Perianth-segments 4, ovate-triangular or ovate-oblong, strongly keeled on the back, coriaceous, becoming thinner at the margin, fluffy-pubescent within the apex and on the margin, 1¼ lin. long, ¾ lin. broad. Stamens 4; filaments fleshy, 1½ lin. long. glabrous; anthers recurved, ¾ lin. long. Rudimentary ovary subglobose, coarsely wrinkled, about ⅔ lin. in diam., very slightly pubescent. Perianth-segments of the female flower much broader than those of the male, strongly imbricate. Capsule ovoid, 5–6 lin. long, about 3½ lin. in diam.; styles 3, persistent, ovate-triangular, nearly 1½ lin. long, slightly spreading and recurved. Seeds (immature) ellipsoid, about 2½ lin. long, brown and shining.—*B. calophylla*, Pax in Engl. Jahrb. xxxix. 632. *Buxanthus Hildebrandtii*, Van Tiegh. in Ann. Sci. Nat. 8me sér. v. 326.

Nile Land. Harar: Diredana, *Rosen!* Somaliland: Ahl Mountains, *Hildebrandt*, 891! Maid, *Hildebrandt*, 1547! Golis Range, *Mrs. Lort Phillips! Drake-Brockman*, 289!

9. **NOTOBUXUS,** Oliv. in Hook. Ic. Pl. xiv. 78.

Flowers monœcious. Disk 0. Male flower: Perianth-segments 4, in opposite pairs, obovate, boat-shaped. Stamens 6, in two series, the outer of 2, each opposite an outer segment, the inner series of 4, each 2 opposite an inner segment; anthers sessile, ovoid, dehiscing longitudinally. Rudimentary ovary absent. Female flower: Perianth-segments 4. Ovary 3-celled; styles 3, divergent, stigmatose inside; ovules 2 in each cell, pendulous. Fruit capsular, dehiscing loculicidally; valves

2-horned. Seeds oblong, keeled, black and shining.—Small trees or shrubs. Leaves opposite, entire, chartaceous, shortly petiolate, penni-nerved. Flowers subfasciculate or shortly cymose, the female solitary and sessile or subsessile in the middle, surrounded by a few pedicellate or subsessile males.

Species 2, the following and another from Natal.

1. **N. acuminata,** *Hutchinson.* A shrub or small tree, glabrous in all its parts; branches longitudinally sulcate or wrinkled, bright green; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves elliptic-lanceolate or slightly obovate-elliptic, long and gradually acuminate to a subacute apex, cuneate at the base, $2\frac{3}{4}$–4 in. long, 1–$1\frac{1}{2}$ in. broad, entire, subchartaceous, bright green; lateral nerves 5–7 on each side, looped and branched well within the margin, distinct and slightly prominent on both surfaces; petiole 1–2 lin. long. Cymes axillary, few-flowered. Male flowers on pedicels up to 5 lin. long. Perianth-segments 4, 1–$1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad. Anthers ovoid, dehiscing longitudinally. Female flowers subsessile: Perianth-segments 4. Ovary 3-celled. Capsule ovoid, about 5 lin. long and $2\frac{1}{2}$ lin. in diam. Seeds triquetrous, convex on the back, black, smooth and shining.—*Macropodandra acuminata,* Gilg in Engl. Jahrb. xxviii. 114.

South Central. Belgian Congo: Ituri region; forest near Wabadso, *Stuhlmann,* 2647!

Allied to *Notobuxus natalensis,* Oliv., from which it differs in the long-acuminate leaves and the longer pedicels of the male flowers.

10. BRIDELIA, Willd.; Benth. et Hook. f. Gen. Pl. iii. 267.

Flowers monœcious or rarely dicœcious, dichlamydeous. Male flowers: Sepals 5, valvate. Petals 5, small, scale-like, clawed and spathulate, the limb often toothed. Disk entire or sinuately lobed. Stamens 5; filaments connate in their lower part into a column in the centre of the flower, their upper part free and spreading; anther-cells parallel, dehiscing longitudinally. Rudimentary ovary inserted at the apex of the staminal column, entire or divided. Female flowers: Sepals often narrower than those of the male. Disk double, the outer part annular, the inner often cupular and embracing the ovary. Ovary 2- (rarely 3-) celled; styles distinct or shortly connate at the base, bilobed or subentire; ovules 2 in each cell. Berry or drupe small, indehiscent; exocarp fleshy or pulpy; endocarp crustaceous and hardened into 2 (or by abortion 1) pyrenes. Seeds often solitary in each pyrene; albumen usually fleshy, deeply excavated on the inner face; cotyledons broad and thin.—Shrubs or trees. Leaves alternate, petiolate, entire; secondary nerves pinnate, the tertiary mostly parallel and prominent. Flowers small, glomerate in the leaf-axils, rarely in spicate clusters, the males numerous and subsessile, the females fewer or solitary, sometimes distinctly pedicellate; bracts small, scaly. Berries or drupes ovoid or globose, small, smooth.

About 40 species, mostly from Tropical Asia, ranging through the Malay Archipelago to New Caledonia and Australia; a few in Madagascar and South Africa.

Fruits 2-celled.
- Lateral nerves of the leaves continued to the margin and forming a marginal nerve.
  - Leaves rigidly coriaceous, hairy above, at least when young; tertiary nerves and veins forming a very prominent network below.
    - Sepals of the male flowers densely pubescent outside . . . . . 1. *B. mollis.*
    - Sepals of the male flowers nearly glabrous outside . . . . . 3. *B. scleroneuroides.*
  - Leaves rigidly coriaceous, glabrous above when young; tertiary nerves and veins forming a very prominent network below . . 5. *B. angolensis.*
  - Leaves membranous or thinly coriaceous, glabrous or slightly hairy above when young; tertiary nerves and veins not prominent below.
    - Leaves oblong or oblong-lanceolate, about thrice as long as broad . . . 4. *B. scleroneura.*
    - Leaves obovate, obovate-elliptic or broadly eiliptic, mostly less than twice as long as broad.
      - Leaves pubescent above, especially when young . . . . . 2. *B. taitensis.*
      - Leaves quite glabrous above . . . 6. *B. tenuifolia.*
- Lateral nerves reticulate and looped, rarely a few extending to the margin.
  - Veins raised and very prominent below.
    - Leaves glabrous beneath . . . . 7. *B. Niedenzui.*
    - Leaves pubescent beneath . . . . 8. *B. Fischeri.*
  - Veins scarcely raised and inconspicuous below . 9. *B. cathartica.*

Fruits 1-celled.
- Lateral nerves not continued to the margin to form a marginal nerve . . . . . 10. *B. atroviridis.*
- Lateral nerves continued to the margin to form a marginal nerve.
  - Acumen of the leaves conspicuously mucronate . 11. *B. speciosa.*
  - Acumen of the leaves obtuse or only very slightly mucronate.
    - Disk of the female flowers glabrous outside.
      - Flowers in the axils of the leaves . . 12. *B. zanzibarensis.*
      - Flowers in leafless spicate clusters . . 13. *B. Neogætzea.*
    - Disk of the female flowers pubescent outside.
      - Leaves rusty-pubescent below; veins prominent on the lower surface . . 14. *B. ferruginea.*
      - Leaves glabrous or minutely puberulous below; veins scarcely prominent . . 15. *B. micrantha.*

1. **B. mollis,** *Hutchinson.* A small tree about 15 ft. high; branchlets brown-tomentose when young, becoming glabrous when older. Leaves broadly elliptic or obovate-rotundate, rounded or truncate and sometimes slightly emarginate, rounded or slightly

cordate at the base, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$–$3\frac{1}{2}$ in. broad, coriaceous, shortly and rather densely pubescent above, densely pubescent below; lateral nerves 9–12 on each side, branched towards the margin but finally reaching it and forming a marginal nerve, slightly prominent on the lower surface; tertiary nerves close, slightly prominent below; veinlets not or scarcely prominent below; petiole 2–$2\frac{1}{2}$ lin. long, densely pubescent; stipules lanceolate or subulate-lanceolate, 2–3 lin. long, 1 lin. broad, densely pubescent. Male flowers subsessile or shortly pedicellate: Sepals ovate-triangular, $1\frac{1}{2}$ lin. long, 1 lin. broad, densely pubescent outside. Petals broadly obovate, slightly toothed in the upper half, 1 lin. long, $\frac{3}{4}$ lin. broad, glabrous. Disk broad and flat, glabrous. Staminal column $\frac{3}{4}$ lin. long; free part of the filaments $\frac{1}{3}$ lin. long, very slender towards the apex; anthers $\frac{2}{3}$ lin. long, glabrous. Rudimentary ovary $\frac{1}{2}$ lin. long, much swollen at the base, glabrous. Female flowers very shortly pedicellate: Sepals ovate-lanceolate, $1\frac{1}{2}$ lin. long, rusty-pubescent. Petals oblong-lanceolate, $\frac{2}{3}$ the length of the sepals. Disk cupular, lobed, glabrous on both sides. Ovary glabrous. Fruit 2-celled, transversely ellipsoid or subglobose, about 4 lin. in diam.—*B. stipularis*, Müll. Arg. in DC. Prodr. xv. ii. 499, partly (as to Kirk's and Burke's specimens), not of Blume.

Mozamb. Distr. British Central Africa: Rhodesia; Victoria, *Monro*, 684! 790! Portuguese East Africa: Boruma, *Menyharth*, 858! Tete, *Kirk!*

Occurs also in the Transvaal.

2. **B. taitensis,** *Pax & Vatke in Engl. Jahrb.* xv. 531. A dense shrub; branches longitudinally sulcate, with a greyish-brown bark, glabrescent; young branchlets slender, rusty-puberulous. Leaves obovate or broadly elliptic, rounded or very shortly and obtusely pointed, slightly cuneate at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly chartaceous, slightly pubescent on the upper surface, a little more densely so below; lateral nerves 8–11 on each side, slender, often a little branched towards but finally reaching the margin and forming a faint marginal nerve; tertiary nerves parallel, distinct below; veins rather close but not prominent below; petiole rather stout, wrinkled, 2 lin. long, shortly pubescent or tomentellous; stipules linear-lanceolate, acute, 2–$2\frac{1}{2}$ lin. long, pubescent. Flowers dicœcious. Male bracts ovate, subacute, strongly keeled on the back, keel pubescent. Sepals lanceolate, obtuse, 1 lin. long, slightly pubescent on the outside towards the base. Petals very broadly obovate or rhomboid, subentire. Disk fleshy, glabrous. Rudimentary ovary short and columnar, subentire, glabrous. Female flowers: Sepals ovate, 1 lin. long, $\frac{1}{2}$ lin. broad, slightly coriaceous, sparingly puberulous outside. Petals rhomboid, keeled on the back, nearly as large as the sepals. Disk thin, toothed, glabrous outside. Ovary oblong-ellipsoid, contracted at the base, glabrous. Fruits 2-celled, ellipsoid-globose, about 3 lin. in diam., black and shining when dry. —Pax in Engl. Pfl. Ost-Afr. C. 237; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 32. *B. nigricans*, Gehrm. l.c. 35.

Nile Land. British East Africa: Taita Hills, *Hildebrandt*, 2415! *Grenfell!* Kibwesi, *Scheffler*, 100! 131!

3. **B. scleroneuroides,** *Pax in Engl. Jahrb.* xv. 532. A shrub 10 ft. high, with drooping branches; branchlets clothed with yellowish hairs. Leaves oblong, oblong-elliptic or lanceolate-oblong, obtuse or subacute, deltoid or rounded at the base, 1–5 in. long, $\frac{1}{4}$–$2\frac{1}{2}$ in. broad, rigidly coriaceous, pubescent above when young, softly and densely pubescent beneath; lateral nerves continued to the margin, 9–15 on each side, prominent below; tertiary nerves wavy, more or less prominent below; veinlets forming a very close, prominent network beneath; petiole 2–4 lin. long, tomentose, at length glabrescent; stipules linear-lanceolate, about $2\frac{1}{2}$ lin. long, pubescent. Bracts broadly ovate, pubescent on the outside. Male flowers subsessile: Sepals ovate, subacute, obtuse, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, glabrous. Petals broadly ovate, toothed at the apex. Disk conspicuous. Rudimentary ovary bilobed. Female flowers: Sepals as in the male. Petals elliptic-ovate, thick, slightly bifid. Disk enclosing the ovary. Ovary ovoid, glabrous; styles 2, bifid, thick at the apex, glabrous. Fruits 2-celled, globose, $3\frac{1}{2}$ lin. in diam.—Pax in Engl. Pfl. Ost-Afr. C. 237. *B. scleroneuroides*, var. *typica*, Gehrm. in Engl. Jahrb. xli. Beibl. 95, 32. *B. Paxii*, Gehrm. l.c. 31. *B. angolensis*, var. *nitida*, Beille in Bull. Soc. Bot. Fr. xl. Mém. viii. 70.

North Central. Upper Ubangi Region: Bagas Country; by the Tomi River, *Chevalier*, 5596!

Nile Land. Sudan: near Jebel Elira, *Broun*, 1368! Jur: Jur Ghattas, *Schweinfurth*, 1496! 1536! 1844! Kich: Ador Village, *Petherick!* Uganda: Madi, *Speke & Grant!* Nyamwamba valley, Ruwenzori, 8000 ft., *Scott-Elliot*, 8035! Usoga district, *Scott-Elliot*, 7250! and without precise locality, *Dawe*, 442! 12 days' march from Mumias, *Whyte!*

Mozamb. Distr. German East Africa: Ukerewe Island, Lake Victoria, *Conrad*, 172!

4. **B. scleroneura,** *Müll. Arg. in Flora*, 1864, 515. A tree up to 40 ft. high; branchlets sparingly pubescent, becoming glabrous. Leaves oblong or oblong-lanceolate, subacute, slightly rounded at the base, 2–$4\frac{1}{2}$ in. long, 1–2 in. broad, thinly coriaceous, glabrous or slightly pubescent above, glabrescent or very sparingly pilose on the lateral and tertiary nerves beneath; lateral nerves extending to the margin, slightly oblique, 11–14 on each side; tertiary nerves somewhat lax, often wavy; veinlets slightly prominent; petiole 2–3 lin. long, slightly wrinkled, very shortly pubescent; stipules caducous. Male buds nearly glabrous. Female flowers: Sepals ovate, slightly acuminate, 1 lin. long, glabrous or pubescent towards the base. Petals elliptic-lanceolate, subacute at both ends, $\frac{1}{2}$ lin. long, slightly toothed in the upper half. Disk bottle-shaped, wholly enveloping the ovary, slightly lobed at the apex, glabrous outside. Ovary ovoid, glabrous; styles 2, bifid. Fruit 2-celled, globose, shortly stipitate and contracted at the base, 3–4 lin. in diam. Seeds flattened or very slightly concave on the inner side.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 908! Lokoja, *Dalziel*, 162A! Yola Province, *Dalziel*, 162! *Shaw*, 61! Southern Nigeria: Onitsa, *Barter*, 577!

Mr. Shaw states that the roots are used in medicine by the natives of Yola.

5. **B. angolensis,** *Welw. ex Müll. Arg. in Journ. Bot.* 1864, 327. A small tree, 15–20 ft. high; trunk 4–8 in. in diam. at the base, bare to a height of 6–7 ft., then with crowded branches and foliage; branchlets pubescent. Leaves broadly elliptic or ovate-elliptic, obtuse, somewhat truncate or rounded at the base, $2\frac{1}{2}$–4 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, rigidly coriaceous, glabrous and dull above, with the nerves and veins densely pubescent below; lateral nerves 14–16 on each side, branching towards the margin but finally reaching it and forming a marginal nerve, prominent below, immersed above; tertiary nerves close, prominent below; veinlets forming a deep network on the lower surface; petiole very thick, wrinkled, 3–4 lin. long, pubescent; stipules ovate-lanceolate. Bracts ovate-deltoid, strongly keeled, brown-villous on the outside. Male flowers subsessile: Sepals ovate, obtuse, glabrous. Petals conspicuous, obovate, 3–5-toothed. Disk broad and flat, slightly rugose. Rudimentary ovary subentire. Young female flowers not seen. Disk lobed, glabrous. Fruit 2-celled, globose, 4 lin. in diam. Seeds flattened on the inner side; testa shining.—Müll. Arg. in DC. Prodr. xv. ii. 496; Hiern in Cat. Afr. Pl. Welw. i. 953. *B. angolensis*, vars. *typica* and *Welwitschii*, Gehrm. in Engl. Jahrb. xli. Beibl. 95, 31.

Lower Guinea. Angola: Pungo Andongo; in woods on the gigantic rocks above Catete, *Welwitsch*, 367! Malange district; Kiambella, *Gossweiler*, 990!

6. **B. tenuifolia,** *Müll. Arg. in Journ. Bot.* 1864, 328. A shrub or small tree; young branches pubescent, at length glabrescent. Leaves nearly twice as long as broad, obovate, obovate-lanceolate or elliptic, shortly acuminate to an obtuse apex, cuneate or rounded at the base, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–$2\frac{1}{2}$ in. broad, slightly membranous, glabrous above, slightly pubescent on the veins below; lateral nerves slender, ascending, slightly oblique, often branching but finally reaching the margin, 9–11 on each side; tertiary nerves lax and faint; veinlets rather close; petiole 1 lin. long, wrinkled, sparingly pubescent; stipules linear-lanceolate, acute, about $2\frac{1}{2}$ lin. long, pubescent. Bracts ovate, subacute, strongly keeled, keel pubescent. Male flowers sessile: Sepals ovate, obtuse, 1 lin. long, glabrescent on the outside. Petals suborbicular, clawed, undulate or slightly lobed at the apex. Disk flat and broad, rugose. Rudimentary ovary bifid. Young female flowers not seen. Fruits 2-celled, ovoid, about 3 lin. in diam. Seeds dull, flattened on one side.—Müll. Arg. in DC. Prodr. xv. ii. 495; Hiern in Cat. Afr. Pl. Welw. i. 953; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 32. *B. stipularis*, Müll. Arg. l.c. 499, partly, as to Welwitsch's spec., not of Blume. *B. scandens*, Hiern, l.c. 955, excl. syn., not of Willd.

Lower Guinea. Loango: Chinchosho, on the Lagoon, *Soyaux*, 30! Lower Congo, *Smith*, 22! Angola: Zenza de Golungo; dry hills near Tanderaxique, *Welwitsch*, 374! Golungo Alto; thickets near the Ambaca road, *Welwitsch*, 370c! 373! Ambriz to about 30 miles inland, *Mr. & Mrs. Monteiro!* Loanda, *Gossweiler*, 413! Huilla; near Mumpulla, *Welwitsch*, 363! near Lopollo and around the great lake of Ivantâla, *Welwitsch*, 362!

Var. *elegans*, Hutchinson. Leaves narrowly oblanceolate, cuneate at the base

2–3½ in. long, ¾–1¼ in. broad.—*B. elegans*, Müll. Arg. in Journ. Bot. 1864, 327, and in DC. Prodr. xv. ii. 496; Hiern, l.c. 953.

Lower Guinea. Angola: Huilla; in wooded thickets around Humpata, *Welwitsch*, 361!

7. **B. Niedenzui,** *Gehrm. in Engl. Jahrb.* xli. *Beibl.* 95, 36, *partly.* A small bush about 6 ft. high; branchlets somewhat elongated and slender, glabrous or very sparingly pubescent when young. Leaves elliptic, oblong-elliptic or oblanceolate, rounded or subacute, rounded or cuneate at the base, 1½–4 in. long, ½–2 in. broad, slightly coriaceous, glabrous on both surfaces, glaucous below, revolute at the margin; lateral nerves 8–11 on each side, looped and reticulate, together with the tertiary nerves and veins very prominent below; petiole stout, 2–3 lin. long, wrinkled; stipules lanceolate-subulate, acute, 2 lin. long, slightly pubescent. Bracts ovate, slightly pubescent. Male flowers: Sepals ovate, glabrous. Petals elliptic-lanceolate, toothed, nearly as long as the sepals. Rudimentary ovary bipartite. Female flowers: Sepals larger than in the male. Petals subentire. Disk cupular, toothed, glabrous. Ovary ovoid; styles bipartite, glabrous. Fruits 2-celled (*Gehrmann*).—S. Moore in Journ. Linn. Soc. xl. 191. *B. Niedenzui*, vars. *Njassæ* and *revoluta*, Gehrm. l.c.

Mozamb. Distr. German East Africa; Bagamoyo, *Hildebrandt*, 1295! Province of Zanzibar, *Kirk!* Livingstone Mountains, *Goetze*, 845! Nyasaland; without precise locality, *Buchanan*, 519! Rhodesia; Leshumo Valley, *Holub!* Umvumvumvu River, 2000 ft., *Swynnerton*, 1736!

Gehrmann quotes *Buchanan*, 51, but it is undoubtedly a mistake for 519.

8. **B. Fischeri,** *Pax in Engl. Jahrb.* xv. 531. A shrub or small tree with rusty-pubescent branchlets. Leaves elliptic or obovate-elliptic, subacute, rounded at the base, 1–4 in. long, ¾–2 in. broad, glabrous above, pilose below, often with reddish hairs; lateral nerves 6–10 on each side, reticulate and prominent below; tertiary nerves and veins conspicuous; petiole 1½ lin. long, pubescent or rusty-tomentose; stipules linear-lanceolate, acute, pubescent. Bracts ovate, pubescent. Male flowers: Sepals ovate, subacute, glabrous. Petals obovate, dentate, about ⅔ the size of the sepals. Disk slightly wrinkled. Female flowers: Sepals as in the male, slightly pubescent. Petals as in the male. Disk cupular, toothed, glabrous. Ovary subglobose; styles very short, bifid, glabrous. Young fruits 2-celled, black, globose, tipped by the persistent base of the style.—Pax in Engl. Pfl. Ost-Afr. C. 237; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 35. *B. Niedenzui*, var. *pilosa*, Gehrm. l.c. 37.

Mozamb. Distr. German East Africa: Unyamwezi; Usuri, *Fischer*, 17! Amboni, *Holst*, 2568! Useguha Steppe, *Scheffler*, 236! Kilimanjaro, 5000 ft., *Johnston!* Likoma Islands (Lukoma), in Lake Nyassa, *Johnson*, 53! *Bellingham!*

Var. *Lingelsheimii*, Hutchinson. Leaves oblong or oblanceolate, acute.—*B. Lingelsheimii*, Gehrm. l.c. 36.

Mozamb. Distr. German East Africa; Dar-es-Salaam, *Holtz*, 1124! foot of Kilimanjaro, *Volkens*, 571.

9. **B. cathartica,** *Bertol. f. Illustr. Mozambiq.* 16, *n.* 13, *t.* 6. A shrub about 6 ft. high; branchlets slender, glabrous or slightly pubescent; internodes very short. Leaves elliptic, oblong-elliptic or narrowly obovate, rounded or very obtusely pointed, rounded or obtuse at the base, 1–3½ in. long, ½–2 in. broad, papery, glabrous on both surfaces or puberulous below, more or less glaucous beneath; lateral nerves looped before reaching the margin, 5–10 on each side; tertiary nerves reticulate, faint; petiole 1–2 lin. long, wrinkled, glabrous or pubescent; stipules lanceolate or linear-lanceolate, acute, 1–1½ lin. long, sparingly pubescent. Bracts pubescent. Male flowers: Sepals ovate, subacute, glabrous. Petals suborbicular or obovate, entire or slightly toothed. Disk thin. Rudimentary ovary deeply bifid. Female flowers: Sepals triangular, subacute, glabrous. Petals large, suborbicular or obovate, shortly clawed, entire. Disk enclosing the ovary, toothed, glabrous outside. Ovary ovoid, glabrous; styles very short, bilobed. Fruits 2-celled, ellipsoid, 4½ lin. long, 4 lin. broad, black when dry.—Müll. Arg. in DC. Prodr. xv. ii. 502; Pax in Engl. Pfl. Ost-Afr. C. 237; S. Moore in Journ. Linn. Soc. xl. 191. *B. melanthesoides*, Klotzsch in Peters, Reise Mozamb. Bot. 103. *Pentameria melanthesoides*, Klotzsch ex Baill. Étud. Euph. 584.

Mozamb. Distr. German East Africa: Rovuma Bay, *Kirk!* Portuguese East Africa: Beira Beach, *Swynnerton*, 538. Mozambique, *Peters!* Lower Zambesi; Shupanga, *Kirk!* opposite Sena, *Kirk!* Boruma, *Menyharth*, 567! 876! Inhambane, *Fornasinio*. British Central Africa: Rhodesia; near Victoria Falls, *Rogers*, 5071! Kandahar Island, *Galpin*, 7015! Livingstone, *Rogers*, 7181!

Occurs also in the Transvaal.

10. **B. atroviridis,** *Müll. Arg. in Journ. Bot.* 1864, 327. A small tree about 10 ft. high, with spreading slender pubescent branchlets. Leaves oblong-elliptic, acuminate, slightly rounded or cuneate at the base, 3–6½ in. long, 1½–2½ in. broad, membranous, glabrescent on both surfaces; midrib very prominent below; lateral nerves ascending, slightly oblique, 10–16 on each side, not continued to the margin; tertiary nerves lax, slightly flexuous; petiole 3–4 lin. long, stout, wrinkled, shortly pubescent; stipules linear-lanceolate, slightly pubescent. Bracts ovate, very hairy. Male flowers shortly pedicellate: Sepals obliquely ovate, acuminate, glabrous or slightly pubescent outside towards the apex. Petals minute, obovate-cuneate. Disk slightly rugose. Rudimentary ovary trifid. Female flowers subsessile: Sepals lanceolate, acute, 1¼ lin. long, ½ lin. broad at the base, pubescent outside in the lower half, glabrescent in fruit. Petals lanceolate, acute, ⅓ lin. long. Disk bottle-shaped, enclosing the ovary, glabrous. Ovary ovoid, glabrous; styles 2, connate, deeply bilobed. Fruit oblong-ellipsoid, 1-celled.—Müll. Arg. in DC. Prodr. xv. ii. 494; Hiern in Cat. Afr. Pl. Welw. i. 953; S. Moore in Journ. Linn. Soc. xl. 190. *B. Zenkeri*, Pax in Engl. Jahrb. xxvi. 327; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 276; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 39; Th. & Hél. Durand, Syll. Flor. Congol. 480.

Upper Guinea. Gold Coast, *Farmar*, 430! Southern Nigeria: Ego, Benin District, *Foster*, 189! Benin City, *Dennett*, 14! 43! between Ibadan and Abeokuta, *Schlechter*, 12356! Cameroons: Bipinde, *Zenker*, 833! 1919! 2223! 2223A!

Lower Guinea. Spanish Gaboon: Makomanan, *Tessmann*, 263! Akam, *Tessmann*, 309! Angola: Golungo Alto; between Sange and Camilungo, *Welwitsch*, 370! Cazengo; forests of Mata de Cabondo, *Welwitsch*, 370B!

South Central. Belgian Congo: Eala, *Laurent*, 1252. *Pynaert*, 1376, 1677. Gumbari, *Seret*.

Mozamb. Distr. Rhodesia: Chipete forest patch, *Swynnerton*, 535!

11. **B. speciosa,** *Müll. Arg. in Journ. Bot.* 1864, 327, *excl. var. tricoclada*. A tree 25–30 ft. high; branchlets glabrous, with scattered lenticels. Leaves obovate-oblong or elliptic-oblong, long-acuminate, acumen mucronate, very slightly rounded at the base, 3–5½ in. long, 1½–2½ in. broad, thinly coriaceous, glabrous on both surfaces; lateral nerves extending to the margin, slightly oblique, 10–15 on each side; tertiary nerves very lax, often reticulate; petiole 4–5 lin. long, wrinkled, glabrescent; stipules caducous. Bracts conspicuous, acutely acuminate, densely pubescent. Male flowers: Sepals ovate-triangular, obtuse, glabrous. Petals small, spathulate, toothed. Disk thick, coarsely wrinkled. Rudimentary ovary subentire. Female flowers: Sepals ovate-lanceolate, subacute, 1 lin. long, ½ lin. broad at the base, coriaceous, glabrous on both sides. Petals obovate-oblanceolate, trifid in the upper part, about half the length of the sepals. Disk nearly enveloping the ovary, toothed, glabrous. Ovary ovoid, glabrous. Fruit 1-celled, oblong-ellipsoid, mucronate, 4 lin. long, 3 lin. in diam. Mature seeds not seen.—*B. speciosa*, var. *psiloclada*, Müll. Arg. in DC. Prodr. xv. ii. 498; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 40. *B. Perrotii*, Beille in Bull. Soc. Bot. Fr. lv. Mém. viii. 69.

Upper Guinea. Cameroon Mountain, *Mann*, 1215!

North Central. Upper Ubangi region: between Fort Possel and Krébedjé, *Chevalier*, 5437!

12. **B. zanzibarensis,** *Vatke & Pax in Engl. Jahrb.* xv. 530. A small tree about 15 ft. high; young branchlets pubescent, soon becoming glabrous, with scattered lenticels. Leaves elliptic or oblong-elliptic, very shortly acuminate, rounded at the base, 2½–3½ in. long, 1½–2¼ in. broad, thinly coriaceous, glabrous above, very minutely puberulous on the veins below; lateral nerves extending to the margin, slightly oblique, 8–11 on each side; tertiary nerves lax, wavy; petiole 2–3 lin. long, tomentose or densely pubescent; stipules lanceolate, acute. Bracts inconspicuous. Male flowers: Sepals ovate, obtuse, glabrous outside, ¾ lin. long. Petals small, orbicular-spathulate, truncate. Disk annular, thick. Rudimentary ovary subentire. Female flowers: Sepals triangular, subacute, ¾ lin. long, glabrous outside. Petals lanceolate, acute. Disk enclosing the ovary, slightly lobed, glabrous outside. Ovary ovoid, glabrous; styles 2, connate, bilobed, branches thick. Fruits 1-celled.—Pax in Engl. Pfl. Ost-Afr. C. 237; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 40.

Mozamb. Distr. Zanzibar, *Hildebrandt*, 1182!

13. **B. Neogœtzea,** *Gehrm. in Engl. Jahrb.* xli. *Beibl.* 95, 40. Young branchlets densely pubescent, glabrescent when older. Leaves elliptic or oblong-elliptic, very shortly and obtusely pointed, rounded at the base, 2–5½ in. long, 1¼–3½ in. broad, thinly coriaceous, glabrescent and shining above, reddish-brown pubescent on the nerves and veins beneath; lateral nerves extending to the margin, nearly straight, very prominent below, 15–18 on each side; tertiary nerves close, more or less prominent below; petiole 4–5 lin. long, densely villous; stipules caducous. Flowers in terminal compound spikes; bracts tomentose. Male flowers: Sepals triangular-ovate, subacute, 1 lin. long, glabrous. Petals obovate-spathulate, very minute. Disk conspicuous, verrucose. Rudimentary ovary conical, acute, entire. Female flowers: Sepals lanceolate, ovate, glabrous. Petals lanceolate. Disk enclosing the ovary, with several teeth at the apex, glabrous. Ovary ovoid, glabrous; styles 2, deeply bipartite, branches flattened. Fruit 1-celled, ovoid, acute, 4 lin. long, 3 lin. in diam.—*Neogœtzea brideliifolia*, Pax in Engl. Jahrb. xxviii. 419.

Nile Land. Uganda: Toro district, 6000–8000 ft.; Kivata, in forest, *Scott-Elliot*, 7695! Wimi Valley, *Scott-Elliot*, 7909!

Mozamb. Distr. German East Africa: Uhehe; Uchungwe Mountain, Pongolo, in the forest at 5600 ft., *Goetze*, 612!

14. **B. ferruginea,** *Benth. in Hook. Niger Fl.* 511. A shrub or small tree, 10–15 ft. high; branchlets ferruginous-pubescent. Leaves elliptic or oblong-elliptic, very shortly acuminate, rounded at the base, 2–4 in. long, 1–2½ in. broad, coriaceous, glabrous or almost so above, pubescent on the nerves and veins below; lateral nerves extending to the margin but often branching, slightly oblique, 7–9 on each side; tertiary nerves wavy, somewhat lax; petiole 1½–3 lin. long, tomentose; stipules lanceolate, acute, about 3 lin. long, pubescent. Bracts ovate-lanceolate, pubescent. Male flowers: Sepals ovate-lanceolate, subacute and very slightly hooded at the apex, pubescent outside with long-adpressed hairs. Petals small, obovate, toothed. Disk thick, wrinkled. Rudimentary ovary subentire. Female flowers: Sepals as in the male. Petals lanceolate, acute. Disk bottle-shaped, enclosing the ovary, lobed, long-pubescent outside. Ovary ovoid; styles 2, bipartite. Fruit 1-celled, ovoid-oblong, 3–4 lin. long, 2½ lin. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 954, excl. var.; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 39. *B. micrantha*, var. *ferruginea*, Müll. Arg. in DC. Prodr. xv. ii. 498; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 46; De Wild. Miss. É. Laurent, 128, and Études Fl. Bas- et Moyen-Congo, ii. 276. *B. speciosa*, var. *kourousensis*, Beille in Bull. Soc. Bot. Fr. lv. Mém. viii. 68. *Gentilia Chevalieri*, Beille, l.c. 71.

Upper Guinea. French Guinea: Kouroussa, *Chevalier*, 15747! Dahomey: Cotonou, *Chevalier*, 4442! Togo: near Lome, *Warnecke*, 157! Lagos, *Foster*, 39! *Rowland! Millen! Dawodu*, 26! Northern Nigeria: Nupe, *Barter*, 1685! 1686! 1711! Zungeru, *Elliott*, 6! Kontagora, *Dalziel*, 51! Southern Nigeria: Attah (Idda), *Vogel*, 62! Cameroons: Yaunde, *Zenker & Staudt*, 392! *Zenker*, 793! 1409! French Soudan: Bambana Toumba, *Chevalier*, 559!

Lower Guinea. Lower Congo: Mfine, *Laurent;* Kisantu, *Gillet*, 755, 1995; Kitobola, *Pynaert*, 36; Kwamouth, *Bieler.* Angola: Golungo Alto; near Trombeta, Sange, and Camilungo, *Welwitsch*, 368! 368B! mountains of Serra de Alto Queta, *Welwitsch*, 369! Pungo Andongo; about Pedras de Guinga, *Welwitsch*, 365! near Bumba, *Welwitsch*, 366! Huilla; at the base of Morro de Lopollo, *Welwitsch*, 372! Malange district; near Catombe, *Gossweiler*, 1001!

South Central. Belgian Congo: Sankuru River, *Sapin;* Luisi River, *Kässner*, 2669! Kundelungu, *Kässner*, 2609!

Var. *orientalis*, Hutchinson. Lateral nerves unbranched, 11–13 (rarely 8 or 9); tertiary nerves slightly prominent below; petiole 4–5 lin. long.—*Gentilia hygrophila*, Beille, l.c. 70. *B. micrantha*, var. *ferruginea*, Oliv. in Trans. Linn. Soc. xxix. 145. *Bridelia ndellensis*, Beille, l.c. 69.

North Central. French Congo: Upper Shari region; Mandjias Country, *Chevalier*, 6289! Ndelli, *Chevalier*, 6903! 7482! 8080!

Nile Land. Jur: Okel (Okale), *Schweinfurth*, 1703! Niamniam: Nabambisso River, *Schweinfurth*, 3726! Uganda: Madi, *Speke & Grant!*

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3429!

15. **B. micrantha,** *Baill. Adansonia*, iii. 164. A tree 20–40 ft. high, with a dense widely spreading head; branchlets rusty-tomentose or pubescent when young, at length glabrous, with scattered lenticels. Leaves elliptic, oblong-elliptic or obovate, shortly acuminate and subacute or obtuse, slightly cuneate or rounded at the base, 2–7 in. long, 1–3 in. broad, slightly coriaceous, often shining and glabrous above, almost glabrous or minutely puberulous below; lateral nerves ascending, slightly oblique, 8–16 on each side, continued to the margin and forming a marginal nerve, prominent below; tertiary nerves more or less inconspicuous; petiole stout, 2–5 lin. long, wrinkled, densely villous or pubescent; stipules caducous; bracts pubescent. Male flowers shortly stalked: Sepals triangular, subacute, $\frac{1}{2}$ lin. long, pubescent towards the base. Petals small, obovate-cuneate, trilobed or dentate. Disk thick and fleshy. Rudimentary ovary truncate or trifid, very short. Female flowers sessile: Sepals as in the male. Petals ovate, entire. Disk almost enclosing the ovary, ciliate, densely pilose outside. Ovary ovoid, glabrous; styles 2, 2-lobed, glabrous. Fruits ovoid or ellipsoid, 2–3 lin. in diam., 1-celled.—Müll. Arg. in DC. Prodr. xv. ii. 498, excl. var. *ferruginea* with syn.; De Wild. & Durand, Reliq. Dewevr. 200; De Wild. Études Fl. Bas- et Moyen-Congo, i. 275, ii. 276; S. Moore in Journ. Linn. Soc. xl. 190. *B. gambicola*, Baill. Adansonia, i. 79; Gehrm. in Engl. Jahrb. xli. Beibl. 95, 40. *B. stenocarpa*, Müll. Arg. in Flora, 1864, 515; Pax in Engl. Jahrb. viii. 61, and in Bolet. Soc. Brot. x. 157; Gehrm. l.c. *B. speciosa*, var. *trichoclada*, Müll. Arg. in Journ. Bot. 1864, 327, and in DC. Prodr. xv. ii. 498. *B. ferruginea*, var. *gambecola*, Hiern in Cat. Afr. Pl. Welw. i. 954. *B. abyssinica*, var. *densiflora*, Gehrm. in Engl. Jahrb. xli. Beibl. 95, 41. *Candelabria micrantha*, Hochst. in Flora, 1843, 79.

Upper Guinea. Senegambia, *Heudelot*, 38! 605! *Sieber!* Albreda, *Leprieur! Perrottet!* in woods near Mboro, *Cayor.* French Guinea: Erimakuna (Herimankuna), *Scott-Elliot*, 5397! Sierra Leone: Bagru River, *Mann*, 883! various localities, *Scott-Elliot*, 4018! 4583! 4911! 5216! Dagomba; Salaga, *Krause!*

Gold Coast: Aburi Hills, *Brown*, 931! Kwahu, *Johnson*, 657! and without precise locality, *Evans*, 20! Lagos, *Rowland!* Southern Nigeria: Aboh, *Barter*, 173! Old Calabar, *Thomson*, 85! *Holland*, 111! Cameroons: Abonando, *Rudatis*, 26! 45! Bipinde, *Zenker*, 1287! 2837! 3735! Batanga, *Bates*, 49! 157!

Nile Land. Uganda; Toro, *Dawe*, 466! Usoga, *Scott-Elliot*, 7191!

Lower Guinea. Princes Island, *Mann!* Island of St. Thomas, *Quintas*, 37! Spanish Guinea: Nkolentangan, *Tessmann*, 145! Lower Congo: islands near Ponta da Lenha, *Naumann.* Angola: Pungo Andongo, *Welwitsch*, 360! 364! Bumbo, *Welwitsch*, 371!

Mozamb. Distr. German East Africa: Uluguru, *Goetze*, 138! Kilimanjaro; Marangu, *Volkens*, 1398! Usambara; Derema, *Scheffler*, 167! British Central Africa: Nyasaland; Namasi, *Cameron*, 6! Shire Highlands, *Buchanan*, 52! *Scott-Elliot*, 8554! Zomba, *Kirk! Purves*, 213! Gazaland: Lower Umswirizwi River; near Chirinda, *Swynnerton*, 46! 536!

This appears to be a very variable species, especially in regard to the number of lateral nerves in the leaves, a character which was used by Müller to distinguish *B. stenocarpa*, but as so many intermediate forms occur I have been compelled to regard them as forms of one species.

Imperfectly known species.

16. **B. abyssinica,** *Pax in Engl. Jahrb.* xxxix. 630. A small, unarmed tree. Leaves narrowly ovate, acuminate, up to 5 in. long and $1\frac{3}{4}$ in. broad, coriaceous, glabrous, shining, bright green below, margin slightly undulate or subcrenulate; lateral nerves 13–17 on each side. Flowers glabrous. Male flowers: Sepals ovate-triangular, acute. Petals minute, much smaller than the sepals. Disk thick, lobed. Rudimentary ovary conical. Female flowers: Sepals and petals as in the male. Ovary glabrous. Styles 2, bilobed. Fruit ellipsoid, acute, about 4 lin. long, 1-celled.—Gehrm. in Engl. Jahrb. xli. Beibl. 95, 40, excl. var. *densiflora*.

Nile Land. Abyssinia: without locality, *Rosen.*

This is probably a form of *B. micrantha*, Baill.

17. **B. Mildbrædii,** *Gehrm. in Jahresb. Schles. Ges., zool.-bot. sect.*,1908, 2. A small tree; branchlets pubescent, at length glabrous. Leaves lanceolate-elliptic, acuminate, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad; lateral nerves produced to the margin; petiole up to 5 lin. long, tomentose. Flowers axillary, $1\frac{1}{4}$ lin. in diam., glabrous. Fruits 1-celled, globose, about 5 lin. in diam.—Fedde, Repert. viii. 575.

Mozamb. Distr. German East Africa: Wau Island, Lake Kiwu, *Mildbraed*, 1160.

11. CLEISTANTHUS, Hook. f.; Benth. et Hook. f. Gen. Pl. iii. 268.

Flowers monœcious or diœcious. Petals usually present. Male flower: Calyx-segments 5, valvate. Petals 5, or rarely absent, scale-like, small. Disk entire or sinuately lobed. Stamens 5, as in *Bridelia*; anther-cells parallel, dehiscing longitudinally. Rudimentary

ovary in the middle of the staminal column, often divided. Female flower: Calyx less deeply divided than that of the male. Disk double, the inner part cupular, surrounding the ovary. Ovary 3-celled; styles distinct, bifid; ovules 2 in each cell. Capsule globose or depressed-globose, often 3-lobed, splitting into three 2-valved cocci. Seeds 2 in each cell (or 1 by abortion); albumen scanty; cotyledons thick and fleshy, rarely thin, often more or less plicate.—Trees or shrubs. Leaves alternate, tertiary nerves reticulate. Flowers small, in axillary fascicles or very short racemes.

Species about 50, mostly Indian and Malayan, a few in New Caledonia, Australia, and Madagascar.

Pedicels $\frac{1}{2}$–1 in. long	1. *C. Holtzii.*
Pedicels 1–2 lin. long.	
Petals absent from the male flowers.	
Leaves ovate, $1\frac{1}{4}$–2 in. broad; male sepals and capsule glabrous	2. *C. caudatus.*
Leaves oblong-lanceolate, $\frac{3}{4}$–1 in. broad; male sepals and capsule pubescent	3. *C. apetalus.*
Petals present in the male flowers.	
Flowers monœcious; leaves 5–6 in. long	4. *C. bipindensis.*
Flowers diœcious; leaves 2–4 in. long.	
Bracts densely pubescent, subpersistent, $1\frac{1}{2}$–2 lin. long; acumen of the leaves 3–6 lin. long	5. *C. polystachyus.*
Bracts glabrescent, deciduous, 1 lin. long; acumen of the leaves 7–9 lin. long	6. *C. libericus.*

1. **C. Holtzii,** *Pax in Engl. Jahrb.* xliii. 77. A large tree; branches slightly sulcate, greyish, glabrous; young branches shortly pubescent, almost tomentose at the tips. Leaves oblong or oblong-elliptic, obtuse and rounded or sometimes very slightly and gradually acuminate, base slightly rounded, 1–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, membranous or thinly chartaceous, glabrous on both surfaces; lateral nerves 4–8 on each side, prominent on both surfaces; petiole rugose, sparingly pubescent, 2–3 lin. long; stipules deciduous. Flowers monœcious. Racemes many-flowered, female flowers few, chiefly towards the base; pedicels slender, up to 1 in. long, puberulous. Buds ellipsoid, obtuse, about 2 lin. long, sparingly puberulous. Male flowers much more numerous than the female: Sepals oblong, very slightly hooded and subacute at the apex, 2 lin. long, puberulous outside. Petals oblong, almost terete, $\frac{1}{2}$ lin. long. Disk glabrous. Filaments $\frac{3}{4}$ lin. long; anthers $1\frac{1}{2}$ lin. long. Rudimentary ovary small, glabrous, 3-partite, branches concave on the inside. Female flowers: Sepals slightly longer than in the male. Petals spathulate, toothed at the apex. Disk glabrous. Ovary subglobose, $1\frac{1}{2}$ lin. in diam., glabrous; styles 3, shortly bifid, glabrous, lobes spreading. Fruit deeply 3-lobed, about $\frac{1}{2}$ in. long; exocarp crustaceous, slightly wrinkled, glabrous and somewhat dull; endocarp horny. Seeds solitary, somewhat irregular in shape, about 2 lin. in diam.—*C. Johnsonii,* Hutchinson in Kew Bulletin, 1909, 380.

Mozamb. Distr. German East Africa: Mtoni, *Holtz,* 983! Dar-es-Salaam, *Holtz,* 1021! Portuguese East Africa: Sofala, large tree growing on the borders of mangrove swamps near the sea, *Johnson,* 26B!

Var. (?) *pubescens,* Hutchinson. Ovary and young fruit densely yellowish-pubescent.—*C. Johnsonii,* var. (?) *pubescens,* Hutchinson, l.c.

Mozamb. Distr. Portuguese East Africa: mangrove swamps at Sofala, *Johnson,* 26A!

C. Holtzii was described as having diœcious flowers and acuminate leaves, and I therefore thought that the plant collected by Johnson could not possibly be the same, as it was undoubtedly monœcious, and the leaves were not at all acuminate, thus differing by the latter character from all the other described African species. On examining the type kindly sent on loan by Prof. Engler, however, I have come to the conclusion that the male flowers have dropped off, and in addition many of the leaves are not acuminate, just as in *C. Johnsonii.*

2. **C. caudatus,** *Pax apud De Wild. & Durand, Contr. Fl. Congo,* i. 49. A small tree. Leaves ovate, caudate-acuminate, obtuse or truncate at the base, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, $1\frac{1}{4}$–2 in. broad, coriaceous, reticulate, shining above, opaque below; petiole 3–4 lin. long, transversely rugose; stipules deciduous. Male flowers in 4–6- (rarely up to 8-) flowered racemes, apetalous. Sepals 5, ovate, glabrous. Filaments short; anthers erect. Rudimentary ovary subcylindric. Female flowers not known. Capsule glabrous, reddish, about 5 lin. long. Pax apud De Wild. & Durand, Reliq. Dewevr. 203.

South Central. Belgian Congo: Bena-Kamba, *Dewèvre,* 1099.

3. **C. apetalus,** *S. Moore in Journ Linn. Soc.* xl. 191. A tree; ultimate branchlets slender, silky-pubescent. Leaves oblong-lanceolate, caudate-acuminate, obtuse, slightly rounded or obtuse at the base, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, $\frac{3}{4}$–1 in. broad, chartaceous, at length thinly coriaceous, sparingly ciliate, glabrous except the puberulous nerves; petiole $2\frac{1}{2}$ lin. long, silky-pubescent; stipules linear-lanceolate, long-acuminate, 3–4 lin. long, silky, subpersistent. Racemes about $\frac{1}{3}$ in. long; bracts small, subulate, soon falling; pedicels 1 lin. long. Sepals of the male often unequal, oblong or oblanceolate, obtuse, 2 lin. long, densely silky-pubescent outside. Petals absent. Disk prominent. Anthers oblong-ovoid, obtuse. Ovary subglobose, tawny-pubescent.

Mozamb. Distr. Gazaland: Zona River, Jihu, *Swynnerton,* 150!

4. **C. bipindensis,** *Pax in Engl. Jahrb.* xxxiii. 282. A tree about 18 ft. high; branchlets grey, minutely pubescent. Leaves oblong or oblong-elliptic, caudate-acuminate, rounded at the base, 5–6 in. long, 2–$2\frac{1}{2}$ in. broad, thinly coriaceous, glabrous; acumen linear-oblong, obtuse, 7–9 lin. long, $1\frac{1}{4}$ lin. broad at the middle; lateral nerves 6–7 on each side, sometimes doubly looped, very prominent below; petiole very stout, 3–4 lin. long, transversely rugose, glabrescent. Racemes short; bracts ovate-triangular, rusty-pubescent; pedicels about 2 lin. long, rusty-tomentose. Male flowers: Sepals ovate-triangular, 3 lin. long,

1½ lin. broad at the base, tomentellous outside. Petals very minute, elliptic. Disk short and thick, hairy at the top Filaments almost free, 1 lin. long; anthers ½ lin. long. Rudimentary ovary very small, pubescent. Female flowers: Sepals and disk as in the male. Petals larger, oblong. Ovary rusty-tomentose; styles thick, rusty-tomentose, multifid and slightly split down the inner side.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2262! 2264A!

5. **C. polystachyus,** *Hook. ex Planch. in Hook. Ic. Pl. t.* 779. A shrub; flowering-branchlets slender, rusty-tomentose or pubescent when young Leaves oblong-lanceolate or oblong-elliptic, subcaudate-acuminate, acute at the base, 2–3 in. long, ½–1½ in. broad; acumen 3–6 lin. long, coriaceous, glabrous on both surfaces; lateral nerves 6–9 on each side, looped; petiole 1--2 lin. long, pubescent. Flowers diœcious. Male racemes axillary, up to ¾ in. long; axis and pedicels rusty-pubescent; bracts oblong or ovate-lanceolate, obtuse, 1½–2 lin. long, densely pubescent; pedicels up to 1½ lin. long. Sepals linear-oblong, subacute, rusty-pubescent outside, 2½ lin. long. Petals lanceolate. Filaments united for half their length; anthers 1 lin. long. Disk almost enclosing the staminal column, pubescent. Rudimentary ovary 3-partite; segments pubescent. Female flowers: Sepals, petals and disk as in the male. Ovary densely rusty-tomentose; styles bipartite, tomentose, branches often bifid. Fruit subglobose; exocarp slightly wrinkled, dull, glabrescent; endocarp horny.—Benth. in Hook. Niger Fl. 512, t. 36; Müll. Arg. in DC. Prodr. xv. ii. 504. *C. angolensis,* Müll. Arg. l.c. 505; Hiern in Cat. Afr. Pl. Welw. i. 955. *Bridelia polystachya,* Baill. Étud. Euphorb. 584. *Kaluhaburunghos angolensis* and *K. polystachyus,* O. Kuntze, Rev. Gen. Pl. ii. 607.

Upper Guinea. Sierra Leone: near Madina, *Scott-Elliot,* 5597! and without precise locality, *Whitfield!* Cameroons: Lolodorf, *Staudt,* 126!

Lower Guinea. Spanish Guinea: Makak, *Tessmann,* 327! Makonanam, *Tessmann,* 328! Angola: Pungo Andongo; in the less dense forests between Pungo Andongo and Luxillo, *Welwitsch,* 353! between Catete and Luxillo, *Welwitsch,* 354!

6. **C. libericus,** *N. E. Br. in Journ. Linn. Soc.* xxxvii. 113. Branchlets slender, grey, glabrescent. Leaves oblong or elliptic-oblong, caudate-acuminate, obtuse or broadly cuneate at the base, 2½–3½ in. long, 1–1½ in. broad, glabrous on both surfaces; acumen linear, obtuse, 7–9 lin. long, ¾ lin. broad in the middle; lateral nerves 4–5 on each side, arcuate but not or only indistinctly looped, uppermost nerve prolonged into the acumen. Racemes ¾–1 in. long, rusty-puberulous; bracts minute; pedicels up to 1½ lin. long. Sepals oblong, subacute, 1¾ lin. long, rusty-puberulous on the outside. Petals linear, scarcely ½ lin. long. Disk cupular, undulate or slightly toothed, pubescent towards the top. Anthers subsessile, 1 lin. long. Rudimentary ovary 3-partite, pubescent. Female flowers not seen.—Stapf in Johnston, Liberia, ii. 648.

Upper Guinea. Liberia: Sinoe Basin, *Whyte!*

12. **OLDFIELDIA**, Benth. et Hook. f.; Benth. et Hook. f. Gen. Pl. iii. 281.

Flowers diœcious. Petals absent. Male flowers: Calyx shortly 5–7-fid. Stamens 4–10, inserted around a very thick fleshy villous shortly lobed disk; filaments free; anthers erect; cells distinct, ovoid, contiguous, dehiscing longitudinally. Rudimentary ovary filiform, entire, truncate. Female flowers not known. Capsule depressed-globose, 3-celled, dehiscing loculicidally into 3 two-valved cocci; pericarp thick, hard. Seeds 1–2 in each cell, obliquely obovoid, slightly compressed; testa crustaceous; albumen fleshy; cotyledons flat, broad. —A tree. Leaves opposite, petiolate, digitately 5–8-foliolate; leaflets more or less stalked, entire, penninerved. Male flowers in lax axillary cymes.

Monotypic, endemic.

1. **O. africana,** *Benth. & Hook. f. in Hook. Kew Journ.* ii. 185, *t.* 6. A tall, extensive tree, with the habit of a *Vitex;* branchlets slightly sulcate, rusty-puberulous when young, soon glabrescent. Leaves digitate; petiole up to 8 in. long, sulcate, puberulous; leaflets 5–8, oblanceolate or oblong-elliptic, more or less acuminate, very acute at the base, up to 7 in. long and $2\frac{1}{2}$ in. broad, papery or subcoriaceous, glabrous; lateral nerves 8–10 on each side, looped, in the larger leaflets prominent below, in the smaller scarcely visible; petiolules up to $\frac{3}{4}$ in. long, grooved above. Male flowers in lax pedunculate axillary cymes; cymes brown-puberulous. Calyx-segments 5–7, rounded, rusty-pubescent. Stamens 5–10, inserted outside the disk; filaments free. Disk very thick, densely pubescent. Rudimentary ovary filiform, truncate, glabrous, hidden by the disk. Female flowers unknown. Capsule depressed-globose, 1 in. in diam., 3-celled, loculicidal; pericarp hard, woody, about $\frac{3}{4}$ lin. thick; seeds 2 in each cell, or 1 by abortion, obliquely obovoid, about 5 lin. long, slightly compressed; testa crustaceous; albumen copious; cotyledons flat, very broad.—Hiern in Cat. Afr. Pl. Welw. i. 963.

Upper Guinea. Sierra Leone: in vast forests on the north side of the colony, *Welwitsch,* 478! Rotambe Island, near Sierra Leone, *Kirk,* 24! Samu River, *Vogel!* and without precise locality, *Oldfield! Mann! Unwin & Smythe,* 19!

Known to commerce as "African oak."

13. **ARISTOGEITONIA**, Prain in Kew Bulletin, 1908, 438.

Flowers monœcious. Petals absent. Male flowers: Calyx 6-partite; lobes 2-seriate, imbricated. Disk 0. Stamens 14–15; filaments free; anthers ovate, cells 2, parallel, dehiscing longitudinally. Rudimentary ovary large, 3-lobed. Female flowers: Calyx 6-partite; lobes 2-seriate, imbricated. Disk conspicuous, annular, crenately lobed. Ovary 3-celled; styles short, flat, spreading, obcordate, thickened, very slightly connate at the base; ovules in each cell paired. Capsule breaking up into 3 two-valved cocci; endocarp hard, crustaceous. Seed

often solitary by abortion in each coccus, ovoid; testa crustaceous, shining.—A tree. Leaves alternate, 1-foliolate or digitately 2–3-foliolate, long-petioled; leaflets sessile, entire, coriaceous, penninerved; stipules distinct, subulate. Flowers in small fascicles on old wood in axils of fallen leaves.

A single endemic species.

1. **A. limoniifolia,** *Prain in Kew Bulletin*, 1908, 438. A tree; young shoots puberulous. Leaves petioled, of very unequal size, 2–3-foliolate or often 1-foliolate; leaflets ovate-lanceolate, acute, entire, cuneate at the base, sessile, $1\frac{1}{4}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, coriaceous, glabrous, with a distinct midrib and 8–12 pairs of faint secondary nerves; stipules subulate, $\frac{1}{4}$ in. long. Male flowers: Calyx-lobes puberulous, triangular, acute. Female flowers: Calyx-lobes puberulous, ovate, shortly acuminate. Fascicles and flowers small. Capsule $\frac{1}{2}$ in. long and as much across. Seed $\frac{1}{4}$ in. long, $\frac{1}{5}$ in. wide.

Lower Guinea. Angola: Loanda, *Gossweiler*, 457 !

14. **PAIVÆUSA**, Welw. ex Benth. et Hook. f. Gen. Pl. i. 993.

Flowers dicœcious. Petals absent. Male flowers: Calyx unequally 6–8-lobed; lobes imbricate. Stamens 6–8, inserted around a thick fleshy disk; filaments glabrous, free; anther-cells distinct, minutely papillose, dehiscing longitudinally. Rudimentary ovary absent or very small. Female flowers: Calyx as in the male. Disk annular, short, pubescent. Ovary ovoid or obovoid, 2-celled; stigmas 2, reniform; ovules 2 in each cell, attached near the apex of the cells, pendulous. Fruit obovoid, shortly stipitate, terminated by the persistent stigmas, more or less imperfectly 2-celled; cells 1–2-seeded.—A small tree with tubercled branches. Leaves alternate, petiolate, digitately 5–7-foliolate; leaflets sessile, entire. Male flowers in dense axillary pedunculate clusters; females solitary or subfasciculate at the ends of the branches.

Monotypic, endemic.

1. **P. dactylophylla,** *Welw. ex Oliv. Fl. Trop. Afr.* i. 328. A resinous tree, 8–30 ft. high; trunk erect, straight, 2–6 in. in diam. at the base (*Welwitsch*); branches and branchlets somewhat tortuous, very rigid, patent, tubercled and rough with the scars of fallen leaves, rufous-tomentose when young. Leaves alternate, often fasciculate at the ends of the branches; leaflets usually 5, rarely more, subsessile, oblanceolate or obovate-oblong, obtuse and often emarginate, acute at the base, up to 6 in. long and $2\frac{1}{4}$ in. broad, thinly coriaceous, covered with crisp short pubescence, at length glabrous and shining, tomentose below; lateral nerves 9–13 on each side, somewhat inconspicuous; petiole 2–4 in. long, shortly tomentose, or at length glabrescent. Male flowers in dense axillary pedunculate clusters; bracts oblong, obtuse, tomentose: Calyx-lobes 6–8, often unequal, oblong, obtuse, rusty-tomentose on the outside. Stamens 6–8; filaments free, alternate

with the lobes of the disk, glabrous; anther-cells distinct, densely beset with minute papillæ. Disk thick and fleshy, obconic, pilose on the top. Female flowers pedicellate, solitary or subfasciculate at the ends of the branches; pedicels very stout, fulvous-tomentose, about 2 lin. long. Calyx a little larger than in the male, tribracteate at the base. Disk annular, pubescent. Ovary obovoid, fulvous-tomentose; stigmas 2, sessile, reniform or slightly lobed. Fruit (immature) obovoid or subglobose, about $\frac{3}{4}$ in. long and $\frac{1}{2}$–3 in. in diam., densely pubescent; stigmas persistent. Seeds much compressed; testa membranous.—Welw. in Trans. Linn. Soc. xxvii. 21, t. 7; Pax in Engl. Hochgebirgsfl. Trop. Afr. 282; Hiern in Cat. Afr. Pl. Welw. i. 963; Pax in Baum, Kunene-Samb. Exped. 282.

Lower Guinea. Angola: dry places in forests between Lopollo and the River Monino, *Welwitsch*, 452! Malange district, *Gossweiler*, 987! 995! 999! between Bandeira and Cunene, *Gossweiler*, 2218! Luasenha River, Kubango River, *Gossweiler*, 3963! between Kubango River and Kassinga, 4200 ft., *Baum*, 919!

15. **MEGABARIA**, Pierre ex Hutchinson in Kew Bulletin, 1910, 56.

Flowers diœcious. Petals present. Male flowers: Sepals 5, imbricate. Petals 5, inserted below the disk. Disk-glands 5. Stamens 5, opposite the sepals, inserted between the disk-glands; filaments free; anther-cells distinct, parallel, dehiscing longitudinally. Rudimentary ovary obconic, flattened above. Female flowers: Sepals and petals as in the male. Disk shortly cupular, undulately lobed. Ovary 3-celled; stigmas 3, reflexed, entire; ovules 2 in each cell. Capsule ellipsoid, entire, loculicidal, leaving a persistent columella; exocarp crustaceous; endocarp thin and horny. Seeds ellipsoid; testa composed of three layers, exterior (epidermis) red or reddish-brown, shining, intermediate white, spongy, interior crustaceous; albumen scanty; embryo straight; cotyledons flat and broad.—Trees. Leaves alternate, lax or crowded, petiolate, entire, penninerved. Panicles terminal, crowded at the apices of the branchlets.

Species 2, endemic.

Inflorescence hairy	1. *M. Trillesii.*
Inflorescence glabrous	2. *M. ugandensis.*

1. **M. Trillesii,** *Pierre ex Hutchinson in Kew Bulletin*, 1910, 57. A tree; branchlets terete, glabrous. Leaves obovate or elliptic, obtuse or rounded, obtusely cuneate or rounded at the base, $3\frac{1}{2}$–7 in. long, $1\frac{1}{2}$–$4\frac{1}{2}$ in. broad, rigidly chartaceous or thinly coriaceous, glabrous and rather dull on both surfaces; lateral nerves 6–8 on each side, arcuate, branched near the margin, distinct but not raised on the upper surface, prominent below; tertiary nerves reticulate, veins distinct on both surfaces; petiole $\frac{1}{4}$–$3\frac{1}{2}$ in. long, glabrous, usually thickened and wrinkled at the apex; stipules small. Male inflorescences in a terminal cluster surrounded by several leaves, each consisting of a raceme or panicle of spikes; axis of each inflorescence rather stout, up to $3\frac{1}{2}$ in. long, sulcate, densely puberulous;

bracts at the base of each spikelet coriaceous, very broadly ovate, rounded at the apex, about $1\frac{1}{2}$ lin. broad, ciliate and puberulous; spikelets with a puberulous stalk up to 2 lin. long; bracts surrounding the flower several, densely puberulous. Calyx 5-partite; lobes broadly ovate, obtuse, $\frac{1}{2}$ lin. broad, membranous towards the margin, very sparingly and minutely puberulous outside, margin shortly ciliate. Petals small, more or less elliptic or obovate, 2–3-toothed towards the apex. Stamens 5; filaments equalling the petals; anther-cells parallel. Disk-glands glabrous. Rudimentary ovary columnar, expanded at the top, glabrous. No young female flowers seen. Fruiting panicles up to 6 in. long; axis angular, sulcate, minutely puberulous. Capsules subsessile or shortly pedicellate, ellipsoid, $\frac{3}{4}$ in. long, about $7\frac{1}{2}$ lin. in diam.; exocarp crustaceous, $\frac{3}{4}$ lin. broad; endocarp thin and horny. Seeds ellipsoid, about $\frac{1}{2}$ in. long, 5 lin. broad, red, shining.—De Wild. Études Fl. Bas- et Moyen-Congo, ii. 284, name only; Th. & Hél. Dur. Syll. Flor. Congol. 497, name only.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1083! 2572! 2603! 2846! 3556!

Lower Guinea. Gaboon: Bata, *Trilles*, 157! Spanish Guinea: Nschadum, *Tessmann*, 285! Alen, *Tessmann*, 138!

South Central. Belgian Congo: islands in the Lulanga River, *Dewèvre*, 856. Eala, *Laurent*, 2035. Bolombo, *Laurent*.

2. **M. ugandensis,** *Hutchinson in Kew Bulletin*, 1910, 57. A forest tree, 50 ft. or more high; branchlets rather stout, glabrous. Leaves usually clustered towards the ends of the branchlets, broadly elliptic or ovate-elliptic, obtuse or shortly acuminate, rounded or very slightly cuneate at the base, 3–11 in. long, 2–6 in. broad, chartaceous or thinly coriaceous, glabrous and dull on both surfaces; lateral nerves 6–14 on each side, arcuate, tapering and branched towards the margin, prominent on the lower surface; tertiary nerves reticulate, lax, distinct below; petiole $\frac{1}{2}$–6 in. long, terete, glabrous, thickened and wrinkled at the apex; stipules present only on the very young shoots, oblong, obtuse, 2 lin. long, $\frac{1}{2}$ lin. broad, with a distinct midrib, membranous towards the margin, glabrous. Male inflorescences paniculate; panicles crowded at the ends of the branchlets; axis of each panicle 6–8 in. long, somewhat angled, slightly sulcate, glabrous; bracts rather broadly ovate-triangular, the largest about 2 lin. long and $1\frac{1}{2}$ lin. broad, membranous towards the margin, glabrous; primary branches of each inflorescence slender and elongated, the lower ones up to $4\frac{1}{2}$ in. long; spikelets stalked or sessile, up to $\frac{1}{2}$ in. long, with a membranous bract at the base of each. Calyx 5-partite; lobes broadly ovate, membranous, glabrous. Petals 5, small, elliptic, membranous, glabrous. Stamens 5; filaments twice the length of the sepals. Disk-glands 5, alternating with the stamens, fleshy, glabrous. Rudimentary ovary columnar, thick, flattened and expanded at the top, glabrous. Female inflorescence a panicle of racemes; bracts as in the male; flowers shortly pedicellate, pedicels elongating in fruit. Calyx and petals as in the male. Disk shortly cupular, undulately lobed, glabrous. Ovary ovoid,

glabrous; stigmas 3, reflexed, entire, sparingly papillose. Fruits ellipsoid, slightly pointed at each end. Seeds ellipsoid, about ½ in. long, 5 lin. broad, red and shining.—*Thecacoris Trillesii*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 120, not of Pierre.

North Central. Upper Shari: valley of the Boro, *Chevalier*, 7036 bis!

Nile Land. Uganda: in the Luanhabya Forest, *Dawe*, 760! Entebbe, *Bagshawe*, 723!

Dr. Bagshawe states that the leaves of this species are copper-coloured and said to be poisonous.

16. **CENTROPLACUS**, Pierre in Bull. Soc. Linn. Par. n.s. i. 114.

Flowers diœcious. Petals present in the male flowers, absent from the female. Male flowers: Sepals 5, imbricate. Petals 5, imbricate, larger than the sepals. Stamens 5, opposite the sepals, inserted on a fleshy cupular disk; filaments very short; anthers introrse, cells distinct, ellipsoid, dehiscing longitudinally. Disk cupular, fleshy. Rudimentary ovary columnar, entire or at length trifid, densely villous. Female flowers: Sepals as in the male. Disk saucer-shaped, 5-lobed, lobes alternate with the sepals. Staminodes small, opposite the sepals. Ovary 3-celled; styles 3, subulate, short, entire, slightly recurved; ovules two in each cell. Capsule oblong-ellipsoid, apparently loculicidal; exocarp slightly bony; endocarp thin. Seeds ellipsoid; testa black and shining.—A tree. Leaves alternate, petiolate, penninerved, obscurely serrate; stipules small. Flowers in axillary panicles on the young shoots; pedicels short.

One endemic species.

This genus has been referred to *Flacourtiaceæ*, but there seems little doubt as to its being Euphorbiaceous.

1. **C. glaucinus,** *Pierre in Bull. Soc. Linn. Par. n.s.* i. 115. A tree, 35–50 ft. high; branchlets slender, terete, glabrous. Leaves oblong or oblong-elliptic, gradually or subcaudate-acuminate to an acute apex, obtuse at the base, 3–7 in. long, 1–2½ in. broad, rather distantly and somewhat obscurely serrate, thinly coriaceous, glabrous on both surfaces, dull below, slightly shining above; lateral nerves 5–7 on each side, faintly looped well within the margin, prominent below, a little raised above; tertiary nerves rather faint, close, spreading at right angles to the midrib; petiole 2–3 lin. long, blackish and slightly wrinkled when dry, glabrous; stipules small, triangular-subulate, scarcely ½ lin. long. Male panicles 1½–3 in. long; axis and branches puberulous; bracts subulate, obtuse, about ½ lin. long, puberulous; pedicels ½ lin. long, puberulous. Sepals 5, slightly unequal, ovate, obtuse or rounded at the apex, about ½ lin. long, coriaceous, ciliate, glabrous within, yellow-puberulous on the outside. Petals 5, broadly obovate or obovate-elliptic, rounded at both ends, about 1 lin. long and broad, slightly coriaceous, puberulous on both sides. Stamens 5; filaments short; anthers ⅙ lin. long. Disk fleshy, slightly lobed between the filaments, glabrous. Rudimentary ovary columnar, ¾ lin. long, entire or at length

trifid, densely villous. Female inflorescence subracemose, 2–3 in. long, puberulous. Calyx cupular; lobes rounded, short, puberulous outside. Disk saucer-shaped, fleshy, 5-lobed, lobes rounded. Staminodes very small, rounded, glabrous. Ovary ovoid, densely puberulous or tomentellous; styles short, subulate, entire. Entire capsule not seen; exocarp slightly bony, tomentellous outside; endocarp thin, shining inside. Seeds ellipsoid, $1\frac{3}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, black and shining.—Gilg in Engl. Jahrb. xl. 516, fig. 3. *Microdesmis paniculata*, Pax in Engl. Jahrb. xxviii. 25, and in Engl. Pflanzenr. Euphorb.-Cluytieæ, 108.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1157! 1743! 1761! 1775! 2030! 2966! 3016! 3109! 3331! 3374! 3478!

Lower Guinea. Gaboon, *Klaine*, 1232! Spanish Guinea: Weyn Oko, *Tessmann*, 675!

Pax, not having seen female flowers, placed this species in *Microdesmis*, of the tribe *Galearieæ*. The genera in this tribe, however, have always a solitary ovule in each cell.

17. **AMANOA**, Aubl.; Benth. et Hook. f. Gen. Pl. iii. 268.

Flowers monœcious. Petals present. Male flowers: Sepals 5, imbricate. Petals 5, short, scale-like. Disk short. Stamens 5, inserted within the disk; filaments free, thick, short or at length elongate; anthers thick, dehiscing longitudinally. Rudimentary ovary present, 3-lobed. Female flowers: Sepals as in the male. Petals sometimes obsolete. Ovary subglobose, 3-celled; stigmas 3, sessile, thick, discoid. Ovules 2 in each cell. Capsule separating into 2-valved cocci. Seeds solitary by abortion, shining, attached by their inner face; testa crustaceous; albumen thin or 0. Cotyledons thick, pulpy; radical short. —Trees or shrubs, glabrous. Leaves alternate, coriaceous, entire. Stipules adnate to the petiole, coriaceous. Flowers in terminal or axillary solitary or spicate clusters; males several, females solitary in each head; bracts coriaceous.

About 12 species, from Madagascar, West Indies, and Tropical South America.

Leaves rounded, obtuse, and very slightly emarginate at the apex	1. *A. Schweinfurthii.*
Leaves acuminate.	
Flower-clusters spicate	2. *A. bracteosa.*
Flower-clusters solitary	3. *A. strobilacea.*

1. **A. Schweinfurthii,** *Baker & Hutchinson in Kew Bulletin*, 1910, 56. A shrub about 10 ft. high, glabrous in all parts. Branches stout, longitudinally grooved; flowering branchlets somewhat purple and glaucous. Leaves oblanceolate or oblong-elliptic, rounded and slightly emarginate, acute at the base, 3–4 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, subcoriaceous, shining above, glaucous below; lateral nerves 12–14 on each side, arcuate, slightly elevated below; veins lax and scarcely raised; petiole smooth or slightly wrinkled, broadly channelled on the upper side; stipules obliquely and broadly ovate, 2 lin. broad at the base, $1\frac{1}{2}$ lin. long, coriaceous, doubly keeled on the back. Flowers fasciculate, axillary, arranged on short lateral leafy branchlets. Bracts

ovate, slightly membranous, glabrous. Male flowers seen only very young. Sepals 5, ovate or triangular-ovate, coriaceous, glabrous. Petals oblong, obtuse, subcoriaceous, glabrous. Rudimentary ovary short, tritid, glabrous. Female flowers not seen.

Nile Land. Jur: Mayob, *Schweinfurth*, 1544!

2. **A. bracteosa,** *Planch. in Hook. Ic. Pl. t.* 797. A tree about 20 ft. high, glabrous in all parts. Leaves oblong-lanceolate, obtusely acuminate, deltoid at the base, $3\frac{1}{2}$–6 in. long, 1–2 in. broad, rigidly coriaceous; lateral nerves 8–10 on each side, looped, loops extending to within 1 lin. of the leaf-margin, very slightly raised below, not evident above; veins lax and inconspicuous; petiole slightly wrinkled, 4–5 lin. long. Flowers in terminal or axillary spicate clusters; clusters alternate, distichous, 9–14 to each inflorescence; bracts coriaceous, outer keeled and mucronate, inner doubly keeled. Male flowers sessile in bud, at length with a stout pedicel about 4 lin. long. Sepals oblong, apex slightly hooded, $3\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad. Petals obovate, subtruncate, 1 lin. long. Disk subsinuately lobed, glabrous. Stamens 5; filaments free to the base, very stout, at first very short, at length $1\frac{1}{2}$ lin. long; anthers nearly 1 lin. long. Rudimentary ovary trifid, glabrous. Female flowers solitary. Ovary 3-celled; stigma sessile, obsoletely trilobed. Capsule subglobose; valves a little over 1 in. long, very thick and hard. Seeds somewhat reniform, shining.—Benth. in Hook. Niger Fl. 512; Müll. Arg. in DC. Prodr. xv. ii. 220; Stapf in Johnston, Liberia, ii. 648. *A. strobilantha,* Planch. in Hook. Niger Fl. t. 47.

Upper Guinea. Sierra Leone, *Don!* Liberia: Monrovia, *Whyte!* Sino Basin, *Whyte!*

3. **A. strobilacea,** *Müll. Arg. in Flora*, 1864, 515. A tree 30 ft. high, glabrous in all parts. Leaves oblanceolate or oblong-elliptic, obtusely acuminate, deltoid at the base, 3–7 in. long, 1–$2\frac{1}{2}$ in. broad, coriaceous; lateral nerves 8–12 on each side, looped, faintly impressed above, conspicuous below; veins lax, conspicuous below; petiole smooth or very slightly wrinkled, 4–5 lin. long; stipules adnate to the base of the petiole, $2\frac{1}{2}$ lin. long, coriaceous. Flowers in subglobose terminal and axillary sessile heads surrounded by coriaceous bracts; bracts coriaceous, outer keeled and mucronate, inner doubly keeled; bracteoles lanceolate, acutely apiculate, membranous. Male flowers: Sepals oblong, apex slightly hooded, 3 lin. long, 1 lin. broad. Petals very broadly obovate or suborbicular, $\frac{3}{4}$ lin. long. Disk undulate, glabrous. Stamens free to the base; filaments about 1 lin. long; anthers $1\frac{1}{2}$ lin. long. Rudimentary ovary trilobed, glabrous. Female flowers: Sepals as in the male. Petals elliptic, $1\frac{1}{4}$ lin. long Disk as in the male. Ovary subglobose, glabrous; stigma discoid. Immature capsule ovoid, about 5 lin. in diam., glabrous, tipped by the persistent stigma.—Müll. Arg. in DC. Prodr. xv. ii. 220; Stapf in Johnston, Liberia, ii. 648.

Upper Guinea. Liberia: Sino Basin, *Whyte!* Cameroons: Cameroon River, *Mann*, 745! 2220!

18. **ACTEPHILA,** Blume; Benth. et Hook. f. Gen. Pl. iii. 269.

Flowers monœcious or diœcious. Petals present. Male flowers: Sepals 5–6, imbricate. Petals 5–6, scale-like. Disk entire in the solitary African species. Stamens 3–6, inserted within the disk; filaments shortly connate at the base; anthers thick, dehiscing longitudinally. Rudimentary ovary trilobed. Female flowers: Sepals and petals as in the male. Ovary 3-celled; styles short, free or connate at the base, undivided or bifid; ovules 2 in each cell. Capsule slightly woody, dehiscing loculicidally into 3 two-valved cocci. Seeds often solitary in each cell, large, testa thin; albumen very scanty or absent; cotyledons thick, fleshy, often much dilated, plicate or contorted-plicate. —Trees or shrubs. Leaves alternate, petiolate, often large, entire. Flowers glomerate in the axils of the leaves; males numerous, shortly pedicellate; females solitary or few, long-pedicellate.

Species about 14, from India, Malay Archipelago, and Australia.

1. **A. reticulata,** *Pax in Engl. Jahrb.* xxvi. 326. A small tree, about 30 ft. high. Leaves oblong or elliptic, caudate-acuminate, more or less rounded at the base, $4\frac{1}{2}$–7 in. long, 2–$3\frac{1}{2}$ in. broad, entire, very thinly coriaceous, glabrous and slightly shining on both surfaces, acumen $\frac{1}{2}$–$1\frac{1}{2}$ in. long; lateral nerves 5–8, arcuate, raised on the lower surface; tertiary nerves subparallel, close and prominent; petiole glabrous, transversely rugose, 3–4 lin. long; stipules subulate from a triangular base. Flowers monœcious, in axillary fascicles, the females very few; pedicels slender, up to 2 lin. long, glabrous or puberulous. Male flowers: Sepals obovate or obovate-elliptic, 1 lin. long, $\frac{3}{4}$ lin. broad, rounded at the apex, coriaceous, with slightly hyaline margins. Petals suborbicular, slightly toothed, $\frac{1}{3}$ the length of the sepals. Disk small, annular, entire, glabrous. Stamens 5–6; filaments shortly connate at the base, inserted within the disk; anthers 1 lin. long. Rudimentary ovary tripartite, reaching almost as high as the top of the anthers, glabrous, lobes truncate. Female flowers: Sepals, petals and disk as in the male. Ovary ovoid. Capsule trilobed, about 5 lin. in diam., with 2 brown shining seeds in each cell.—*Pentabrachion reticulatum,* Müll. Arg. in Flora, 1864, 533, and in DC. Prodr. xv. ii. 224. *Microdesmis reticulata,* Benth. & Hook. f. ex Pax in Engl. Jahrb. xxvi. 326. *Amanoa laurifolia,* Pax, l.c. xv. 522. *Actephila africana,* Pax in Engl. & Prantl, Pflanzenfam. Nachtr. i. 210, name only.

Upper Guinea. Cameroons: Bipinde, *Zenker,* 844! 865! 934! 1124! 1688! 2337! 2888! 2982! 3448! 3497! 3869! Great Batanga, *Dinklage,* 572!

Lower Guinea. Gaboon: Gaboon River, *Mann,* 944! *Klaine,* 639! 986! Sibange Farm, *Soyaux,* 79! *Büttner,* 291! *Dinklage,* 572! Agoncho, *Buchholz!*

19. **ANDRACHNE,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 270.

Flowers monœcious. Petals present in the African species. Male flowers: Sepals 5–6, imbricate. Petals membranous. Disk consisting

of 5 or 6 glands opposite the petals. Stamens usually 5, alternate with the petals; filaments free; anther-cells parallel, dehiscing longitudinally. Rudimentary ovary present. Female flowers: Sepals usually longer than in the male. Ovary 3-celled; ovules 2 in each cell; styles bipartite. Capsule globose, dehiscing into 2-valved cocci. Seeds curved, rugose, without a strophiole; albumen fleshy; embryo curved; radicle long; cotyledons flat and broad.—Diffuse herbs or slender shrubs. Leaves alternate, petiolate, entire, usually small. Flowers axillary, pedicellate, the males fasciculate, the females solitary.

About 25 described species, spread throughout both hemispheres.

Leaves orbicular or reniform	1. *A. aspera.*
Leaves lanceolate or elliptic-lanceolate	2. *A. telephioides.*

1. **A. aspera,** *Spreng. Syst.* iii. 884. Stems numerous, slender, diffuse, scabrous-puberulous, reaching a foot or more in length, arising from a perennial root-stock. Leaves orbicular or subreniform, often emarginate and mucronate, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, membranous, glabrous or scabrous-puberulous; petiole up to 4 lin. long, scabrous-puberulous; stipules ovate, very small. Male flowers: Sepals ovate-lanceolate, $\frac{3}{4}$ lin. long, membranous, whitish, margins jagged. Petals almost equalling the sepals, lanceolate. Disk-glands small, truncate, fleshy. Stamens 5; filaments membranous. Rudimentary ovary tripartite, membranous, glabrous. Female flowers: Sepals oblong-lanceolate, subacute, green, 1 lin. long, margin scarious. Petals very small, lanceolate. Disk-glands 5, subtruncate, fleshy. Ovary glabrescent; styles bipartite to the base, slender, glabrous. Capsule globose, about 2 lin. in diam., reticulate, sparingly hispid. Seeds subtriquetrous, convex on the back, slightly pitted.—A. Rich. Tent. Fl. Abyss. ii. 254; Schweinf. Beitr. Fl. Aethiop. 34; Müll. Arg. in DC. Prodr. xv. ii. 236; Boiss. Fl. Orient. iv. 1138; Hook. f. Fl. Brit. Ind. v. 284; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 299. *A. aspera,* var. *maritima,* Terrac. in Ann. Istit. Bot. Roma, v. 98.

Nile Land. Nubia: Soturba mountains, *Schweinfurth,* 827! Eritrea: islands of Midir and Auto Kebir, *Terracciano.* Mount Kubé, *Schweinfurth & Riva,* 1531! Mount Alamkale, *Schweinfurth & Riva,* 1631! various localities, *Schweinfurth,* 43, 168, 355, 356, 438, 1562, 1633, 1661. Abyssinia: near Adowa, *Schimper,* 1112! and without precise locality, *Schimper,* 209! islands of Dalak and Hauakel, *Ehrenberg!*

Occurs also in Egypt, Arabia, Persia, and North-West India.

2. **A. telephioides,** *Linn. Sp. Pl. ed.* i. 1014. Stems arising from a woody rootstock, slender, prostrate, narrowly sulcate, minutely beaded, otherwise glabrous. Leaves lanceolate or elliptic-lanceolate, subacute at both ends, 4–6 lin. long, $1\frac{1}{2}$–2 lin. broad, rather rigidly chartaceous, glaucous and glabrous or nearly so on both surfaces; lateral nerves about 3 on each side, very indistinct; petiole $\frac{1}{2}$ lin. long, glabrous; stipules lanceolate, auriculate at the base, the margins jagged or fringed. Male flowers 2–3 in each leaf-axil, shortly pedicellate: Sepals 5, obovate or elliptic-obovate, scarcely $\frac{1}{2}$ lin. long, entire, mem-

branous, glabrous. Petals small. Disk-glands very small. Stamens 5; filaments very short. Rudimentary ovary small, tripartite, glabrous. Female flowers solitary, about twice the size of the males; pedicels about 1 lin. long, glabrous. Sepals 5, ovate, $1\frac{1}{3}$ lin. long, $\frac{3}{4}$ lin. broad, 1-nerved, keeled on the back, margin membranous and transparent, glabrous. Disk spreading, toothed. Ovary subglobose, very slightly trilobed, minutely beaded; styles spreading, free to the base, bipartite, segments linear, very slightly swollen at the tips. Capsule slightly depressed-globose, about $1\frac{1}{2}$ lin. in diam., reticulate. Seeds subtriquetrous, convex and minutely and closely pitted on the back.—Müll. Arg. in DC. Prodr. xv. ii. 235; Boiss. Fl. Orient. iv. 1138; Sibth. Fl. Græc. x. t. 953; Reichb. Ic. Fl. Germ. v. t. 153; Hook. f. Fl. Brit. Ind. v. 284. *A. rotundifolia*, C. A. Meyer in Eichw. Pl. Casp. 18, t. 20. *A. somalensis*, Pax in Engl. Jahrb. xv. 522.

Nile Land. Somaliland: Ahl Mountains, near Meid, 4000 ft., *Hildebrandt*, 1457!

Occurs also in Spain, the Cape Verde Islands, eastwards through N. Africa, Arabia and Afghanistan to India.

20. **UAPACA**, Baill.; Benth. et Hook. f. Gen. Pl. iii. 282.

Flowers diœcious. Petals absent. Male flowers aggregated in a dense globose head enclosed in a calycine involucre of 5–8 imbricate bracts. Calyx subcampanulate or turbinate, dentate or 5–6-lobed. Disk 0. Stamens 4–6; filaments shortly exserted; anthers erect; cells contiguous, parallel, dehiscing longitudinally. Rudimentary ovary usually expanded at the top. Female flower solitary and sessile in each involucre, the latter pedunculate. Calyx very short and disk-like, entire or sinuately lobed. Ovary 3- (rarely 2- or 4-) celled; styles thick, recurved, much-branched; ovules 2 in each cell. Fruits indehiscent, globose; exocarp hard, containing 3–4 pyrenes. Pyrenes yellowish, obliquely ellipsoid, with 2 longitudinal grooves on the back. Seed in each pyrene large, compressed on one side; albumen fleshy; embryo straight; cotyledons flat and broad. — Trees with stout branches; stems often provided with aërial roots. Leaves alternate, usually crowded towards the ends of the branchlets, entire, penninerved. Male and female heads usually stalked.

About 23 species, 7 from Madagascar and the following; many are very imperfectly known and described from incomplete material.

Leaves sessile or subsessile.
- Leaves long-pilose with erect hairs below; tertiary nerves lax and branched, not parallel . . . 1. *U. pilosa.*
- Leaves scurfy-pubescent with interlacing hairs below; tertiary nerves parallel . . . . 2. *U. Gossweileri.*

Leaves petiolate.
- Leaves floccose, woolly-pubescent, pilose or pilose only on the midrib below.
  - Leaves mostly unequal-sided at the base . . 3. *U. sansibarica.*

Leaves equal-sided at the base.
Leaves floccose or woolly-pubescent all over the lower surface.
Petiole not more than $\frac{3}{4}$ in. long; lateral nerves 13–19; peduncles clustered . . 4. *U. kirkiana.*
Petiole 1–$1\frac{3}{4}$ in. long; lateral nerves 8–12; peduncles solitary . . . . . 5. *U. benguelensis.*
Leaves pilose with weak spreading hairs only on the midrib and lateral nerves below. . 6. *U. togoensis.*
Leaves glabrous or slightly scaly below
Calyx of the male flowers glabrous outside.
Leaves more or less dull on both surfaces; rudimentary ovary glabrous
Leaves elongate-obovate, acuminate, much narrowed to the base, 9–14 in. long, 3–$5\frac{1}{2}$ in. broad . . . . . 7. *U. Staudtii.*
Leaves oblanceolate or obovate, not elongated, rounded or obtusely pointed, cuneate at the base, $2\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad.
Calyx of the male flowers deeply lobed . 8. *U. Heudelotii.*
Calyx of the male flowers subentire or slightly undulately lobed . . . 9. *U. Bossenge.*
Leaves shining on the upper surface; rudimentary ovary piloso . . . . . 10. *U. nitida.*
Calyx of the male flowers pilose outside.
Leaves usually unequal-sided at the base, rather small and slightly scabrous above . 3. *U. sansibarica.*
Leaves equal-sided at the base, usually large, not scabrous above . . . . . 11. *U. guineensis.*

1. **U. pilosa,** *Hutchinson.* A shrub 4–5 ft. high; young branchlets stout, pubescent, tomentose at the tips. Leaves seen only in a young state, sessile, crowded at the ends of the branchlets, obovate-cuneate, rounded at the apex, 5–$5\frac{1}{2}$ in. long, $2\frac{1}{4}$–$2\frac{3}{4}$ in. broad, entire, thinly chartaceous, pilose with long weak hairs on both surfaces; lateral nerves about 12 on each side, spreading, prominent on both surfaces; tertiary nerves lax and branched, not visible above; stipules subulate-lanceolate, about 2 lin. long, densely tomentose, soon falling off. Flowers not seen. Fruits nearly $1\frac{1}{2}$ in. in diam., glabrous. Exocarp crustaceous, about 1 lin. thick. Pyrenes 1 in. long, $\frac{1}{2}$ in. broad.

Mozamb. Distr. Nyasaland: Stevenson Road, *Scott-Elliot*, 8272!

2. **U. Gossweileri,** *Hutchinson.* A handsome tree 15–30 ft. high or more; trunk 1–$1\frac{1}{2}$ ft. in diam. at the base; branches spreading; branchlets stout, more or less tomentose when young. Leaves sessile, crowded at the tips of the branchlets, obovate-cuneate or elongate-obovate, rounded or truncate, attenuated to the base, 4–11 in. long, 2–6 in. broad, rigidly coriaceous, bright green, rather rough and glabrous above, pubescent with interlacing hairs below, becoming nearly glabrous when older; lateral nerves 12-17 on each side, in the

older leaves diverging almost at right angles from the midrib, indistinctly looped almost at the margin, undivided, prominent on the lower surface; tertiary nerves numerous, parallel; stipules filiform, about $\frac{1}{2}$ in. long, densely pilose. Male heads crowded towards the ends of the branchlets; peduncle $\frac{1}{2}$ in. long, deeply grooved. Bracts of the involucre oblong-elliptic, obtuse, about 4 lin. long and 2 lin. broad, slightly pubescent outside. Calyx irregularly lobed; lobes sparingly pilose at the apex. Filaments glabrous. Rudimentary ovary broadly obconic, densely pilose towards the top. Young female flowers not seen. Fruits 4-celled, subglobose, slightly over 1 in. in diam., covered with numerous lenticels, glabrous. Pyrenes 2-grooved on the back.—*U. benguelensis*, Müll. Arg. in Journ. Bot. 1864, 332, as to the specimen with sessile leaves; Hiern in Cat. Afr. Pl. Welw. i. 963, partly.

Lower Guinea. Angola: near the River Kutoto, *Gossweiler*, 3206! near Kaconda, *Gossweiler*, 3364! Gimbundo, *Gossweiler*, 3802! Kului, *Gossweiler*, 980! 2937! Huilla; between Lopollo and the River Monino, *Welwitsch*, 453, partly! (♂ specimen); near Lopollo, *Welwitsch*, 455! (Herb. Kew. not Herb. Mus. Brit.).

3. **U. sansibarica,** *Pax in Engl. Jahrb.* xxxiv. 370. A tree about 30 ft. high; branchlets pubescent or glabrous, stout, about 3 lin. in diam. Leaves obovate to oblanceolate, rounded at the apex, somewhat obtuse and usually unequal-sided at the base, 3–5$\frac{1}{2}$ in. long, 1$\frac{1}{2}$–2$\frac{1}{2}$ in. broad, rather thinly coriaceous, slightly rough on the upper surface, glabrous on both or very sparingly setulose-pilose below; lateral nerves 9–13 on each side, nearly straight and very faintly looped or almost continued to the margin, impressed above, very prominent below; tertiary nerves very slender, subparallel, not evident above; petiole rather stout, $\frac{3}{4}$–1$\frac{1}{4}$ in. long, glabrous or sparingly pubescent. Male flowers: Peduncle stout, up to 10 lin. long, glabrous or pubescent. Bracts of the involucre 8–10, outer ones oblong, strongly keeled on the back, up to 5 lin. long and 2 lin. broad, slightly pubescent towards the base on the outside, inner bracts elliptic, glabrescent. Calyx-lobes pilose outside. Filaments stout, flattened, glabrous, nearly 1 lin. long. Rudimentary ovary obconic, pilose. Female flowers: Bracts of the involucre ovate-elliptic, less numerous than in the male, glabrous. Calyx pilose. Ovary subglobose, glabrous, verrucose; styles 4–5-partite. Fruits ellipsoid, $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. in diam. Seeds solitary in each cell, 5 lin. long; testa somewhat shining and slightly wrinkled when dry.—S. Moore in Journ. Linn. Soc. xl. 193.

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Stuhlmann*, 32! *Holtz*, 32! 690! *Busse*, 3148! Portuguese East Africa: Quilimane, *Stuhlmann*, 577! Nyasaland: Shire Highlands, at Mtoto, *Buchanan*, 430! and without precise locality, *Buchanan*, 221! Massewe, *Goetze*, 1325! Rhodesia: Melsetter district; open woods, Chirinda, *Swynnerton*, 155! 6513!

Var. *cuneata*, Pax, l.c. Leaves narrowly oblanceolate-spathulate, up to 2$\frac{3}{4}$ in. long and 1$\frac{1}{4}$ in. broad.

Mozamb. Distr. German East Africa: Kimoani, *Stuhlmann*, 3386!

4. **U. kirkiana,** *Müll. Arg. in Flora*, 1864, 517. A robust umbrella-shaped tree; branchlets stout, glabrous except when very

young. Leaves obovate or obovate-elliptic, rounded at the apex, more or less cuneate at the base, 3–10 in. long, 2–5½ in. broad, rigidly and rather thinly coriaceous, margins often undulate, slightly rough on the upper surface, floccose-pubescent below; lateral nerves 13–19 on each side, in the older leaves diverging almost at right angles from the mid-rib, indistinctly looped almost at the margin, usually undivided, raised on the lower surface; tertiary nerves indistinct, more or less parallel; petiole very stout, up to 3 lin. in diam. and ¾ in. long, shortly pubescent or glabrous. Male flower-heads borne on the previous year's growth, in fascicles: peduncles glabrescent, ¼–2 in. long. Bracts of the involucre 5–6, broadly elliptic, 3–4 lin. long, 1½–2 lin. broad, membranous, glabrous, margin slightly undulate. Calyx membranous, irregularly lobed; lobes filiform, glabrous. Filaments short, glabrous. Rudimentary ovary obconic, truncate, pilose towards the top. Female flowers: Peduncle about 3 lin. long, sparingly pubescent. Bracts of the involucre as in the male. Calyx cupular, very small, and shortly lobed, coriaceous, glabrous. Ovary 4-celled, ovoid, 2½ lin. in diam., whitish-tomentose, almost hidden by the reflexed spreading styles; styles 4, reflexed, fan-shaped, lobed to the middle, 2½ lin. long, 3 lin. broad, lobes numerous, linear, subterete. Fruit subglobose, 3–4-celled, about 1 in. in diam., glabrous when mature; exocarp ½ lin. thick, crustaceous. Pyrenes deeply grooved on the back.—Müll. Arg. in DC. Prodr. xv. ii. 491; Pax in Engl. Pfl. Ost-Afr. C. 237, and in Engl. Jahrb. xxxiv. 370; S. Moore in Journ. Linn. Soc. xl. 194. *U. Gœtzei*, Pax, l.c. xxviii. 418, xxx. 338. *U. kirkiana*, var. *Gœtzei*, Pax, l.c. xxxiv. 370.

Mozamb. Distr. German East Africa: Usagara, *Busse*, 195! Ungoni, *Busse*, 1244. Uhehe, *Prittwitz & Gaffron*, 69, *Goetze*, 598. Nyasaland: Shire Highlands, *Buchanan*, 103! 234! 339, 429! Portuguese East Africa: near Soche, Manganja Country, *Kirk!* Rhodesia: north of Broken Hill, *Allen*, 446! Melsetter district; Yungunyana, 4000 ft., *Johnson*, 128! near Chirinda, *Swynnerton*, 49!

Pax quotes *Buchanan*, 234, under var. *Gœtzei*, but it does not appear to differ from Kirk's specimen, which is the type of the species.

5. **U. benguelensis,** *Müll. Arg. in Journ. Bot.* 1864, 332, *partly*. A tree, usually branched from the base; branchlets stout, puberulous. Leaves often crowded towards the ends of the branchlets, obovate or elliptic, rounded at the base and apex, or sometimes very slightly cuneate at the base, but not decurrent on the petiole, 3–5 in. long, 2–3 in. broad, rigidly coriaceous, scaly on the upper surface, floccose-pubescent below, distinctly lepidote, especially below; lateral nerves 8–12 on each side, very prominent and sharp on the lower side, very indistinctly looped almost at the margin; tertiary nerves parallel and rather close, not visible above, very faint below; petiole ¾–1 in. long, nearly glabrous. Male flowers not seen. Female flowers very shortly pedunculate. Bracts of the involucre oblong, obtuse, about 4 lin. long and 2 lin. broad, coriaceous, adpressed-pubescent on the outside. Calyx irregularly lobed, pilose on the outside. Ovary 3-celled, densely pubescent; styles 3, reflexed and covering the upper half of the ovary, much laciniated,

glabrous above, puberulous below. Fruits (immature) ellipsoid, about 1 in. long, $\frac{3}{4}$ in. broad, densely pubescent with crisped hairs, crowned by the persistent styles.—Müll. Arg. in DC. Prodr. xv. ii. 491, partly; Ficalho, Pl. Uteis, 249, partly; Hiern in Cat. Afr. Pl. Welw. i. 963, partly; Pax in Engl. Jahrb. xxxiv. 371, partly.

Lower Guinea. Angola: in the less dense rather dry forests between Lopollo and the River Monino, *Welwitsch*, 453! (♀ specimen only); near Lopollo, *Welwitsch*, 455! (Herb. Mus. Brit. not Herb. Kew.). Benguella: country of the Ganguellas and Ambuellas, *Gossweiler*, 3205! 3801!

6. **U. togoensis,** *Pax in Engl. Jahrb.* xxxiv. 371, *partly.* A tree or shrub; branches glabrous, with brown bark, slightly sulcate. Leaves obovate, rounded at the apex, slightly cuneate or rounded at the base, $3\frac{1}{2}$–5 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, thinly coriaceous or chartaceous, pilose on the midrib and lateral nerves below, the midrib flexuous towards the top and divided before reaching the apex of the leaf; lateral nerves 7–8 on each side, slightly impressed above, prominent below, branching and fading near the margin; tertiary nerves conspicuous, flexuous, rather lax; petiole $\frac{3}{4}$–1 in. long, subterete, glabrous. Male flowers not known. Female flowers axillary or extra-axillary; peduncle 4 lin. long. Involucral bracts very unequal, obovate or elliptic, up to 4 lin. long and $2\frac{1}{2}$ lin. broad, coriaceous, entire, glabrous. Calyx short, subentire, glabrous. Ovary globose, densely pubescent; styles spreading over the ovary, primarily bipartite, the segments bilobed; lobes linear, slightly pubescent below, glabrous above. Fruits subglobose, about 1 in. in diam., warted, glabrescent; fruit stalk stout, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Pyrenes yellow, oblong-ovate, pointed, about 7 lin. long, with 2 grooves on the back.—*U. Chevalieri*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 68.

Upper Guinea. Sierra Leone: in forest on the edge of a precipice, Mount Gonkwi, Talla, *Scott-Elliot*, 4828! French Guinea: Futa-Jallon; high plateaux between Bitinn and Biaguissa, *Chevalier*, 12670! between Kala and Dalaba, *Chevalier*, 13477!

7. **U. Staudtii,** *Pax in Engl. Jahrb.* xxiii. 522. A tree, 35–90 ft. high; branchlets stout, glabrous, about 3 lin. in diam. near the apex. Leaves elongate-obovate, very shortly acuminate, much attenuated to the base, acumen up to $\frac{1}{2}$ in. long, 9–14 in. long, 3–$5\frac{1}{2}$ in. broad, thinly coriaceous, glabrous and dull on both surfaces; lateral nerves 11–14 on each side, diverging at an angle of 45°, gradually fading away near the margin, inconspicuous above, prominent below; tertiary nerves and veins very fine and scarcely visible; petiole 1–3 in. long, swollen at the apex, terete, $1\frac{1}{4}$ lin. in diam., finely sulcate, glabrescent. Male flower-heads crowded at the ends of the branches: peduncles minutely rusty-puberulous, $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Bracts of the involucre about 8, oblanceolate to obovate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 2–4 lin. broad, coriaceous, glabrous. Calyx-tube entire or only very slightly lobed, glabrous. Stamens 5; filaments glabrous, one often much elongated. Rudimentary ovary thick, obconic, rather shortly and irregularly lobed at the apex, glabrous. Female flowers not known.—Pax in Engl. Jahrb. xxxiv. 371.

Upper Guinea. Cameroons: *Preuss*, 1171! *Rudatis*, 23. Bipinde, *Zenker*, 3007! Lolodorf, *Staudt*, 275!

8. **U. Heudelotii,** *Baill. Adansonia*, i. 81. A tree up to 60 ft. high; branchlets sulcate, glabrous. Leaves oblong-oblanceolate, rounded or very obtusely pointed, acutely cuneate to the base, 2½–6 in. long, 1½–2½ in. broad, somewhat coriaceous, margins slightly undulate, glabrous and dull on both surfaces; lateral nerves 10–15 on each side, looped some distance from the margin, raised on the lower surface; tertiary nerves reticulate, lax, distinct below; petiole slender, ½–1¼ in. long, often sulcate, glabrous. Male flower-heads crowded at the ends of the branchlets, solitary; peduncles glabrous. ½–¾ in. long. Bracts of the involucre elliptic or obovate, up to 4 lin. long and 2 lin. broad, membranous, glabrous. Calyx deeply lobed, glabrous; lobes unequal. Stamens 5; filaments glabrous. Rudimentary ovary columnar, truncate, erect, glabrous. Female flowers axillary or arising above the axils, mostly solitary, pedunculate; peduncles thick, terete, ¾ in. long. Involucre 5–6-partite, lobes caducous. Ovary 2–4-celled. Fruit ellipsoid, acute, glabrous, crowned by the slender persistent styles.—Müll. Arg. in DC. Prodr xv. ii. 490; Pax in Engl. Jahrb. xxxiv. 371; De Wild. Miss. É. Laurent, i. 128. *U. Marquesii*, Pax in Engl. Jahrb. xxiii. 522, xxxiv. 371.

Upper Guinea. Senegambia, *Heudelot*, 836! Sierra Leone: by Kabele River, Ninia, and common on the Talla Hills and Falaba plateau, 3500 ft., *Scott-Elliot*, 4925! 4946! 5150! Ivory Coast: shore of the lagoon at Dabow, *Chevalier*, 16199! Lagos: near Lagos, *Moloney! Foster*, 3! Awon River, *Rowland!* Nigeria: Nupe, river-bank, *Barter*, 1151! near the river at Ode Obba, *Foster*, 169! Old Calabar: near the river, *Mann*, 2268! Cameroons: Bipinde, *Zenker*, 1227! 1551! 1631! 1724! Johann Albrechtshöhe, *Staudt*, 652! Tibati, *Ledermann*, 2365!

South Central. Lunda; Lulua, *Pogge*, 298! 633, 674!

Var. ? *acuminata*, Hutchinson. Leaves shortly acuminate.

Upper Guinea. Cameroons: Barombi, *Preuss*, 8! Johann-Albrechtshöhe, *Staudt*, 577!

9. **U. Bossenge,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 271, *t.* 70, *figs.* 1–4. A much-branched tree; branchlets glabrous when mature. Leaves obovate, obtuse or rounded at the apex, somewhat cuneate at the base, 4–6½ in. long, 1¼–2¼ in. broad, glabrous on both surfaces; lateral nerves 10–12 on each side; stipules soon falling off; petiole ¾–1¼ in. long. Male flower-heads axillary; peduncle ½–¾ in. long. Involucral bracts obovate, 5 lin. long, 4 lin. broad, glabrous. Calyx glabrous, subentire or undulate. Filaments glabrous. Rudimentary ovary glabrous, gradually widened into a flat top, reaching the top of the calyx-tube. Female flowers not known.

South Central. Belgian Congo: near Eala, *Laurent*, 128.

Native name "bessenge."

10. **U. nitida,** *Müll. Arg. in Flora*, 1864, 517. A shrub or tree up to 50 ft. high; trunk erect, up to 18 in. in diam.; head spreading. Leaves crowded towards the ends of the branchlets, oblong-elliptic or

slightly oblanceolate-elliptic, rounded at the apex, cuneate at the base, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–$2\frac{1}{4}$ in. broad, entire, rigidly coriaceous, glabrous, shining on the upper surface, dull or slightly shining below; lateral nerves 8–12 on each side, looped and branched towards the margin, slightly prominent on both surfaces; tertiary nerves branched, slightly prominent or scarcely visible below; petiole slender, subterete, about $\frac{1}{2}$ lin. in diam., $\frac{1}{2}$–$1\frac{1}{2}$ in. long, glabrous. Male flowers: Peduncle $\frac{1}{2}$ in. long, glabrous. Bracts of the involucre elliptic or obovate, $3\frac{1}{2}$ lin. long, 2 lin. broad, coriaceous, glabrous. Calyx 4–5-partite; lobes oblong, obtuse, glabrous. Stamens 4–5; filaments glabrous. Rudimentary ovary deeply tripartite, lobes pilose on the outside. Young female flowers not seen. Fruits 3-celled, ovoid, with several longitudinal ribs, about 7 lin. long and 6 lin. in diam., glabrous, dark brown when dry.—Müll. Arg. in DC. Prodr. xv. ii. 491; Pax in Engl. Pfl. Ost-Afr. C. 237, and in Engl. Jahrb. xxxiv. 370. *U. microphylla*, Pax in Engl. Jahrb. xxiii. 523.

Lower Guinea. Angola: Malange, *Teusz* in *Mechow, Pl. Angol.*, 433! on the road from Palacio to Catombe, *Gossweiler*, 956! in secondary thickets near the high-road to Quisange, *Gossweiler*, 982! on rocky situations between the rivers Kutchi and Kutato, *Gossweiler*, 3942!

Mozamb. Distr. German East Africa: *Langenburg, Goetze*, 833! Usagara, *Stuhlmann*, 8476! and without precise locality, *Holtz*, 961! Rhodesia: Batoka Country, *Kirk!* Choma, *Rogers*, 8028! Nyasaland: Shire Highlands, *Buchanan*, 254! 431!

11. **U. guineensis,** *Müll. Arg. in Flora*, 1864, 517. A tree 40–60 ft. high, "with fine dark foliage" (*Barter*); branchlets sulcate, glabrous, rough with the scars left by the leaf-stalks. Leaves obovate, oblong-obovate or oblanceolate, rounded or shortly and obtusely pointed, more or less cuneate at the base, 4–13 in. long, $2\frac{1}{2}$–7 in. broad, thinly coriaceous, margins slightly undulate, glabrous and dull on both surfaces; lateral nerves 6–11 on each side, looped near the margin, prominent below; tertiary nerves subparallel, distinct on the lower surface; veins lax; petiole usually stout, swollen at the apex, about 1 in. long in the smaller leaves, up to $5\frac{1}{2}$ in. in the larger ones, glabrous. Male flower-heads scattered towards the ends of the branches; peduncle about $\frac{1}{2}$ in. long, almost glabrous. Bracts of the involucre oblong to suborbicular, coriaceous, 1-nerved, glabrous, margins crenulate. Calyx irregularly lobed, pilose. Rudimentary ovary columnar, pilose. Female flowers: Bracts of the involucre fewer and smaller than in the male. Calyx shortly cupular, pilose inside. Ovary 3-celled, glabrous; styles reflexed, fan-shaped, much divided, slightly pubescent outside towards the base. Fruits stalked, 3-celled, ovoid or subglobose, abont 1 in. in diam., glabrous; pyrenes shallowly furrowed on the back.—Müll. Arg. in DC. Prodr. xv. ii. 490; Benth. in Hook. Ic. Pl. t. 1287; Pax in Engl. Jahrb. xxxiv. 371. *U. Mole*, Pax, l.c. xix. 79. *U. togoensis*, Pax, l.c. xxxiv. 371, partly. *U. ealaensis*, De Wild. in Études Fl. Bas- et Moyen-Congo, ii. 272, t. lxx. figs. 5–8? *U. Guignardi*, Chev. ex Beille, and *U. bingervillensis*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 66. *U. Perrotii*, Beille, l.c. 67.

Upper Guinea. Sierra Leone: Erimakuna, *Scott-Elliot*, 5395! French Guinea: Fouta Jallon; Ymbo-Orobé, *Caille*, 14790! Liberia: near Kakatown, *Johnston!* Ivory Coast: Bingerville district; Abidjean, *Chevalier*, 15273! 15415! Bouron Kron, *Chevalier*, 16121! 16135! Lagos: *Maloney!* Nigeria: Nupe, in moist ravines, *Barter*, 1693! Brass, *Barter*, 1833! 1834! Cross River Division; Uivet, *McLeod!* Nun River, *Barter*, 20116! Fernando Po, *Mann*, 74! *Vogel*, 194!

North Central. Upper Ubangi: Ungcurra plateaux, *Chevalier*, 6154! Upper Shari: various localities, *Chevalier*, 6177! 6220! 6350! 7234! 7366!

Nile Land. Uganda: Sesse Islands, Victoria Nyanza, *Dawe*, 957! Entebbe, *Bagshawe*, 714! swampy forests of Buddu, *Dawe*, 329!

Var. *sudanica*, Hutchinson. Fruits sessile or subsessile.—*U. Guignardi*, var. *sudanica*, Beille, l.c. 67.

North Central. Upper Shari: Gribingui; between Fort Crampel and the Kaya M'Bra, *Chevalier*, 6450!

Var. *sudanica* may possibly be a distinct species, but as only fruiting specimens are known it seems preferable to retain it for the present as a variety.

U. Guignardi was described by Beille as having "hispidulous filaments," thus differing from *U. guineensis* by this character. The filaments in his type, however, are quite glabrous and his plant is indistinguishable from typical *U. guineensis*.

Imperfectly known species.

12. **U. Teusczii,** *Pax in Engl. Jahrb.* xix. 79. A tree; branchlets stout, slightly grooved, very sparingly puberulous or glabrescent. Leaves elliptic or obovate-elliptic, rounded at the apex, slightly cuneate at the base, $3\frac{1}{2}$–5 in. long, 2–$3\frac{1}{4}$ in. broad, rather rigidly coriaceous, glabrous and slightly rough on both surfaces, brown above (when dry), reddish below; lateral nerves 9–10 on each side, spreading, gradually fading before reaching the margin; tertiary nerves subparallel, not raised and rather faint; stipules not seen; petiole $\frac{3}{4}$–1 in. long, very sparingly pilose or glabrous. Male flowers not known. Females clustered at the base of the branchlets; peduncle $2\frac{1}{2}$ lin. long, glabrous. Bracts of the involucre oblong, rather strongly keeled, about 4 lin. long, $1\frac{1}{2}$–3 lin. broad, entire, coriaceous, glabrous. Calyx irregularly lobed; lobes pilose towards the top. Ovary 4-celled, glabrous, nearly hidden by the 4 reflexed very much divided styles.

Lower Guinea. Angola: Malange, *Teuscz*, 423!

13. **U. Pynærtii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 274, *t.* 71. A large tree. Leaves obovate, obtuse, long-cuneate at the base, 8–12 in. long, $3\frac{1}{2}$–$4\frac{1}{2}$ in. broad, coriaceous, glabrous on both surfaces; lateral nerves 12–15 on each side, oblique, obscurely reticulate; petiole $1\frac{1}{2}$–2 in. long. Male inflorescences axillary; peduncle 1–$2\frac{1}{4}$ in. long. Bracts of the involucre numerous, up to $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad, obovate, obtuse. Calyx villous inside towards the base, otherwise glabrous. Filaments glabrous. Rudimentary ovary glabrous, a little longer than the calyx. Female flowers and fruits not known.

South Central. Belgian Congo: in the forest at Bumba, *Pynaert*, 117.

De Wildeman figures and describes linear petals in the male flowers of this species. Sometimes portions of the columnar rudimentary ovary become detached, and the parts figured may possibly represent these. Petals are unknown to me in the genus.

14. **U. Sereti,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 274, *t.* 72. A tree about 25 ft. high; adult branches glabrous. Leaves obovate, rounded or very shortly acuminate, more or less cuneate at the base, $5\frac{1}{2}$–8 in. long, $2\frac{1}{2}$–$3\frac{3}{4}$ in. broad, coriaceous, glabrous on both surfaces; lateral nerves 8–9 on each side, more prominent below. Inflorescence axillary. Female flower solitary; peduncle 5–10 lin. long, glabrous. Involucral bracts obovate, nearly 5 lin. long, $2\frac{1}{2}$ lin. broad, glabrous. Calyx short, pilose on the inside. Ovary ovoid, slightly angled, glabrescent; stigmas 3, reflexed, much divided. Male flowers and fruit not known.

South Central. Belgian Congo: near Nala, *Seret*, 778.

This is probably identical with *U. guineensis*, Müll. Arg. I have not seen the specimen.

15. **U. Vanhouttei,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 275. A tree with pubescent young branches, becoming glabrous when older. Leaves obovate-oblong, obtusely rounded at the apex, cuneate at the base, $3\frac{1}{4}$–$6\frac{1}{2}$ in. long, $1\frac{1}{2}$–$3\frac{1}{4}$ in. broad, coriaceous; petiole $\frac{1}{2}$–$1\frac{3}{4}$ in. long, swollen at the top. Inflorescence axillary; peduncle 5–6 lin. long, attaining a length of $\frac{3}{4}$ in. when in fruit. Ovary ovoid; styles reflexed, much divided. Fruits subglobose, $\frac{3}{4}$–1 in. in diam.

Lower Guinea. Lower Congo: Kisantu-Makela, *Gillet*, 3454.

16. **U. Laurentii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 272, *t.* 69. A tree; branchlets somewhat thick, longitudinally sulcate in the dried state. Leaves obovate, rounded at the apex, cuneate at the base, $3\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{3}{4}$–4 in. broad, glabrous; lateral nerves 7–10; petiole $1\frac{1}{4}$–$2\frac{1}{4}$ in. long. Male peduncles $\frac{3}{4}$–$1\frac{1}{6}$ in. long. Bracts of the involucre ovate, obtuse, up to 5 lin. long and 3 lin. broad. Male calyx villous, undulately lobed. Stamens overtopped by the flattened apex of the pilose rudimentary ovary. Female flowers not known.

South Central. Belgian Congo: Lake Iumba, *Laurent.*

21. **ANTIDESMA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 284.

Flowers diœcious. Petals absent. Male flowers: Calyx deeply 3–5-lobed or partite; lobes or segments imbricate. Disk subentire or consisting of distinct glands alternating with the stamens. Stamens 2–5, opposite the calyx-lobes; anthers inflexed in bud, erect in the open flowers; cells distinct at the apex of a thickened and often curved connective. Rudimentary ovary small. Female flowers: Calyx as in the male. Disk often shortly embracing the base of the ovary. Ovary 1-

(very rarely 2-) celled; styles 3, very short, usually 2-lobed; ovules 2 in the cell. Drupes small, often oblique. Seed solitary by abortion (very rarely 2), without a strophiole; albumen fleshy; cotyledons flat, broad.—Trees or shrubs. Leaves alternate. Flowers small, racemose or spicate, racemes or spikes often very slender, solitary or more rarely subpaniculate towards the ends of short branchlets. Bracts small, usually ciliate.

About 80 species, distributed throughout the warmer regions of the Old World.

Stipules tripartite or laciniate.	
Sepals 3, equal; ovary glabrous	1. *A. laciniatum.*
Sepals 5, unequal; ovary hairy	2. *A. Chevalieri.*
Stipules entire.	
Female inflorescence pendulous, 16–18 in. long .	3. *A. Staudtii.*
Female inflorescence (where known) less than 10 in. long.	
Midrib of the leaves glabrous above . . .	4. *A. leptobotryum.*
Midrib of the leaves hairy above.	
Fruits sessile	5. *A. vogelianum.*
Fruits pedicellate.	
Leaves rather large, usually obovate, oblanceolate or elliptic-oblanceolate, usually caudate-acuminate, cuneate at the base, always glabrous excepting the midrib and lateral nerves	6. *A. membranaceum.*
Leaves rather small, usually elliptic or oblong-elliptic, mostly rounded at the base and apex, rarely shortly and obtusely pointed, often hairy and sometimes quite tomentose below	7. *A. venosum.*

1. **A. laciniatum,** *Müll. Arg. in Flora*, 1864, 520. A tree 15–30 ft. high; branchlets smooth or slightly wrinkled, pubescent when young; bark grey. Leaves oblong- or oblanceolate-elliptic, acuminate, mucronate, mucro pubescent when young, rounded at the base, 4–10 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, rigidly membranous, glabrous excepting on the nerves and midrib beneath; lateral nerves 10–13 on each side, distinctly looped near the margin; tertiary nerves and veins lax, prominent only on the lower surface; petiole 3–4 lin. long, stout, pubescent; stipules deeply 3–5-partite, oblong or obovate, up to $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. broad, densely pubescent; lobes lanceolate, acute. Male racemes 2–$2\frac{1}{2}$ in. long; peduncle pubescent; bracts linear, $\frac{1}{2}$ lin. long, long-pilose. Sepals 3 (rarely 4), ovate, obtuse, scarcely $\frac{1}{2}$ lin. long. Disk annular, fleshy, glabrous. Stamens 3. Rudimentary ovary linear-terete, glabrous. Female racemes at the time of flowering 2–3 in. long, attaining about 6 in. when in fruit; axis pubescent; bract as in the male. Sepals 3, ovate, acute, $\frac{1}{2}$ lin. long, pilose on both sides. Disk saucer-shaped, glabrous. Ovary ellipsoid, glabrous; styles terminal. Fruit ellipsoid, about 4 lin. long, glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 260; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 270.

Upper Guinea. Interior of Western Lagos, *Rowland!* Southern Nigeria: Uregin, north of Benin City, *Unwin*, 113! Fernando Po, *Mann*, 201! 256! *Barter!*

Cameroons: Victoria, *Schlechter*, 12363! Yaunde, 2400 ft., *Zenker & Staudt*, 545! *Zenker*, 152! and without precise locality, *Preuss*, 1104!

South Central. Belgian Congo: environs of Nala, *Seret*, 806; Lukolela, *Laurent;* Yambuya, *Laurent*, 993.

Var. *membranaceum*, Müll. Arg. ll. cc. Branchlets and the nerves and veins on the lower surface of the leaves clothed with long, spreading hairs. Leaves membranous; lobes of the stipules subulate, longer than in the type.—*A. pseudo-laciniatum*, Beille in Bull. Soc. Bot. Fr. lvii. Mém. viii. 122.

Upper Guinea. Sierra Leone: Bagru River, *Mann!* near Kafogo, *Scott-Elliot*, 5607! Ivory Coast: Aboisso, *Chevalier*, 17875! between Soubiré and Yaou, *Chevalier*, 17785! Bouron Kron, *Chevalier*, 16845! Gold Coast: Kwaha, *Johnson*, 637! Ashanti: Assin Yan Kumassi, *Cummins*, 97!

2. **A. Chevalieri,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 65. A shrub; young branchlets densely and softly pubescent, at length glabrous. Leaves elliptic-oblong or elliptic-lanceolate, 4–9 in. long, $1\frac{3}{4}$–$3\frac{1}{2}$ in. broad, chartaceous, rounded at the base, densely pilose on the midrib when young, glabrous except on the midrib and lateral nerves; midrib produced a little beyond the apex of leaf-blade; lateral nerves 9–12 on each side, diverging from the midrib at an angle of 45°, slightly immersed above, prominent below; tertiary nerves subparallel, rather distant; petiole $1\frac{1}{2}$–2 lin. long, channelled above, brownish-pubescent; stipules tripartite, rusty-pubescent, subpersistent. Male flowers not known. Female inflorescences subsolitary, axillary and terminal, sessile or shortly pedunculate, somewhat densely flowered, shorter than the leaves; axis subterete or slightly compressed, tomentose; bracts ovate-triangular. Flowers very shortly pedicellate. Sepals 5, free to the base, unequal, ovate, rather densely pubescent on both sides. Disk annular, thick, glabrous. Ovary ellipsoid, twice the length of the calyx, pubescent; stigmas 3, bifid or rarely trifid, slightly recurved. Fruits ellipsoid, compressed, 3–4 lin. long, 2–$2\frac{1}{2}$ lin. broad, sparingly pubescent, tipped by the persistent stigmas.

North Central. Dar Banda; on the banks of the Bokaka River, Upper Shari, *Chevalier*, 7327! 7332! 7359 bis! Kaga Bongolo, *Chevalier*, 7262! Kourou, *Chevalier*, 7381! Ndellé, *Chevalier*, 7584!

3. **A. Staudtii,** *Pax in Engl. Jahrb.* xxvi. 327. Young branchlets yellowish-tomentose, older ones shortly pubescent or glabrous. Leaves oblong or oblong-elliptic, acuminate, acumen mucronate, somewhat unequal and slightly narrowed to the base, older ones about 8 in. long and $2\frac{1}{4}$ in. broad, firmly membranous, glabrous on both surfaces except on the pubescent midrib below; lateral nerves 8–10 on each side, curved and distinctly looped near the margin, slightly impressed above, sharply prominent below; tertiary nerves and veins lax, distinct on the lower surface; petiole 2–4 lin. long, pubescent when young, at length glabrous and wrinkled; stipules entire, lanceolate-subulate, very acute, about $1\frac{1}{2}$ lin. long, rusty-pubescent. Male inflorescences not seen. Female racemes pendulous, 14–16 in. long; axis densely puberulous; flowers shortly pedicellate, reflexed at an early stage; bracts minute.

Calyx cup-shaped, tridentate, ciliate and pubescent. Disk short, cup-shaped, surrounding the base of the ovary, ciliate. Ovary oblique, tomentose; stigmas inserted laterally.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 988, in Herb. Kew! (according to Pax, *Staudt*, 988).

4. **A. leptobotryum,** *Müll. Arg. in Flora*, 1864, 529. A small tree 15 ft. high; branchlets slightly grooved, shortly pubescent when young, at length almost glabrous. Leaves elliptic-lanceolate, somewhat cuspidate-acuminate, acumen more or less mucronate, obtusely cuneate at the base, 2½–6 in. long, 1–2 in. broad, thinly coriaceous, glabrous and slightly shining on both surfaces; lateral nerves 7–9 on each side, looped, distinct on both surfaces; veins lax; petiole scarcely 1 lin. long, pubescent; stipules entire, lanceolate-subulate, 2–2½ lin. long, pubescent. Male racemes axillary, 1–3 in. long; peduncle minutely puberulous; bracts ovate-lanceolate, acute, scarcely ½ lin. long, ciliate; pedicels at the time of flowering about ½ lin. long. Sepals 5, rounded, minutely ciliate, otherwise glabrous. Disk-glands long-pilose. Stamens 5; filaments glabrous; anther-cells distinct, descending. Rudimentary ovary truncate, papillose on the top. Fruits not known.—Müll. Arg. in DC. Prodr. xv. ii. 250.

Upper Guinea. Cameroons: Lolodorf, forest region, *Staudt*, 342! Efulen, *Bates*, 428!

Lower Guinea. Gaboon: Mfoa, 85 miles east of Gaboon, *Bates*, 513 Sierra del Crystal, *Mann*, 1714! Lower Congo, *Smith!*

5. **A. vogelianum,** *Müll. Arg. in Flora*, 1864, 529. A shrub; branchlets shortly pubescent when young, at length glabrous; bark smooth, slightly glaucous-grey. Leaves oblanceolate or oblong-oblanceolate, cuspidate-acuminate, acute at the base, 4–6 in. long, 1–2 in. broad, papery, glabrous on both surfaces except on the midrib, which is pubescent above and below; lateral nerves 6–9 on each side, looped near the margin, very slightly impressed above, prominent below; veins lax; petiole 2–3 lin. long, slightly wrinkled, very sparingly pubescent or glabrous; stipules entire, linear-lanceolate, subacute, 2–3½ lin. long, pubescent. Female spikes in the fruiting stage 5–6 in. long, axis minutely puberulous. Flowers not known. Fruits sessile, elliptic, somewhat acute at both ends, compressed, 3–4 lin. long, 2 lin. broad, tipped by the persistent styles, sparingly adpressed-pubescent.—Müll. Arg. in DC. Prodr. xv. ii. 260.

Upper Guinea. Southern Nigeria: Ibu (Abo), *Vogel*, 22!

6. **A. membranaceum,** *Müll. Arg. in Linnæa*, xxxiv. 68, *excl. part of var. molle.* A tree 20–30 ft. high; branchlets slender, pubescent or at length glabrous. Leaves elliptic, oblong-elliptic or oblanceolate, more or less caudate-acuminate, rounded or cuneate at the base, 3–8 in. long, 1½–3 in. broad, membranous or thinly coriaceous, glabrous above except on the pubescent midrib, glabrous or very sparingly pubescent on the nerves and veins beneath; lateral nerves 6–8 on each

side, not or scarcely looped near the margin, scarcely raised on the upper surface, prominent below; veins lax, faint; petiole 2–5 lin. long, densely pubescent, becoming glabrous; stipules entire, subulate-lanceolate, acute, 2–3 lin. long, pubescent. Male inflorescence 2–5 in. long; axis pubescent; bracts small, ovate, acute, long-ciliate. Calyx 3–4-lobed; lobes ciliate. Disk fleshy, glabrous. Stamens 3–4. Rudimentary ovary fleshy, very sparingly and minutely pubescent or glabrous. Female racemes 6–7 in. long; axis minutely puberulous, slightly sulcate; pedicels in the fruiting stage for the most part reflexed, stout, 1–1½ lin. long, almost glabrous. Calyx pilose. Fruits elliptic, slightly compressed, subacute at both ends, 3–4 lin. long, 2½ lin. broad, glabrous, tipped by the persistent styles.—Müll. Arg. in DC. Prodr. xv. ii. 261, excl. var. *molle;* Pax in De Wild. & Durand, Contr. Fl. Congo, i. 49, and Reliq. Dewevr. 206; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 270.

Upper Guinea. Sierra Leone, *Smeathman.* Northern Nigeria: Nupe, *Barter,* 1557! Southern Nigeria: Adiabo, Old Calabar, *Holland,* 89! Cameroons: Bipinde, *Zenker,* 955! 1175! 1326! 1649! 1977! 2413! 2606! 2872! 3075! 3075A! 3254! 3272! 3643! 3917! 3849! Yaunde, *Zenker,* 1423! Abonando, *Rudatis,* 43! and without precise locality, *Preuss,* 1321!

Lower Guinea. Gaboon: Sibange Farm, *Soyaux,* 89! 252! Lower Congo: Dembo, *Vanderyst;* between Kisantu and the River Kwango, *Büttner.*

South Central. Belgian Congo: Lukolela, *Dewèvre;* Eala, *Pynaert, Laurent;* Madibi, *Sapin;* Mobeka, *Pynaert;* Gombari, *Seret.*

I cannot quite agree with Mueller in his treatment of this species and of *A. venosum,* Tul. In Linnæa (l.c.) he described *A. membranaceum* under two varietal names, var. α *molle* from a specimen collected by Smeathman in Sierra Leone, and from several of Welwitsch's numbers from Angola; and var. β *glabrescens* from *Barter,* 1557. Later, in Decandolle's Prodromus, he added a third variety, var. *tenuifolium,* founded on Smeathman's plant. I cannot distinguish var. *molle* as defined in the Prodromus from many of the specimens which he quotes under *A. venosum,* Tul., and it is, in consequence, here reduced to that species. His variety *glabrescens* should therefore be regarded as typical *A. membranaceum.*

7. **A. venosum,** *Tul. in Ann. Sci. Nat. 3me sér.* xv. 232. A shrub or tree about 30 ft. high, usually found in sandy places near rivers. Leaves usually more or less elliptic or oblanceolate, somewhat rounded or subacute at the base and apex, sometimes slightly emarginate, up to 6 in. long and 2½ in. broad, thinly coriaceous or almost membranous, glabrous or pubescent above, varying from thinly pubescent to tomentose below; lateral nerves usually about 7 on each side, more or less distinctly looped, slightly impressed above, prominent below; petiole up to 3 lin. long, pubescent; stipules lanceolate, entire, acute, mostly more or less tomentose. Male spikes up to 6 in. long, tomentose or pubescent; bracts very small. Calyx 3–5-partite, more or less pubescent or tomentose. Disk subglabrous. Stamens 3–5. Rudimentary ovary pilose or subglabrous. Female racemes 2–5 in. long; bracts as in the male. Fruits pedicellate, ellipsoid, slightly flattened, glabrous, about 4 lin. long and 2½ lin. broad.—Müll. Arg. in DC. Prodr. xv. ii. 260; Pax in Engl. Pfl. Ost-Afr. C. 237, and in Baum, Kunene-Samb. Exped.

282; Durand & Schinz, Études Fl. Congo, 243; Hiern in Cat. Afr. Pl. Welw. i. 965; De Wild. & Durand, Contr. Fl. Congo, i. 49, and Reliq. Dewevr. 206; De Wild. Études Fl. Katanga, 79, and Miss. É. Laurent, 128; Th. & Hél. Durand, Syll. Fl. Congol. 484. *A. venosum*, var. *thouarsianum*, Tul. l.c. 234. *A. bifrons*, Tul. l.c. 229. *A. rufescens*, Tul. l.c. 231. *A. boivinianum*, Baill. Adansonia, ii. 45. *A. membranaceum*, var. *molle*, Müll. Arg. l.c. 261; Hiern, l.c.; Rendle in Journ. Linn. Soc. xxxvii. 211; S. Moore in Journ. Linn. Soc. xl. 194. *A. nervosum*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 270. *A. venosum*, forma *glabrescens*, De Wild. Études Fl. Katanga, 79. *A. fusco-cinerea*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 64. *A. Sassandræ*, Beille, l.c. lvi. Mém. viii. 123.

Upper Guinea. Senegambia: near Albreda, *Leprieur*, *Perrottet*. French Guinea: Fouta Jallon; plateau of Labé, *Chevalier*, 12397! Dintinn, *Chevalier*, 13523! 13524! Sierra Leone: various localities, *Scott-Elliot*, 5259! 5393! 5708! Ivory Coast: basin of the Lower Sassandra River at Soubré, *Chevalier*, 19118! Gold Coast: Abetifi-Kwahu, *Johnson*, 634! 636! Lagos: various localities, *Foster*, 23! 92! 97! *Dawodu*, 200! Northern Nigeria: various localities, *Barter*, 1696! *Vogel! Elliott*, 189! *Dalziel*, 200! *Shaw*, 65! Cameroons: Yaunde, *Zenker*, 743!

North Central. Eastern Shari region: Snoussi country; Ndellé, *Chevalier*, 7665!

Nile Land. Soudan: Bahr-el-Jebel; Giging, *Broun*, 1119! Bahr-el-Ghazal, *Broun!* Fazokl, *Kotschy*, 397! Jur, *Schweinfurth*, 135! 1943! British East Africa: region of Mombasa, *Whyte!* Uganda: various localities, *Dawe*, 200! 318! *Scott-Elliot*, 7230! 7358! 8089!

Lower Guinea. Princes Island, *Laurent*. French Congo: Bongo, *Schlechter*, 12669! Lower Congo: various localities, *Smith*, 47! *Dewèvre*, *Dupont*, *Pynaert*, *Büttner*, *Vanderyst*. Angola: various localities, *Welwitsch*, 402! 202B! 403! 405 partly! *Monteiro! Gossweiler*, 346! 346B! 759! *Baum*, 411!

South Central. Belgian Congo: various localities, *Hens*, C. 120! *Luja*, *Verdick*, *Debeerst*, *Sapin!* Monbuttu; Munza, *Schweinfurth*, 3364! 3447!

Mozamb. Distr. Pemba Island: Ngezi Forest, *Lyne*, 128! Zanzibar, *Hildebrandt*, 1160! *Kirk! Boivin*, *Peters*. German East Africa: various localities, *Goetze*, 32! 58! *Volkens*, 9! *Heinsen*, 144! *Holst*, 2094! *Scott-Elliot*, 8327! *Meller!* Portuguese East Africa: Shupanga, *Kirk!* Gazaland, *Swynnerton*, 169! Likoma Islands, in Lake Nyasa, *Johnson*, 53! Nyasaland: various localities, *Kirk! Buchanan*, 14! 443! 732! 1492! *Scott-Elliot*, 8448! 8572! *Adamson*, 165! *Purves*, 19! 123! *Whyte*, 82! *Cameron*, 7! *McClounie*, 33! Rhodesia: Victoria, *Monro*, 762! 1059!

Occurs also in South Africa.

The inflorescence is frequently attacked by a gall insect, and then it is more or less paniculate.

Imperfectly known species.

8. **A. pachybotryum,** *Pax & K. Hoffm. in Engl. Jahrb.* xlv. 236. A shrub 6–8 ft. high; branchlets fulvous-pubescent when young, at length glabrous. Leaves oblong or obovate-oblong, acuminate to an obtuse apex, obtuse at the base, 6–7½ in. long, 2½–3¼ in. broad, subcoriaceous, rufous-pubescent on the nerves, at length more or less glabrous, prominently reticulate below; stipules lanceolate, acuminate, fulvous-

pilose, persistent, about 4 lin. long; petiole about $\frac{1}{4}$ in. long, thick. Male flowers not known. Female spikes dense, thick, about $2\frac{1}{4}$ in. long. Calyx 4-partite almost to the base, densely pilose. Ovary pilose; stigma terminal. Fruits oblong-elliptic, glabrous, coarsely scrobiculate.

Upper Guinea. Cameroons: between Mbanti and Tibati, *Ledermann*, 2311.

22. **HYMENOCARDIA,** Wall.; Benth. et Hook. f. Gen. Pl. iii. 285.

Flowers dicœcious, apetalous. Disk 0. Male flowers: Calyx-segments or lobes 4–5, rarely 6, imbricate. Stamens usually 5, opposite the calyx-segments; filaments rarely exceeding the calyx, connate at the base into a very short column or free; anthers large, at first reflexed, usually adorned with a conspicuous yellow or golden-coloured gland on the back, cells distinct, parallel, dehiscing longitudinally. Rudimentary ovary as long as the filaments, bifid or entire. Female flowers: Sepals distinct, narrow, caducous. Ovary 2-celled, compressed in the opposite plane to that of the septum; styles 2, free from the base, long, subterete or flattened in the same plane as the ovary, undivided, papillose or glabrous; ovules 2 in each cell. Capsule flat, of 2 compressed very broadly winged cocci, separating from a central axis; pericarp crustaceous, reticulate; endocarp membranous. Seeds usually solitary in each coccus, compressed; testa thin; albumen not copious; cotyledons thin, broad and flat; radicle long.—Trees or tall shrubs. Leaves alternate, petiolate, membranous or coriaceous, entire, penninerved. Male inflorescence a catkin-like spike, female shortly racemose.

Species 8, one in India, the others all from Tropical Africa.

Wings of the cocci continued to and connate at the base of the fruit and decurrent on the axis, resembling those of *Ulmus*.

Leaves about $1\frac{1}{4}$ in. long, 6–8 lin. broad; styles glabrous; fruits $\frac{1}{2}$–$\frac{3}{4}$ in. in diam. . . . . 1. *H. ulmoides.*

Leaves $2\frac{1}{2}$–4 in. long, $\frac{3}{4}$–2 in. broad; styles tomentose on the inner face; fruits $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad . 2. *H. grandis.*

Wings spreading from the upper part of the cocci or horizontally, not continued to the base.

Axis of the fruit projecting from the middle of an obscure sinus; wings spreading horizontally.

Fruits glabrous . . . . . 3. *H. Heudelotii.*

Fruits pubescent . . . . . 4. *H. Chevalieri.*

Axis of the fruit not projecting from the middle of the sinus; wings ascending.

Wings of the cocci almost touching at the top, forming a very narrow sinus . . . . . 5. *H. lyrata.*

Wings of the cocci divergent, forming a broad sinus at the top.

Mature fruits somewhat densely pubescent . . 6. *H. mollis.*

Mature fruits glabrous . . . . . 7. *H. acida.*

1. **H. ulmoides,** *Oliver in Hook. Ic. Pl. t.* 1131. A shrub or tree with the habit of *Ulmus;* branchlets slender, glabrous or very

sparingly hairy when young. Leaves ovate, ovate-elliptic or lanceolate, obtusely acuminate, rounded or subacute at the base, about $1\frac{1}{4}$ in. long, 6–8 lin. broad, rather thinly coriaceous, glabrous on both surfaces; lateral nerves 3–6 on each side, inconspicuous; petiole slender, 2–4 lin. long, sparingly pubescent; stipules soon falling off. Male spikes racemosely arranged on short lateral branchlets crowded towards the ends of the branches, about $\frac{1}{2}$ in. long; axis very slender, puberulous; bracts broadly spathulate, ciliate. Calyx deeply 5-lobed; lobes rounded, densely ciliate. Anthers with a small gold-coloured gland on the back. Rudimentary ovary equalling the filaments, entire, glabrous. Female racemes axillary; bracts oblong, pubescent. Calyx-lobes 5, linear, subequal, membranous, about $1\frac{1}{2}$ lin. long. Ovary oblong, compressed, emarginate, glabrous, with a few scattered yellow glands; styles distinct, linear, flattened, glabrous, about 2 lin. long. Fruits broadly obovate or suborbicular, apex emarginate, base rounded or acute, wings joined at the base and decurrent on the stipe, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., glabrous, membranous; pedicels 2–3 lin. long, glabrous; stipe 1–2 lin. long.—Pax in Engl. Pfl. Ost-Afr. C. 236, and in De Wild. & Durand, Contr. Fl. Congo, i. 49; Hiern in Cat. Afr. Pl. Welw. i. 966; De Wild. & Durand, Reliq. Dewevr. 207; De Wild. Miss. É. Laurent, 127, and Études Fl. Bas- et Moyen-Congo, ii. 269. *H. Poggei*, Pax in Engl. Jahrb. xv. 528; Durand & Schinz, Études Fl. Congo, 243.

Lower Guinea. French Congo; Brazzaville, *Thollon*, 592! Kitabi, *Lecomte*, 12! Lower Congo: Kisantu, *Gillet*, 461, 483. Angola: banks of the River Cuango, *Welwitsch*, 410! Alto Queta, *Welwitsch*, 410B! bank of the River Luinha, 1800 ft., *Welwitsch*, 411!

Mozamb. Distr. German East Africa: Mandera, *Sacleux*, 1837! Dar-es-Salaam, *Kirk*, 117! *Stuhlmann*, 7332! *Holtz*, 345! 936! *Hedde*, 28! Pangani, *Stuhlmann*, 165! Ngeregere, *Busse*, 3022! Kwa-Sisumbi, *Busse*, 2893!

South Central. Belgian Congo: Lunda; Mukenge, *Pogge*, 1361! 1362! Sankuru, *Ledermann*, 45! Eala, *Laurent*, 844; Kiri, *Laurent!* various localities along the Congo, *Dewèvre*, 588, 671, 727, 734A, 1027.

2. **H. grandis,** *Hutchinson in Kew Bulletin*, 1911, 184. A large tree 80–160 ft. high; branches terete, covered with light grey bark; young branchlets nearly glabrous, angular. Leaves ovate, ovate-elliptic or ovate-lanceolate, shortly and obtusely acuminate, rounded at the base, $2\frac{1}{2}$–4 in. long, $\frac{3}{4}$–2 in. broad, entire, membranous or thinly chartaceous, glabrous on both surfaces; lateral nerves 5–8 on each side, slightly raised below; petiole 4–5 lin. long, slender, glabrous; stipules minute. Male and female flowers not known. Fruits broadly obovate or orbicular, rather deeply emarginate, very shortly cuneate at the base, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, 1–$1\frac{1}{2}$ in. broad; fruit-body oblique to the axis, placed in the lower half of the wings, obovate, about $\frac{1}{2}$ in. long and 4 lin. broad; wings membranous, each about $\frac{1}{2}$ in. broad in the middle, minutely and sparingly puberulous, striately marked with numerous lines radiating from the body of the fruit; styles persistent, tomentose, nearly $\frac{1}{2}$ in. long; pedicels 4–5 lin. long, minutely and sparingly puberulous; stipe about 2 lin. long.

Upper Guinea. Togo: Afem, *Kersting*, A. 515! Bagu, *Kersting*, 301! Njamassilä, *Kersting*, 157!

South Central. Belgian Congo: Fort Beni, *Mildbraed*, 2421!

3. **H. Heudelotii,** *Müll. Arg. in Flora*, 1864, 518. A shrub or small tree; branchlets whitish-pubescent, at length glabrous. Smaller leaves elliptic, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, older leaves broadly ovate or rotundate-ovate, obtuse, cordate at the base, 2–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–3 in. broad, firmly membranous or papery, midrib and lateral nerves pubescent beneath, blade otherwise glabrous and beset with golden-coloured glands on the lower surface; lateral nerves 5–6 on each side, distinct on both surfaces and slightly prominent on the lower; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. long, densely pubescent; stipules lanceolate, soon falling, about $2\frac{1}{2}$ lin. long. Male spikes 1–2 in. long; axis minutely puberulous; bracts broadly ovate, coriaceous, almost glabrous. Calyx 5-lobed to about the middle, glandular and pubescent; lobes ovate, obtuse, ciliolate. Stamens 5, joined at the base of the rudimentary ovary; anthers and rudimentary ovary as in *H. acida*. Young female flowers not seen. Fruits depressed-cordate, with the axis slightly projecting at the apex from the centre of the obscure sinus, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 1–$1\frac{1}{4}$ in. broad, very flat, distinctly reticulate, glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 477; Pax in De Wild. Études Fl. Bas- et Moyen-Congo, ii. 269. *H. guineensis*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 63.

Upper Guinea. Senegambia: *Heudelot*, 838! French Guinea: Fouta Jallon, between the Konkouri River and Timbo, *Chevalier*, 12458! between Ditinn and Timbo, *Chevalier*, 12636! Sierra Leone: near Mofari, *Scott-Elliot*, 4431! near Musaia, *Scott-Elliot*, 5104! near rivers, Erimakuna, *Scott-Elliot*, 5257! Madina, Limba, *Scott-Elliot*, 5899! Northern Nigeria: Nupe, *Barter*, 1150! at the confluence of the Niger and the Benue, *Barter*, 383! Southern Nigeria: Idda, *Barter*, 327!

South Central. Belgian Congo: Ubangi; Modgaka, *Thollon*, 43! Eala, *Laurent*, 1972; *Pynaert*, 344; near Yumbi, *Laurent*, 427.

4. **H. Chevalieri,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 61. A shrub or small tree 10–16 ft. high; branches and young branchlets densely and shortly pubescent, the former at length glabrous or nearly so. Mature leaves broadly ovate, shortly and rather abruptly acuminate, rounded or cordate at the base, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–3 in. broad, thinly chartaceous, midrib pubescent on both surfaces, with rather dense tufts of hairs in the axils of the lateral nerves on the lower side, otherwise glabrous, beset with numerous gold-coloured glands on the lower surface; lateral nerves 5–8 on each side, spreading, faintly looped near the margin, distinct on both surfaces, prominent below; veins very slender and rather close; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, terete, pubescent; stipules linear, 2–3 lin. long, pubescent. Male spikes solitary, about $1\frac{1}{2}$ in. long, borne on the two-year-old wood; axis pubescent; bracts ovate, lanceolate, rather densely pubescent outside. Calyx 5-lobed; lobes ovate-triangular, pubescent. Stamens 5; filaments short; anthers with a golden-coloured gland on the back. Rudimentary ovary sub-

cylindric, pilose towards the apex. Female flowers not seen. Fruits like those of *H. Heudelotii*, but rather densely pubescent.

Upper Guinea. French Guinea: Fouta Jallon; Kollangui, *Chevalier*, 12205! 12206! 13504! plateaux of Labé, *Chevalier*, 12380! Sierra Leone: between Berria and Falaba, *Scott-Elliot*, 4976! Gold Coast: *Easmon!* Ivory Coast: banks of the River Comoé, *Chevalier*, 17571!

5. **H. lyrata,** *Tul. in Ann. Sci. Nat. 3me sér.* xv. 258. Branchlets sparingly pubescent when young, soon becoming glabrous. Leaves ovate-elliptic, obtusely acuminate, rounded and usually unequal at the base, 1–2¼ in. long, ½–1¼ in. broad, papery or firmly membranous, glabrous on both surfaces, with reddish glands below; lateral nerves 4–6 on each side, looped some distance from the margin, very slightly raised on the lower surface; veins scarcely visible; petiole 3–4 lin. long, slender, often slightly wrinkled and pubescent; stipules soon falling off. Male and young female flowers not known. Fruits compressed, oblong or obovate, deeply emarginate, subcordate at the base, wings forming a very narrow sinus and almost touching each other; fruit-body reticulate, glabrous; wings membranous, obscurely and longitudinally striate. —Baill. Étude Gén. Euph. t. 27, fig. 24; Müll. Arg. in DC. Prodr. xv. ii. 477.

Upper Guinea. Senegambia: *Heudelot*, 581! *Perrottet*, 359. Sierra Leone: *Unwin & Smythe*, 10! Ivory Coast: valley of the Cavally, Mount Nienskué, *Chevalier*, 19454!

6. **H. mollis,** *Pax in Engl. Jahrb.* xv. 528, *excl. var.* A tree or shrub; branchlets pubescent. Leaves elliptic or slightly oblanceolate-elliptic, obtuse, very slightly rounded at the base, 1¾ in. long, ¾–1 in. broad, sparingly pilose and somewhat bullate on the upper surface, densely pilose below and with gold-coloured glands scattered amongst the hairs; lateral nerves about 6 on each side, pubescent on the upper surface, almost hidden by the hairs below. Fruits cordate at the base; fruit-body broadly ovate in outline, reticulate and densely pubescent; wings longitudinally striate, about ½ in. long and 8 lin. broad.—Pax in Engl. Pfl. Ost-Afr. C. 237; De Wild. Études Fl. Bas- et Moyen-Congo, i. 275. *H. lasiophylla*, Pax in Engl. Jahrb. xix. 79.

Mozamb. Distr. German East Africa: Kagehi, on Lake Victoria, *Fischer*, 533! Pori, on the Ugalla River, *Böhm*, 117A! North-west Rhodesia; Makoti, *Rogers*, 8289!

7. **H. acida,** *Tul. in Ann. Sci. Nat. 3me sér.* xv. 256. A small tree about 20 ft. high, or a shrub; branchlets rusty-puberulous. Leaves oblong, elliptic-oblong or oblanceolate, obtuse and often rounded, rarely emarginate, somewhat rounded and slightly unequal or narrowed at the base, up to 3½ in. long and 1½ in. broad; young leaves usually pubescent and membranous, densely beset with gold-coloured glands beneath; older leaves coriaceous, usually becoming glabrous or almost so; lateral nerves 7–9 on each side, distinct on both surfaces; petiole slender, up to ½ in. long, in the young state pubescent, at length glabrous; stipules subulate or filiform, pubescent, about half the length of

the petiole. Male spikes up to $2\frac{1}{2}$ in. long; axis densely puberulous; bracts broadly spathulate, sparingly pilose. Calyx cupular, pinkish-red, shortly 5-lobed; lobes triangular, ciliate. Stamens 5; filaments a little longer than the calyx, swollen towards the top, glabrous; anthers $\frac{1}{2}$ lin. long, white (in the dried state), with a conspicuous golden-coloured gland on the back near the top; apices of the cells pilose. Rudimentary ovary linear, terete, bilobed, lobes pilose at the apex. Female flowers axillary on leafy lateral branchlets. Calyx divided to the base. Sepals 5–8, linear-lanceolate, densely pubescent. Ovary glabrous, winged. Styles 2, distinct, divergent, about $1\frac{1}{2}$ times the length of the ovary, wrinkled and often twisted. Fruits obcordate, compressed, reticulate, about 1 in. long and $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, glabrous, wings firmly membranous, longitudinally striate.—Baill. Études Gen. Euph. t. 27, fig. 25; Müll. Arg. in DC. Prodr. xv. ii. 477; Oliv. in Trans. Linn. Soc. xxix. 145, t. 94 (erroneously called *H. Heudelotii* on the plate); Pax in Engl. Pfl. Ost-Afr. C. 236; De Wild. & Durand, Mat. Fl. Congo, ii. 59, in Bull. Herb. Boiss. 2me sér. i. 47, and Contrib. Fl. Congo, i. 49; Hiern in Cat. Afr. Pl. Welw. i. 966; De Wild. Reliq. Dewevr. 207; Pax in Baum, Kunene-Samb. Exped. 282; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 269; S. Moore in Journ. Linn. Soc. xl. 194. *H. mollis*, var. *glabra*, Pax in Engl. Jahrb. xv. 528. *H. obovata*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 62. *H. granulata* and *H. lanceolata*, Beille, l.c. 62 and 63.

Upper Guinea. Senegambia, *Heudelot*, 779! Casamanca, *Perottet*, 359! *Chevalier*, 2626! Gambia: Albreda, *Leprieur!* French Guinea: various localities, *Farmar*, 230! 231! 287! *Chevalier*, 311! 383! 573! 12481! Sierra Leone: Kassa, *Scott-Elliot*, 5075! Duunia, *Scott-Elliot*, 4886! Falaba plateaux, *Scott-Elliot*, 5449! Gold Coast: Abetifi-Kwahu, *Thompson*, 86! Lagos: various localities, *Moloney! Foster*, 31! *Barter*, 1206! *Rowland! MacGregor*, 189! Southern Nigeria: Western Province, *Thompson*, 25! Northern Nigeria: confluence of the Niger and Benue Rivers, *Barter*, 329! Nupe, *Barter*, 1098! 1207! 1558! Kontagora, *Dalziel*, 78! Cameroons: Garua, *Ledermann*, 5068!

North Central. Dar-Banda: foot of Kaga-Balidja, *Chevalier*, 6697! Eastern Shari region: Snoussi country; Kaga Toulou, *Chevalier*, 7366!

Nile Land. Soudan, *Broun*, 496! Jur: various localities, *Schweinfurth*, 126! 1310! 1338! 1519! 1576! 2353! Mittu, *Schweinfurth*, 2777! 2844! Uganda: Unyoro, *Dawe*, 694! Bugoma, *Dawe*, 726! Madi, *Speke & Grant*, 733!

Lower Guinea. Gaboon, *Thollon*, 973! French Congo: prairies of the Batékés, *Thollon*, 180! 422! Lower Congo: various localities, *Thollon*, 904! *Pynaert*, 161; *Vanderyst; Gillet*, 152; *Dewèvre*, 349, 727, 734A. Angola: various localities, *Welwitsch*, 412! 412B! 413! 414! 414B! *Gossweiler*, 962! 968! 3978! *Baum*, 216! 547! *Dekindt*, 3024! *Antunes*, 368! 3128! 3147!

Mozamb. Distr. British Central Africa: Nyasaland; Manganja, *Dybowski!* Rhodesia: Gazaland; Chikore Hills, *Swynnerton*, 1214! 1519!

South Central. Belgian Congo: Lomani River, *Pogge*, 1349! Bukila and Dibele, *Laurent*.

23. **CYATHOGYNE**, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 286.

Flowers diœcious. Petals absent. Male flowers: Calyx 5- (rarely 6-) partite; lobes imbricate, membranous. Disk-glands distinct. Stamens 5, opposite the sepals; filaments free; anther-cells parallel, attached at the top, pendulous in bud, in the mature flower spreading almost at right angles, dehiscing longitudinally. Rudimentary ovary large, cyathiform, membranous, entire, or broadly 3-lobed. Female flowers: Calyx less deeply divided than in the male. Disk annular, crenulate. Ovary 3-celled; styles 3, distinct, thick, very shortly bifid; ovules 2 in each cell. Capsule trilobed, soon dehiscing into 2-valved cocci; pericarp thin. Seeds rounded on the back, many-striate, shining.—Erect herbs; stems mostly unbranched, arising from a perennial rhizome. Leaves alternate, entire or toothed; stipules ovate, subulate or setaceous, caducous. Racemes axillary, simple or sparingly branched; male flowers nearly sessile, females pedicellate.

Species 5, endemic.

Leaves $\frac{1}{2}$–1 in. long, 2–5 lin. broad.
- Leaves spathulate or oblanceolate; male disk-glands glabrous or nearly so . . . . . 1. *C. spathulifolia.*
- Leaves elliptic or lanceolate; male disk-glands pilose . 2. *C. Bussei.*

Leaves $1\frac{1}{4}$–5 in. long, 1–5 in. broad.
- Calyx-lobes 6 . . . . . 3. *C. Dewevrei.*
- Calyx-lobes 5.
  - Leaves entire or nearly so . . . . . 4. *C. viridis.*
  - Leaves repand-dentate in the upper two-thirds . 5. *C. Preussii.*

1. **C. spathulifolia,** *Pax in Engl. Jahrb.* xxxiii. 281. Stems simple or subsimple, erect, about 15 in. long, arising from a woody root-stock, crisped-pubescent when young. Leaves produced on very short lateral branchlets, spathulate or oblanceolate, emarginate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 2–4 lin. broad, thin and entire or nearly so, glabrescent except on the midrib, which is slightly pubescent below; lateral nerves 3–4 on each side, very faint or nearly invisible; petiole very short; stipules subulate from a broad base, about $\frac{1}{2}$ lin. long, slightly pubescent. Racemes often geminate, produced on very short arrested leafy branchlets; axis 4–6 lin. long, flattened, crisped-pubescent; bracts very acute from an ovate base, $\frac{1}{2}$ lin. long, membranous, slightly pubescent; pedicels scarcely $\frac{3}{4}$ lin. long, pubescent. Calyx-lobes 5, ovate-obtuse, ciliate, membranous. Disk-glands large and fleshy, contiguous and connate at the base, glabrous or nearly so. Rudimentary ovary large, funnel-shaped, fleshy, glabrous. Female flowers not known.

Mozamb. Distr. German East Africa: Nyasa expedition, without locality, *Goetze*, 401!

2. **C. Bussei,** *Pax in Engl. Jahrb.* xxxiii. 280. Stems as in *P. spathulifolia*. Leaves elliptic or lanceolate, deeply emarginate,

cuneate at the base, ½–1 in. long, 3–5 lin. broad, membranous, entire, glabrous; lateral nerves and veins not or hardly visible; petiole, stipules and inflorescence as in *P. spathulifolia*. Calyx-lobes 5, oblong, obtuse, ciliate, membranous. Disk-glands oblong or obconic, pilose in the upper half. Rudimentary ovary columnar, expanded and fleshy at the top, glabrous. Filaments flattened, thin, glabrous. Female flowers not known.

Mozamb. Distr. German East Africa: Usambara; in mixed open forest on the Mssindjewe River, *Busse*, 1042!

3. **C. Dewevrei,** *Pax in De Wild. & Durand, Contr. Fl. Congo*, i. 49. Leaves shortly petiolate, elliptic, acuminate, acute at the base, 1¼–2 in. long, 1–1½ in. broad, membranous, "margin repand, subrevolute" (*Pax*); petiole 2 lin. long; stipules linear, equalling the petiole. Male flowers not known. Female racemes ½–¾ in. long; axis pilose; pedicels short; bracts persistent, small. Sepals 6, oblong, acute. Ovary 3- or 4-celled; styles very thick, linear, shortly bifid.—Pax in De Wild. & Durand, Reliq. Dewevr. 207.

South Central. Belgian Congo: Eastern Province; Wabundu, *Dewèvre*, 1142.

4. **C. viridis,** *Müll. Arg. in Flora*, 1864, 536. A herb about 1 ft. high, erect from a perennial rhizome; stem hard, usually unbranched, glabrous or with a few crisped hairs. Leaves obovate or oblanceolate, very shortly and obtusely acuminate, narrowed to an acute base, 1½–5 in. long, ¾–2¼ in. broad, subentire or the margin undulate and very minutely denticulate, papery, glabrous or nearly so on both surfaces, midrib pubescent below; lateral nerves 6–9 on each side, looped near the margin, inconspicuous on both surfaces; veins very lax, scarcely visible; petiole 2–5 lin. long, pubescent; stipules subulate or almost filiform, acute, about 2 lin. long, pubescent. Male racemes geminate on an axillary peduncle; peduncle about ½ in. long; racemes about ¾ in. long; axis puberulous; bracts about ½ lin. long, acute; pedicels very short. Calyx-lobes 5, obovate, about ¾ lin. long, membranous, ciliolate and sparingly pubescent. Anthers parallel and attached at the top, pendulous in bud, afterwards spreading almost at right angles. Disk-glands fleshy, pilose. Rudimentary ovary large, funnel-shaped, glabrous. Female racemes about 1 in. long, few-flowered; axis and bracts as in the male; pedicels about 1 lin. long, tomentellous. Calyx-lobes ovate, subacute, spreading, pubescent. Disk annular, crenulate, sparingly pubescent. Ovary pubescent or nearly glabrous; styles distinct, thick, glabrous, very shortly bifid. Capsule trilobed, 4 lin. in diam., shortly pubescent or nearly glabrous. Seeds rounded on the back, 1¼ lin. long, faintly many-striate, shining.—Müll. Arg. in DC. Prodr. xv. ii. 226; Benth. in Hook. Ic. Pl. t. 1278; De Wild. & Durand, Pl. Thonner. Congol. 21; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 268.

Lower Guinea. Spanish Guinea: Corisco Bay, *Mann*, 1868! Gaboon:

on the Gaboon River, *Mann*, 971! near Libreville, *Klaine*, 1804! 1854! 1868! 1877! 2074! 2101! 2159! 2782! Lower Congo: Mayomba, *Lecomte*, 9!

South Central. Belgian Congo: Eala, *Laurent*, *Pynaert*, 655.

5. **C. Preussii,** *Pax in Engl. Jahrb.* xxiii. 521. Habit of *C. viridis*; stems puberulous. Leaves obovate-elliptic, shortly acuminate, acute or subacute at the base, $2\frac{3}{4}$–$4\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 in. broad, membranous, margin subentire in the lower third, the other two-thirds coarsely repand-dentate, glabrous or nearly glabrous on both surfaces; lateral nerves 5–6 on each side, distinctly looped and reticulate some distance from the margin, distinctly impressed above, slightly prominent below; tertiary nerves and veins very indistinct; petiole 2–4 lin. long, tomentellous; stipules subulate, 1–$1\frac{1}{2}$ lin. long, pubescent. Male flowers not known. Female racemes $1\frac{1}{2}$ in. long, few-flowered; axis puberulous; bracts small, ovate-triangular, acute, puberulous; pedicels rather stout, about 1 lin. long. Calyx-lobes broadly ovate, puberulous, about $\frac{1}{2}$ lin. long. Disk annular, sparingly pubescent. Ovary thinly pubescent; styles distinct, thick, shortly bifid, glabrous. Fruits unknown.

Upper Guinea. Cameroons: Victoria, *Preuss*, 1210; Bipinde, *Zenker*, 891!

An imperfect specimen collected by Lecomte (E. 6) at Mayomba in Lower Congo probably belongs here.

24. MARTRETIA, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 64.

Flowers diœcious. Petals absent. Disk absent from both sexes. Male flowers: Sepals 4, slightly imbricate? Stamens 5–7; filaments shortly connate at the base around a small bifid rudimentary ovary; anthers extrorse; cells parallel, contiguous, dehiscing longitudinally, connective produced slightly beyond the apex of the cells. Female flowers: Sepals 5–6. Ovary 2-celled, each cell nearly completely divided by a false septum between each pair of ovules, thus resembling a 4-celled ovary with 1 ovule in each cell; styles 2, connate at the base, linear and undivided, slightly twisted, spreading in the same plane as the false septa; ovules 2 in each cell. Mature fruits and seeds not seen.—A shrub? Leaves alternate, shortly petiolate, chartaceous, entire; stipules small, deciduous. Flowers in axillary racemes.

Species 1, endemic.

Martretia is remarkable among the genera of *Phyllantheæ* in having a two-celled ovary, each cell being nearly completely divided by a false septum.

1. **M. quadricornis,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 64. Branches clothed with a dull-grey bark; young branchlets up to 3 in. long, terete, glabrous. Leaves lanceolate, oblong-lanceolate or ovate-elliptic, gradually acuminate to an acute or mucronate apex, cuneate at the base, 4–9 in. long, $1\frac{1}{4}$–$3\frac{1}{2}$ in. broad, entire, chartaceous, glabrous and somewhat dull on both surfaces; lateral nerves 10–15 on each side, very slender, looped and anastomosing freely well within the margin, distinct and slightly prominent on both surfaces; petiole 2–3 lin. long,

deeply grooved on the upper side, wrinkled, otherwise glabrous; stipules ovate-lanceolate, small, soon falling off. Male racemes axillary on the young shoots, solitary or subsolitary, about 2 in. long; axis slightly flexuous, sulcate, glabrous; bracts ovate, slightly keeled, ciliate; pedicels about $\frac{3}{4}$ lin. long, glabrous. Sepals 4, oblanceolate, $\frac{3}{4}$ lin. long, ciliate towards the apex, otherwise glabrous. Stamens 5–7; filaments $\frac{1}{3}$ lin. long, glabrous; anthers ellipsoid, nearly $\frac{1}{2}$ lin. long, mucronate. Rudimentary ovary short, bifid, glabrous. Female racemes solitary or geminate towards the base of the young shoots or on the two-year-old wood, $1\frac{1}{2}$–2 in. long; axis angular or deeply sulcate, glabrous; bracts ovate or ovate-triangular, about half the length of the pedicels, ciliate; pedicels stout, angular, 1 lin. long, glabrous. Sepals 5 or 6, ovate-lanceolate or lanceolate, gradually acuminate, $\frac{3}{4}$ lin. long, ciliate. Ovary 2-lobed (resembling 2 shoulders), each lobe very slightly bifid, glabrous; styles connate for about $\frac{1}{2}$ lin. at the base, linear and undivided, glabrous, 3 lin. long. Fruits not seen.

North Central. Upper Ubangi region: valley of the Tomi River, between Fort Sibut and Fort Possel, *Chevalier*, 10577!

25. **PROTOMEGABARIA,** Hutchinson in Hook. Ic. Pl. t. 2929.

Flowers dicœcious. Petals absent. Male flowers: Sepals 5, imbricate. Disk-glands 5, alternating with the filaments, large and fleshy, contiguous. Stamens 5, opposite the sepals; filaments free; anthers introrse, cells parallel, contiguous, dehiscing longitudinally. Rudimentary ovary columnar, entire or bipartite, fleshy. Female flowers: Calyx as in the male. Disk adnate to the inner side of the sepals. Ovary 3-celled; styles 3, bifid or bilobed, at first erect, at length spreading and recurved, glabrous; ovules 2 in each cell, collateral, almost hidden from the outside by a very large flat caruncle. Capsule large, subglobose or oblong-ellipsoid, septicidal, exocarp partially splitting from each end into six pieces, cocci falling away and leaving the persistent central axis; exocarp crustaceous, thin; endocarp horny, nearly $\frac{1}{2}$ lin. thick. Seeds not seen.—**Trees.** Leaves alternate, petiolate, entire, penninerved. Flowers small, racemose or subspicate; racemes simple, axillary or extra-axillary, solitary or geminate; flowers subtended by bracts in three series, outer ovate, middle cupular and enclosing the flowers in bud, innermost obovate.

Species 2, endemic.

Leaves pubescent on the midrib and lateral nerves below; rudimentary ovary bipartite	1. *P. stapfiana.*
Leaves glabrous on the midrib and lateral nerves below; rudimentary ovary undivided	2. *P. macrophylla.*

1. **P. stapfiana,** *Hutchinson in Hook. Ic. Pl. t.* 2929. A tree about 50 ft. high; branchlets stout, glabrous. Leaves elongate-oblong or elongate-obovate, rounded or very shortly and obtusely acuminate, more or less narrowed to the base, 6–15 in. long, 3–6 in. broad, thinly chartaceous or membranous, entire, glabrous above, pubescent on the midrib

and lateral nerves beneath; lateral nerves 10–17 on each side, diverging from the midrib at an angle of 45°, looped and branched near the margin, prominent only on the lower surface; tertiary nerves parallel, rather slender; veins scarcely visible; petiole $1\frac{1}{2}$–2 in. long, swollen and wrinkled at the top, glabrous; stipules not seen, soon falling off. Male racemes about $2\frac{1}{2}$ in. long; axis sulcate, glabrous; outer bract ovate-rotundate, slightly ciliate; inner bract in the shape of a cup enclosing the three closely packed flowers whilst in bud, central flower overtopping the two others; bracteoles at the base of each pedicel ovate, ciliate and pubescent; pedicels short. Sepals 5, oblong, inflexed and fringed at the apex. Stamens 5; filaments about half as long as the sepals. Disk-glands 5, large and fleshy, glabrous. Rudimentary ovary bipartite, segments slightly papillose towards the apex. Female racemes about $1\frac{1}{2}$ in. long; axis sulcate or angular, glabrous; bracts ovate-lanceolate, obtuse, $1\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, thinly coriaceous, glabrous. Sepals 5, one smaller than the rest, ovate-lanceolate, obtuse, 2 lin. long, coriaceous, glabrous on both sides. Disk adnate to the base of the sepals, glabrous. Ovary slightly trilobed, glabrous; styles 3, free to the base, at first erect, at length recurved, bifid or bilobed, glabrous. Capsule subglobose or oblong-ellipsoid, $1\frac{1}{4}$–$1\frac{1}{2}$ in. in diam., septicidal, exocarp partially splitting from each end into six pieces, the cocci falling away and leaving the persistent central axis; exocarp crustaceous, thin; endocarp horny, nearly $\frac{1}{2}$ lin. thick. Seeds not seen.—*Megabaria obovatum*, Pierre ex Hutchinson in Hook. Ic. Pl. sub t. 2929. *Mæsobotrya stapfiana*, Beille in Bull. Soc. Bot. France, lvi. Mém. viii. 121.

Upper Guinea. Ivory Coast: Malamalasso, *Chevalier*, 16249! Gold Coast: Eastern Akim; Kankan, *Johnson*, 596! Kwahu district, *Thompson*, 92!

Lower Guinea. Gaboon: in the neighbourhood of Libreville, *Klaine* (coll. Aug. 1897 and 1898, May 1899, and Jan. 1902), 575! without date, 2314!

2. **P. macrophylla,** *Hutchinson in Hook. Ic. Pl. sub t.* 2929. A small tree about 20 ft. high; branchlets stout, glabrous. Leaves oblong-elliptic or elongate-obovate, shortly acuminate, slightly rounded at or narrowed to the base, 7–15 in. long, 2–$3\frac{1}{2}$ in. broad, rather rigidly chartaceous, entire, glabrous on both surfaces; lateral nerves 10–20 on each side, diverging from the midrib at an angle of 45°, looped and branched near the margin, prominent only on the lower surface; tertiary nerves subparallel, rather faint; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, swollen and slightly wrinkled at the apex, glabrous; stipules not seen, evidently soon falling off. Male inflorescences solitary or geminate, 4–5 in. long; axis angular or deeply sulcate, glabrous; outer bract broadly ovate, $\frac{1}{2}$ lin. long, glabrous; intermediate bract cupular as in *P. stapfiana*, innermost bracts obovate or oblanceolate, membranous, margin minutely ciliolate; pedicels very short, glabrous. Sepals ovate, obtuse, glabrous outside, very sparingly pilose within towards the base. Stamens 5; filaments short. Disk-glands 5, large and fleshy, glabrous. Rudimentary ovary very short, columnar, entire, glabrous. Female inflorescences as in the male. Flowers solitary in the axil of each bract, with two connate bracteoles at the middle of the pedicel; bracts ovate, obtuse, $\frac{3}{4}$ lin. long,

coriaceous, glabrous; bracteoles connate, boat-shaped, glabrous; pedicels 1 lin. long. Sepals 5, ovate-lanceolate, obtuse, 1 lin. long, ½ lin. broad, thick and coriaceous, glabrous on both sides. Disk thin and closely adpressed to the base of the sepals, glabrous. Ovary ovoid, 3-angled, glabrous; styles short, bilobed, at first erect, at length recurved, glabrous. Fruits nearly 2 in. long. Seeds ellipsoid, ½ in. long, shining, with a distinct funicle.—*Baccaurea macrophylla*, Pax in Engl. Jahrb. xxviii. 21, not of Müll. Arg. *Megabaria klaineanum*, Pierre ex Hutchinson in Hook. Ic. Pl. sub t. 2929.

Upper Guinea. Cameroons: Batanga, moist forest, *Dinklage*, 1180!

Lower Guinea. Gaboon: in the neighbourhood of Libreville, *Klaine*, 25! (coll. Aug. 1896, not of other dates), 575! 2582! 2654! 2837! 3017!

A specimen collected by *Henriques*, 8, in the Island of St. Thomas, is possibly this species. The leaves are almost membranous and more attenuated to the base than those of the specimens from the mainland.

26. THECACORIS, A. Juss.; Benth. et Hook. f. Gen. Pl. iii. 286.

Flowers diœcious. Petals usually present. Male flowers: Sepals 5, imbricate, often ciliate. Petals 5, lanceolate, often ciliate. Disk consisting of 5 free segments, segments opposite the petals, often hairy. Stamens 5, inserted between the disk-segments, opposite the sepals; filaments free; anther-cells distinct, subglobose, pendulous from a thick connective or at length erect. Rudimentary ovary thick, fleshy, truncate. Female flowers: Petals smaller than in the male. Disk annular. Ovary 3-celled; ovules 2 in each cell; styles 3, distinct or shortly connate at the base, recurved, apex bifid. Capsule trilobed, dehiscing into 2-valved cocci. Seeds (where known) more or less rounded; testa shining.—Trees or shrubs. Leaves alternate, stipulate, entire. Flowers small, in axillary many-flowered racemes or spikes; bracts usually small.

Species 9, one from Madagascar, the remainder West African.

*Leaves narrowed to the base.

Bracts of the female inflorescence conspicuous, about 2 lin. long in fruit.

Male inflorescence and flowers pubescent . . 1. *T. stenopetala.*

Male inflorescence and flowers glabrous . . . 2. *T. Batesii.*

Bracts of the female inflorescence small and inconspicuous, ½–¾ lin. long in fruit.

Ovary pilose or setulose.

Leaves conspicuously mucronate, under 6 in. long and 2½ in. broad. 3. *T. lucida.*

Ovary sparingly setulose in the upper part only

Ovary equally setulose or pubescent all over.

Leaves about thrice as long as broad, gradually produced to the mucro, unequal-sided at the base . . . . . 4. *T. trichogyne.*

Leaves about twice as long as broad, abruptly mucronate, equal-sided at the base . . 5. *T. Chevalieri.*

Leaves inconspicuously mucronate, over 6 in. long and 3 in. broad . . . . . 6. *T. membranacea.*

Ovary quite glabrous . . . . . 7. *T. gymnogyne.*
**Leaves more or less rounded at both ends or slightly obtusely pointed at the apex . . . . . 8. *T. manniana.*

1. **T. stenopetala,** *Müll. Arg. in DC. Prodr.* xv. ii. 246. A shrub; branches puberulous when young, at length glabrous; bark grey or greyish-brown. Leaves obovate or elliptic-obovate, acuminate, cuneate at the base, $3\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{1}{2}$–$3\frac{1}{4}$ in. broad, acumen $\frac{1}{2}$–$\frac{3}{4}$ in. long, subacute, membranous, glabrous and somewhat dull on both surfaces; lateral nerves 6–7 on each side, looped, slightly raised below; veins lax; petiole 2–3 lin. long, stout, slightly wrinkled, minutely puberulous or glabrescent. Male spikes slender, almost 2 in. long; bracts acute from a broad base, densely pubescent. Sepals suborbicular, ciliate. Petals oblanceolate, subterete, ciliate at the apex. Disk-segments thick, sparingly pubescent. Anther-cells distinct. Rudimentary ovary truncate, entire, very sparingly pubescent. Female racemes 2–3 in. long; bracts lanceolate, acute, 2 lin. long, pilose on the outside, ciliate. Sepals ovate, acute, ciliate. Petals lanceolate, ciliate in the upper part. Disk short, sparingly pilose. Ovary subglobose, glabrous; styles connate at the base, tripartite, glabrous. Fruit trilobed, about $2\frac{1}{2}$ lin. in diam., glabrous; pedicels in fruit 3 lin. long, minutely pubescent.—Pax in Bolet. Soc. Brot. x. 159. *Antidesma stenopetalum,* Müll. Arg. in Flora, 1864, 520.

Upper Guinea. Fernando Po, *Vogel,* 228!

Lower Guinea. Princes Island, *Mann!* Island of St. Thomas; Monte Café, 4000 ft., *Moller & Quintas.*

A specimen collected by Dinklage, 1939, near the River Cess, in Grand Bassa, Liberia, seems to be a form of this species. The leaves are more narrowed towards the base than those of the type.

2. **T. Batesii,** *Hutchinson in Kew Bulletin,* 1910, 58. A small shrub about 2 ft. high; branches glabrous. Leaves obovate, acutely acuminate, more or less cuneate at the base, 3–5 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, membranous, glabrous and dull on both surfaces; lateral nerves 5–6 on each side, looped, slightly raised below, loops 2–3 lin. distant from the margin; veins lax, inconspicuous; petiole stout, 2–3 lin. long, glabrous or only minutely puberulous above; stipules ovate-lanceolate, acuminate, acute, $2\frac{1}{2}$ lin. long, glabrescent or minutely puberulous when young. Male spikes scarcely over $\frac{3}{4}$ in. long, glabrous; bracts lanceolate, acute, shortly ciliate. Sepals suborbicular, minutely ciliate. Petals lanceolate, very acute. Disk-glands truncate, fleshy, glabrous or minutely and sparingly puberulous. Rudimentary ovary obconic, truncate, entire, glabrous. Young female flowers not seen. Fruit trilobed, nearly 4 lin. in diam., glabrous; cocci obtuse. Seeds 2 lin. long, more or less flattened on one side, dark brown, shining; pedicels in fruit stout, $2\frac{1}{2}$ lin. long, minutely puberulous; bracts ovate, acute, almost 2 lin. long, ciliate.—*T. gymnogyne,* var. *reticulata,* Pax in Engl. Jahrb. xxviii. 21.

Upper Guinea. Cameroons: bush along the path from the Batanga Mission to Bongahela, *Bates,* 174! Ebea Falls, *Dinklage,* 204!

3. **T. lucida,** *Hutchinson.* Branchlets pubescent, at length glabrous. Leaves elliptic or oblong-elliptic, acuminate, conspicuously mucronate, cuneate at the base, 2½–5 in. long, 1–2 in. broad, papery, margin slightly recurved, midrib very sparingly pubescent towards the base on the lower side, otherwise glabrous and slightly shining on both surfaces; lateral nerves 9–11 on each side, very fine, much branched towards the margin, slightly raised on the lower surface; tertiary nerves and veins laxly reticulate; petiole 1½ lin. long, sparingly hispid; stipules subulate-lanceolate, acute, 3 lin. long, strigillose. Male racemes 1–5 in each leaf-axil, about 1½ in. long; axis rather densely puberulous; pedicels short; bracts triangular, ¾ lin. broad, hispidulous on the outside, glabrous within, margin ciliate. Sepals 5, obliquely elliptic, acute at both ends, ciliate and pubescent. Petals small, oblong, ciliate in the upper part. Stamens 5; anther-cells parallel when young, at length turning upwards and becoming erect; filaments glabrous. Rudimentary ovary obconic, sparingly pilose. Female racemes axillary, solitary or geminate, about ¾ in. long when in flower, about 2 in. long when in fruit. Bracts and sepals as in the male. Petals absent. Disk annular, glabrous. Ovary depressed-globose, sparingly setulose in the upper part; styles 3, bifid, glabrous, erect and slightly incurved when young. Fruit trilobed, 4 lin. in diam., almost glabrous; lobes rounded; pedicels in fruit reflexed, 3 lin. long, slightly pubescent; bracts very small.—*Baccaureopsis lucida,* Pax in Engl. Jahrb. xliii. 319.

South Central. Belgian Congo: Myaribu, between Fort Beni and Irumu, *Mildbraed,* 2855! 2856!

4. **T. trichogyne,** *Müll. Arg. in Journ. Bot.* 1864, 328. A small sparingly and patently branched tree 10–15 ft. high; head lax; branches slender, somewhat flexuous, rusty-pubescent. Leaves oblong or oblanceolate, shortly acuminate, conspicuously mucronate, subcuneate at the base, 2½–6½ in. long, 1–2 in. broad, papery, distinctly reticulate on both surfaces; lateral nerves 8–9 on each side, looped, conspicuous on both sides; veins prominent below, somewhat close; petiole stout, about 3 lin. long, clothed with a few long brown hairs; stipules lanceolate, acute, 3–4 lin. long, densely pubescent. Male inflorescence about 1 in. long, rather dense-flowered. Flowers sessile. Sepals ovate, subacute, ½ lin. long and broad, setulose-pubescent in the upper half outside. Petals absent. Stamens 5; filaments ¾ lin. long, glabrous. Disk-glands large, setose, fleshy. Rudimentary ovary obconic, fleshy, subentire, nearly glabrous. Female racemes elongated, lax-flowered. Ovary pubescent; styles bipartite, recurved. Capsule adpressed-pubescent.—Hiern in Cat. Afr. Pl. Welw. i. 967.

Lower Guinea. Angola: Pungo Andongo; in woods, *Welwitsch,* 415! between Quetta Station and Monte Bello, *Gossweiler,* 4369! 4370!

5. **T. Chevalieri,** *Beille in Bull. Soc. Bot. France,* lvi. *Mém.* viii. 119. A shrub 6–10 ft. high; bark greyish-brown; young branchlets rather densely rusty-setulose. Leaves obovate, elliptic-obovate or elliptic-oblanceolate, more or less gradually or rarely somewhat abruptly

acuminate, abruptly mucronate, cuneate at the base, $2\frac{1}{4}$–5 in. long, $\frac{3}{4}$–$2\frac{1}{4}$ in. broad, membranous or very thinly chartaceous, quite glabrous above, even when young, sparingly rusty-setulose on the midrib and lateral nerves below; lateral nerves 6–8 on each side, spreading, distinctly looped and anastomosing far from the recurved margin; veins somewhat lax and slender, slightly prominent below; petiole $1\frac{1}{2}$–2 lin. long, pubescent; stipules oblong-lanceolate, subacute, 1 lin. long, densely rusty-pubescent, very early deciduous. Male racemes axillary, solitary or in pairs, about $1\frac{1}{4}$ in. long; axis densely rusty-pubescent; bracts broadly ovate, obtuse, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, densely rusty-pubescent outside; pedicels very short, almost glabrous. Sepals 5, ovate, obtuse, setulose-pubescent outside. Petals linear, terete, about half as long as the sepals, glabrous except for the filiform tip. Disk-glands rounded, fleshy, pilose. Stamens 5; filaments glabrous. Rudimentary ovary short, obconic, flat on the top, glabrous or nearly so. Young female inflorescences not seen. Fruiting racemes $2\frac{1}{2}$–3 in. long; axis shortly pubescent; bracts acute from an ovate base, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, adpressed rusty-pilose; pedicels spreading at right angles from the axis, $1\frac{1}{2}$–3 lin. long, shortly pubescent. Sepals ovate, acute, densely ciliate. Petals spathulate, pilose towards the apex. Small glabrous staminodes present opposite the sepals. Disk annular or saucer-shaped, densely pilose on the margin. Fruits trilobed, about 3 lin. in diam., very sparingly setulose. Styles spreading over the top of the fruit, $\frac{3}{4}$ lin. long, bilobed, glabrous. Seeds black and shining, obovate in outline, 2 lin. long.—*Antidesma comoensis*, Beille in Bull. Soc. Bot. France, lvi. Mém. viii. 122.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 833! Ivory Coast: Malamalassa, on the Lower Comoé, *Chevalier*, 17489! Central Cavally: banks of the River Hama, *Chevalier!*

6. **T. membranacea,** *Pax in Bolet. Soc. Brot.* x. 158. A tree; branchlets very sparingly puberulous when quite young, soon glabrous. Leaves elliptic or obovate-elliptic, gradually and shortly acuminate, only slightly mucronate, cuneate at the base, $6\frac{1}{2}$–9 in. long, $2\frac{1}{2}$–4 in. broad, membranous, glabrous and dull on both surfaces; lateral nerves 8–9 on each side, oblique, slightly raised on both surfaces; tertiary nerves very slender and lax; veins scarcely visible; petiole 2–4 lin. long, sparsely puberulous when young, at length glabrous and wrinkled; stipules soon deciduous, ovate-triangular, acute, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, strigillose. Male flowers not known. Female racemes about $1\frac{3}{4}$ in. long at the flowering stage; axis almost glabrous; bracts scarcely $\frac{1}{2}$ lin. long, ovate, pubescent; pedicels $\frac{1}{2}$ lin. long, puberulous. Calyx more or less undulately 5–6-lobed, ciliate. Disk annular, densely ciliolate. Ovary very sparingly pilose; styles short, bifid, glabrous. Entire fruit not seen; exocarp very thin, glabrous and closely wrinkled outside; endocarp horny, slightly thicker than the exocarp. Fruit-axis persistent, shaggy-pubescent towards the top. Seeds rounded, 2 lin. in diam., slightly shining; pedicels in fruit spreading, 4 lin. long; bracts minute.

Lower Guinea. Island of St. Thomas, *Quintas*, 121!

7. **T. gymnogyne,** *Pax in Engl. Jahrb.* xxviii. 20. A shrub or small tree; branches pubescent. Leaves obovate or obovate-oblong, cuspidate-acuminate, narrowed to the base, 4–9 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, membranous, glabrous; lateral nerves 8–11 on each side, looped, prominent below, loops extending to within 3 lin. of the margin; veins very lax; petiole very stout, 1–2 lin. long, sparingly pubescent: stipules lanceolate, acute, about twice as long as the petiole. Male inflorescence $2\frac{1}{2}$–3 in. long, pubescent; bracts lanceolate, acute, ciliate, $\frac{1}{2}$ lin. long. Sepals suborbicular, ciliate. Petals minute. Disk-segments densely pilose. Rudimentary ovary glabrous, truncate. Female inflorescence up to 5 in. long; pedicels $\frac{3}{4}$ lin. long, densely pubescent; bracts triangular, acute, ciliate. Sepals ovate, acute, ciliate. Petals minute. Disk densely pilose. Ovary globose, glabrous; styles short, bifid, glabrous. Fruits trilobed, about 3 lin. in diam., glabrous; lobes rounded or very slightly keeled; styles persistent; pedicels in fruit about 4 lin. long, pubescent.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1642! 1788! 2276! 2276A! 3021! 3231! 3596! 3783! Ebea Falls, *Dinklage*, 233. Gross Batanga, *Dinklage*, 1024!

Lower Guinea. Gaboon: *Klaine*, 1998!

8. **T. manniana,** *Müll. Arg. in DC. Prodr.* xv. ii. 246. A tree 40 ft. high; bark greyish and somewhat sulcate when dry, glabrous. Leaves elliptic or slightly obovate-elliptic, somewhat rounded at both ends, 4–7 in. long, $2\frac{1}{2}$–$4\frac{1}{2}$ in. broad, entire, membranous, glabrous and somewhat dull on both sides; lateral nerves 7–9 on each side, looped, slightly grooved above, rounded and elevated below; veins lax, not prominent; petiole 4–5 lin. long, very stout, slightly wrinkled, glabrous or minutely puberulous when young. Male flowers in short axillary simple or forked spikes or racemes, sessile or on pubescent pedicels up to $1\frac{1}{2}$ lin. long; bracts ovate, acute, membranous, ciliate. Sepals ovate, subacute, $\frac{1}{2}$ lin. long, ciliate. Petals lanceolate, ciliate towards the apex, nearly as long as the sepals. Disk consisting of 5 distinct segments opposite the petals; segments fleshy, villous in the upper part. Stamens 5; filaments free, inserted between the segments of the disk; anthers suborbicular. Rudimentary ovary fleshy, truncate, annular and scarcely lobed, sparingly pubescent. Female racemes 1–$2\frac{1}{2}$ in. long; bracts small, ovate, acute, about $\frac{1}{2}$ lin. long, pubescent; pedicels $1\frac{1}{2}$–2 lin. long, spreading, rather densely pubescent. Sepals ovate-triangular, subacute, $\frac{3}{4}$ lin. long and broad, rather sparingly rusty-puberulous on the outside. Petals obovate, acute, ciliate in the upper half, $\frac{3}{4}$ lin. long. Staminodes small, subulate, opposite the sepals. Disk fleshy, thick, densely rusty-pubescent. Ovary depressed-globose, pubescent; styles spreading, nearly glabrous, minutely bifid at the apex. Capsule oblong-ellipsoid, 7 lin. long, about 5 lin. in diam.; exocarp glabrescent, thin; endocarp yellowish-white, horny, about $\frac{1}{2}$ lin. thick. Mature seeds not seen.—Pax in Bolet. Soc. Brot. x. 158. *Antidesma mannianum,* Müll. Arg. in Flora, 1864, 519.

Lower Guinea. Peak of the Island of St. Thomas, *Mann*, 1073! *Moller*, 122! 124! *Quintas*, 123! 124A! 126! Rolas Island, *Quintas*, 162!

27. **MÆSOBOTRYA,** Benth.; Benth. et Hook. f. Gen. Pl. iii. 284.

Flowers diœcious. Petals absent. Male flowers: Calyx 5-fid or 5- (rarely 4-) partite, imbricate. Disk-glands 5, alternating with the filaments, large and fleshy, often contiguous. Stamens 5 (rarely reduced to 4), opposite the calyx-lobes; filaments free; anthers erect; cells parallel, contiguous or distinct, dehiscing longitudinally. Rudimentary ovary columnar or obconic, fleshy, usually hairy. Female flowers: Calyx as in the male. Disk hypogynous, cupular, clasping the base of the ovary, entire and often ciliolate. Ovary 2–4-celled; styles short, small, bifid, slightly recurved, glabrous; ovules 2 in each cell. Fruits subglobose or ellipsoid, loculicidal, mostly 1-seeded by abortion; pericarp thin and membranous. Seeds (where known) ellipsoid; testa thin; cotyledons green, broad and flat; albumen scanty.—Trees or shrubs, rarely climbers. Leaves alternate, petiolate, entire or repand-dentate or denticulate, penninerved. Stipules usually deciduous, subulate or falcate. Flowers racemose or subspicate, axillary or produced in clusters on the old wood, each flower subtended by a solitary bract.

Species about 12, endemic.

Stipules foliaceous, falcate, persistent or subpersistent.
- Leaves obscurely setulose-denticulate, midrib and lateral nerves setulose below; stipules about 7 lin. long and 4 lin. broad . . . . . 1. *M. Dusenii.*
- Leaves distinctly repand-denticulate, teeth without setæ, midrib and lateral nerves glabrous below; stipules about 3 lin. long and $1\frac{1}{2}$ lin. broad . . 2. *M. bertramiana.*

Stipules small, neither foliaceous nor falcate, soon falling off.

Inflorescences axillary, produced on or towards the base of the young leafy branchlets.

Leaves distinctly repand-denticulate or dentate.

Ovary glabrous.
- Petioles rather stout, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, not pulvinate at the apex; infructescence slender, 3–4 in. long, bearing numerous fruits . 3. *M. floribunda.*
- Petioles slender, 1–2 in. long, slightly pulvinate at the apex; infructescence $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, bearing not more than about 15 fruits . 4. *M. sparsiflora.*

Ovary setulose or densely pilose below.
- Leaves setulose or pilose on the midrib and lateral nerves below; ovary densely pilose . 10. *M. Barteri.*
- Leaves almost glabrous on the midrib and lateral nerves below; ovary sparingly setulose . 5. *M. hirtella.*

Leaves entire.
- Ovary glabrous . . . . . 6. *M. pauciflora.*
- Ovary tomentose or sparingly setulose.
  - Leaves elliptic or obovate-elliptic; ovary densely white-tomentose . . . . . 7. *M. bipindensis.*
  - Leaves oblong; ovary sparingly setulose . . 8. *M. oblonga.*

Inflorescences produced in fascicles on the old wood of the stem or on the old leafless branches of several years' growth.

Leaves distinctly pilose or setose on the upper surface; ovary glabrous . . . . . 9. *M. Staudtii.*
Leaves glabrous above (except on the midrib); ovary tomentose or setulose.
Leaves distinctly repand-denticulate or dentate, or if subentire then pilose below . . . 10. *M. Barteri.*
Leaves entire, glabrous on both surfaces.
Axis of the male inflorescence and sepals densely puberulous . . . . . 11. *M. griffoniana.*
Axis of the male inflorescence and sepals glabrous 12. *M. longipes.*

1. **M. Dusenii,** *Hutchinson.* A tree or shrub; branchlets pilose, often more or less quadrangular when young. Leaves elliptic or oblong-elliptic, caudate-acuminate at the apex, slightly rounded at the base, $3\frac{1}{2}$–9 in. long, $1\frac{3}{4}$–4 in. broad, with a remotely setulose-denticulate margin, somewhat rigidly membranous, glabrous on both sides except the pilose midrib and lateral nerves below; lateral nerves 6–8 on each side, looped and branched near the margin, slightly prominent on the lower surface; tertiary nerves subparallel or branched, distinct below; petiole $\frac{3}{4}$–$3\frac{1}{2}$ in. long, rather slender, setulose; stipules foliaceous, broadly falcate, 7 lin. long, 4 lin. broad, glabrous on one side, setulose and with a strong nerve near the concave margin on the other side. Male racemes produced in dense clusters on the old wood (trunk?), about $2\frac{1}{2}$ in. long; axis deeply grooved, minutely puberulous; bracts very minute. Male flowers seen only in very young bud, glabrous. Female racemes produced on the old wood, about 6 in. long; axis sulcate, minutely and sparingly puberulous; bracts minute, pubescent; pedicels $\frac{1}{2}$ lin. long, at length reflexed, glabrous. Calyx 5-lobed; lobes truncate or rounded at the apex, glabrous. Disk cupular, enclosing about $\frac{1}{3}$ of the ovary, ciliate. Ovary 3-celled, ovoid, glabrous; stigmas 3, rounded, sessile, minutely bifid. Fruits (immature) obovoid, contracted and somewhat acute at the base, 5 lin. long, 3 lin. in diam., purplish-red when dry, glabrous.—*Staphysora Dusenii*, Pax in Engl. Jahrb. xxiii. 521. *S. klaineana*, Pierre in Bull. Soc. Linn. Paris, ii. 1233, name only.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1849! 2243! 2243A! 2379! 3364! 3450! 3553! and without precise locality, *Dusén.*

Lower Guinea. Spanish Guinea: Alen, *Tessmann*, 18! Gaboon: in the neighbourhood of Libreville, *Klaine*, 98! 198! 1034! 1134! 1325! 1343! 3085! 6405! *Jolly*, 70!

2. **M. bertramiana,** *Büttner in Verhandl. Bot. Ver. Brandenb.* xxxi. 93. A shrub; young branchlets very sparingly puberulous. Leaves oblong-elliptic or obovate-lanceolate, rather abruptly acuminate, subcuneate at the base, 4–$5\frac{1}{2}$ in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ in. broad, margin remotely but distinctly denticulate, rather rigidly membranous, glabrous on both surfaces; lateral nerves 6–8 on each side, looped and branched towards the margin, prominent on the lower surface; tertiary nerves few and distant, branched; veins and veinlets scarcely visible; petiole $\frac{1}{2}$–1 in. long, sparingly setulose when young, at length glabrous; stipules conspicuous, at length deciduous, falcate, the concave margin encircling the

branchlet, 3 lin. long, 1½ lin. broad, with a strong pubescent nerve parallel to the concave margin. Male flowers not known. Female racemes axillary on the leafy shoots, solitary, 1½ in. long at the time of flowering; axis puberulous; bracts minute, triangular, acute, densely pubescent; pedicels very short. Calyx-lobes 5, broadly ovate, obtuse, ciliate, otherwise almost glabrous. Disk annular, short, minutely ciliolate. Ovary ovoid, 2-celled, glabrous; styles very short, bifid, spreading. Fruits (immature) ellipsoid, 3 lin. long, 2 lin. broad, glabrous, covered with a glaucous bloom like that of a grape; pedicels 1 lin. long, puberulous.—*M. Sapini*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 268 (from description). *M. Sapini*, var. *brevipetiolata*, De Wild. l.c. 269. *Staphysora Sapini*, De Wild. l.c., name only.

South Central. Belgian Congo: Muene-Putu-Kassongo, *Büttner*, 259! valley of the Dyuma River? *Gentil.* Madibi, Kwibu, Kasai, Bangala, and Dima, *Sapin.*

3. **M. floribunda,** *Benth. in Hook. Ic. Pl.* xiii. 75, *t.* 1296. Branchlets terete, at first when quite young sparingly setulose-pubescent, very soon becoming entirely glabrous. Leaves elliptic or slightly oblong-elliptic, shortly and rather abruptly acuminate, rounded or very rarely subcuneate at the base, 3–6 in. long, 2–3¼ in. broad, membranous when young, thinly chartaceous when older, the margin remotely repand-denticulate, glabrous on both surfaces; lateral nerves 6–9 on each side, looped and anastomosing near the margin, prominent below; tertiary nerves distinct, distant, subparallel; veins lax, scarcely conspicuous; petiole ½–1¼ in. long, rather stout, sparingly pilose along the groove on the upper side, otherwise glabrous; stipules subulate, about 2 lin. long, setulose-pubescent, subpersistent. Male racemes crowded in the leaf-axils, about 2 in. long; axis almost glabrous or very sparingly puberulous; bracts small, triangular, acute. Calyx 5–6-lobed; lobes ovate, obtuse, ½ lin. long, glabrous. Disk-glands large, fleshy, sparingly pilose or almost glabrous. Stamens 5–6; filaments quite free, glabrous; anther-cells parallel. Rudimentary ovary almost equalling the filaments, subentire, slightly pubescent. Female racemes solitary or geminate in each leaf-axil, about 3 in. long; bracts acute; pedicels in the fruiting stage about 1 lin. long. Calyx-lobes ovate or obliquely ovate, obtuse, strongly imbricate, glabrous. Disk cupular, short, sparingly ciliolate. Ovary ovoid, glabrous; styles 2, very short, bilobed, glabrous, the lobes a little recurved. Infructescences slender, 3–4 in. long, bearing many fruits. Fruits purple, ovoid or ovoid-globose, 3 lin. long, 2 lin. in diam., tipped by the persistent styles, glabrous and slightly glaucous.—*Antidesma Schweinfurthii,* Pax in Engl. Jahrb. xv. 530.

South Central. Belgian Congo: Niamniam; by the Assika River, *Schweinfurth,* 3124! 3322! Monbuttu: Munza, *Schweinfurth,* 3472!

4. **M. sparsiflora,** *Hutchinson.* A climbing shrub or small tree; young branchlets sparingly setulose, older ones glabrous. Leaves elliptic or oblong-elliptic, rather acutely and somewhat abruptly acuminate, rounded at the base or rarely slightly cuneate, very variable in size,

3–8 in. long, $1\frac{1}{4}$–$3\frac{1}{2}$ in. broad, membranous, margin distinctly repand-denticulate, glabrous on both surfaces except on the sparingly setulose midrib and lateral nerves below; lateral nerves 6–8 on each side, looped near the margin, prominent on the lower surface; tertiary nerves distinct, somewhat distant, subparallel or branched; veins slender, slightly conspicuous below; petiole 1–2 in. long, rather slender, slightly swollen at the apex, more or less setulose-pubescent, at length glabrous or nearly so; stipules subulate as in *M. floribunda*, but very soon deciduous and not at all persistent. Male racemes solitary when borne in the leaf-axils of the young shoots, two or three in a cluster when produced in the axils of the lower leaves, 1–$1\frac{1}{2}$ in. long when young, at length elongating to 3 in.; axis rather shortly pubescent when young, becoming nearly glabrous when older; bracts ovate, subacute, slightly pubescent; pedicels scarcely $\frac{1}{2}$ lin. long. Calyx-lobes 4–5, ovate, slightly pubescent or glabrous at maturity. Stamens 4–5, when 4, then one of the filaments much thicker than the others. Disk-glands large and fleshy, contiguous, more or less pubescent. Rudimentary ovary columnar, terete, pubescent. Female inflorescences subsolitary or few together on the second-year wood; bracts, pedicels and calyx as in the male. Disk cupular, short, very shortly ciliolate, otherwise glabrous. Ovary oblong-ellipsoid, glabrous; styles 2, very short, bifid, the lobes recurved. Infructescences $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, bearing not more than 15 fruits. Fruits ellipsoid, 4 lin. long, 3 lin. in diam., covered with a fine glaucous bloom. Mature seeds not seen.—*Baccaurea sparsiflora*, Scott-Elliot in Journ. Linn. Soc. xxx. 97. *B. Bonnetii*, *B. longispicata*, *B. Gagnepainii*, *B. Poissonii*, *B. Glaziovii*, and *B. Caillei*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 58–61. *B. cavalliensis*, Beille, l.c. lvi. Mém. viii. 121.

Upper Guinea. French Guinea: Fouta Jallon; Kouria, *Caille*, 14770! 14699! 14846! between the Santa River and Timbo, *Chevalier*, 12607! 12820! Sierra Leone: various localities, *Scott-Elliot*, 4035! 4543! 4746! 5311! 5813! Ivory Coast: Bingerville, *Chevalier*, 15227! 15229! 15232! 15418! 15511! 15512! Prolo, *Chevalier*, 19872! between Grabo and Tate, *Chevalier*, 19759! Gold Coast: Aburi, *Johnson*, 1067!

5. **M. hirtella,** *Pax in Engl. Jahrb.* xxviii. 21. A shrub 10–14 ft. high. Leaves oblong, acuminate, acute at the base, about $4\frac{1}{2}$ in. long and 2–$2\frac{1}{2}$ in. broad, coriaceous, glabrous below except the minute marginal teeth; petiole $1\frac{1}{4}$ in. long; setulose; stipules setaceous, pubescent, deciduous. Flowers of both sexes racemose; racemes axillary, females $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, males somewhat longer. Male flowers: Calyx-lobes 5, ovate. Stamens 5. Disk-glands filiform. Rudimentary ovary depressed, hirtellous. Female flowers: Calyx-lobes ovate. Disk shortly urceolate. Ovary 2-celled; styles 2, erect, short, undivided. Fruits (immature) 1-seeded, ellipsoid, 3 lin. long, sparingly setulose.—De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 836, and Reliq. Dewevr. 206; De Wild. Miss. É. Laurent, 127, and Études Fl. Bas- et Moyen-Congo, i. 275, ii. 268.

Lower Guinea. Lower Congo: various localities, *Butaye*, *Gillet*, 1478, 1678, 1970, 2037, 2123, 2300, *Oddon*.

South Central. Belgian Congo: Dyuma Valley, *Gentil*, *Gillet*, 2799, 2819;

Eala, *Pynaert*, 41, 562, 1304, 1453, *Laurent*, 74; Sanda, *Gillet*, 3618; Bikou, *Pynaert*, 321; Lulonga, *Pynaert*, 743; Bokakata, *Dewèvre*, 763; Coquilhatville, *Dewèvre*, 632; Kasai River region, *Sapin!*

I have not seen a good example of this species, but from the description it appears to be very near *M. sparsiflora*. Pax describes the disk-glands of the male flowers as filiform, but as they are always rounded in the other species I am very doubtful if this is correct.

6. **M. pauciflora,** *Pax in Engl. Jahrb.* xxxiii. 281. A shrub; branchlets terete, glabrous. Leaves obovate or elliptic, more or less caudate-acuminate, acute or subacute at the base, $2\frac{1}{2}$–7 in. long, $1\frac{1}{4}$–3 in. broad, margin entire, papery, glabrous on both surfaces; lateral nerves 5–6 on each side, distinctly looped near the margin, often slightly impressed above, prominent below; tertiary nerves reticulate, lax, distinct; petiole $\frac{1}{3}$–1 in. long, subterete, glabrous; stipules not seen. Male racemes solitary, about 1 in. long; axis somewhat flattened, glabrous; bracts minute. Flowers pedicellate, usually in distant clusters on the axis. Calyx 5-partite; lobes rounded, minutely ciliolate. Stamens 5. Disk-glands large and fleshy, subglabrous. Rudimentary ovary fleshy. Female flowers: Calyx-lobes oblong, submembranous, glabrous. Disk pubescent. Ovary 2-celled, glabrous. Fruit (immature) ellipsoid, 4 lin. long, $2\frac{1}{2}$ lin. in diam., glabrous.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1771! 2746! 2952! 3321! 3709!

Lower Guinea. Spanish Guinea: Mount John, on the Kongui River, *Mann*, 1786!

South Central. Lunda: Mukenge, *Pogge*, 1418!

Schmidelia oblongifolia, Baker in Oliv. Fl. Trop. Afr. i. 424, described from a specimen collected by Mann (1703) on the Sierra del Crystal, Gaboon, is probably a species of *Mæsobotrya* and closely allied to the above. As the specimen is too incomplete, however, only leaves and male flowers being present, it does not seem advisable to include it.

7. **M. bipindensis,** *Hutchinson.* A large shrub, 12–15 ft. high; branchlets terete, glabrous. Leaves elliptic or obovate-elliptic, abruptly acuminate, cuneate at the base, 3–8 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, papery or very thinly coriaceous, glabrous on both surfaces; lateral nerves 4–5 on each side, looped and branched towards the margin, slightly impressed on the upper surface, prominent on the lower; tertiary nerves and veins forming a very lax network; petiole slender, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, glabrous; stipules small, triangular, very soon falling off. Male racemes in axillary clusters, 3–6 in each cluster, up to 3 in. long; axis slender, somewhat flattened, very minutely puberulous; bracts very minute, puberulous; pedicels slender, up to $1\frac{1}{2}$ lin. long, glabrous. Calyx 5-partite; lobes ovate-rounded, minutely ciliolate in the upper half, otherwise glabrous. Stamens 5; filaments glabrous. Disk-glands fleshy, pilose. Rudimentary ovary oblong, pilose. Female racemes solitary or subsolitary, somewhat shorter than the males; pedicels shorter and stouter than in the male. Calyx-lobes broadly ovate, rounded at the apex, sparingly puberulous on the back. Disk annular, short, puberulous in the upper part. Ovary

3-celled, ovoid, densely white-tomentose. Styles 3, linear, undivided, glabrous. Fruits (immature) ellipsoid, about 3 lin. long, $1\frac{1}{2}$ lin. in diam., sparingly adpressed-pubescent. Pedicels in the fruiting stage reflexed, minutely puberulous.—*Baccaurea bipindensis*, Pax in Engl. Jahrb. xxxiv. 368. *Mareya micrantha*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 285, not of Müll. Arg., nor of Pax in De Wild. & Durand, Reliq. Dewevr. 213.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1878! 2598! 3010!
South Central. Belgian Congo: Lusambo, *Laurent!*

8. **M. oblonga,** *Hutchinson.* Branchlets sparingly hirsute when young, terete. Leaves oblong, somewhat acutely triangular-acuminate, slightly rounded or subcuneate at the base, $2\frac{1}{2}$–$5\frac{1}{2}$ in. long, 1–$1\frac{3}{4}$ in. broad, rigidly membranous, margin entire, glabrous on both surfaces; lateral nerves 8–10 on each side, distinctly looped a little distance from the margin, prominent only on the lower surface; tertiary nerves lax and branched; petiole 2–4 lin. long, sparingly hirsute; stipules lanceolate-subulate, about 1 lin. long, soon falling off. Male flowers not known. Female racemes solitary and axillary on the young leafy branchlets, $3\frac{1}{2}$–5 in. long; axis rather densely puberulous; bracts linear, pubescent, $\frac{1}{2}$ lin. long; pedicels scarcely 1 lin. long, puberulous. Calyx-lobes 3 or more rarely 4, ovate, rounded at the apex, ciliate and sparingly pubescent. Disk annular, densely ciliate. Ovary obliquely ovoid, very sparingly setulose or almost glabrous; styles 3, very short, deeply bifid, glabrous.

Upper Guinea. Liberia: within 20 miles of Kakatown, *Whyte!*

9. **M. Staudtii,** *Hutchinson.* A tree; branchlets hispid. Leaves elliptic or slightly obovate-elliptic, slightly acuminate, rounded or only very slightly narrowed to the base, $4\frac{1}{2}$–$5\frac{1}{2}$ in. long, about $2\frac{1}{2}$ in. broad, membranous, hispidulous on both surfaces; lateral nerves 7–9 on each side, faintly looped and reticulate towards the margin, slightly conspicuous on the lower surface; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, slightly sulcate, hispid with yellowish-brown hairs; stipules small, subulate. Male inflorescences simple or subsimple, crowded on the older wood at the base of the young shoots; bracts ovate, densely pubescent; pedicels very short. Calyx-lobes 5, ovate, obtuse, ciliate. Disk-glands large and fleshy, contiguous, densely pubescent. Stamens 5; anther-cells distinct. Rudimentary ovary columnar, very hairy. Female racemes in clusters, arising from the old wood, up to $3\frac{1}{2}$ in. long; axis rather densely puberulous, somewhat stout; bracts ovate-triangular, acute, pubescent; pedicels scarcely 1 lin. long, glabrous. Calyx 5-partite; segments ovate-triangular, sparingly ciliolate. Disk somewhat fleshy, cupular and enclosing about half of the glabrous ovary, sparingly pubescent on both sides.—*Baccaurea Staudtii*, Pax in Engl. Jahrb. xxiii. 521; De Wild. & Durand, Reliq. Dewevr. 205.

Upper Guinea. Cameroons: Lolodorf, *Staudt*, 333! Abonando, *Rudatis*, 63!

Lower Guinea. Gaboon, *Klaine*, 1177! Lower Congo: Shinganga, *Dewèvre*, 264.

South Central. Belgian Congo: Upper Congo; Oukounou, *Dewèvre*, 1083.

10. **M. Barteri,** *Hutchinson*. A shrub or small tree 8–25 ft. high, with hard wood (*Millen*); young branchlets yellowish-brown pubescent, almost glabrous when older. Leaves elliptic, oblong-elliptic or obovate, acutely cuspidate-acuminate, rounded at the base, $2\frac{1}{2}$–9 in. long, $1\frac{1}{4}$–$4\frac{1}{4}$ in. broad, membranous or papery, margin repand-denticulate or dentate, glabrous above (except on the midrib), sparingly and shortly pubescent below, midrib setulose; lateral nerves 6–9 on each side, looped and reticulate near the margin, slightly impressed above, prominent and setulose below; tertiary nerves usually inconspicuous above, subparallel; veins lax; petiole $\frac{3}{4}$–$2\frac{1}{2}$ in. long, somewhat slender, terete, more or less densely brown-pubescent; stipules subulate, entire, nearly 2 lin. long, pubescent. Male racemes in clusters, usually arising from the older wood of the branchlets or branches, 1–$2\frac{1}{2}$ in. long; axis tomentellous; bracts conspicuous, ovate, acute, pubescent; pedicels short. Flower when expanded scarcely over 1 lin. in diam. Calyx 4–5-partite; lobes oblong-ovate, obtuse, sparingly pubescent. Disk-glands large, fleshy, sparingly pilose. Stamens 4–5; filaments glabrous. Rudimentary ovary columnar, long-pilose. Female racemes arising in dense clusters from the old wood, about 2 in. long at the time of flowering; axis tomentose. Flowers solitary or subsolitary in the axil of each bract; bracts triangular, acute, sparingly pubescent. Calyx 5–6-partite; lobes ovate, obtuse, glabrous or nearly so. Disk shortly cupular, ciliolate. Ovary ovoid, densely pilose; styles bipartite, segments very short. Fruiting racemes up to 4 in. long; pedicels about 1 lin. long. Fruits ellipsoid, tipped by the short persistent styles, about 4 lin. long and $2\frac{1}{2}$ lin. in diam., puberulous. Seeds about 3 lin. long; testa bright red and membranous.—*Pierardia Barteri*, Baill. Adansonia, iv. 137. *Baccaurea Barteri*, Müll. Arg. in DC. Prodr. xv. ii. 464.

Upper Guinea. Lagos: various localities, *Millen*, 41! 92! 153! 174! 220! *Barter*, 3289! 3296! Southern Nigeria: Old Calabar, *Mann*, 2299! 2300! Cameroons: Bipinde, *Zenker*, 1115! 1400! 1603! 1776! 2255! *Preuss*, 1336! 1342!

Lower Guinea. Spanish Guinea: Corisco Bay, *Mann*, 1846!

Schmidelia? reflexa, Baker in Oliv. Fl. Trop. Afr. i. 425, described from a specimen collected by Mann (1742) at Corisco Bay, is evidently a *Mæsobotrya*, and may be a large-leaved form of this species.

11. **M. griffoniana,** *Pierre MSS.* A large shrub or tree 9–20 ft. high; branches subterete with greyish bark; branchlets terete, glabrous. Leaves oblong-elliptic or slightly obovate-elliptic, caudate-acuminate, very slightly rounded or subcuneate at the base, 3–6 in. long, $1\frac{1}{4}$–3 in. broad, rigidly membranous or somewhat papery, margin distinctly recurved, entire, glabrous and very slightly shining on both surfaces; lateral nerves 6–8 on each side, prominent on the lower surface, distinctly

looped and reticulate near the margin; tertiary nerves and veins lax, scarcely conspicuous; petiole $\frac{3}{4}$–2 in. long, channelled above, slightly wrinkled at the apex; stipules subulate, acute, subterete, glabrous. Male racemes clustered, arising from the old wood, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long; axis grooved, puberulous; flowers in fascicles; pedicels slender, about $\frac{1}{2}$ lin. long, puberulous; bracts ovate, pubescent. Calyx deeply 5–6-partite; lobes ovate, subacute, pubescent and ciliolate. Disk-glands large and fleshy, transversely ellipsoid, shortly pubescent. Stamens 5–6; filaments glabrous. Rudimentary ovary equalling the stamens, subpeltate, shortly pubescent. Female racemes clustered, 9–20 in each cluster, arising from the older wood, $2\frac{1}{2}$–4 in. long; axis somewhat sulcate, densely puberulous or tomentellous; bracts minute; pedicels about $\frac{1}{2}$ lin. long, tomentellous. Calyx as in the male. Disk shortly cupular, surrounding the base of the ovary, ciliolate. Ovary tomentose; styles bipartite, recurved, acute, subglabrous. Fruits ovoid-globose, 4–5 lin. in diam., reddish-brown when dry, very sparingly pubescent, 2–4-celled. Seeds usually solitary.—*Pierardia griffoniana*, Baill. Adansonia, iv. 136. *Baccaurea griffoniana*, Müll. Arg. in DC. Prodr. xv. ii. 464.

Lower Guinea. Gaboon: *Klaine*, 545! 1267! 1268! *Griffon du Bellay*, 126.

12. **M. longipes,** *Hutchinson.* A shrub or small tree 7–12 ft. high; branchlets terete, glabrous; bark grey. Leaves lanceolate or oblong-lanceolate, acutely acuminate, acute at the base, 4–10 in. long, 1–$2\frac{1}{2}$ in. broad, entire, firmly membranous, glabrous and dull on both surfaces; lateral nerves 8–10 on each side, reticulate and faintly looped near the margin, slightly prominent on the lower surface only; tertiary nerves distant, subparallel, faint; veins scarcely visible; petiole 1–2 in. long, with a broad shallow groove on the upper side, glabrous; stipules lanceolate-subulate, setulose in a young state, soon falling off. Male racemes about $2\frac{1}{2}$ in. long; axis rather stout, sulcate, glabrous; bracts small, ovate, acute, glabrous; pedicels about $\frac{1}{2}$ lin. long, glabrous. Calyx-lobes 5, oblong-elliptic, obtuse, $\frac{3}{4}$ lin. long, scarcely $\frac{1}{2}$ lin. broad, quite glabrous and not ciliate. Disk-glands 5, contiguous, pubescent. Stamens 5; filaments at length long and exceeding the sepals; anther-cells parallel. Rudimentary ovary columnar or subobconic, entire, pubescent. Female racemes lax, apparently arising from the old wood, about $2\frac{1}{2}$ in. long when in fruit; axis slightly flattened and grooved, very minutely puberulous; bracts about half the length of the pedicels, subulate; pedicels $\frac{1}{2}$ lin. long, sparingly puberulous. Calyx-lobes 5, strongly imbricate, triangular, subacute, $\frac{1}{2}$ lin. long, minutely ciliolate. Disk shortly cupular, ciliate. Ovary 2-celled, ovoid, sparingly setulose; styles 2, very short, minutely bifid, sparingly setulose. Fruits with a pedicel 1 lin. long, ellipsoid or obliquely ellipsoid, 3 lin. long, 2 lin. in diam., glabrous except for a very few setulose hairs towards the base, brownish-red when dry.—*Antidesma longipes*, Pax in Engl. Jahrb. xv. 529, not of Hook. f.

Lower Guinea. Gaboon: Munda district; Sibange Farm, *Soyaux*, 264! 400!

28. **PSEUDOLACHNOSTYLIS,** Pax in Engl. Jahrb. xxviii. 19.

Flowers dicœcious. Petals absent. Male flower: Sepals 5, imbricate. Disk annular, glabrous. Stamens 5; filaments connate into a column for about half their length; anther-cells parallel, slightly unequal, introrse, dehiscing longitudinally. Rudimentary ovary in the middle of the staminal column, often divided. Female flower: Calyx as in the male. Disk annular, closely embracing the base of the ovary, often irregularly toothed. Ovary 3-celled; styles 3, diverging, very slightly connate at the base, bilobed; ovules 2 in each cell. Capsule globose or depressed-globose, entire, tardily septicidal; endocarp thick and bony. Seeds solitary in each cell, ellipsoid, strophiolate; albumen fleshy; cotyledons flat and broad.—Trees or shrubs. Leaves alternate, petiolate, simple. Male flowers in axillary few-flowered pedunculate cymes surrounded by membranous bracts. Female flowers axillary, solitary or subsolitary.

Species 4, endemic.

Fruits ellipsoid or ovoid; young shoots and leaves glabrous, the latter glaucous below . . .	1. *P. glauca.*
Fruits more or less globose or depressed-globose; young shoots and leaves more or less hairy (glabrous in 2, *P. Bussei*).	
Leaves glabrous on both surfaces; young shoots glabrous; pedicels glabrous (at least when in fruit)	2. *P. Bussei.*
Leaves hairy on both surfaces or only on the midrib; young shoots and inflorescence hairy.	
Leaves hairy only on the midrib below . .	3. *P. maprouneæfolia.*
Leaves hairy over all the lower surface . .	4. *P. Dekindtii.*

1. **P. glauca,** *Hutchinson.* A tree 12–60 ft. high; trunk straight, about 2 ft. in diam., bare of branches for a long distance below; head widely spreading, leafy; branches subterete, very slightly angular, with grey bark; branchlets spreading or suberect, rather slender, obtusely angular, sulcate, leafy. Leaves elliptic or oblong-elliptic, rounded, emarginate or obtusely pointed at the apex, unequal and slightly narrowed or rounded at the base, 1–3½ in. long, ½–1¾ in. broad, coriaceous, very deep green above, highly glaucous beneath, glabrous on both surfaces; lateral nerves 6–8 on each side, very slender and inconspicuous; petiole rather slender, 3–6 lin. long, glabrous; stipules lanceolate, about 1 lin. long, slightly pubescent towards the apex, caducous. Male flowers in axillary pedunculate cymes on short lateral leafy branchlets; peduncle ¼–½ in. long, swollen towards the apex, glabrous; flowers in each cyme subsessile or very shortly pedicellate; bracts acuminate from a broad base, 1¼ lin. long, shortly ciliate, otherwise glabrous. Sepals 5, ovate, very obtuse or rounded at the apex, 1½ lin. long, ¾–1 lin. broad, entire, slightly coriaceous, glabrous. Disk fleshy, annular, wrinkled or a little cut up, glabrous. Staminal column glabrous, about ½ lin. long; filaments free at the top; anthers ½ lin. long, glabrous. Rudimentary ovary small, subentire or slightly

trifid, glabrous. Young female flowers not seen. Fruits tardily ? septicidal, ovoid or ellipsoid, $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. thick, 3-celled; pericarp coarsely wrinkled when dry, glabrous and shining; endocarp horny, about $\frac{1}{2}$ lin. thick. Seeds ellipsoid, about 4 lin. long, 2 lin. thick; testa shining.—*Cleistanthus ? glaucus*, Hiern in Cat. Afr. Pl. Welw. i. 955. *Pseudolachnostylis Dekindtii*, Pax, var. (?) *glabra*, Pax in Engl. Jahrb. lxiii. 75. *P. Verdickii*, De Wild. Études Fl. Katanga, 205, from description.

Lower Guinea. Angola: Pungo Andongo; near Luxillo and Pedras de Guinga, *Welwitsch*, 1235! Golungo Alto; between Camilungo and Quitara, *Welwitsch*, 1244! Malange district, *Gossweiler*, 958! 964! 967! 979! Benguela, *Dekindt*, 849.

South Central. Belgian Congo: Lukafu, *Verdick*, 33.

Mozamb. Distr. German East Africa: Ukami; Morogoro, *Holtz*, 1788!

2. **P. Bussei,** *Pax MSS.* Branches terete, slightly sulcate; bark brown, glabrous; ultimate branchlets rather slender, glabrous. Leaves ovate-oblong or ovate-elliptic, rounded at both ends, $1\frac{1}{2}$–4 in. long, 1–$2\frac{3}{4}$ in. broad, chartaceous or thinly coriaceous, quite glabrous on both surfaces; lateral nerves 6–7 on each side, prominent on the lower surface, branched towards the margin; tertiary nerves rather distant, distinct below; veins somewhat faint and rather close; petiole 2 lin. long, somewhat fleshy and wrinkled, quite glabrous; stipules deciduous. Flowers not known. Fruits depressed-globose, $\frac{3}{4}$ in. in diam.; pericarp thin, coarsely wrinkled when dry, yellow-drab, glabrous; mesocarp thick, crustaceous or almost fibrous; endocarp hard and bony, yellow, about $\frac{1}{3}$ lin. thick. Seeds ellipsoid, about 3 lin. long and 2 lin. broad; testa thin and shining.

Mozamb. Distr. German East Africa: Mandera, *Sacleux*, 925! Dar-es-Salaam, *Holtz*, 1120! *Stuhlmann*, 39! Kilimatinde, *Holtz*, 1450! and without precise locality, *Busse*, 2807!

3. **P. maprouneæfolia,** *Pax in Engl. Jahrb.* xxviii. 20. A shrub or small tree; branchlets terete, tomentose when young, becoming glabrous. Leaves ovate or ovate-elliptic, rounded or very slightly and obtusely pointed at the apex, rounded or slightly cuneate at the base, $1\frac{1}{2}$–3 in. long, 1–$1\frac{1}{2}$ in. broad, slightly coriaceous, glabrous on both surfaces except on the lower half of the midrib, which is more or less densely pubescent below; lateral nerves 6–7 on each side, looped, slightly prominent on the lower surface; petiole 3–5 lin. long, slightly wrinkled, brownish-pubescent; stipules deciduous. Male flowers in axillary pedunculate cymes; peduncle 2–3 lin. long, more or less densely pubescent; flowers clustered, subsessile; bracts ovate or oblong, pubescent. Sepals 5, ovate, obtuse, $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, pubescent outside, glabrous within. Disk annular, slightly wrinkled. Stamens as in *P. Dekindtii*. Rudimentary ovary very small. Female flowers solitary; peduncle up to 3 lin. long, pubescent. Sepals oblong-lanceolate, obtuse, $2\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, distinctly 5–6-nerved on the outside, pubescent. Disk cupular, toothed, glabrous. Ovary densely brown-villous; styles 3, connate at the base, lobed, glabrous,

lobes rather thick. Fruit globose, $\frac{3}{4}$ in. in diam.; pericarp about $\frac{1}{4}$ lin. thick, coarsely wrinkled when dry, yellow-drab; endocarp bony and very hard, yellow, nearly $\frac{1}{2}$ lin. thick. Seeds ellipsoid, shining, with a yellowish strophiole at the base, longitudinally striate, $3\frac{1}{2}$ lin. long, $2\frac{1}{4}$ lin. broad.

Mozamb. Distr. German East Africa: Salanda, *Fischer*, 287! Usambiro, *Stuhlmann*, 853! Portuguese East Africa: Gazaland; Lower Umswirizwi River, *Swynnerton*, 151! British Central Africa: Nyasaland; River Shire, *Kirk!* Mungazi, *Kirk!* Msolo, *Buchanan*, 269! and without precise locality, *Buchanan*, 227! 409! Tanganyika, *Scott-Elliot*, 8716! Rhodesia: Matoppo Hills, *Gibbs*, 276! *Rogers*, 5334! Victoria, *Monro*, 724! Bechuanaland: Palapye, *Passarge*, 90!

4. **P. Dekindtii,** *Pax in Engl. Jahrb.* xxviii. 20. A shrub or small tree 9–15 ft. high; young branchlets densely brown-pubescent or tomentose. Leaves lanceolate or oblong, slightly narrowed to an obtuse apex, rounded and slightly unequal at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{8}$ in. broad, thinly coriaceous, pilose with rather long scattered hairs on both surfaces, yellowish-green above when dry, rather browner below; lateral nerves 6–8 on each side, very faint on both surfaces; petiole 1–2 lin. long, tomentose; stipules somewhat oblanceolate or lanceolate, membranous, pubescent, deciduous, 2 lin. long. Male flowers in axillary pedunculate few-flowered clusters; peduncle 4–5 lin. long, tomentose; flowers subsessile in each cluster; bracts varying from ovate-lanceolate to subulate, nearly $1\frac{1}{2}$ lin. long, with a pubescent mid-rib on the back, membranous towards the margin. Sepals 5, ovate, obtuse, entire, $2\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, slightly coriaceous, glabrous inside, pubescent outside. Disk annular, fleshy, glabrous. Staminal column 1 lin. long, glabrous; filaments free for half their length; anthers 1 lin. long, glabrous. Rudimentary ovary tripartite; segments erect, slender, glabrous. Female flowers axillary, solitary, pedunculate, bibracteate at the base; peduncle about 2 lin. long, densely pubescent or tomentose; bracts resembling the stipules. Sepals as in the male. Disk annular, closely clasping the base of the ovary, fleshy, rather irregularly toothed, glabrous. Ovary depressed-globose, densely villous, 1 lin. in diam.; styles 3, slightly connate at the base, glabrous, bilobed, lobes diverging. Unripe fruits subglobose, with a few long scattered hairs, shining, pale yellow.—*Cleistanthus sp. nov.?* Hiern in Cat. Afr. Pl. Welw. i. 956. *Pseudolachnostylis maprouneæfolia*, Pax in Baum, Kunene-Samb. Exped. 285, not of Pax in Engl. Jahrb. xxviii. 20.

Lower Guinea. Angola: Huilla; forests of Morro de Lopollo, 5500 ft. *Welwitsch*, 1252! Benguella, *Dekindt*, 849! *Gossweiler*, 2014! at the Chitanda River, below Goudkopje, *Baum*, 154!

Mozamb. Distr. Rhodesia: Victoria Falls, *Allen*, 164! 166! *Rogers*, 5304! 15 miles north of Victoria Falls, *Seiner*, 113! Pemba, between Broken Hill and Livingstone, *Rogers*, 8563! Livingstone, *Rogers*, 7220! 7240!

29. **DRYPETES,** Vahl; Benth. et Hook. f. Gen. Pl. iii. 278.

Flowers diœcious. Petals absent. Male flowers: Buds often globose. Sepals 4 or 5, broad, imbricate, usually coriaceous. Stamens 3–∞, inserted around and at the base of a central flat concave or rarely cupular disk; filaments free; anthers erect, often large, cells parallel and dehiscing longitudinally. Rudimentary ovary not present or represented by a small conical production in the middle of the disk. Female flowers: Calyx as in the male. Disk hypogynous, annular or cupular. Ovary 1–4-celled; styles short or absent; stigmas thick, flattened, bifid or undivided and more or less reniform; ovules 2 in each cell. Fruits globose, ellipsoid or ovoid, indehiscent; pericarp thick, woody, 1–4-celled. Seeds solitary by abortion; albumen fleshy; embryo straight; cotyledons flat and broad.—Trees or shrubs; leaves alternate, coriaceous or chartaceous, entire or toothed; stipules caducous, rarely persistent. Male and female flowers fasciculate in the axils of the leaves, or produced on the older branches or the stem, usually pedicellate.

Over 70 species, chiefly in the Old-World Tropics, a few in the West Indies and South America.

Like Baillon, I have been unable to separate the Old-World genus *Cyclostemon*, Blume (1825), from the New-World *Drypetes*, Vahl (1807). J. Müller in De Candolle's Prodromus placed the former in the subtribe *Cyclostemoneæ*, calling the central body in the male flower a "disk," whilst the latter he placed in the subtribe *Securinegeæ*, with the central body in the male flower designated "rudimentary ovary." This central body in each so-called genus, however, is identical in form and structure, and is usually a flat fleshy, or more rarely cupular disk, with or mostly without a small concave production in the middle which, as pointed out by Baillon, could scarcely be looked upon as a rudimentary ovary. The stamens in the American species of *Drypetes* are mostly either the same or double the number of the sepals, but this is also the case in many of those from Africa, and this character, if used to re-establish the two genera, would produce quite ambiguous results. It might also be pointed out that an unnamed specimen of an apparently undescribed species, collected by *Glaziou* at Rio Janeiro, which, from the number of stamens and the locality, would be placed in *Drypetes*, although not the same, might easily be mistaken for *Cyclostemon Principum*, Müll. Arg., from the Cameroons.

As many species of *Drypetes* have a 1-celled ovary, *Sibangea*, Oliv., which was distinguished from *Cyclostemon* by this character, must therefore be also included.

Stipules laciniate, persistent or subpersistent.
- Stipules $\frac{1}{2}$–$\frac{3}{4}$ in. long; sepals of female 4 . . . 1. *D. laciniata.*
- Stipules about $\frac{1}{4}$ in. long; sepals of female 5 . . 2. *D. verrucosa.*

Stipules entire or rarely slightly toothed.
- Stipules large, imbricate, foliaceous, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$ in. broad . . . . . 3. *D. magnistipula.*

Stipules smaller, not imbricate, usually less than $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad.

*Flowers fasciculate in the leaf-axils of the young shoots.

†Leaves with entire or slightly undulate margins.

Stipules conspicuous, subpersistent, ovate or lanceolate, $\frac{1}{3}$–$\frac{3}{4}$ in. long.
- Stipules $\frac{3}{4}$ in. long . . . . . 4. *D. Mildbrædii.*

Stipules about $\frac{1}{3}$ in. long.
Leaves large, 7–14 in. long.
Flowers subsessile; sepals puberulous outside . . . . . 5. *D. glomerata.*
Flowers pedicellate; sepals glabrous outside . . . . . 6. *D. similis.*
Leaves smaller, 3–4 in. long . . . 7. *D. bipindensis.*
Stipules inconspicuous, deciduous.
Stamens 3–4.
Young branchlets glabrous.
Stamens 3; leaves 4–6 in. long.
Disk of the male flowers cupular; ovary 4-celled . . . . 8. *D. gabonensis.*
Disk of the male flowers nearly flat, thick and fleshy; ovary 1-celled . 9. *D. arborescens.*
Stamens 4; leaves $1\frac{1}{4}$–$2\frac{1}{2}$ in. long . 10. *D. Rowlandii.*
Young branchlets hairy.
Disk of the male flowers flat with a small conical production in the middle . 11. *D. Klainii.*
Disk of the male flowers cupular, undulately lobed, without a conical production in the middle.
Disk of the male flowers hairy on the inner side; leaves oblong or oblong-elliptic . . . . 12. *D. Paxii.*
Disk of the male flowers glabrous on the inner side; leaves elliptic or lanceolate-elliptic.
Leaves acute or cuneate at the base, finely reticulate on the lower surface, midrib much more prominent than the lateral nerves on the upper surface . 13. *D. leonensis.*
Leaves somewhat rounded or obtuse at the base, prominently reticulate on the lower surface, midrib only a little more prominent than the lateral nerves . . 14. *D. reticulata.*
Stamens 8–∞.
Male flowers pedicellate; young branchlets glabrous; sepals glabrescent or puberulous outside.
Leaves cuneate and acute at the base, 2–4 in. long . . . 15. *D. aframensis.*
Leaves obtuse and oblique at the base, $5\frac{1}{2}$–8 in. long . . . . 16. *D. glabra.*
Male flowers sessile or subsessile; young branchlets hairy; sepals yellow-tomentose outside . . . . 17. *D. Dinklagei.*
††Leaves more or less distinctly toothed.
Midrib of the leaf hairy below.
Leaves with a petiole 3–5 lin. long . . 18. *D. occidentalis.*
Leaves sessile . . . . . 19. *D. inæqualis.*
Midrib of the leaf glabrous below.
Male flowers subsessile . . . . 5. *D. glomerata.*

Male flowers with a pedicel 2 lin. long . 20. *D. Principum.*
**Flowers arising from the trunk or from the nodes of two-year-old branches which are devoid or almost devoid of leaves..
Stipules persistent or subpersistent, ovate-lanceolate or lanceolate, $\frac{1}{4}$–$\frac{3}{4}$ in. long.
Midrib and lateral nerves of the leaves glabrous below; stipules $\frac{1}{4}$ in. long, ovate-lanceolate, often toothed . . . . . 21. *D. stipularis.*
Midrib and lateral nerves of the leaves pubescent below; stipules $\frac{3}{4}$ in. long, foliaceous, lanceolate, entire . . . . . 4. *D. Mildbrædii.*
Stipules deciduous, small.
Leaves with entire or slightly undulate margins.
Leaves equal- or subequal-sided at the base . 22. *D. Henriquesii.*
Leaves unequal-sided at the base.
Flowers produced in the axils of the leaves of the young shoots or from the nodes of two-year-old branches.
Stamens 3.
Disk of the male flowers cupular; ovary 4-celled . . . . 8. *D. gabonensis.*
Disk of the male flowers thick and fleshy; ovary 1-celled . . . 9. *D. arborescens.*
Stamens 8 . . . . . 16. *D. glabra.*
Flowers produced on the old wood of several years' growth.
Leaves oblong-elliptic, caudate-acuminate, 4–6 in. long, 2–2$\frac{1}{2}$ in. broad; petiole glabrous . . . . 23. *D. Afzelii.*
Leaves elliptic or lanceolate-elliptic, gradually acuminate at the apex, 2–4 in. long, 1–2 in. broad; petiole pubescent 24. *D. usambarica.*
Leaves more or less distinctly toothed.
Sepals densely ciliate, pubescent outside . 20. *D. Principum.*
Sepals shortly ciliolate, glabrous or nearly so outside.
Flowers on more or less slender pedicels 2–6 lin. long.
Leaves rather small, 7 in. long or less.
Midrib of the leaf hairy below.
Ovary and fruit glabrous . . 25. *D. Preussii.*
Ovary and fruit hairy . . . 26. *D. pierreana.*
Midrib of the leaf glabrous below.
Leaves caudate-acuminate . . 27. *D. ugandensis.*
Leaves obtusely pointed, scarcely acuminate.
Leaves oblong or oblong-lanceolate, denticulate; pedicels of the male flowers very slender, 5–6 lin. long . . 28. *D. floribunda.*
Leaves ovate, dentate; pedicels of the male flowers stouter, 2–3 lin. long . . . 29. *D. ovata.*
Leaves very large, 12 in. long or more . 30. *D. Staudtii.*

Flowers sessile or subsessile.
Lateral nerves of the leaves elongated, running subparallel with the margin in their upper half . . . . . 31. *D. spinoso-dentata.*
Lateral nerves short, anastomosing freely some distance from the margin 32. *D. major.*

1. **D. laciniata,** *Hutchinson.* A shrub 9-12 ft. high; branchlets subterete, clothed with velvety pubescence, glabrescent when older. Leaves oblong or narrowly elliptic, acuminate or abnormally emarginate, somewhat rounded at the base, very unequal, one half of the blade produced 1–1½ lin. below the other, 4–7 in. long, 1¾–2½ in. broad, papery or slightly coriaceous, obscurely serrate in the upper third, otherwise entire, glabrous or nearly so on both surfaces excluding the nerves; midrib densely pubescent below; lateral nerves 7–8 on each side, impressed above, very prominent below, looped and branched a considerable distance from the margin; tertiary nerves and veins much branched, lax and prominent on the lower surface; petiole stout, about 2 lin. long, velvety-pubescent; stipules laciniate, including the segments ½–¾ in. long, pubescent; segments subulate or filiform, about 3 lin. long. Male flowers in small fascicles of about 10 in the axils of the leaves of the young branchlets; bracts subulate, nearly 1 lin. long, densely pubescent; pedicel 1 lin. long, sparingly pubescent. Sepals 5, 2 often more or less connate, rounded or very broadly ovate, brown-tomentose outside, adpressed-pubescent within, 1½ lin. long, strongly imbricate. Stamens 5; filaments glabrous, a little shorter than the sepals; anthers broad. Disk-glands transversely oblong, pilose towards the top on the inner face. Centre of the flower densely brown-setose. Female flowers in few-flowered fascicles arising from the older branchlets, subsessile. Sepals 4, rounded, about 2 lin. broad, tomentose. Disk very thick and leathery, 4-lobed; lobes opposite the sepals, ovate, rounded at the ends, long-pilose towards the base of the ovary. Young ovary not seen. Young fruit ovoid, 2-lobed, subcordate at the base, ½ in. long, 4 lin. broad, hispid.—*Cyclostemon laciniatus,* Pax in Engl. Jahrb. xxxiii. 278.

Upper Guinea. Cameroons: Bipinde, *Zenker,* 1068! 1879! 3570!

2. **D. verrucosa,** *Hutchinson.* A tree 50–65 ft. high; branchlets pubescent. Leaves oblong-elliptic or lanceolate-elliptic, shortly acuminate, rounded and unequal-sided at the base, 5–7 in. long, 2¼–3 in. broad, thinly chartaceous, spinulose-dentate, glabrous on both surfaces except on the pubescent midrib below, shining above, duller below; lateral nerves 6–8 on each side, spreading, looped and anastomosing freely some distance from the margin, slightly impressed above, prominent below; veins distinct on both sides, especially on the lower; petiole 2–3 lin. long, finely wrinkled, puberulous; stipules laciniate, about ¼ in. long, segments subulate. Male flowers not known. Female flowers produced in fascicles from the old wood; pedicel rather stout, ½–¾ in. long, sparingly puberulous, at length glabrescent. Sepals 5, suborbicular, coriaceous, glabrous on both surfaces, the margin minutely

ciliolate. Disk cupular, densely tomentose. Ovary tomentose; stigmas 3, flat, closely adpressed to the top of the ovary, reniform, about $1\frac{1}{2}$ lin. broad, their margins crenulate. Fruit ovoid, entire, nearly $1\frac{1}{2}$ in. long, a little over 1 in. in diam., pubescent; exocarp hard, nearly 2 lin. thick; endocarp bony, $\frac{3}{4}$ lin. thick, shining inside. Seeds as in *D. pierreana*.—*Cyclostemon verrucosus*, Pierre, Icon.

Lower Guinea. Gaboon: in the neighbourhood of Libreville, *Klaine*, 2382 2482! 2589!

3. **D. magnistipula,** *Hutchinson*. A shrub?; branchlets glabrous bark light grey, with numerous lenticels. Leaves elongate-obovate-oblong, acuminate, unequal and rounded on one side at the base, 12–14 in. long, $3\frac{1}{2}$–$4\frac{1}{2}$ in. broad, rigidly membranous, glabrous on both surfaces, margin subentire or obscurely and remotely serrate; lateral nerves 9–10 on each side, slightly oblique, reticulate towards the margin, fairly distinct below; tertiary nerves reticulate, lax; petiole 4–6 lin. long, glabrous and more or less wrinkled; stipules foliaceous, very large and imbricate, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$ in. broad, rigidly membranous, with a distinct midrib and lateral nerves, glabrous. Male flowers not seen. Female flowers produced on the woody branches, sessile, about 4 lin. in diam. Sepals 4, rounded-ovate, very obtuse, concave, yellowish. Disk annular, glabrous. Ovary tomentose; stigmas 2, reflexed, entire, thick, glabrous.—*Cyclostemon magnistipulus*, Pax in Engl. Jahrb. xliii. 76.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3367!

4. **D. Mildbrædii,** *Hutchinson*. A large shrub; branches subterete, glabrescent, covered with a light grey bark; young branchlets angular, puberulous. Leaves oblong or elliptic, abruptly acuminate, subcuneate and slightly unequal at the base, 4–8 in. long, $1\frac{1}{2}$–3 in. broad, chartaceous, glabrous on both surfaces except on the pubescent midrib and lateral nerves, dull or slightly shining, margin entire or minutely and remotely serrate; lateral nerves 6–8 on each side, spreading and anastomosing towards the margin, slightly impressed above, prominent below; veins rather close and prominent below; stipules large, foliaceous, lanceolate or oblong-lanceolate, $\frac{3}{4}$ in. long, 3–4 lin. broad, minutely puberulous; petiole 2–4 lin. long, densely puberulous. Flowers of both sexes produced on the two-year-old branchlets or towards the base of the young shoots; pedicels very short, about 1 lin. long, tomentellous. Male flowers: Sepals 4, suborbicular, 2 lin. in diam., ciliate, sparingly puberulous on both sides. Stamens about 10; filaments glabrous; anthers $\frac{3}{4}$ lin. long. Disk fleshy, slightly lobed; lobes protruding between the filaments, hairy in the middle. Female flowers: Sepals 4, a little larger than those of the male. Disk annular, thick, glabrous. Ovary subglobose, slightly bilobed, densely tomentose; stigmas flat and spreading, bifid, lobes crenulate.—*Cyclostemon Mildbrædii*, Pax in Engl. Jahrb. xliii. 318.

South Central. Belgian Congo: Niamniam; by the Yuru River, *Schweinfurth*, 3266! Ituri; Mokoko, *Mildbraed*, 2947! Kalonda, *Mildbraed*, 3033! Ihulu, *Mildbraed*, 2988! Kasanga, *Mildbraed*, 3090!

5. **D. glomerata,** *Hutchinson.* A shrub about 20 ft. high; branchlets terete, glabrous; bark grey. Leaves oblong-elliptic, shortly acuminate, unequal-sided at the base, subcuneate, 7–9 in. long, $2\frac{1}{2}$–$4\frac{1}{2}$ in. broad, coriaceous, margin entire or undulate, glabrous and somewhat dull on both surfaces; lateral nerves 7–9 on each side, distinctly looped and prominent below; tertiary nerves and veins very lax; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, glabrescent, longitudinally wrinkled; stipules soon deciduous. Male flowers subsessile in clusters in the axils of the leaves of the young branchlets; bracts very small, pubescent; pedicel very short, scarcely $\frac{1}{2}$ lin. long, glabrous. Sepals 4–5, green, strongly imbricate, rounded, about $1\frac{1}{2}$ lin. in diam., coriaceous, shortly ciliate, minutely puberulous outside, shortly and adpressed-pubescent within. Stamens 9; anthers subsessile. Disk glabrous.—*Cyclostemon glomeratus*, Müll. Arg. in Flora, 1864, 532, and in DC. Prodr. xv. ii. 485; Pax in Engl. Jahrb. xxxiii. 278.

Upper Guinea. Fernando Po, *Mann*, 278!

6. **D. similis,** *Hutchinson.* A tree; branchlets terete, covered with a grey bark, glabrous. Leaves large, oblong-elliptic, shortly pointed, cuneate or subobtuse at the base, 12–14 in. long, $3\frac{1}{2}$–5 in. broad, coriaceous, glabrous and shining on both surfaces; lateral nerves 8–9 on each side, spreading or ascending, branched near the margin, slightly impressed above, prominent below; veins very lax, slightly raised on the lower surface; petiole thick, $\frac{1}{2}$ in. long, glabrous; stipules subpersistent, lanceolate, obtuse, 4–6 lin. long, very thick, sometimes nearly subterete, glabrous. Male flowers produced from the older parts of the branchlets; pedicel about 2 lin. long, rather stout, angular or sulcate, glabrous. Sepals 5, rarely 4, oblong-oblanceolate, $1\frac{3}{4}$ lin. long, $\frac{3}{4}$ lin. broad, coriaceous, toothed in the upper part, glabrous. Stamens 4 or 5, inserted around the disk; filaments rather thick, glabrous; anthers rounded, $\frac{3}{4}$ lin. long. Disk in the centre of the flower, saucer-shaped, thick, undulate, glabrous. Female flowers few together or subsolitary towards the ends of the branchlets; pedicel stout, at length about $\frac{1}{2}$ in. long when in fruit, glabrous. Sepals 5, oblong, obtuse, nearly 2 lin. long, coriaceous, glabrous. Disk thick, annular, glabrous. Ovary ellipsoid, glabrous; style short; stigmas rounded, entire. Fruits ellipsoid, about $\frac{1}{2}$ in. long and 5 lin. in diam. Mature seeds not seen.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3194! 3527! 3721! Ilendi *Ledermann*, 654!

7. **D. bipindensis,** *Hutchinson.* A shrub or small tree 18–20 ft. high; branchlets slender, subterete, glabrous. Leaves lanceolate or oblong-lanceolate, acuminate, subcuneate at the base, 3–4 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad, rigidly papery, entire, glabrous on both surfaces, shining on the upper; lateral nerves 6–7 on each side, looped and reticulate some distance from the margin, prominent on the lower surface only; veins lax, distinct below; petiole very short, about $1\frac{1}{2}$ lin. long, glabrous; stipules lanceolate-falcate, subacute, 3–4 lin. long, about $1\frac{1}{2}$ lin. broad, puberulous when young. Male flowers fasciculate in the axils of the

leaves of the young branchlets; bracts small, broadly ovate, ciliate, pubescent, ½ lin. long; pedicel 1¼ lin. long, puberulous. Sepals 5, strongly imbricate, orbicular or transversely elliptic, about 1½ lin. in diam., ciliate and puberulous. Stamens 10–11; filaments nearly equalling the sepals. Disk fleshy, glabrous. Female flowers not known. —*Cyclostemon bipindensis*, Pax in Engl. Jahrb. xxxiii. 279.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1796!

8. **D. gabonensis,** *Hutchinson.* A tree 18–21 ft. high; branchlets terete, glabrous. Leaves oblong or elliptic-oblong, abruptly and shortly acuminate, unequal and rounded on one side at the base, 6–9 in. long, 2½–3½ in. broad, thinly coriaceous, glabrous and shining on both surfaces, margin entire, slightly recurved; lateral nerves 7–8 on each side, inconspicuous above, prominent below, looped and branched near the margin; tertiary nerves oblique, rather closely reticulate; petiole stout, about ½ in. long, glabrous; stipules lanceolate, 2 lin. long, slightly pubescent, soon falling. Male flowers numerous in dense axillary fascicles on the younger branches, rarely on the older wood; bracts small, puberulous; pedicel about 2½ lin. long, slender, puberulous. Sepals 3–4, broadly ovate, obtuse, 1½ lin. broad, puberulous outside, margin shortly ciliate. Stamens 3, erect; filaments 2 lin. long, glabrous; anthers broad, ¾ lin. long. Disk cupular, thin, glabrous. Female calyx a little larger than the male. Disk glabrous, short. Ovary subglobose, glabrous; stigmas 3–4, entire, flat, covering the top of the ovary. Fruits globose, 1 in. in diam., 3-seeded, glabrous; exocarp crustaceous, 1 lin. thick, brown; endocarp thin, horny. Seeds ½ in. long, 4 lin. broad, slightly wrinkled when dry; testa reddish-brown.—*Cyclostemon gabonensis*, Pierre, Icon.

Lower Guinea. Gaboon: Libreville, *Klaine*, 551! 690! 1034! 1278! 3188!

9. **D. arborescens,** *Hutchinson.* A small tree, 11–12 ft. high; branches and branchlets glabrous. Leaves oblong or oblong-elliptic, gradually acuminate, rounded or cuneate at the base, 3–7 in. long, 1–3½ in. broad, rigidly chartaceous, entire, glabrous and somewhat dull on both surfaces; lateral nerves 5–6 on each side, looped and anastomosing well within the margin, prominent only on the lower surface; veins lax and distinct below; petiole 3–4 lin. long, slightly wrinkled, glabrous; stipules small and caducous. Male flowers fasciculate on the older wood of the branches or towards the base of the young branchlets; pedicel thickened towards the apex, 2 lin. long, puberulous. Sepals 3–6, oblong, puberulous outside. Stamens 3; filaments glabrous; anthers rounded, glabrous. Disk thick and fleshy, undulate, glabrous. Female flowers produced in a similar position to the male. Pedicels and sepals similar to those of the male. Disk annular, glabrous. Ovary ovoid glabrous, 1-celled; stigma capitate, unilateral, thick. Fruit ellipsoid, about ½ in. long, 5 lin. in diam. Seeds not seen. —*Sibangea arborescens*, Oliv. in Hook. Ic. Pl. t. 1411.

Upper Guinea. Cameroons: Campo, *Ledermann*, 405!

Lower Guinea. Gaboon: Sibange Farm, *Soyaux*, 18! *Klaine*, 2472! and without precise locality, *Klaine*, 1037! 1901! 1912! 2068! 2202! 2472! 2577 3057!

10. **D. Rowlandii,** *Pax in Engl. Jahrb.* xliii. 219. Branches subterete; young flowering branchlets somewhat angular, glabrous. Leaves elliptic, shortly acuminate, shortly cuneate at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, coriaceous, glabrous and shining on both surfaces; lateral nerves 4–5 on each side, looped and anastomosing well within the margin, distinct on both surfaces; veins rather close, distinct; petiole $1\frac{1}{2}$–2 lin. long, sparingly pubescent or nearly glabrous; stipules small and caducous. Male flowers in axillary fascicles on the young branchlets; pedicel rather stout, about 1 lin. long, densely pubescent. Sepals 4, obovate, obtuse, densely pubescent outside. Stamens 4; filaments glabrous; anthers rounded, glabrous. Disk cupular, undulately lobed, lobes protruding between the filaments, glabrous. Female flowers not known.

Upper Guinea. Interior of Western Lagos, *Rowland!*

11. **D. Klainii,** *Pierre ex Pax in Engl. Jahrb.* xliii. 219, *name only*. A tree about 70 ft. high; branchlets slender, densely pubescent. Leaves small, oblong-lanceolate, shortly acuminate, subcuneate and unequal-sided at the base, 1–$1\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. broad, thinly chartaceous, entire, glabrous on both surfaces; lateral nerves about 6 on each side, looped and anastomosing well within the margin, slightly raised on both surfaces; petiole 1–2 lin. long, densely pubescent; stipules small, caducous. Male flowers axillary, fasciculate on the young branchlets; pedicel 1–$1\frac{1}{2}$ lin. long, densely pubescent. Sepals 4, ovate, pubescent on both sides. Stamens 4; filaments glabrous; anthers rounded, glabrous. Disk flat, fleshy, with a slight conical production in the middle, glabrous.

Lower Guinea. Gaboon: *Klaine*, 3043!

12. **D. Paxii,** *Hutchinson*. Branchlets slender, channelled, minutely puberulous. Leaves oblong or oblong-elliptic, caudate-acuminate, subcuneate and slightly unequal at the base, 3–$4\frac{1}{2}$ in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad, thinly chartaceous or almost membranous, entire, glabrous on both surfaces, shining on the upper; lateral nerves 10–11 on each side, very slender, spreading, anastomosing freely some distance from the margin; veins and veinlets slightly prominent, somewhat lax; petiole slender, 2–3 lin. long, rather densely puberulous; stipules deciduous, small. Male flowers axillary, fasciculate on the young leafy branchlets; pedicel slender, $1\frac{1}{2}$ lin. long, densely puberulous. Sepals 4, oblong, obtuse, 1 lin. long, $\frac{1}{2}$ lin. broad, puberulous on both sides, margin ciliate. Stamens 4; filaments slender, gradually broadened to the base, glabrous; anthers oblong-ellipsoid, $\frac{1}{3}$ lin. long. Disk cupular, thin, margin toothed, pubescent inside, glabrous outside. Female flowers not known.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3788!

13. **D. leonensis,** *Pax in Engl. Jahrb.* xliii. 219. Branches terete; young flowering branchlets slender, pubescent. Leaves elliptic or elliptic-lanceolate, gradually and shortly acuminate, acutely cuneate at the base, 2–3½ in. long, ¾–1½ in. broad, subcoriaceous, entire, glabrous and shining on both surfaces, closely reticulate; lateral nerves 5–6, looped and anastomising well within the margin, slightly raised on both surfaces; stipules small and caducous; petiole 1–2 lin. long, pubescent. Male flowers fasciculate in the axils of the leaves of the young branchlets; pedicel nearly 2 lin. long, puberulous. Sepals 4, obovate, obtuse, pilose outside. Stamens 4; filaments glabrous; anthers ellipsoid. Disk cupular, undulate, glabrous. Female flowers not known.

Upper Guinea. Sierra Leone: near Duunia, Talla, *Scott-Elliot*, 4981!

14. **D. reticulata,** *Pax in Engl. Jahrb.* xliii. 219. A tree 25–30 ft. high; bark grey; young branchlets somewhat angular, pubescent. Leaves elliptic or lanceolate-elliptic, obtusely pointed or shortly acuminate, obtuse and very unequal-sided at the base, 2–3½ in. long, 1–2 in. broad, coriaceous, closely reticulate, shining and glabrous on both surfaces; lateral nerves about 5 on each side, looped well within the margin, slightly prominent on both surfaces; petiole 2½–3 lin. long, pubescent; stipules small, deciduous. Male flowers few, in axillary fascicles on the young branchlets; pedicel 2–2½ lin. long, sparingly pubescent. Sepals 4, obovate, ciliate, pubescent on both sides. Stamens 4; filaments glabrous; anthers rounded, glabrous. Disk cupular, undulately lobed, lobes protruding between the filaments. Female flowers not known.

Mozamb. Distr. German East Africa: Lofio River, *Goetze*, 441!

15. **D. aframensis,** *Hutchinson.* A tree 40 ft. high; branchlets slightly sulcate, glabrous. Leaves elliptic or oblong-elliptic, very shortly and rather abruptly acuminate, cuneate and slightly unequal at the base, 2–4 in. long, 1–1¾ in. broad, rigidly chartaceous, glabrous and dull or slightly shining on both surfaces; lateral nerves about 7 on each side, anastomosing freely well within the margin, distinct on both surfaces, slightly raised below; veins rather lax; petiole 1½–2 lin. long, slightly wrinkled, glabrous; stipules small, coriaceous, caducous. Male flowers in axillary fascicles on the young branchlets; pedicel 1½–2 lin. long, glabrous. Sepals 4, obovate or oblong-obovate, obtuse, 1¼ lin. long, ¾ lin. broad, tips pubescent, otherwise glabrous, membranous. Stamens 8; filaments slender, glabrous; anthers small, glabrous. Disk large, cupular, glabrous, margin irregularly toothed. Female flowers not known.

Upper Guinea. Gold Coast: Afram Plains, *Johnson*, 714!

16. **D. glabra,** *Hutchinson.* A tree about 20 ft. high; branchlets slightly flexuous, terete, glabrous. Leaves oblong or oblong-elliptic, shortly acuminate, obtuse and oblique at the base, 5½–8 in. long, 2–3½ in. broad, chartaceous, entire, glabrous; lateral nerves 8–9 on each side, arcuate, looped and branched near the margin, indistinct

above, prominent below; veins very lax, raised on the lower surface; petiole stout, 2–5 lin. long, slightly wrinkled, glabrous; stipules small, deciduous. Male flowers fasciculate and axillary on the young branchlets and also on the older wood; pedicel rather slender, 3 lin. long, very sparingly puberulous. Sepals 4, broadly imbricate, ovate-elliptic, obtuse, $1\frac{1}{2}$ lin. long, 1 lin. broad, coriaceous, glabrescent outside, margin shortly ciliate, pilose within. Disk small, glabrous. Stamens 8; filaments 1 lin. long, stout, glabrous; anthers nearly $\frac{3}{4}$ lin. long, glabrous. Female flowers: pedicel $\frac{3}{4}$ in. long, puberulous, becoming stouter and reaching $1\frac{1}{4}$ in. when in fruit. Sepals as in the male, but sparingly puberulous outside. Disk annular, thick, entire, glabrous. Ovary ellipsoid, 2 lin. long, $1\frac{1}{2}$ lin. in diam., glaucous, glabrous; stigmas sessile, cushion-shaped, entire, glabrous. Fruit ellipsoid, nearly 1 lin. long, 7 lin. in diam., glabrous.—*Cyclostemon glaber*, Pax in Bolet. Soc. Brot. x. 157.

Lower Guinea. Isle of St. Thomas, *Quintas*, 132! Rolas Island, *Quintas*, 131!

17. **D. Dinklagei,** *Hutchinson.* A small tree, 12–20 ft. high; branches somewhat flexuous, glabrescent and subterete when older, hirsute and somewhat angular when young. Leaves oblong or oblong-elliptic, rarely lanceolate, somewhat caudate-acuminate, cuneate or somewhat obtuse and slightly unequal at the base, 6–10 in. long, $1\frac{3}{4}$–3 in. broad, thinly chartaceous, entire, glabrous on both surfaces except on the midrib and lateral nerves, which are puberulous below; lateral nerves 6–8 on each side, ascending, elongated and running parallel with the margin, slightly impressed above, prominent below; veins somewhat lax, distinct below; petiole 4–6 lin. long, rather stout, hirsute; stipules ovate-lanceolate, about 3 lin. long, adpressed-hirsute, deciduous. Male flowers in axillary clusters on the young branchlets and also on the older parts of the branchlets from which the leaves have fallen, sessile or subsessile. Sepals 4, suborbicular, $1\frac{1}{4}$ lin. in diam., shortly pubescent on both sides, ciliate. Stamens 8; filaments glabrous; anthers $\frac{1}{2}$ lin. long. Disk thick, lobed, densely hairy in the middle.—*Cyclostemon Dinklagei*, Pax in Engl. Jahrb. xxiii. 520.

Upper Guinea. Cameroons: Batanga, *Dinklage*, 798! Lolodorf, *Staudt*, 143! Bebai, *Tessmann*, 550!

18. **D. occidentalis,** *Hutchinson.* A tree about 20 ft. high; branchlets densely rusty-puberulous or tomentellous, deeply grooved. Leaves oblong-lanceolate or oblong-elliptic, more or less caudate-acuminate, rounded and slightly unequal at the base, 4–$6\frac{1}{2}$ in. long, $1\frac{1}{2}$–3 in. broad, thinly coriaceous, coarsely crenate-serrate, rusty-puberulous on both surfaces when quite young, at length glabrous and shining on the upper; lateral nerves 7–8 on each side, distinct below, looped and faintly reticulate towards the margin; tertiary nerves faint and subparallel; petiole stout, 3–5 lin. long, densely rusty-tomentellous; stipules lanceolate, rusty-tomentellous, 3 lin. long, soon falling off. Male flowers not known. Female flowers axillary, solitary or subsolitary on

the younger branchlets; pedicel stout, swollen towards the top, rusty-tomentellous, about 3 lin. long. Sepals ovate, 2 lin. long, rusty-tomentellous outside. Disk cupular, deeply crenate, thin, glabrous, about $\frac{1}{2}$ lin. high. Ovary 2-celled, villous-tomentose, $1\frac{1}{2}$ lin. in diam.; styles 2, linear, swollen and bifid at the apex, $1\frac{1}{2}$ lin. long, glabrous. —*Cyclostemon occidentalis*, Müll. Arg. in Flora, 1864, 517, and in DC Prodr. xv. ii. 481; Pax in Engl. Jahrb. xxxiii. 280.

Upper Guinea. Fernando Po, *Mann*, 1158!

19. **D. inæqualis,** *Hutchinson.* Young branchlets yellowish-pubescent, angular. Leaves sessile, obliquely ovate-lanceolate, acutely caudate-acuminate, very unequal-sided at the base, one side rounded, the other narrowed to the base, 2–$4\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. broad, chartaceous, glabrous on both surfaces except on the midrib and lateral nerves, which are more or less pilose on the lower surface, margin sharply serrate; lateral nerves 5–6 on each side, anastomosing freely well within the margin, slightly impressed above, prominent below; veins somewhat close, raised below; stipules small, ovate-lanceolate, acuminate, pubescent, $1\frac{1}{2}$ lin. long. Male flowers not known. Female flowers axillary, solitary on the young branchlets. Sepals 5, ovate-orbicular, yellow-tomentose. Disk densely yellow-pilose. Fruit ovoid-globose, 1 in. long, about $\frac{3}{4}$ in. in diam., densely yellow-tomentose; stigmas spreading, flat, crenate.—*Cyclostemon leonensis*, Pax in Engl. Jahrb. xxxiii. 280.

Upper Guinea. Sierra Leone: Ninia, Talla Hills, *Scott-Elliot*, 4895! and without precise locality, *Afzelius!*

20. **D. Principum,** *Hutchinson.* A small tree; branchlets sparingly pubescent when quite young, soon becoming glabrous. Leaves oblong-lanceolate or oblong-elliptic, very shortly acuminate, subacute and slightly unequally-sided at the base, $3\frac{1}{2}$–$7\frac{1}{2}$ in. long, $1\frac{1}{4}$–3 in. broad, repand-denticulate in the upper third, rigidly membranous, glabrous on both surfaces; lateral nerves 6–9 on each side, looped and reticulate some distance from the margin, prominent on the lower surface; veins forming a somewhat close network; petiole 2–3 lin. long, wrinkled, glabrescent; stipules subulate, scarcely 1 lin. long, hirsute, soon falling off. Male fascicles in the axils of the leaves of the young branchlets, 3–6-flowered; bracts very small, pubescent; pedicel 2 lin. long, minutely puberulous. Sepals 4, suborbicular, 2 lin. in diam., margin rather densely ciliate, minutely puberulous outside, adpressed-pubescent inside. Stamens 8–10; filaments glabrous, as long as the sepals. Disk small, nearly glabrous, except in the centre, which is long-pilose. Female fascicles produced from the old wood; flowers shortly pedicellate. Sepals as in the male. Disk thin, cupular, crenulate at the top, glabrous towards the outside, with a line of dense hairs towards the base of the ovary. Ovary densely villous; stigmas sessile, flat, semicircular, entire, glabrous on the upper surface.—*Cyclostemum Principum*, Müll. Arg. in Flora, 1864, 531, and in DC. Prodr. xv. ii. 483; Pax in Engl. Jahrb. xxxiii. 279.

Lower Guinea. Princes Island, *Mann*, 1136!

21. **D. stipularis,** *Hutchinson.* A small tree 15 ft. high; young branchlets deeply grooved, sparingly setulose; internodes 1½–2 in. long. Leaves oblong or oblong-elliptic, acutely cuspidate-acuminate, slightly cuneate and unequal at the base, one half of the blade produced 1 lin. below the other, 6–12 in. long, 2–3½ in. broad, subentire, rigidly membranous, closely reticulate, glabrous and shining on both surfaces; lateral nerves 7–10 on each side, arcuate, distinctly looped and reticulate some distance from the margin, distinct on both sides, more prominent below; tertiary nerves very few, reticulate; petiole 1½–3 lin. long, sparingly setulose; stipules ovate-lanceolate, obtuse, almost glabrous, 3–4 lin. long, 1½ lin. broad. Male flowers not known. Female fascicles produced on the old wood; bracts ovate, pubescent; pedicel about 2 lin. long, glabrous. Sepals orbicular, about 2 lin. in diam., coriaceous, glabrous except at the membranous minutely ciliolate margin. Disk cupular, ½ lin. high, nearly enveloping the ovary, glabrous, 5-lobed; lobes quadrangular, crenulate at the top, ½ lin. broad. Ovary depressed, nearly hidden by the stigmas and disk, glabrous; stigmas 2, sessile, very large, reniform, entire, yellow, glabrous, completely covering the top of the ovary. Fruit not known.—*Cyclostemon stipularis*, Müll. Arg. in Flora, 1864, 531, and in DC. Prodr. xv. ii. 484; Pax in Engl. Jahrb. xxxiii. 279.

Lower Guinea. Spanish Guinea: Mount John, on the River Kongui, *Mann*, 1780!

22. **D. Henriquesii,** *Hutchinson.* A tree; young branchlets adpressed-pubescent. Leaves lanceolate or oblong, somewhat caudate-acuminate, acute and slightly oblique at the base, 4–4¾ in. long, 1–1½ in. broad, coriaceous, glabrous, shining, reticulate. Female flowers pedicellate; pedicels thick, about ½–¾ in. long in the fruiting stage. Styles 2, dilated and bilobed at the apex. Fruit adpressed, grey-pubescent.—*Cyclostemon Henriquesii*, Pax in Bolet. Soc. Brot. x. 158.

Lower Guinea. Island of St. Thomas: Roça S. Nicolau, 3000 ft., *Moller*.

23. **D. Afzelii,** *Hutchinson.* A tree about 40 ft. high; branchlets glabrous. Leaves oblong-elliptic, caudate-acuminate, subcuneate and unequal-sided at the base, 4–6 in. long, 2–2½ in. broad, distinctly reticulate on both surfaces, margin entire or slightly undulate, glabrous and shining on both surfaces; lateral nerves 5–6 on each side, more or less distinctly looped and branched some distance from the margin; petiole 2–3 lin. long, wrinkled, glabrous; stipules not seen, probably small. Male flowers not known. Female flowers produced from the old wood; pedicel ¼ in. long (in the fruiting stage ½ in. long), minutely puberulous, at length glabrous. Sepals orbicular, glabrous. Disk cupular, pilose. Ovary 2-celled, pubescent. Fruit oblong-ellipsoid, about 8 lin. long and 7 lin. broad, brownish-pubescent; exocarp crustaceous, ¾ lin. thick; endocarp yellow, rather thin.—*Cyclostemon Afzelii*, Pax in Engl. Jahrb. xxiii. 520, and xxxiii. 279.

Upper Guinea. Sierra Leone: Jepihun, *Smythe*, 236! and without precise locality, *Afzelius!*

24. **D. usambarica,** *Hutchinson.* A large forest tree, 100–200 ft. high, with horizontally spreading branches; branchlets somewhat angular or subterete, glabrous or nearly so. Leaves elliptic or elliptic-lanceolate, gradually acuminate to the obtuse apex, cuneate and unequal at the base, 2–4 in. long, 1–2 in. broad, subcoriaceous, entire or undulate, glabrous on both surfaces; lateral nerves about 7 on each side, spreading, looped and anastomosing some distance from the margin, distinct on both surfaces, especially below; veins somewhat close and distinct on both surfaces; petiole 1–2½ lin. long, pubescent; stipules small, deciduous. Male fascicles produced on the old wood; pedicel ¼–¾ in. long, slender, glabrous. Sepals 5, suborbicular, 2 lin. in diam., coriaceous, glabrous on both surfaces, margin minutely ciliolate. Stamens 10, inserted outside the disk; anthers 1½ lin. long. Disk fleshy, flat, glabrous, undulately lobed, lobes protruding between the bases of the filaments. Female flowers not known.—*Cyclostemon usambaricus,* Pax in Engl. Jahrb. xxxiii. 279.

Mozamb. Distr. German East Africa: Usambara; Sakare, *Busse,* 350! *Holtz,* 762! *Illich;* in the evergreen forest, *Engler,* 1008A! Kwai, *Albers,* 21! Ukinga, *Goetze,* 1205!

25. **D. Preussii,** *Hutchinson.* A tree, 12–20 ft. high; young branchlets densely hirsute, subterete. Leaves lanceolate-elliptic or oblong-elliptic, caudate-acuminate, subcuneate or slightly rounded at the base, 2½–6 in. long, thinly chartaceous, serrate, glabrous on both surfaces except on the pubescent midrib below; lateral nerves 6–7 on each side, looped and anastomosing some distance from the margin, slightly impressed above, prominent below; veins somewhat lax, not at all prominent; petiole 2–3 lin. long, densely pubescent; stipules subulate, acute, 1½ lin. long, villous, deciduous. Male and female flowers produced in clusters on the old wood; male pedicel ½ in. long, glabrous, female 3–4 lin. long. Male flowers: Sepals 5, orbicular, 2 lin. in diam., coriaceous, glabrous on both sides, margin shortly ciliate. Stamens about 15; anthers ¾ lin. long. Disk flat, fleshy, glabrous, margin lobed, lobes protruding between the bases of the filaments. Young female flowers not seen. Disk annular, entire, glabrous. Fruits 3-celled, trilobed, ellipsoid, ¾ in. long, 7 lin. in diam., glabrous; stigmas spreading and recurved, obliquely lanceolate.—*Cyclostemon Preussii,* Pax in Engl. Jahrb. xxvi. 326.

Upper Guinea. Cameroons: Barombi, *Preuss,* 23! Bipinde, *Zenker,* 2257! 2257A! 2839! 2850! Tibaté, *Ledermann,* 2329!

26. **D. pierreana,** *Hutchinson.* A tree 20–25 ft. high; branchlets subterete, densely puberulous. Leaves oblong or oblong-elliptic, caudate-acuminate, subcuneate and very unequal at the base, 4–7 in. long, 1¼–3 in. broad, thinly coriaceous or chartaceous, denticulate in the upper half, glabrous on both surfaces except on the pubescent midrib on the lower side, slightly shining on the upper surface, dull below; lateral nerves about 9 on each side, spreading, looped and anastomosing some distance from the margin, slightly impressed above, prominent below;

veins somewhat indistinct on both surfaces; petiole 2 lin. long, densely puberulous or almost tomentellous; stipules subulate, about $1\frac{1}{2}$ lin. long, densely pubescent, deciduous. Male and female fascicles produced on the old wood; pedicel of the male slender, $\frac{1}{2}$ in. long, glabrous, that of the female a little stouter. Male flowers: Sepals suborbicular, 2 lin. in diam., thinly coriaceous, glabrous on both surfaces, margin minutely ciliolate. Stamens about 15, inserted around the disk; anthers $\frac{3}{4}$ lin. long. Disk-folds slightly pubescent. Female flowers: Sepals more or less as in the male. Disk cupular, glabrous outside, margin pubescent. Ovary trilobed, densely tomentose; stigmas spreading and recurved, bilobed, lobes acuminate. Fruit trilobed, ellipsoid or obovoid, $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. in diam., pubescent. Seeds rather elongate-ellipsoid, $\frac{3}{4}$ in. long, 4 lin. broad; testa shining, crustaceous.—*Cyclostemon klaineanus*, Pierre, Icon. (not *Drypetes Klainii*, Pierre ex Pax in Engl. Jahrb. xliii. 219).

Lower Guinea. Gaboon: in the neighbourhood of Libreville, *Klaine*, 572! 1241! 1426! 1811! 2191! 2239! 2786! 3232!

27. **D. ugandensis,** *Hutchinson.* A low tree with grey bark. Leaves oblong-elliptic or oblong-lanceolate, acuminate, slightly unequal and a little narrowed to the base, 4–$6\frac{1}{2}$ in. long, $1\frac{1}{4}$–2 in. broad, thinly coriaceous, glabrous and slightly shining on both surfaces; lateral nerves 6–7 on each side, diverging almost at right angles from the midrib, much branched and fairly prominent; veins lax, conspicuous below; petiole $1\frac{1}{2}$ lin. long, finely wrinkled, glabrous; stipules soon falling off. Male fascicles produced on the old wood; pedicel 4–6 lin. long. Flowers about $3\frac{1}{2}$ lin. in diam. Sepals 5, suborbicular, glabrous. Stamens numerous. Female flowers similar to the males. Ovary globose; stigmas dilated, retuse. Young fruits blackish, with a hard pericarp.—*Cyclostemon ugandensis*, Rendle in Journ. Linn. Soc. xxxvii. 211.

Nile Land. Uganda: Island of Buvuma, in Lake Victoria, *Bagshawe*, 613!

28. **D. floribunda,** *Hutchinson.* A small tree; young branchlets rather slender, puberulous. Leaves oblong or oblong-oblanceolate, shortly and obtusely acuminate, subcuneate at the base, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–2 in. broad, rather rigidly membranous or slightly coriaceous, serrate, glabrous on both surfaces, slightly shining above, dull below; lateral nerves 5–6 on each side, distinct below, looped and anastomosing a considerable distance from the margin; veins close, distinct; petiole 1–2 lin. long, densely puberulous; stipules subulate, 2 lin. long, puberulous, very soon falling off. Male fascicles produced on the older wood; bracts very small; pedicel very slender, glabrous, about 4 lin. long. Sepals suborbicular, about $1\frac{1}{2}$ lin. in diam., thinly coriaceous, shortly ciliate, otherwise glabrous. Stamens 10–15. Disk glabrous. Female flowers not known.—*Cyclostemon floribundus*, Müll. Arg. in Flora, 1864, 532, and in DC. Prodr. xv. ii. 484.

Upper Guinea. Southern Nigeria: Idda, *Barter*, 1673!

29. **D. ovata,** *Hutchinson.* An evergreen arborescent shrub or tree with a pyramidal growth and dense leaves; branches subterete; bark breaking up longitudinally, light yellow, glabrescent; young branchlets subterete, puberulous. Leaves ovate, rarely ovate-lanceolate, obtusely and shortly acuminate, rounded and very unequal-sided at the base, $1\frac{1}{2}$–3 in. long, $\frac{3}{4}$–2 in. broad, thinly coriaceous, repand-dentate or denticulate, glabrous on both surfaces, shining above, duller below; lateral nerves 5–8 on each side, looped and anastomosing freely well within the margin, distinct on both surfaces, more prominent below; veins rather close and distinct; petiole 2 lin. long, puberulous; stipules very small, subulate, $\frac{1}{2}$ lin. long, pubescent, deciduous. Male fascicles produced from the old wood; pedicel 2–3 lin. long, rather stout, glabrous. Sepals 5, orbicular, 2 lin. in diam., thinly coriaceous, margin slightly membranous and minutely ciliolate, otherwise glabrous on both surfaces. Stamens about 15; anthers $\frac{3}{4}$ lin. long. Disk central, fleshy, wrinkled, glabrous, the marginal wrinkles or lobes protruding between the bases of the filaments. Fruits globose, the size of a cherry. (*Warnecke*). Female flowers not seen.

Upper Guinea. Togo: abundant near Lome, *Warnecke,* 154!

Warnecke states that the Christians are in the habit of using this tree at Christmas as a substitute for the one used in Europe.

30. **D. Staudtii,** *Hutchinson.* A tree 15–30 ft. high; branchlets more or less angular, glabrous and shining. Leaves elongate-oblong-elliptic, shortly acuminate, rounded and slightly unequal at the base, 12–15 in. long, 4–5 in. broad, thinly coriaceous, serrate, with teeth about $\frac{3}{4}$ in. apart, shining, glabrous and closely reticulate on both surfaces; midrib prominent on both surfaces; lateral nerves 14–16 on each side, looped and anastomosing well within the margin, distinct on both surfaces; cross nerves and veins prominent, the latter very close and forming a fine network; petiole stout, about 4 lin. long, grooved on the upper side, finely and closely wrinkled, glabrous; stipules ovate, coriaceous, about 2 lin. long, deciduous. Male flowers large, produced in fascicles on the old wood; bracts ovate, coriaceous, ribbed, glabrous; pedicel $\frac{1}{2}$–$\frac{3}{4}$ in. long, glabrous. Sepals 5, elliptic, 4 lin. long, $2\frac{1}{2}$ lin. broad, rather thin, glabrous on both sides, margin minutely ciliolate. Stamens numerous, inserted around the margin of the fleshy glabrous disk; anthers $1\frac{1}{2}$ lin. long. Female flowers not known.—*Cyclostemon Staudtii,* Pax in Engl. Jahrb. xxvi. 326.

Upper Guinea. Cameroons: Lolodorf, *Staudt,* 122!

31. **D. spinoso-dentata,** *Hutchinson.* Branchlets glabrous. Leaves oblong-elliptic or oblong-lanceolate, shortly acuminate, unequal and slightly rounded at the base, 4–8 in. long, coriaceous, margin remotely repand-dentate, glabrous and slightly shining on both surfaces; midrib prominent below, transversely wrinkled towards the base; lateral nerves 6–8 on each side, slightly prominent below, elongated and running parallel with the margin in their upper half; veins

somewhat lax, rather faint; petiole stout, 3 lin. long, narrowly grooved on the upper side, closely and transversely wrinkled, glabrous; stipules very soon falling off, evidently very small. Male flowers subsessile, produced in clusters on the older branchlets; bracts small, scaly, glabrous or very shortly ciliate. Sepals 5, strongly imbricate, suborbicular, outer ones coriaceous, inner membranous, shortly ciliate, otherwise glabrous, about 3 lin. in diam. Stamens about 25; filaments glabrous. Disk very slightly pubescent.—*Cyclostemon spinoso-dentatus*, Pax in Engl. Jahrb. xliii. 76.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2328! 3398! 3398A; 3712!

32. **D. major,** *Hutchinson*. A tree 16–20 ft. high; branches subterete, with a yellowish-grey bark, glabrous; young branchlets slightly puberulous, soon glabrescent. Leaves oblong-lanceolate or elongate-lanceolate, obtuse, somewhat rounded and slightly unequal at the base, 4–10 in. long, 1½–3½ in. broad, thinly coriaceous, repand-dentate or denticulate, glabrous, brightly shining on the upper surface, duller below; lateral nerves 9–10 on each side, spreading, looped and anastomosing freely some distance from the margin, distinct on both surfaces, prominent below; veins somewhat lax; petiole 3 lin. long, deeply grooved above, closely wrinkled, glabrous; stipules linear, small, scarcely 1 lin. long, pubescent, soon deciduous. Male flowers subsessile or sessile, produced in clusters on the older wood; bracts puberulous. Sepals 5, suborbicular, 2½ lin. in diam., slightly coriaceous, margin membranous and minutely ciliolate, otherwise glabrous on both surfaces. Stamens numerous; anthers 1½ lin. long. Disk flat, glabrous, margin lobed, lobes protruding between the bases of the filaments.—*Cyclostemon major*, Pax in Engl. Jahrb. xxxiv. 369.

Mozamb. Distr. German East Africa: Usambara; lower part of Mbalu Mountain, 2600 ft., *Engler*, 1504! Mombo, *Engler*, 3267! *Zimmermann*, 945! *Eick*, 75! Kilimanjaro, *Uhlig*, 1072! 1236!

Imperfectly known species.

33. **D. euryodes,** *Hutchinson*. A tree with the habit of *Eurya*, glabrous except the inflorescence; branches and branchlets spreading, rather slender. Leaves ovate-oblong, narrowly acuminate, somewhat unequal, broad and cordate at the base, 2–4 in. long, ¾–1½ in. broad, chartaceous, undulate and serrulate-crenulate on the margin, with slender and not conspicuous venation; stipules lanceolate, ciliate near the apex. Male flowers not known. Female flowers axillary, yellowish, subsessile. Sepals 5, rounded, 2–2½ lin. in diam., densely and shortly pubescent on both sides, shortly ciliate, coriaceous. Disk fleshy, unequally 5-lobed, shortly ciliate, lobes broad, obtuse. Ovary tomentellous, 1½ lin. long; styles short; stigmas thick, dilated, ⅛ in. in diam. —*Cyclostemon euryodes*, Hiern in Cat. Afr. Pl. Welw. i. 961.

Lower Guinea. Angola: Pungo Andongo; wooded rocky parts of Barranco da Pedra Songue, *Welwitsch*, 1268!

30. **LINGELSHEIMIA,** Pax in Engl. Jahrb. xliii. 317.

Flowers monœcious or diœcious. Petals absent. Male flowers: Sepals 4 or 5, imbricate. Stamens 8–25, 2- to several-seriate, inserted on and between the lobes or folds of the disk, lobes frequently surrounding the base of each filament and resembling a small perianth; filaments free; anthers erect; cells parallel or diverging at the base, dehiscing longitudinally. Rudimentary ovary not present. Female flowers: Sepals 4–7. Disk hypogynous, annular, entire or crenulate. Ovary 2–3-celled; styles short or absent, when present bifid; stigmas sometimes sessile and bilobed; ovules 2 in each cell. Fruits (where known) globose, indehiscent; pericarp thick, crustaceous; endocarp hard. Seeds solitary by abortion; albumen copious, fleshy; embryo straight; cotyledons flat and broad, cordate at the base.—Shrubs. Leaves alternate, coriaceous or chartaceous, entire or toothed; stipules entire. Male and female flowers axillary, fasciculate, borne on the young leafy branchlets, males pedicellate, females pedicellate or subsessile.

Species 5, endemic.

Flowers monœcious . . . . . 1. *L. frutescens.*
Flowers diœcious.
  Pedicels of the male flowers very slender, 2–3 in. long 2. *L. capillipes.*
  Pedicels of the male flowers less than $\frac{1}{4}$ in. in length.
    One half of the leaf-blade produced below the other at the base.
      Flowers pedicellate; sepals glabrous outside . 3. *L. gilgiana.*
      Flowers sessile; sepals tomentellous outside . 4. *L. tessmanniana.*
    Both halves of the leaf-blade produced at the base to the same point on the petiole . . . . 5. *L. parvifolia.*

1. **L. frutescens,** *Pax in Engl. Jahrb.* xliii. 317. A shrub up to 7 ft. high; branches slightly angular, glabrous; flowering branchlets spreading, glabrous. Leaves oblong, oblong-oblanceolate or obovate-elliptic, shortly and rather abruptly acuminate, cuneate at the base, $1\frac{1}{2}$–5 in. long, $\frac{3}{4}$–2 in. broad, thinly chartaceous, entire, glabrous and dull on both surfaces; lateral nerves 6–8 on each side, spreading, becoming fainter and looped near the margin, distinct on both surfaces, prominent below; veins very lax; petiole 2–4 lin. long, glabrous; stipules peltate, persistent, ovate, about 1 lin. long, coriaceous, glabrous. Flowers monœcious, in axillary fascicles on the young shoots, two or three subsessile females surrounded by a few pedicellate males. Male flowers: Sepals 5, ovate, obtuse, $\frac{1}{2}$ lin. long, glabrous. Stamens about 15; filaments glabrous; anthers small. Disk lobed on the upper surface, glabrous. Female flowers mature before the males in each cluster: Sepals 6–7, ovate, obtuse, subcoriaceous, glabrous. Disk annular, fleshy, crenulate, glabrous. Ovary ellipsoid, lobed, glabrous; styles thick, bilobed, lobes recurved, glabrous. Fruit not known.

South Central. Belgian Congo: Bulika, between Mawambi and Awakubi, *Mildbraed,* 3203!

2. **L. capillipes,** *Pax in Engl. Jahrb.* xliii. 318. A large shrub; young branchlets subterete, glabrous. Leaves oblong-elliptic or elliptic-lanceolate, acutely caudate-acuminate, rounded and one side of the blade produced slightly below the other at the base, 2–5 in. long, 1–2½ in. broad, chartaceous, glabrous and somewhat dull on both surfaces, margin minutely and obtusely denticulate; lateral nerves 5–8 on each side, looped and anastomosing well within the margin, prominent below; tertiary nerves close, spreading from the midrib to the lateral nerves, prominent below; petiole 1–2 lin. long, glabrous; stipules very small, deciduous. Flowers diœcious, males geminate or solitary in the leaf-axils of the young shoots; pedicel drooping, very slender, 2–3 in. long, glabrous. Sepals 5, suborbicular, 2½ lin. in diam., coriaceous, glabrous on both surfaces, margin shortly ciliolate. Disk fleshy, much lobed over the surface, lobes pubescent and encircling the base of each filament, simulating a small perianth. Stamens about 25, inserted amongst the lobes of the disk; filaments glabrous; anthers oblong, cordate at the base, 1 lin. long. Female flowers not known.

South Central. Belgian Congo: Kabroada, in the Ituri forest west of Lake Albert, *Mildbraed,* 3036 !

3. **L. gilgiana,** *Hutchinson.* A shrub; branchlets slender, slightly sulcate, puberulous, nearly glabrous when older. Leaves ovate-elliptic, caudate-acuminate, acumen about ½ in. long, rounded and very unequal at the base, one half of the blade produced about ½ lin. below the other, 2–3½ in. long, 1–1½ in. broad, papery, margin minutely crenulate-denticulate, glabrous and closely reticulate on both surfaces; midrib prominent on the lower side, glabrous; lateral nerves 4–5 on each side, distinctly looped some distance from the margin; veins and veinlets very close; petiole very short, hardly 1 lin. long, rather densely pubescent; stipules small, ovate. Male flowers 3–4 in each leaf-axil; pedicel 2 lin. long, glabrous. Sepals 4, suborbicular, 1¾ lin. in diam., glabrous outside, margin minutely ciliolate. Stamens about 15; filaments inserted amongst and between the lobes of the disk. Female flowers solitary or subsolitary in the axils of the leaves of the young branchlets; pedicel ¼–½ in. long (at least in the young fruit), shortly pubescent. Sepals 4, transversely elliptic or rounded, distinctly striate with about eight veins, leathery, glabrous except at the minutely ciliolate margin. Disk annular, entire, nearly flat, thick, glabrous. Ovary depressed-globose, glabrous; stigmas sessile, reflexed, flattened, bilobed, glabrous. Fruit globose, a little more than ½ in. in diam., hispid, light-brown, dull when dry; exocarp nearly 1 lin. thick, crustaceous; endocarp very hard, ½ lin. thick, yellowish-brown. Seeds flattened on the inner side; testa brown and reticulate; cotyledons large, flat, very thin, cordate at the base, palmately veined; albumen copious, fleshy.—*Cyclostemon gilgianus,* Pax in Engl. Jahrb. xxxiii. 278.

Upper Guinea. Lagos: interior, *Millson,* 139! Southern Nigeria: without locality, *Foster,* 353! Cameroons: Bipinde, *Zenker,* 2349!

4. **L. tessmanniana,** *Hutchinson.* Branchlets angular when young, at length subterete, glabrous; internodes ¾–1 in. long. Leaves sessile, obliquely oblong-elliptic or ovate-oblong, acutely acuminate, rounded and unequal-sided at the base, one half of the blade produced about 1 lin. below the other, 2½–4½ in. long, 1¼–2 in. broad, sharply and rather remotely denticulate, subcoriaceous, glabrous and conspicuously reticulate on both surfaces; lateral nerves 6–7 on each side, looped and branched well within the margin, prominent on both surfaces; veins rather close, conspicuous; stipules small and very early deciduous. Flowers diœcious, sessile in axillary clusters. Male flowers: Sepals 4, suborbicular, nearly 2 lin. in diam., coriaceous, tomentellous outside, puberulous inside. Stamens 8–10; filaments stout, glabrous; anthers ¾ lin. long. Disk deeply divided, segments fleshy, rusty-puberulous. Female flowers not known.—*Cyclostemon tessmannianus,* Pax in Engl. Jahrb. xlv. 236.

Lower Guinea. Spanish Guinea: on the way to Nsangbrang, *Tessmann,* 996!

5. **L. parvifolia,** *Hutchinson.* A small shrub; branchlets terete, glabrous or with a few scattered whitish hairs on the young shoots; bark light yellowish-grey when dry. Leaves somewhat crowded, ovate or ovate-lanceolate, acuminate, acumen subacute, rounded and subequal at the base, 1½–3½ in. long, ½–1½ in. broad, papery or slightly coriaceous, closely reticulate, serrate or somewhat repand-dentate, glabrous on both surfaces; lateral nerves 4–5 on each side, looped and reticulate some distance from the margin, distinct on both surfaces; tertiary nerves reticulate; petiole scarcely ½ lin. long, very finely wrinkled, glabrous; stipules lanceolate, 2 lin. long, nearly glabrous, very soon deciduous. Male flowers axillary, fasciculate on the young branchlets; bracts small, ovate, acute, densely ciliate; pedicel about 1 lin. long, glabrous. Sepals usually 4, orbicular, thinly coriaceous, glabrous except for the ciliolate margin, strongly imbricate. Stamens 10–14; filaments very short, glabrous. Disk lobed, wrinkled, glabrous. Female flowers not known. —*Cyclostemon parvifolius,* Müll. Arg. in Flora, 1864, 532, and in DC. Prodr. xv. ii. 486; Pax in Engl. Jahrb. xxxiii. 279.

Upper Guinea. Sierra Leone, *Afzelius!* Northern Nigeria: Nupe, *Barter,* 1032! 1700!

31. PHYLLANTHUS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 272.

Flowers monœcious or sometimes diœcious. Petals absent. Disk always present in the African species. Male flowers: Sepals 4-6, free or slightly joined at the base, imbricate, and when 4 or 6 often in 2 series. Disk of separate glands (annular in 19, *P. discoideus*); glands usually fleshy, smooth or more or less warted. Stamens 2–6, in the centre of the flower; filaments free or connate, or some free and the others connate; anthers 2-celled, oblong or rounded, the cells parallel and dehiscing longitudinally, or diverging from the apex, the line of

dehiscence then appearing transverse and often continuous between the cells; connective often slightly produced. Rudimentary ovary absent (a slight production of the staminal column present in 17, *P. Hildebrandtii*). Female flowers: Sepals as in the male, but often larger. Disk hypogynous, usually saucer-shaped or cupular, entire, variously toothed or lobed, or rarely of separate glands. Ovary usually 3-celled, sessile or rarely slightly stipitate; styles 3, rarely absent, free or partially connate, bifid or bilobed (rarely entire), the arms slender and sometimes swollen at the apex; ovules 2 in each cell. Capsule dry or more rarely fleshy, dehiscent or subindehiscent, breaking up into 2-valved cocci. Seeds transversely trigonous, convex on the back and often longitudinally sulcate or pitted, without a strophiole; testa membranous or crustaceous; albumen fleshy; embryo straight or slightly incurved; cotyledons flat and straight or rarely flexuous.—Herbs, shrubs, or trees, of various habit. Leaves alternate in all the African species, entire, often distichous, the flowering branchlets frequently simulating pinnate leaves. Flowers small, axillary, the males mostly numerous and fasciculate, usually pedicellate, the females few or solitary, pedicellate.

About 450 species, spread throughout the tropical regions of both hemispheres.

Glochidion, Forst., which was separated from *Phyllanthus* by Sir J. D. Hooker in the Flora of British India, is not represented in Africa.

*Flowering branchlets fasciculate.
- †Stamens 6, free or nearly so; flowering branchlets arrested . . . . . 1. *P. kirkianus.*
- ††Stamens 4 or 5, two or three of the filaments connate, the remainder free and shorter; flowering branchlets well developed.
  - Stamens 4.
    - Flowers diœcious . . . . . 2. *P. lalambensis.*
    - Flowers monœcious . . . . . 3. *P. guineensis.*
  - Stamens 5.
    - Flowers diœcious; flowering branchlets surrounded at the base by numerous thick spines 4. *P. Engleri.*
    - Flowers monœcious; flowering branchlets not spiny at the base . . . . . 5. *P. reticulatus.*
- †††Stamens 4 or 5, all the filaments free.
  - Flowers monœcious.
    - Flowers produced on clustered slender leafless racemes of fascicles which arise in the axil of a leafy flowerless shoot; leaves $\frac{3}{4}$–3 in. long 6. *P. floribundus.*
    - Flowers produced on slender leafy branchlets; leaves 2–7 lin. long.
      - Leaves oblong, flaccid; disk of the female flower crenulate . . . . . 7. *P. Dinklagei.*
      - Leaves obovate or elliptic, rigid; disk of the female flower entire . . . . . 8. *P. loandensis.*
  - Flowers diœcious.
    - ‡Stamens 5.
      - Male flowers arranged in slender leafless racemes of fascicles . . . . . 9. *P. polyanthus.*
      - Male flowers on leafy clustered branchlets . 10. *P. physocarpus.*

‡‡Stamens 4.
Male flowering branchlets usually leafy towards the apex, produced in clusters on the younger wood in the axil of a leafy flowerless shoot . . . . . 11. *P. profusus.*
Male flowering branchlets not or scarcely leafy, produced in clusters on the older wood and not in the axil of a leafy flowerless shoot . . . . . 12. *P. Tessmannii.*
††††Stamens 3, filaments free or united.
Filaments quite free.
Flowers diœcious . . . . . 13. *P. meruensis.*
Flowers monœcious . . . . . 16. *P. Kæssneri.*
ilaments connate.
Leaves linear-lanceolate, rigidly coriaceous, not more than $1\frac{1}{4}$ lin. broad . . . . 14. *P. virgulatus.*
Leaves obovate, elliptic or suborbicular, more than $1\frac{1}{4}$ lin. broad.
Leaves mucronate . . . . . 15. *P. macranthus.*
Leaves not mucronate.
Male flowers solitary; staminal column slightly produced beyond the insertion of the anthers; flowering branchlets less than 1 in. long . . . . . 17. *P. Hildebrandtii.*
Male flowers 3–4 together in each leaf-axil; staminal column not produced; flowering branchlets 1–2 in. long . . . 18. *P. sepialis.*
**Flowering branchlets not produced in fascicles.
†Stamens 3, 4 or 5; filaments free or slightly connate at the base, or rarely some free and the others connate, never all connate.
Disk of the male flowers annular . . . 19. *P. discoideus.*
Disk of the male flowers consisting of separate glands.
‡Stamens 5, rarely 4.
Two or three of the filaments connate to the apex, the remainder free and shorter . 5. *P. reticulatus.*
All the filaments quite free.
Flowers diœcious . . . . 20. *P. graminicola.*
Flowers monœcious.
Pedicel slender, 2 lin. long or more.
Branchlets puberulous or pubescent . 21. *P. capillaris.*
Branchlets glabrous or very slightly asperulate.
Capsule about 1 lin. in diam.; seeds pitted . . . . . 22. *P. nummularifolius.*
Capsule about $2\frac{1}{2}$ lin. in diam.; seeds smooth . . . 23. *P. somalensis.*
Pedicel shorter and stouter, usually less than $1\frac{1}{2}$ lin. long.
Branches spiny . . . . 7. *P. Dinklagei.*
Branches not spiny.
Styles short and very divergent, spreading over the top of the ovary, free to the base . . 24. *P. pentandrus.*

Styles erect or suberect, free to the base . . . . . 25. *P. angolensis.*
Styles erect, connate in the lower half, free parts recurved or spreading.
Leaves elliptic or obovate, 2–4 lin. long; styles slender . . 8. *P. loandensis.*
Leaves linear-lanceolate, $\frac{3}{4}$–$1\frac{3}{4}$ in. long; styles very thick . 26. *P. purpureus.*

‡‡Stamens 3.
Perennials; sepals 6.
Stems simple or subsimple, arising from a woody rhizome.
Flowers diœcious . . . . . 27. *P. alpestris.*
Flowers monœcious . . . . . 28. *P. glaucophyllus,* var. *major.*
Shrubs; stems branched, not from a rhizome 13. *P. meruensis.*
Annual herb; sepals 5. . . . . 29. *P. benguelensis.*

††Stamens 3; filaments connate their whole length or nearly so.
Sepals of both sexes 5, those of the female in a single series.
Flowers diœcious.
Leaves reticulate, margins slightly recurved . 30. *P. arvensis.*
Leaves not reticulate, with reddish margins . 31. *P. microphyllinus.*
Flowers monœcious.
Styles absent; stigmas sessile; leaves slightly woolly-pubescent . . . . . 32. *P. sublanatus.*
Styles present, sometimes short; leaves not woolly-pubescent.
Ovary prominently warted.
Styles very slender, spreading; stigmas not swollen; disk of female flower 5-lobed . . . . . 33. *P. niruroides.*
Styles erect; stigmas globose; disk of female flowers crenulate . . . 34. *P. leucocalyx.*
Ovary smooth.
Disk of female flower large, fleshy, supporting the stipitate ovary like a collar 35. *P. microdendron.*
Disk of female flower flat; ovary not or only slightly stipitate.
Disk of female flowers 5-lobed, lobes triangular . . . . 36. *P. amarus.*
Disk of female flowers crenulate or undulate, not regularly lobed.
Leaves conspicuously mucronate . 37. *P. Paxii.*
Leaves not or scarcely mucronate.
Male disk-glands smooth.
Under-shrub; styles spreading 38. *P. hutchinsonianus.*
Annual; styles erect or suberect . . . . 39. *P. Bœhmii.*
Male disk-glands strongly warted 40. *P. Dekindtii.*
Sepals of both sexes 6, those of the female often in 2 series.
Flowers diœcious.

Leaves usually less than $\frac{1}{2}$ in. long, lanceolate or obovate; pedicels very short.
Flowering branchlets asperulate . . 41. *P. Dinteri.*
Flowering branchlets smooth.
Leaves with a hardened spinescent apex . . . . . 14. *P. virgulatus.*
Leaves not spiny at the apex . . 42. *P. suffrutescens.*
Leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. long, ovate or ovate-elliptic; pedicels 2–4 lin. long . . . 52. *P. myrtaceus.*
Flowers monœcious.
Stems prostrate and rooting at the nodes, or if erect then the leaves minutely ciliolate and the ovary warted.
Stems prostrate, rooting at the nodes; ovary smooth . . . . . 43. *P. prostratus.*
Stems erect, not rooting at the nodes; ovary warted . . . . . 44. *P. Urinaria.*
Stems erect, never rooting at the nodes; ovary smooth.
Disk of the female flowers consisting of separate glands . . . . 45. *P. maderaspatensis.*
Disk of the female flowers annular, saucer-shaped or cupular, entire, lobed or toothed.
Stems arising from a thick woody rhizome.
Leaves linear-lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $1\frac{1}{2}$–3 lin. broad; stems winged; sepals oblanceolate-spathulate . 46. *P. Dusenii.*
Leaves oblong-elliptic or ovate-elliptic, cordate at the base, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, 5–10 lin. broad; stems terete; sepals ovate . . . . 47. *P. welwitschianus.*
Shrubs or annuals, without rhizome.
Leaves almost linear-lanceolate.
Leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long.
Stems smooth; stigmas not swollen . . . . 48. *P. Gossweileri.*
Stems asperulate; stigmas globose . . . . . 49. *P. omahakensis.*
Leaves $\frac{3}{4}$–$1\frac{1}{2}$ in. long . . . 50. *P. Chevalieri.*
Leaves ovate, broad and rounded or truncate at the base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. broad . . . 51. *P. mittenianus.*
Leaves rounded, obovate, elliptic or oblong-oblanceolate, smaller than in the preceding.
Ovary shortly stipitate, or if sessile then the female disk 5–6-lobed.
Ovary sessile; disk 5–6-lobed . 53. *P. Pseudo-niruri.*
Ovary shortly stipitate.
Styles rather short, suberect from the base, recurved . 54. *P. odontadenius.*
Styles long and bilobed, spreading from the base . . 55. *P. leucanthus.*

Ovary sessile; disk toothed.
Stigmas swollen and undivided or bifid at the apex.
Stems cobwebby-pubescent; flowering branchlets and leaves smooth . . 56. *P. Rivæ.*
Stems not hairy; flowering branchlets and leaves asperulate.
Styles bifid . . . 57. *P. aspericaulis.*
Styles entire; stigmas globose 15. *P. macranthus.*
Stigmas not swollen at the apex.
Styles rather long, erect or suberect, bilobed to near the middle.
Leaves 3–5 lin. broad; disk of the female flowers cupular, erect, margin incised like the teeth of a comb; male disk-glands slightly warted 58. *P. Fischeri.*
Leaves 3 lin. broad or less; disk of the female flowers saucer-shaped, spreading, margin crenulate or entire; male disk-glands prominently warted or smooth.
Male disk-glands warted.
Stipules very conspicuous, with long subulate points, 1½–2 lin. long . . . 59. *P. mannianus.*
Stipules not conspicuous, scarcely 1 lin. long . . . 60. *P. Volkensii.*
Male disk-glands smooth . 38. *P. hutchinsonianus.*
Styles very short, shortly bifid.
Leaves oblong or oblong-elliptic; disk of the female flowers rather deeply toothed . . 61. *P. Niruri.*
Leaves orbicular or obovate-orbicular; disk of the female flowers crenulate . 62. *P. rotundifolius.*

†††Stamens 2; filaments connate.
A small annual herb about 5 in. high . . . 63. *P. parvus.*
Shrubs 3–10 ft. high; leaves elliptic or oblong.
Leaves caudate-acuminate . . . . 64. *P. diandrus.*
Leaves not acuminate.
‡Leaves ½–4 in. long.
Leaves obtusely pointed; lateral nerves 9–10 on each side, prominent below; sepals of the female flowers ovate-orbicular, broad at the base; seeds minutely and closely pitted . . . . 65. *P. petræus.*

Leaves rounded or truncate and often slightly emarginate; lateral nerves 13–16 on each side, slightly raised below; sepals of the female flowers obovate, narrowed to the base; seeds covered with numerous longitudinal rows of very small wart-like protuberances	66. *P. Beillei.*
‡‡Leaves $\frac{1}{4}$–$\frac{1}{3}$ in. long	38. *P. hutchinsonianus.*

1. **P. kirkianus,** *Müll. Arg. in Flora*, 1864, 486. A small shrub; branches subsimple, stout, terete, glabrous; young shoots produced in fascicles, rather slender, glabrous. Leaves obovate or suborbicular, rounded or truncate at the apex, very obtuse or slightly cuneate at the base, 2–6 lin. long, 2–4 lin. broad, membranous, glabrous on both surfaces; lateral nerves about 5 on each side, branched, slightly prominent below; veins slightly prominent below, rather lax; petiole $\frac{1}{2}$ lin. long; stipules linear-lanceolate, equalling the petiole, membranous, brown, margin jagged. Flowers diœcious, clustered on extremely short lateral branchlets produced in fascicles on the older wood. Male flowers: bracts membranous; pedicel very slender, 2 lin. long, glabrous. Sepals 6, unequal, obovate or oblong, $\frac{1}{2}$ lin. long, membranous, glabrous, tips reddish-brown and laciniate or jagged. Disk annular, subcrenulate, glabrous. Stamens 6; filaments about thrice the length of the calyx, glabrous, very shortly connate at the base or nearly free; anthers curved. Female flowers: pedicel $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, very slender, slightly thickened towards the apex, glabrous. Sepals joined at the base, otherwise similar to the male. Disk very thin and adnate to the base of the calyx, glabrous. Ovary ovoid, each carpel depressed in the upper part; styles slender, connate at the base, bilobed to about the middle, slightly papillose. Capsule (immature?) trilobed, about 3 lin. long and $2\frac{1}{2}$ lin. in diam., closely and distinctly reticulate, each style persistent in a depression of the incurved apex of each carpel. Ripe seeds not seen.—Müll. Arg. in DC. Prodr. xv. ii. 334; Pax in Engl. Pfl. Ost-Afr. C. 236. *P. senensis*, Müll. Arg. l.c. 335. *Diasperus kirkianus* and *D. senensis*, O. Kuntze, Rev. Gen. Pl ii. 599, 601. *Cluytiandra Schinzii*, Pax in Bull. Herb. Boiss. 2me sér. viii. 635.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Tete, *Kirk*, 4! Sena, *Peters!* Boruma, *Menyharth*, 779!

2. **P. lalambensis,** *Schweinf. in Bull. Herb. Boiss.* 1*re sér.* vii. *App.* ii. 302. A shrub several feet high or a small tree; branches terete, with a dark-brown sulcate bark; flowering-branchlets fasciculate, leafy, less than 1 in. long, subterete, glabrous. Leaves oblong or oblong-elliptic, obtuse at both ends, 3–5 lin. long, 2–3 lin. broad, thinly chartaceous, glabrous on both surfaces; petiole about $\frac{1}{2}$ lin. long; stipules ovate or oblong-lanceolate, a little longer than the petiole, margin lacerate. Flowers diœcious, males in axillary fascicles; pedicel about $\frac{3}{4}$ lin. long, rather slender, glabrous. Sepals 4 or 5, broadly elliptic or obovate, slightly unequal, margins slightly membranous. Disk-glands 4, fleshy, rounded, almost contiguous, slightly pitted. Stamens 4,

two of the filaments quite connate, the two others shorter and free; anther-cells diverging from their apex, dehiscing at the side. Female flowers not known.—Penzig in Atti Congr. Bot. Genova, 1892, 360.

Nile Land. Eritrea: Lalamba Mountain, near Keren, *Schweinfurth*, 881! Ginda, *Schweinfurth*, 404.

Mozamb. Distr. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 169!

Occurs also in Arabia.

3. **P. guineensis,** *Pax in Bull. Herb. Boiss. 1re sér.* vi. 732. A shrub, much branched from the base, 3–10 ft. high; branches angular, glabrous, with spinescent stipules; flowering branchlets produced in clusters of 2–4, up to 3 in. long, leafy, glabrous. Leaves oblong or oblong-elliptic, truncate or rounded and often mucronate at the apex, rounded or obtuse at the base, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $1\frac{1}{2}$–4 lin. broad, thin or very slightly chartaceous, glabrous on both surfaces; lateral nerves spreading, very faint, about 7 on each side; petiole $\frac{3}{4}$ lin. long, glabrous; stipules on the flowering branchlets oblong, brown, membranous, ciliate. Flowers monœcious, axillary, about 4 or 5 males and 1 female in each fascicle; pedicel slender, $1\frac{1}{2}$ lin. long, glabrous. Male flowers: Sepals 4, ovate, obtuse or subacute, $\frac{3}{4}$ lin. long, 1-nerved, glabrous. Disk-glands 4, rounded or transversely oblong, fleshy, slightly pitted. Stamens 4, two of the filaments connate for nearly their full length, the other two free and slightly shorter; anthers dehiscing longitudinally. Female flowers: Sepals 5, a little longer than those of the male. Disk fleshy, cupular, very slightly crenulate or entire. Ovary ovoid or ellipsoid, slightly wrinkled, glabrous; styles long and slender, free to the base, entire or very minutely bifid. Fruits fleshy, ellipsoid, about 2 lin. in diam. Ripe seeds not seen.—*P. floribundus*, Hiern in Cat. Afr. Pl. Welw. i. 957, not of Müll. Arg. *P. ugandensis*, Rendle in Journ. Linn. Soc. xxxvii. 210.

Nile Land. Uganda: coast of Victoria Nyanza, *Bagshawe*, 571! Dumu, *Dawe*, 29!

Lower Guinea. Angola: Loanda; Cazengo, *Gossweiler*, 4882! Golungo Alto; near Sange and Bango, *Welwitsch*, 319! near the rivulet Delamboa, *Welwitsch*, 318! Ambaca; near a dried-up stream near Hâlo, *Welwitsch*, 320! Pungo Andongo, *Welwitsch*, 317B! Malange district, *Gossweiler*, 960! 965! 969! *Antunes*, 1243! Kunene region; on the banks of the Kakulovar River, *Dekindt*, 844.

Mozamb. Distr. British Central Africa: Nyasaland; *Buchanan*, 353! 469! Ntondwe, *Cameron*, 135!

4. **P. Engleri,** *Pax in Engl. Pfl. Ost-Afr. C.* 236. A tree about 18 ft. high; stem slender; branches knotted with perennial spiny buds which produce annually several flowering branchlets in fascicles; flowering branchlets 3–4 in each fascicle, somewhat slender, up to 7 in. long, finely sulcate, glabrous. Leaves rounded or elliptic, mucronate and sometimes slightly emarginate, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, firmly chartaceous, glabrous on both surfaces, glaucous below; lateral nerves scarcely visible, about 5 on each side; petiole $\frac{3}{4}$ lin. long, glabrous;

stipules linear, membranous with jagged margins, about 1 lin. long, soon falling off. Male flowers in axillary fascicles on the young branchlets, surrounded at the base by laciniate brown bracts; pedicel short, glabrous. Sepals 5, elliptic-ovate, acute, 1-nerved, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, glabrous. Disk-glands 5, rounded, fleshy, nearly smooth. Stamens 5, three filaments connate to near the top, the other two free nearly to the base; anthers dehiscing longitudinally. Female flowers not known.

Mozamb. Distr. German East Africa: Unyamwezi; Mugondi, *Trotha*, 72! Mgogondi, *Trotha*, 2D! Kagehi, on Lake Victoria, *Fischer*, 554! Karagwe; Ihangiro, *Stuhlmann*, 904!

5. **P. reticulatus,** *Poir. Encycl.* v. 298. An erect much-branched shrub; stems pubescent, at length nearly glabrous; flowering branchlets sometimes produced in fascicles, but more often solitary, up to $2\frac{1}{2}$ in. long, densely crisped-pubescent. Leaves oblong or elliptic, mostly rounded at both ends, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $3\frac{1}{2}$–7 lin. broad, somewhat membranous, glabrous or crisped-pubescent; lateral nerves 7–9 on each side; petiole pubescent; stipules lanceolate, acute. Flowers monœcious, axillary, one female and two or three males in each fascicle; pedicel slender, up to 2 lin. long, slightly pubescent or glabrous. Male flowers: Sepals 5, ovate-elliptic, 1-nerved, about $\frac{3}{4}$ lin. long. Disk-glands 5, obovate, flattened, smooth. Stamens 5; two or three of the filaments connate to near the top, the two others always free and much shorter; anthers dehiscing at the side, cells cohering at their tips, diverging at the base. Female flowers: Sepals as in the male. Disk of separate glands similar to those of the male. Ovary depressed-globose, glabrous; styles very short, erect and crowded. Fruit fleshy or coriaceous, 8–16-seeded, about 3 lin. in diam. Seeds irregularly trigonous, punctulate. —Pax in Engl. Pfl. Ost-Afr. C. 236; Durand & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 103; De Wild. & Durand, Reliq. Dewevr. 205; De Wild. Miss. É. Laurent, 127, and Études Fl. Bas- et Moyen-Congo, i. 275, ii. 268; Gibbs in Journ. Linn. Soc. xxxvii. 469. *Phyllanthus multiflorus*, Willd. Sp. Pl. iv. 581. *P. prieurianus*, Müll. Arg. in Linnæa, xxxii. 12. *P. alaternoides*, Reichb. ex Baill. Adansonia, i. 83. *P. reticulatus*, var. *genuinus*, Müll. Arg. in DC. Prodr. xv. ii. 344; Hiern in Cat. Afr. Pl. Welw. i. 958. *Anisonema reticulatum*, Adr. Juss. Euph. t. 4, fig. 11. *Kirganelia reticulata*, Baill. Étude Gén. Euphorb. 613. *K. prieuriana*, Baill. Adansonia, i. 82. *Diasperus reticulatus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. Senegambia: Senegal, *Sieber*, 41! *Leprieur! Perrottet*, 64, 751, 752. Western Sudan: from El Massara to Djygm, *Chevalier*, 3461! Northern Nigeria: Katagum district, *Dalziel*, 210! sand-flats of the River Benue, *Dalziel*, 161! North Bornu; near Duchi, *Elliott*, 143! Southern Nigeria: Attah (Idda), *Vogel*, 114! Cameroons: Garua, *Ledermann*, 3253!

Nile Land. Sudan: Sedab, between Berber and Khartum, *Schweinfurth*, 540! near Khartum, *Schweinfurth*, 868! Atbara, *Broun*, 1017! Mittu: Mvolo, *Schweinfurth*, 2828! British East Africa: Witu, *Thomas*, 202!

Lower Guinea. Lower Congo: various localities, *Dewèvre; Gillet*, 3979, 4045, *Pynaert*, 191, *Laurent*, *Büttner*. Angola: Loanda, *Welwitsch*, 325! *Gossweiler*, 245! Benguela, *Welwitsch*, 326!

South Central. Belgian Congo: Kasongo, *Dewèvre*, 950A.

Mozamb. Distr. German East Africa: Usaramo, *Stuhlmann*, 1619! Tanga, *Holst*, 2012! *Volkens*, 98! British Central Africa: Nyasaland; various localities, *Scott! Scott-Elliot*, 8409! *Whyte! Buchanan*, 947! Rhodesia: near Victoria Falls, *Miss Gibbs*, 129! *Galpin*, 7016! Matoppo Hills, *Rattray in Herb. Galpin*, 6969!

Var. *glaber*, Müll. Arg. in Linnæa, xxxii. 12. Entirely glabrous, otherwise similar to the typical plant.—Müll. Arg. in DC. Prodr. xv. ii. 345; Hiern, l.c. *Phyllanthus polyspermus*, Schumach. & Thonn. Beskr. Guin. Pl. 416. *Kirganelia prieuriana*, var. *glabra*, Baill. Adansonia, i. 12. *K. zanzibariensis*, Baill. l.c. ii. 48.

Upper Guinea. Gold Coast: Kita (Quetta), *Thonning!* Lagos, *Millen*, 53! *Rowland!* Southern Nigeria: River Quorra (Niger), *Vogel!*

Nile Land. British East Africa: Shimba Mountains, *Kässner*, 193!

Lower Guinea. Angola: Loanda, *Welwitsch*, 325B!

6. **P. floribundus,** *Müll. Arg. in Linnæa*, xxxii. 14. A trailing shrub or climber up to 30 ft. high; stems terete, glabrous, with short ovate or lanceolate often recurved spines at the base of the lateral leaf-bearing branchlets; leafy branchlets slender, spreading, up to 7 in. long, thickened at the base, glabrous. Leaves ovate or ovate-elliptic, rounded and mucronate at the apex or very shortly acuminate from a rounded apex, mostly rounded or truncate at the base, $\frac{3}{4}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, membranous or the older thinly chartaceous, glabrous on both surfaces, often glaucous below; lateral nerves 6–12 on each side, spreading almost at right angles, then curved and branched, slightly raised on both surfaces; veins lax and indistinct; petiole $1\frac{1}{2}$ lin. long, glabrous; stipules linear, shorter than the petiole. Flowers monœcious, racemose; racemes fasciculate in the axils of the leaf-bearing branchlets, slender, up to 2 in. long; flowers in clusters on the main axis of each inflorescence, 2 or 3 males surrounding a solitary female; male pedicel very slender, 1 lin. long, glabrous, of the female a little shorter and stouter. Male flowers: Sepals 5, oblong, rounded at the apex, about $\frac{1}{2}$ lin. long, glabrous. Disk-glands 5, fleshy, slightly pitted or warted. Stamens 5; filaments quite free, slightly unequal; anthers dehiscing at the side. Female flowers: Sepals soon deciduous. Disk cupular, entire or undulately lobed, glabrous. Ovary ellipsoid, glabrous; styles 4–5, spreading, very slender, bilobed, lobes linear, subterete. Fruit depressed-globose, $1\frac{1}{2}$ lin. in diam.; mesocarp fleshy. Seeds triquetrous, convex on the back, smooth and faintly reticulate.—Müll. Arg. in DC. Prodr. xv. ii. 343; Pax in Engl. Pfl. Ost-Afr. C. 236, and in Bull. Soc. Bot. Belg. xxxvii. 103; De Wild. & Durand, Reliq. Dewevr. 204; De Wild. Études Fl. Bas- et Moyen-Congo, i. 275, ii. 266; Stapf in Johnston, Liberia, ii. 648; Th. & Hél. Durand, Syll. Flor. Congol. 482. *Phyllanthus floribundus*, var. *krebedjensis*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 55. *Kirganelia floribunda*, Baill. Adansonia, i. 83. *Diasperus floribundus*, O. Kuntze, Rev. Gen. Pl. ii. 597.

Upper Guinea. Senegambia: Nunez, *Heudelot*, 659! Sierra Leone: various localities, *Scott-Elliot*, 4144! 4402! 4625! *Johnston*, 96! Liberia: near Monrovia, *Whyte!* Togo: various localities, *Krause*, 17–19! *Büttner*, 19! 112!

157! *Kersting*, 42! 165! 171! 430! *Graf Zech*, 291–293! Lagos: various localities, *Barter*, 3280! *Rowland!* *Moloney!* *MacGregor*, 159! Northern Nigeria: Nupe, *Barter*, 1666! Zungeru, *Dalziel*, 64! Southern Nigeria: Old Calabar River, *Mann*, 2262! Idda, *Barter*, 454! Cameroons: various localities, *Zenker & Staudt*, 458! *Zenker*, 1310! 2486! 2729! 3657! *Staudt*, 571! *Ledermann*, 3801! 4831! 2106! 2773! *Bates*, 377! Fernando Po, *Mann*, 12!

North Central. Lake Iro region, *Chevalier*, 8755! Ndellé, *Chevalier*, 8037!

Nile Land. Bongo, *Schweinfurth*, 2209!

Lower Guinea. Island of St. Thomas, *Mann*, 1076! French Congo: Krebedjé; valley of the Tomi, *Chevalier*, 5394! Boma; Upper Shiloango, *Cabra & Michel*. Stanley Pool; Kimuenza, *Gillet*.

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3359! 3449! Niamniam: Diagbe River, *Schweinfurth*, 3111!

Mozamb. Distr. German East Africa: eastern shore of Lake Tanganyika, *Scott-Elliot*, 8313! 8351!

7. **P. Dinklagei,** *Pax in Engl. Jahrb.* xix. 77. A shrub; branches spiny, angular or subterete, glabrous; flowering branchlets spreading, slender, 2–3½ in. long, with up to 14 pairs of leaves, rather sharply angular, glabrous. Leaves oblong, rounded at both ends, 5–7 lin. long, 1½–3 lin. broad, very thin, darker and closely reticulate on the upper surface, glabrous on both surfaces, glaucous below; lateral nerves 9–12 on each side, not at all raised on either surface; petiole ½ lin. long, glabrous; stipules subulate, nearly twice the length of the petiole, margin slightly serrulate or jagged. Flowers monœcious, axillary, one female and three or four males in each leaf-axil; pedicel very slender, glabrous, of the male 2–2½ lin. long, of the female a little shorter. Male flowers: Sepals 5, ovate-lanceolate, subacute, ½ lin. long, not membranous, glabrous. Disk-glands 5, small, rounded, fleshy. Stamens 5; filaments free, 3 long and 2 shorter; anthers dehiscing longitudinally. Female flowers: Sepals as in the male. Disk cupular, rather fleshy, crenulate. Ovary ovoid, smooth; styles erect, connate in the lower half, free portion bilobed to near the base, lobes linear and very slender, reflexed or reflexed-spreading. Capsule subglobose, about 1 lin. in diam.; exocarp slightly fleshy. Mature seeds not seen.

Upper Guinea. Cameroons: Efulen, *Bates*, 371! between Mundane and Otam, *Schlechter*, 12887!

Lower Guinea. Gaboon: Sibange Farm, *Dinklage*, 583!

8. **P. loandensis,** *Welw. ex Müll. Arg. in Journ. Bot.* 1864, 329. An undershrub, woody at the base; stem erect, 2–3 ft. high, branched; branchlets slender, glabrous. Leaves elliptic or obovate, obtuse at both ends, obtusely mucronulate at the apex, 2–4 lin. long, 1–2½ lin. broad, slightly coriaceous, glabrous on both surfaces; lateral nerves 4–5 on each side, slightly prominent below; veins not visible; petiole ¼ lin. long, glabrous; stipules subulate, a little longer than the petiole. Male flowers: pedicel ½ lin. long, glabrous. Sepals obovate, rounded at the apex, ½ lin. long, ⅓ lin. broad, membranous, with a distinct midrib, glabrous. Disk-glands 5, broadly obovate, truncate, thin, glabrous.

Stamens 5; filaments free; anthers dehiscing longitudinally at the side. Female flowers: Sepals 5, ovate-elliptic, membranous. Disk saucer-shaped, entire, glabrous. Ovary minutely pitted; styles 3, erect and subconnate in the lower half, bilobed, lobes spreading, slender. Capsule not seen.—Müll. Arg. in DC. Prodr. xv. ii. 342; Hiern in Cat. Afr. Pl. Welw. i. 957. *Diasperus loandensis*, O. Kuntze, Rev. Gen. Pl. ii. 599.

Lower Guinea. Angola: Loanda; in hilly bushy places on a clay soil behind Penedo, rare, *Welwitsch*, 335! Loanda, *Gossweiler*, 146! 266!

9. **P. polyanthus,** *Pax in Engl. Jahrb.* xxviii. 19. A glabrous tree with spreading branches. Leaves ovate or oblong, attenuated to the apex, subacute at the base, nearly 3 in. long, $1\frac{1}{4}$ in. broad, coriaceous, shining on both surfaces, margin slightly undulate; petiole 2 lin. long; stipules triangular, much shorter than the petiole and not spinescent. Male flowers in slender leafless racemose fascicles about 3 in. long, on woody branches; pedicel capillary, double the length of the flower. Sepals 5, ovate-orbicular, obtuse. Disk-glands 5. Stamens 5; filaments unequally free; anthers dehiscing almost vertically. Female flowers not known. Capsule large, 4-celled, $1\frac{1}{4}$ in. in diam.—De Wild. & Durand, Reliq. Dewevr. 204.

South Central. Belgian Congo: Bangala, on the Congo near Bumba, *Dewèvre*, 890.

Bagshawe, 1493, from Uganda may possibly be this species; see note under 10, *P. physocarpus*.

10. **P. physocarpus,** *Müll. Arg. in Flora*, 1864, 515. A tree 25 ft. high; branches terete, glabrous; branchlets clustered, slender, grooved, glabrous. Leaves oblong or oblong-elliptic, acute, subacute or very shortly acuminate, obtusely cuneate at the base, $\frac{3}{4}$–4 in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, membranous, glabrous on both surfaces, glaucous below; lateral nerves 4–7 on each side, very slender and much branched; veins very lax; petiole 1–2 lin. long, slightly wrinkled, glabrous; stipules subulate-filiform, about 1 lin. long, glabrous. Flowers dicœcious, males few in axillary fascicles, females few and solitary or subsolitary. Male flowers: pedicel very slender, about $1\frac{1}{2}$ lin. long, glabrous. Sepals 5, oblong-ovate, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, obtuse, entire, very thin and membranous, with a slender midrib. Disk-glands 5, contiguous, transversely oblong, very thick and fleshy, distinctly pitted. Stamens 5; filaments free; anthers dehiscing longitudinally at the side. Female flowers: pedicel much thicker than those of the male (at least when in fruit). Disk annular, subentire. Ovary ovoid, glabrous and smooth; styles free almost to the base, bipartite, very slender. Capsules about 1 in. in diam., very light; exocarp crustaceous, slightly thicker than the very thin yellow endocarp. Seeds subreniform, not at all triquetrous, about $3\frac{1}{2}$ lin. long; testa mottled and rather dull.—Müll. Arg. in DC. Prodr. xv. ii. 342. *Diasperus physocarpus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Lower Guinea. Princes Island, *Mann*, 1133! *Barter*, 2023!

A specimen in fruit collected by Dr. Bagshawe (1493) in the Budongo Forest,

Unyoro, Uganda, represents a species evidently very closely allied to *P. physocarpus*. The capsules are very large (1½ in. in diam.), and the seeds, although very similar, are not quite identical, the portion near the middle on the ventral side not being contracted as in that species. It may possibly be *P. polyanthus*, Pax, which I have not seen.

11. **P. profusus,** *N. E. Br. in Journ. Linn. Soc.* xxxvii. 113. Branches subterete, woody, glabrous; flowering branchlets produced in fascicles in the axils of a sterile branchlet, up to 8 in. long, slightly flattened. Leaves ovate or oblong-ovate, acutely acuminate, rounded or slightly cuneate at the base, 1–3 in. long, ¾–1½ in. broad, chartaceous, glabrous on both surfaces, paler below; lateral nerves 5–6 on each side, looped and branched about half-way between the midrib and margin, very slightly raised below; petiole 1 lin. long, glabrous; stipules small, slightly oblique, lanceolate, acute, glabrous. Male flowers very numerous, fasciculate on crowded branchlets produced from the axil or a little above the axil of a sterile branch, whitish or pale green; pedicel very slender, up to 4 lin. long, glabrous. Sepals 4, oblong-elliptic, obtuse, 1 lin. long, ⅓ lin. broad, membranous, glabrous. Disk-glands 4, rounded and slightly fleshy, faintly pitted. Stamens 4; filaments free; anthers dehiscing at the side. Female flowers not known.—Stapf in Johnston, Liberia, ii. 648.

Upper Guinea. Liberia: Sinoe Basin, *Whyte!* within a radius of 20 miles from Kakatown, *Whyte!*

12. **P. Tessmannii,** *Hutchinson.* Branches subterete, covered with a greyish-brown bark; leafy branchlets rather deeply grooved or angular, glabrous. Leaves ovate or ovate-elliptic, shortly and gradually acuminate or obtuse, truncate or subcuneate at the base, 1¼–4 in. long, ¾–2 in. broad, membranous, glabrous on both surfaces, pallid below; lateral nerves 7–9 on each side, looped and freely anastomosing well within the margin, slightly raised below; veins slender, rather lax, distinct on the lower surface; petiole 1–1½ lin. long, subterete, glabrous; stipules oblong-spathulate, ¾–1½ lin. long, soon deciduous, margin jagged or fringed in the upper part. Male racemes of fascicles leafless, or slightly leafy toward the top, very slender, produced in clusters on the older wood, about 3½ in. long; axis of each raceme glabrous; bracts spathulate, ½ lin. long, slightly 4–5-lobed and fringed in the upper half. Sepals 4–5, ovate-elliptic, rounded at the apex, 1 lin. long, membranous, with a distinct slender midrib and lateral nerves. Disk-glands 5, suborbicular, fleshy, smooth or very slightly pitted. Stamens 4; filaments quite free to the base; anther-cells distinct, parallel, dehiscing longitudinally. Female flowers not known.—*P. gracilipes*, Pax in Engl. Jahrb. xlv. 235, not of Müll. Arg.

Lower Guinea. Island of St. Thomas: south-west district, *Chevalier,* 14624! Spanish Guinea: Campo region, *Tessmann,* 710! 925! 940A!

13 **P. meruensis,** *Pax in Engl. Jahrb.* xv. 526. A shrub; branches angular, glabrous; flowering branchlets up to 4 in. long, angular or narrowly winged, smooth. Leaves elliptic or lanceolate-elliptic, slightly narrowed to both ends, mucronate, 4–7 lin. long, 2–4 lin. broad, mem-

branous, glabrous on both surfaces; lateral nerves 5–6 on each side, distinct on both surfaces and slightly raised below; petiole ¾ lin. long, slender; stipules linear, 1–1½ lin. long, glabrous, membranous. Flowers diœcious, solitary, female pedicel about 1 lin. long, the male much shorter. Male flowers: Sepals 6, oblong-elliptic, 1-nerved, scarcely ½ lin. long. Disk-glands 6, flattened, rounded and prominently warted. Stamens 3; filaments free to the base; anther-cells distinct, dehiscing at the side. Female flowers: Sepals 6, oblong-oblanceolate, ¾ lin. long, ⅓ lin. broad, with a broad green portion in the middle, margins transparent and membranous. Disk thin, saucer-shaped, crenulate. Ovary subglobose, slightly warted; styles free to the base, slender, bilobed to below their middle, lobes linear and not swollen at the apex. Capsule depressed-globose, reticulate, about 1¼ lin. in diam. Seeds with about 6 or 7 faint longitudinal lines on the back.—Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. British East Africa: Tana River, *Battiscombe*, 240!

Mozamb. Distr. German East Africa: Meru Mountain, *Fischer*, 102! 532! between Meru Mountain and Kilimanjaro, *Merker*, 610! Kilimanjaro; various localities, *Merker*, 609! *Volkens*, 1718! 1639! 1640! south of Mondul, *Uhlig*, 424!

14. **P. virgulatus,** *Müll. Arg. in Journ. Bot.* 1864, 330. An undershrub; stems elongated, woody, finely longitudinally sulcate, glabrous; flowering branches slender, spreading, up to 5 in. long, subterete. Leaves linear-lanceolate, produced into a sharp spinescent apex, narrowed to the base, the largest ½ in. long, 1¼ lin. broad, coriaceous, 1-nerved, with a cartilaginous margin, glabrous on both surfaces; petiole very short; stipules rigidly subulate from a broader base, very acute, 1¼ lin. long. Flowers diœcious, males axillary, solitary, or sometimes accompanied by one or two rudimentary ones, shortly pedicellate. Sepals 6, in 2 series, 3 outer elliptic, rounded at the apex, 1¼ lin. long, ¾ lin. broad, 3 inner a little narrower, all with a faint median nerve and several lateral ones. Disk-glands 6, thin, smooth. Stamens 3; filaments connate; anthers dehiscing at the sides. Female flowers solitary; pedicel about 1 lin. long, much thickened towards the top. Sepals 6, in 2 series, 3 outer ones small, ovate, obtuse, 3 inner ovate-oblong, 1¼ lin. long, ¾ lin. broad, the whole very thick and coriaceous without visible veins. Disk entire, annular, flat, glabrous. Ovary subglobose, slightly lobed, glabrous; styles erect, free to the base, entire, stigma subcapitate. Ripe capsule not seen.—Müll. Arg. in DC. Prodr. xv. ii. 360; Hiern in Cat. Afr. Pl. Welw. i. 959; Pax in Baum, Kunene-Samb. Exped. 282. *Diasperus virgulatus*, O. Kuntze, Rev. Gen. Pl. ii. 601.

Lower Guinea. Angola: Pungo Andongo; in thickets between Bumba and Condo, near the great Cataract of the Cuanza River, *Welwitsch*, 328! by the Kutsi River above Kapulo, 4300 ft., *Baum*, 893! east of Fort Princeza Amelia, Cubango, *Gossweiler*, 2000! along the wagon road at Canguia, near Munonque, *Gossweiler*, 2639! Mount Amaral and Kubango, *Gossweiler*, 1827!

15. **P. macranthus,** *Pax in Engl. Jahrb.* xix. 77. A small compact shrub; bark of the stem splitting longitudinally, brown; flowering

branchlets often produced in fascicles, short, about 1 in. long, sharply angular, distinctly asperulate, bearing 3–5 pairs of leaves. Leaves broadly elliptic or nearly rounded, slightly mucronate at the apex, 2–3½ lin. long, 1½–3 lin. broad, chartaceous, asperulate on both surfaces and on the margins; lateral nerves about 3 on each side, faint; petiole very short; stipules lanceolate, acute, ½ lin. long, somewhat membranous. Flowers creamy-white, monœcious, solitary in each leaf-axil, females towards the ends of the branchlets, males towards the base; pedicel short. Male flowers: Sepals 6, linear-oblong, obtuse, 1½ lin. long, ½ lin. broad, 1-nerved, glabrous. Disk-glands 6, rounded, fleshy, smooth. Stamens 3; filaments connate to the top into a slender column; anthers dehiscing longitudinally. Female flowers: Sepals 6, in two distinct series, the outer ovate, 1¾ lin. long, 1 lin. broad, the inner oblong and narrower, faintly 1-nerved. Disk large and thick, fleshy, rather coarsely wrinkled, glabrous. Ovary lobed, smooth; styles erect, thick, connate in the lower half; stigmas capitate, globose. Capsule thin. Seeds with about 5 very faint lines on the back.—Pax in Engl. Pfl. Ost-Afr. C. 236, and in Engl. Jahrb. xxx. 338; S. Moore in Journ. Linn. Soc. xl. 192.

Lower Guinea. Angola: Ambriz, *Monteiro!*

Mozamb. Distr. German East Africa: Ubena; Liangira, *Goetze*, 795. Portuguese East Africa: *Stuhlmann*, 850! Mbussonil and Cabeceira, *Rodrigues de Cavalho!* Maconi Madanda, 200 ft., *Johnson*, 102! Madanda forests, *Swynnerton*, 1756! 1757!

16. **P. Kæssneri,** *Hutchinson in Kew Bulletin*, 1911, 315. A shrub; branches terete, with a greyish-brown bark; flowering branchlets fasciculate or rarely solitary, produced on woody outgrowths from the main branches, very slender, terete, glabrous, bearing about 5 pairs of leaves. Leaves obovate or obovate-elliptic, rounded and sometimes slightly emarginate at the apex, subcuneate at the base, 2½–4 lin. long, 1½–2½ lin. broad, very thinly chartaceous, yellowish-brown on the upper surface when dry, glaucous below, glabrous and conspicuously reticulate on both surfaces; lateral nerves 4–5 on each side, distinct on both surfaces; petiole ⅓ lin. long, glabrous; stipules obliquely lanceolate, reddish, about as long as the petiole, margins slightly jagged. Flowers monœcious, one male and two females in each leaf-axil; pedicel of the male slender, 2–3 lin. long, glabrous, of the female stouter, 1 lin. long. Male flowers: Sepals 6, in two distinct series, the outer small, ovate, obtuse, the inner obovate, ½ lin. long, ⅓ lin. broad, all rather fleshy or coriaceous, 1-nerved and glabrous. Disk-glands 6, slightly stalked, fleshy, rounded, smooth or nearly so. Stamens 3, quite free to the base; filaments long and slender; anther-cells diverging, the line of dehiscence continuous through the cells. Female flowers: Sepals 6, in two series, the outer small, the inner broadly ovate, somewhat coriaceous. Disk annular, subentire. Ovary ovoid, slightly lobed, smooth; styles suberect, free to the base, bilobed, lobes linear and not swollen at the tips. Fruit not seen.

Nile Land. British East Africa: Pemba River, *Kässner*, 356!

17. **P. Hildebrandtii,** *Pax in Engl. Jahrb.* xv. 526. A glabrous shrub about 7 ft. high; branches terete; flowering branchlets produced in fascicles, about $\frac{3}{4}$ in. long, bearing about 4 pairs of leaves. Leaves elliptic or obovate-elliptic, rounded at both ends, 2–4 lin. long, $1\frac{1}{2}$–3 lin. broad, very thinly chartaceous; petiole very short; stipules ovate-triangular, lacerate towards the apex. Flowers diœcious, axillary, solitary, shortly pedicellate. Male flowers: Sepals 6, oblong or oblong-linear, 1-nerved, membranous. Disk-glands 6, flat and rounded, slightly warted. Stamens 3; filaments united to near the top, the column very slightly produced into a little knob in the middle of the anthers; anthers dehiscing at the side. Female flowers not known.

Nile Land. Somaliland: Ahl Mountains; among rocks near Maid, *Hildebrandt*, 1537!

18. **P. sepialis,** *Müll. Arg. in Abhandl. Naturw. Ver. Bremen*, vii. 25. A shrub about 7 ft. high; branches woody, somewhat angular when young, glabrous; flowering branchlets up to 2 in. long, slightly flattened or subterete, glabrous. Leaves obovate or obovate-elliptic, rounded or truncate and very slightly mucronulate at the apex, broadly cuneate at the base, 3–5 lin. long, $1\frac{1}{2}$–3 lin. broad, thin, glabrous on both surfaces; lateral nerves 5–6 on each side, very slightly raised below; petiole scarcely $\frac{1}{2}$ lin. long, glabrous; stipules lanceolate, membranous, a little longer than the petiole. Flowers diœcious, or at least the males and females on separate shoots. Males two or three together in each leaf-axil; pedicel slender, about 1 lin. long, glabrous. Sepals 6, elliptic, rounded or slightly pointed at the apex, about $\frac{1}{2}$ lin. long, 1-nerved, membranous, glabrous. Disk-glands 6, flat, contiguous, slightly warted. Stamens 3; filaments connate; anthers dehiscing at the side. Female flowers axillary, solitary; pedicel $1\frac{1}{2}$ lin. long, slender, glabrous. Sepals as in the male. Disk flat, rather deeply 5–6-lobed; lobes crenulate, glabrous. Ovary subglobose, not lobed, glabrous; styles free to the base, slender, spreading, bilobed to about the middle, lobes linear. Capsule not seen.—Pax in Engl. Pfl. Ost-Afr. C. 236. *P. Conradi*, Pax in Engl. Jahrb. xliii. 75.

Nile Land. British East Africa: Ukamba; near Kitui, *Hildebrandt*, 2695!

Mozamb. Distr. German East Africa: Kilimanjaro; Moschi, *Engler*, 1871! Neuwied, Ukerewe Island, *Conrad*, 286!

19. **P. discoideus,** *Müll. Arg. in Linnæa*, xxxii. 51. A tree 30–50 ft. high, but sometimes a shrub; branches finely sulcate, subterete; lateral flowering branchlets about $2\frac{1}{2}$ in. long, spreading, crisped-puberulous or more rarely glabrescent. Leaves ovate-elliptic to obovate-oblanceolate, rounded or very shortly acuminate at the apex, varying from rounded to cuneate at the base, 1–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, thinly chartaceous or membranous, glabrous on both surfaces except on the midrib which is sometimes puberulous below; lateral nerves 6–12 on each side, spreading, slightly raised on both surfaces; veins slender and rather close; petiole $1\frac{1}{2}$–2 lin. long, tomentellous; stipules soon falling off, oblong-linear, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, membranous,

glabrescent. Flowers diœcious; males numerous in fascicles in the axils of the leaves or fallen leaves of the young branchlets, females similarly arranged but only 2 in each fascicle; male pedicel very slender, 1½ lin. long, glabrous or sparingly puberulous, female stouter, 2–3 lin. long, glabrescent or rather densely puberulous; bracts large, ovate-orbicular, membranous, soon falling off. Male flowers: Sepals 4, obovate-oblong, ½ lin. long, glabrous. Disk fleshy, entire, glabrous. Stamens 4; filaments free to the base; anthers dehiscing longitudinally. Female flowers: Sepals 4, larger than those of the male. Disk large, fleshy, flat, entire, very minutely puberulous. Ovary ellipsoid, glabrous; styles connate at the base, the free parts spreading out and flattened, bilobed. Capsule 3–4-lobed, 4 lin. in diam., glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 416; Ficalho, Pl. Uteis, 249; Pax in Bolet. Soc. Brot. x. 157; Hiern in Cat. Afr. Pl. Welw. i. 960; S. Moore in Journ. Linn. Soc. xl. 192. *Cicca discoidea*, Baill. Adansonia, i. 85. *Phyllanthus anomalus*, Müll. Arg. l.c. 418 (as to Kirk's specimen from Lake Nyassa); Pax in Engl. Pfl. Ost-Afr. C. 236. *Securinega bailloniana*, Müll. Arg. l.c. 451. *Diasperus discoideus*, O. Kuntze, Rev. Gen. Pl. ii. 599. *Fluggea obovata*, Baill. Adansonia, ii. 41 (not *Xylophylla obovata*, Willd.). *F. nitida*, Pax in Engl. Jahrb. xix. 76, and in Engl. Pfl. Ost-Afr. C. 236. *F. bailloniana*, Pax, l.c. in obs.

Upper Guinea. Senegambia: Mbidjem, *Thierry*, 209! near Albreda, *Leprieur!* Sieka, near Albreda, *Perrottet*; River Nunez, *Heudelot*, 102! 789! Sierra Leone: various localities, *Afzelius! Smythe*, 49! *Mann*, 882! *Scott-Elliot*, 5086! 5923! Togo: various localities, *Baumann*, 5! *Kersting*, 29! 38! 164! Dahomey, *Poisson*! Lagos: interior, *Rowland!* Awe, *Dodd*, 415! Ashasha, *Conservator of Forests*, 452! Ijaye, *Barter*, 3420! Northern Nigeria: Nupe, *Barter*, 1498! Cameroons: Bipinde, *Zenker*, 2083! 2530! 2890! 3138! Johann-Albrechtshöhe, *Staudt*, 227! Mba, *Ledermann*, 2579! Dodo, *Ledermann*, 2870! 2909! 2945!

Nile Land. British East Africa: Mantavayo, *Kässner*, 146! Taita: Ndi Mountain, *Scott-Elliot*, 6214! Uganda: Entebbe, *Mahon!* Budongo Forest, *Dawe*, 1016!

Lower Guinea. Princes Island, *Mann! Welwitsch*, 339! *Moller & Quintas.* Island of St. Thomas, *Moller*, 118! Gaboon: around Libreville, *Klaine*, 169! 194! 589! 1030! 1031! Angola: Golungo Alto; near Sange, *Welwitsch*, 340! Gazengo, *Gossweiler*, 455! 478! 4519! 4677! 4692!

Mozamb. Distr. Zanzibar, *Bovin!* German East Africa: various localities, *Holst*, 2176! 2718! *Holtz*, 344! 1792! 2718! *Kirk! Engler*, 2193! 2170! *Zimmerman*, 1093! *Stuhlmann*, 144! 3437A! 6051! 6289! 7093! 8084! *Scheffler*, 171! *Böhm*, 90A! *Trotha*, 23! Portuguese East Africa: Quilimane, *Stuhlmann*, 559! Madanda forests, *Swynnerton*, 1504! 1749! British Central Africa: Nyasaland; west shore of Lake Nyasa, *Kirk!*

20. **P. graminicola,** *Hutchinson ex S. Moore in Journ. Linn. Soc.* xl. 191. A small herb; stems glabrous. Leaves elliptic, obtuse, rounded at the base, 3–4 lin. long, 1½–2½ lin. broad, membranous, glabrous; lateral nerves 5–6 on each side, spreading, distinct below, fading towards the margin; petiole ½ lin. long, glabrous; stipules small. Flowers diœcious, males axillary, solitary or in pairs; pedicel very slender, about 1 lin. long, glabrous. Sepals 5, obovate, rounded at the apex, ⅔ lin. long,

⅓ lin. broad, membranous, glabrous. Disk-glands transversely oblong, ¼ lin. broad, very thin and smooth. Stamens 4–5, filaments free to the base; anther-cells divergent, dehiscing at the side. Female flowers not known.

Mozamb. Distr. Rhodesia: near Chirinda, *Swynnerton*, 261!

21. **P. capillaris,** *Schum. & Thonn. Beskr. Guin. Pl.* 417. A small shrub 2–4 ft. high; branches and branchlets slender, slightly grooved or terete, whitish-pubescent. Leaves obovate or elliptic-obovate, rounded or subacute and slightly mucronate, slightly cuneate or obtuse at the base, 4–12 lin. long, 3–5 lin. broad, membranous, glabrous, glaucous-green on the lower surface; lateral nerves 5–9 on each side, prominent below; veins scarcely visible on either side; petiole ½ lin. long, glabrous; stipules lanceolate, subulate at the apex, 1¼ lin. long, ⅓ lin. broad towards the base, entire, glabrous. Flowers in axillary fascicles on the young branchlets, females often solitary or subsolitary; pedicel very slender, up to ¾ in. long, glabrous. Male flowers: Sepals 5, broadly obovate, ½ lin. long, ¾ lin. broad. Disk of 5 obovate truncate fleshy glands alternating with the sepals. Stamens 5, free; anthers rounded, dehiscing at the side. Female flowers: Sepals 4–5 (usually 5), ovate-elliptic, obtuse at both ends, ½ lin. long, ⅓ lin. broad, entire, membranous with a conspicuous greenish-yellow midrib. Disk saucer-shaped, entire, glabrous. Ovary globose, glabrous; styles 3, free, slender, bipartite nearly to the base, spreading or reflexed. Capsule depressed-globose, 1 lin. in diam., smooth; seeds convex on the back, testa brown, minutely and closely pitted.—Müll. Arg. in DC. Prodr. xv. ii. 338 (incl. vars.); Pax in Engl. Pfl. Ost-Afr. C. 236; Hiern in Cat. Afr. Pl. Welw. i. 957; Durand & Schinz, Études Fl. Congo, 242; De Wild. & Durand in Bull. Soc. Bot. Belg. xxxvii. 103; De Wild. Miss. É. Laurent, 127, and Études Fl. Bas- et Moyen-Congo, ii. 196, t. 54, and Pl. Thonner. Congol. 22; Stapf in Johnston, Liberia, ii. 648. *Diasperus capillaris*, O. Kuntze, Rev. Gen. Pl. ii. 598.

Upper Guinea. Sierra Leone: near Erimakuna, *Scott-Elliot*, 5245! Samu country, *Scott-Elliot*, 5041! Liberia: Sinoe Basin, *Whyte!* Ivory Coast: Bingerville, *Chevalier*, 16071! Kapiacron, *Chevalier*, 17178! Gold Coast, *Thonning! Burton!* Togo: Bismarkburg, *Büttner*, 333! Lagos, *Phillips*, 33! *Millson*, 146! *Rowland!* Southern Nigeria: Old Calabar, *Holland*, 85! Bonny, *Kalbreyer*, 44! Cameroons: Cameroon River, *Mann*, 758! 2226! Yaunde, *Zenker*, 1410! *Zenker & Staudt*, 95! Efulen, *Bates*, 380!

Nile Land. Mittu: Kuraggera, *Schweinfurth*, 2763! Uganda: waste ground, *Wilson*, 102! British East Africa: Ukamba, *Scott-Elliot*, 6439!

Lower Guinea. Spanish Guinea: Bebai, *Tessmann*, 430! 584! Lower Congo: various localities, *Cabra, Vanderyst, Dupont, Dewèvre, Laurent, Gillet.* Angola: Golungo Alto; *Welwitsch*, 336! Malange, *Gossweiler*, 984!

South Central. Belgian Congo: various localities, *Laurent, Schlechter*, 12604! *Hens*, 142! *Thonner, Descamps.*

Mozamb Distr. German East Africa: Umbugwe and Iraku, *Merker*, 126!

Var. *Stuhlmanii*, Hutchinson. Pedicels and midrib of the leaves crisped-pubescent; leaves 1½–3 lin. long.—*P. Stuhlmanii*, Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. Uganda: Buddu, *Scott-Elliot,* 7512! *Stuhlmann!* British East Africa: Galunka, *Kässner,* 788!

22. **P. nummulariæfolius,** *Poir. Encycl.* v. 302, *partly.* A small much-branched shrub; branches and branchlets slightly grooved, glabrous. Leaves obovate or rounded-obovate, subacute and mucronate, rounded or subacute at the base, 3–9 lin. long, 2–5 lin. broad, membranous, glabrous on both surfaces, sometimes glaucous below; lateral nerves 5–7 on each side, usually prominent on the lower surface; veins hardly visible; petiole $\frac{1}{2}$–$\frac{3}{4}$ lin. long, glabrous; stipules, male and female flowers, fruits and seeds as in *P. capillaris.*—Willd. Sp. Pl. iv. 584; Müll. Arg. in DC. Prodr. xv. ii. 337; Pax in Engl. Pfl. Ost-Afr. C. 236. *Monarda nummularifolia,* Baill. Étude Gén. Euphorb. 609. *Anisonema multiflorum,* Thomson in Speke, Nile Journ. App. 647, not of Wight. *Diasperus nummulariæfolius,* O. Kuntze, Rev. Gen. Pl. ii. 600.

Nile Land. Monbuttu: on the Kussumbo River, *Schweinfurth,* 146! Niamniam: by the River Sway, *Schweinfurth,* 2865! top of Mount Baginse, *Schweinfurth,* 3829! Uganda: Elgon district, *James!* Madi; near water, *Speke & Grant!* British East Africa: 4 days' march from Mumias, *Whyte!*

Mozamb. Distr. Zanzibar: *Speke,* 4! *Hildebrandt,* 1042! *Kirk!* German East Africa: Amboni, *Holst,* 2834! Gonga, *Holst,* 4239! Portuguese East Africa: Mapesi, *Johnson,* 147! Moramballa, *Kirk!* Inhambane, *Scott!* British Central Africa: Nyasaland; Fort Hill, Tanganyika Plateau, *Whyte!* Nyika Plateau, *McClounie,* 116! Plateau of Mount Zomba, 5000–6000 ft., *Whyte!* near Blantyre, *Last!* and without precise locality, *Buchanan,* 308!

Occurs also in Madagascar.

23 **P. somalensis,** *Hutchinson.* A shrub 4–7 ft. high; branches flexuous, subterete, covered with a brown bark; flowering branchlets produced singly on rather short shoots, slender, slightly flexuous, subterete, glabrous. Leaves elliptic or obovate-elliptic, obtuse at both ends, $\frac{1}{3}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, thin, glaucous below; lateral nerves about 5 on each side, branched some distance from the margin, distinct below; petiole about $\frac{1}{3}$ lin. long, smooth; stipules subulate, acute, $\frac{1}{3}$ lin. long, with slightly jagged margins. Flowers monœcious, axillary, three or four males and a solitary female in each leaf-axil. Male flowers: pedicel 2 lin. long, terete, glabrous. Sepals 4 or 5, obovate-elliptic, about $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, glabrous, membranous. Disk-glands 4–5, rounded, fleshy, glabrous. Stamens 4–5; filaments quite free; anthers oblong, cells parallel and dehiscing longitudinally. Female flowers: pedicel and sepals as in the male. Disk annular, fleshy, slightly undulately lobed between the sepals, glabrous. Ovary globose, smooth; styles 3–5, flat and broad, 2–4-fid, reflexed over the top of the ovary. Capsule about 2 lin. in diam. Seeds much compressed laterally, smooth.—*Cluytiandra somalensis,* Pax in Engl. Jahrb. xxxiii. 277, as to Ellenbeck, 2193, not description.

Nile Land. Somaliland: Galla Highlands; Boran country, *Ellenbeck,* 2193!

24. **P. pentandrus,** *Schum. & Thonn. Beskr. Guin. Pl.* 419. A much-branched herb up to 18 in. high; stem woody, subterete,

glabrous; flowering branchlets very slender, more or less flexuous, glabrous or very minutely and sparingly asperulate. Leaves oblong-lanceolate or linear-lanceolate, subacute, usually obtuse at the base, up to $\frac{3}{4}$ in. long and $\frac{1}{3}$ in. broad, thin, glabrous on both surfaces; lateral nerves about 5 on each side, slightly prominent below; petiole about $\frac{1}{2}$ lin. long, glabrous; stipules lanceolate, tapered into a fine point, $\frac{1}{2}$ lin. long, glabrous. Flowers monœcious, males 2–3 together in the axils of the lower leaves, females solitary in the upper leaves of the branchlets; pedicel slender, short, glabrous. Male flowers: Sepals 5, ovate or elliptic, subacute, small, broadly 1-nerved, membranous towards the margin, glabrous. Disk-glands 5, flat, smooth and thin. Stamens 5; filaments free; anthers dehiscing at the side. Female flowers: Sepals as in the male. Disk flat, entire, glabrous. Ovary lobed, minutely beaded; styles spreading horizontally, very short, bifid. Capsule depressed-globose, about 1 lin. in diam., scarcely lobed. Seeds marked with 5–6 longitudinal lines of dots on the back.—Müll. Arg. in DC. Prodr. xv. ii. 336 (incl. vars.); Hiern in Cat. Afr. Pl. Welw. i. 957; Pax in Engl. Pfl. Ost-Afr. C. 236; De Wild. Études Fl. Bas- et Moyen-Congo, i. 275. *P. piluliferus*, Fenzl in Flora, 1844, 312, name only; Benth. in Hook. Niger Flora, 510. *P. linoides*, Hochst. ex Baill. Adansonia, i. 84, name only. *P. linifolius*, Vahl ex Baill. l.c., name only. *P. deflexus*, Klotzsch in Peters, Reise Mossamb. Bot. 104. *P. dilatatus*, Klotzsch, l.c. 106. *P. scoparius*, Welw. Apont. 591, No. 110. *P. tenellus*, var., Pax in Baum, Kunene-Samb. Exped. 282, not of Roxb.; *P. Niruri*, N. E. Br. in Kew Bulletin, 1909, 139, not of Linn. *Menarda linifolia*, Baill. l.c., name only. *Diasperus pentandrus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. Senegambia, *Heudelot*, 466! *Leprieur!* *Richard!* *Lelievre!* *Perrottet!* Dahomey, *Burton! Newton*, 7! Gold Coast: Aburi, *Anderson*, 2 Christiansborg, *Thonning!* Togo: near Lome, *Warnecke*, 2! Lagos: interior, *Rowland!* Ilesa Road, *Denton*, 21! Northern Nigeria: Nupe, *Barter!* Lokoja, *Parsons*, 20! Katagum district, *Dalziel*, 206! Southern Nigeria: Stirling Hill, on the Niger, *Vogel*, 136! Cameroons: Garua, *Ledermann*, 4497!

Nile Land. Kordofan: Rabad, *Broun*, 874! Obeid, *Kotschy*, 303! Araschkol Mountain, *Kotschy*, 89! *Pfund*, 9! Umsutt, *Pfund*, 382! Takari, *Pfund*, 380! Ethiopia: *Kotschy*, 115!

Lower Guinea. French Congo: Loango, *Soyaux*, 192 Lower Congo: between the Kwango River and Kisantu, *Büttner*. Angola: Loanda, *Welwitsch*, 324! *Gossweiler*, 380! Pungo Andongo, *Welwitsch*, 322! 323! On the Longa River near Napalanka, *Baum*, 584! German South West Africa: Okahandya, *Dinter!*

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; near Sena, *Kirk!* *Peters!* Tete, *Peters!* Morambala Mountain, *Scott!* Mozambique, *Rodrigues de Cavalho!* British Central Africa: Nyasaland; various localities, *Whyte!* *McClounie*, 48! *Buchanan*, 909! Rhodesia; various localities, *Kolbe*, 3175! *Rogers*, 7166! 8275! Ngamiland; Kwebe Hills, *Lugard*, 155! *Mrs. Lugard*, 80!

Occurs also in South Africa.

P. deflexus and *P. dilatatus* from Sena were described as having only 3 stamens joined at the base. By the courtesy of Prof. Engler I have been able to examine the types of these species, and both have 5 stamens as in typical *P. pentandrus*.

25. **P. angolensis,** *Müll. Arg. in Journ. Bot.* 1864, 329. A slender annual herb 6–8 in. high; stem and branches puberulous the latter short, ascending, not more than ¾ in. long. Leaves very small, ovate or ovate-elliptic, obtuse, more or less rounded at the base, 1½ lin. long, ¾ lin. broad, rather thick, slightly scabrous on both surfaces; petiole very short, minutely puberulous; stipules subulate-filiform, 1–1¼ lin. long, slightly puberulous towards the base. Male flowers: solitary or subsolitary in the axils of the leaves on the lower part of the branches; females solitary in the upper part. Male sepals 5, 1-seriate, elliptic, rounded at the apex, ½ lin. long, ⅓ lin. broad, 1-nerved, membranous, glabrous. Disk-glands 5, thin, smooth. Stamens 5; filaments free; anthers dehiscing obliquely. Female sepals 5, similar to the male. Disk entire, flattened, thin, glabrous. Ovary depressed-globose, glabrous; styles free to the base, very small, bilobed, lobes slightly recurved, subacute. Capsule 1½ lin. in diam., depressed-globose, faintly striate. Seeds laterally compressed, convex on the back, minutely pitted, giving the appearance of a very close striation, ¾ lin. long, ½ lin. broad on the back.—Müll. Arg. in DC. Prodr. xv. ii. 339; Hiern in Cat. Afr. Pl. Welw. i. 957. *Diasperus angolensis*, O. Kuntze, Rev. Gen. Pl. ii. 598.

Lower Guinea. Angola: Huilla; among low bushes between Lopollo and Ferrão da Sola, *Welwitsch*, 332!

26. **P. purpureus,** *Müll. Arg. in Journ. Bot.* 1864, 329. A shrub 5–6 ft. high, with bright purple stems and branches; stems numerous, straight; branchlets slender, glabrous. Leaves linear-lanceolate, mucronate, ¾–1¾ in. long, 1½–3½ lin. broad, thinly coriaceous, glabrous on both surfaces, greenish and slightly shining above, yellowish-brown below; lateral nerves about 6 on each side, very faint and not at all raised; petiole ½ lin. long, glabrous; stipules subulate-lanceolate, subacute, about 1 lin. long, glabrous. Male flowers: pedicel about 1½ lin. long, glabrous. Sepals 5, ovate or ovate-oblong, membranous, glabrous. Disk-glands 5, transversely oblong or ellipsoid, very thick and fleshy, slightly pitted, glabrous. Stamens 5; filaments free; anthers dehiscing longitudinally. Female flowers: pedicel a little longer than in the male. Sepals 5, broadly ovate or ovate-elliptic, rounded at the apex, 1 lin. long, ¾ lin. broad, 1-nerved, membranous, glabrous. Disk crenate or lobed, glabrous. Ovary smooth, glabrous; styles connate in the lower half, very thick; free portion very thick, bifid at the apex, slightly wrinkled or rough. Capsule depressed-globose, smooth, about 2 lin. in diam. Seeds flattened laterally, smooth. —Müll. Arg. in DC. Prodr. xv. ii. 349; Hiern in Cat. Afr. Pl. Welw. i. 958. *Diasperus purpureus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Lower Guinea. Angola: Mossamedes; in gravelly places and in the bed of the River Maiombo, near Pedra de El Rei, *Welwitsch*, 329!

27. **P. alpestris,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 56. An undershrub 4–8 in. high; stems woody, short, arising from a thick woody rhizome; branches short, flowering ones compressed, shortly

pubescent. Leaves ovate, obtuse or rounded at the apex, subcordate at the base, $\frac{1}{3}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, subcoriaceous, margin recurved; lateral nerves about 6 on each side, looped; petiole $\frac{1}{2}$ lin. long, somewhat fleshy, glabrous; stipules deciduous. Flowers diœcious, males in pairs, females solitary. Male pedicel $2\frac{1}{2}$ lin. long, slender, glabrous. Sepals 6, obovate, 1-nerved, membranous. Disk-glands 6, rounded, pitted. Stamens 3; filaments free. Female pedicel stouter than those of the males. Sepals 6, in 2 series, ovate, narrowed to the apex. Disk cupular, crenulate. Styles 3, rather thick, bilobed to about the middle, spreading stellately over the top of the ovary. Capsule globose, 3 lin. in diam. Seeds subtriquetrous, convex on the back, quite smooth.

Upper Guinea. French Guinea: Labe, 3300 ft., *Chevalier*, 12305! Fouta Jallon; high plateaux between Dintinu and Diaguissa, *Chevalier*, 12907! Diaguissa, *Chevalier*, 12943!

28. **P. glaucophyllus,** *Sond.*, var. **major,** *Müll. Arg. in Flora*, 1864, 514. Stems numerous, slender, subsimple, arising from a woody rootstock, angular or flattened, finely sulcate, glabrous. Leaves ovate, mucronate, rounded or almost subcordate at the base, 4–9 lin. long, firmly membranous, glabrous and often glaucous on both surfaces; lateral nerves 5–7 on each side, looped some distance from the margin, distinct below; petiole very short, $\frac{1}{2}$ lin. long, glabrous; stipules ovate or ovate-lanceolate, subpeltately attached or auriculate at the base, a little longer than the petiole, membranous, brown, glabrous. Male flowers solitary towards the ends of the shoots; pedicel very slender, 2 lin. long, glabrous. Sepals 6, unequal, oblong, obtuse, entire, the largest about $\frac{3}{4}$ lin. long and $\frac{1}{2}$ lin. broad. Disk-glands 6, large, flat, orbicular, peltately attached. Stamens 3; filaments quite free; anthers dehiscing at the side. Female flowers solitary in the lower parts of the shoots; pedicel about 3 lin. long when in fruit. Sepals a little larger than in the male. Disk flat and annular and slightly lobed, glabrous. Ovary 6-lobed, glabrous; styles free, bilobed, lobes very slender. Capsule depressed-globose, 3- or obscurely 6-lobed, $1\frac{1}{2}$ lin. in diam., glabrous. —Müll. Arg. in DC. Prodr. xv. ii. 393; Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. British East Africa: Ukamba; Kitui, on waste ground, *Hildebrandt*, 2690!

Lower Guinea. Angola: River Longa, *Gossweiler*, 4065 partly!

Mozamb. Distr. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 154! 269! 1351! *Adamson*, 154! Blantyre, *Scott!* Ndirandi Mountain, *Scott-Elliot*, 8496! Mount Mlanji, *Scott-Elliot*, 8641! Rhodesia; Broken Hill, *Rogers*, 8071!

Occurs with the type in South Africa.

29. **P. benguelensis,** *Müll. Arg. in Journ. Bot.* 1864, 331. An annual slender erect herb about 9 in. high; stem terete, glabrous, branched in the upper part; branches terete. Leaves oblong-elliptic or oblong-ovate, obtuse or subacute, rounded and slightly unequal at the base, 3–7 lin. long, 2–$3\frac{1}{2}$ lin. broad, very membranous, glabrous on

both surfaces, glaucous below; lateral nerves 5–7 on each side, rather faint; veins not visible; petiole $\frac{1}{4}$ lin. long, glabrous; stipules lanceolate-subulate, $\frac{3}{4}$ lin. long, glabrous. Male flowers 1–3 in the axils of the lower leaves, females solitary in the axils of the upper leaves, shortly pedicellate. Male sepals 5, small, 1-nerved, membranous, glabrous. Disk-glands 5, transversely elliptic, smooth and rather thin. Stamens 3; filaments free to the base; anthers dehiscing extrorsely. Female sepals 5, 1-seriate, elliptic, rounded at the apex, 1 lin. long, $\frac{2}{3}$ lin. broad, 1-nerved with several reticulate lateral nerves, and with 1–2 large glands on each side of the main nerve about the middle. Disk large and fleshy, annular, entire or slightly undulately lobed, glabrous. Ovary ovoid, slightly lobed, glabrous; styles free to the base, bilobed; stigma capitate. Capsule about $1\frac{1}{2}$ lin. in diam. Seeds much flattened, faintly punctate.—Müll. Arg. in DC. Prodr. xv. ii. 365; Hiern in Cat. Afr. Pl. Welw. i. 959. *Diasperus benguelensis*, O. Kuntze, Rev. Gen. Pl. ii. 598.

Lower Guinea. Angola: Pungo Andongo; in sandy, bushy places on the banks of the River Cuanza, near Candumba, *Welwitsch*, 315B! Bumbo; in fields, *Welwitsch*, 315!

30. **P. arvensis,** *Müll. Arg. in Journ. Bot.* 1864, 332. Stems terete, glabrous; flowering branchlets short, about $1\frac{1}{2}$ in. long, glabrous. Leaves elliptic-rotundate, rounded or truncate at the apex, subcordate at the base, $2\frac{1}{2}$–4 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, membranous, glabrous on both surfaces; margins recurved; lateral nerves 5–6 on each side, distinct below, not visible above; petiole very short, glabrous; stipules subulate with filiform points, 1 lin. long, glabrous. Flowers dicœcious, males solitary or in pairs. Male flowers: Sepals 5, obovate, rounded at the apex, 1 lin. long, $\frac{3}{4}$ lin. broad, with a slender median nerve, glandular-membranous, glabrous. Disk-glands 5, large and flat, slightly warted. Stamens 3; filaments connate; anthers dehiscing at the side. Female flowers not known.—Müll. Arg. in DC. Prodr. xv. ii. 405; Hiern in Cat. Afr. Pl. Welw. i. 959. *Diasperus arvensis*, O. Kuntze, Rev. Gen. Pl. ii. 598.

Lower Guinea. Angola: Huilla; *Antunes*, 162! in vegetable fields near Lopollo, *Welwitsch*, 313!

Mozamb. Distr. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

31. **P. microphyllinus,** *Müll. Arg. in Journ. Bot.* 1864, 332. Stems very slender, elongated, probably arising from a rhizome, about $2\frac{1}{2}$ ft. high, glabrous, terete, closely longitudinally sulcate; lateral branches short, up to $1\frac{1}{2}$ in. long, terete, glabrous. Leaves oblong-elliptic, rounded at both ends or slightly narrowed towards the base, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 1–$1\frac{1}{2}$ lin. broad, margin purple, glabrous on both surfaces, with minute black dots on the upper; lateral nerves not evident; petiole $\frac{1}{4}$ lin. long, glabrous; stipules subulate, with purple tips, $\frac{3}{4}$ lin. long. Male flowers shortly pedicellate, solitary. Sepals 5, 1-seriate, oblong-elliptic, rounded at the apex, $\frac{3}{4}$ lin. long, $\frac{2}{3}$ lin. broad, faintly

1-nerved, membranous, glabrous. Disk-glands 5, orbicular, flattened, covered with wart-like protuberances. Stamens 3; filaments connate; anthers 4-lobed, dehiscing obliquely. Female flowers not known.—Müll. Arg. in DC. Prodr. xv. ii. 409; Hiern in Cat. Afr. Pl. Welw. i. 960. *P. arvensis*, Pax in Baum, Kunene-Samb. Exped. 281, not of Müll. Arg. *Diasperus microphyllinus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Lower Guinea. Angola: Pungo Andongo; in mountainous cultivated places near the Præsidium, *Welwitsch*, 312! Amboella district; by the Longa River at Napalanka, *Baum*, 590!

32. **P. sublanatus,** *Schum. & Thonn. Beskr. Guin. Pl.* 420. Stem terete, glabrous; branches slender, spreading, slightly angular, glabrous. Leaves oblong-elliptic, rounded at the base and apex, 1½–4 lin. long, 1–1½ lin. broad, membranous, very slightly woolly or nearly glabrous on both surfaces; lateral nerves about 5 on each side, slightly prominent above, indistinct below; petiole very short, ¼ lin. long, glabrous; stipules subulate, glabrous, about ⅓ lin. long. Flowers axillary, solitary, males towards the base of the flowering branch, females in the upper part; pedicel ½ lin. long, glabrous. Male flowers: Sepals 5, very small, about ¼ lin. long. Disk-glands very minute. Stamens 3; filaments connate; anthers subconnate. Female flowers: Sepals 5, subequal, elliptic-lanceolate, obtuse, ½ lin. long, ¼ lin. broad, with a broad middle nerve, membranous towards the margin. Disk entire, annular, glabrous. Ovary ellipsoid, slightly 6-lobed, glabrous; stigmas 3, sessile. Capsule depressed-globose, obscurely 6-lobed, 1 lin. in diam. Seeds subtriquetrous, convex on the back, ¾ lin. long, ½ lin. broad, marked with close longitudinal lines, about seven of them on the outer convex side.—Müll. Arg. in DC. Prodr. xv. ii. 359. *Diasperus sublanatus*, O. Kuntze, Rev. Gen. Pl. ii. 601.

Upper Guinea. Sierra Leone: Buyabuya, *Scott-Elliot*, 4267! Gold Coast: Accra, *Ansell!* and without precise locality, *Thonning!*

33. **P. niruroides,** *Müll. Arg. in Journ. Bot.* 1864, 331. An annual herb up to 2½ ft. high; stem erect, longitudinally grooved, glabrous. Leaves oblong or oblong-lanceolate, apex mucronate, rounded or slightly cuneate at the base, 3–4 lin. long, 1–2 lin. broad, membranous, glabrous on both surfaces; lateral nerves inconspicuous; petiole short, glabrous; stipules filiform, scarcely 1 lin. long, glabrous. Male flowers two or three together in the axils of the lower leaves; pedicel very short. Sepals 5, obovate, rounded at the apex, ½ lin. long, 1-nerved, membranous, glabrous. Disk-glands 5, rounded, fleshy, warted. Stamens 3; filaments connate; anthers dehiscing at the side. Female flowers solitary in the upper leaf-axils; pedicel thickened towards the top, ½ lin. long, glabrous. Sepals larger than in the male. Disk stellately 5-lobed, flat, thin, glabrous. Ovary slightly lobed, densely covered with wart-like protuberances; styles very slender, free, bilobed to about the middle, lobes linear, terete. Capsule trilobed, depressed-globose, 1 lin. in diam., conspicuously warted. Seeds flattened on the sides, convex on the back, marked with several longitudinal lines.—Müll. Arg. in

DC. Prodr. xv. ii. 409; Hiern in Cat. Afr. Pl. Welw. i. 960. *P. Niruri*, var. *genuinus*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 58, partly, not of Müll. Arg. *Diasperus niruroides*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. French Guinea: Kouria, *Caille*, 14839! Sierra Leone: near Freetown, *Welwitsch*, 316! Kambia, on the Scarcies River, *Scott-Elliot*, 4346! Togo: Misahöhe, *Baumann*, 144 partly! Southern Nigeria: Old Calabar, *Holland*, 44! Cameroons: Belltown, *Dinklage*, 128!

Lower Guinea. Gaboon: Sibange Farm, *Soyaux*, 330!

34. **P. leucocalyx,** *Hutchinson in Kew Bulletin*, 1911, 316. Stems slender, woody, terete or nearly so, glabrous; flower-bearing branchlets slender and elongated, up to 6 in. long, terete, glabrous. Leaves oblong or oblong-elliptic, conspicuously mucronate, obtuse and slightly rounded at the base, 3–4 lin. long, 1–1¾ lin. broad, rather thin, with recurved margins, glabrous on both surfaces; lateral nerves 5–6 on each side, distinct below, invisible above; petiole very short; stipules subulate-filiform, about 1 lin. long, persistent. Flowers monœcious, about 3 males in the axil of each of the lower leaves, females solitary in the upper half of the branchlets; pedicel short, glabrous, those of the female stouter than those of the male. Male flowers: Sepals 5, obovate-elliptic, with 1 broad median nerve, glabrous. Disk-glands 5, large, flat and conspicuously warted. Stamens 3; filaments connate into a slender column; anthers free among themselves. Female sepals larger than those of the male, penninerved, obovate-elliptic, 1½ lin. long, ¾ lin. broad, glabrous. Disk thin, crenate, glabrous. Ovary globose, conspicuously warted; styles erect, rather long, slender, bilobed; stigmas globose. Capsule 1¼ lin. in diam., conspicuously warted in the upper half. Seeds very closely marked on the back with about 14 fine longitudinal lines.—*P. rotundifolius*, var. *leucocalyx*, Müll. Arg. in DC. Prodr. xv. ii. 406, partly.

Nile Land. British East Africa: Nyika country, near Mombasa, *Wakefield!*

Mozamb. Distr. Zanzibar: in cultivated fields and dry vegetable gardens, *Hildebrandt*, 1042A! German East Africa: Pangani, *Stuhlmann*, 185! Rovuma Bay, *Kirk!*

Easily distinguished from *P. rotundifolius*, Klein ex Willd., by the long slender styles, globose stigmas, and warted ovary.

35. **P. microdendron,** *Welw. ex Müll. Arg. in Journ. Bot.* 1864, 330. Habit somewhat like that of a little tree (*Welwitsch*); stem woody, terete in the lower part, flattened and grooved when young; flowering branchlets subterete, up to 3 in. long. Leaves ovate-elliptic or oblong-elliptic, acute or subacute, sometimes with a very sharp point, mostly rounded and slightly unequal-sided at the base, 3–8 lin. long, 1½–3 lin. broad, rather rigidly membranous, slightly scabrous on both surfaces; lateral nerves 6–7 on each side, distinct; petiole ¼ lin. long; stipules subulate from a slightly broadened base, nearly 1 lin. long, glabrous. Flowers monœcious, males small, geminate in the axils of the lower leaves of each branchlet, females larger and solitary in the upper leaves.

Male flowers: Sepals 5, 1-seriate, obovate-spathulate, rounded at the apex, 1 lin. long, $\frac{3}{4}$ lin. broad, membranous, midrib very faint and slender. Disk-glands 5, thin, rounded, smooth. Stamens 3; filaments connate to the top; anther-cells distinct, dehiscing longitudinally. Female flowers: Sepals 5, much larger than those of the male, broadly elliptic, 2 lin. long, $1\frac{1}{2}$ lin. broad, with a very faint median nerve and several branching side nerves. Disk very large and supporting the stipitate ovary, about $1\frac{1}{2}$ lin. high, vertically sulcate or wrinkled. Ovary stipitate on the top of the disk, rather deeply lobed, glabrous; styles free almost to the base, bilobed, lobes slightly recurved and obtuse. Capsule depressed-globose, about 2 lin. in diam., enclosed by the persistent sepals. Seeds with about 15 longitudinal lines on the back, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad.—Müll. Arg. in DC. Prodr. xv. ii. 359; Hiern in Cat. Afr. Pl. Welw. i. 959. *P. Antunesii*, Pax in Engl. Jahrb. xxiii. 519. *Diasperus microdendron*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Lower Guinea. Angola: Huilla; among low bushes in moist places between Nene and Lopollo, *Welwitsch*, 334! and without precise locality, *Antunes*, 156!

36. **P. amarus,** *Schum. & Thonn. Beskr. Guin. Pl.* 421. A herb about 1 ft. high; stem woody at the base, terete, glabrous; flowering branchlets spreading, slender, up to $5\frac{1}{2}$ in. long, terete, glabrous. Leaves oblong or elliptic, rounded or almost truncate at both ends, 2–6 lin. long, 1–3 lin. broad, thin, glabrous on both surfaces; lateral nerves 4–5 on each side, slender and not at all conspicuous; petiole very short; stipules subulate-filiform, scarcely $\frac{1}{2}$ lin. long. Flowers monœcious, one male and one female in each leaf-axil; pedicel short. Male flowers: Sepals 5, ovate, 1-nerved, very small. Disk-glands small. Stamens 3; filaments connate; anthers small. Female flowers: Sepals 5, larger than those of the male. Disk 5-lobed, thin. Ovary smooth; styles very short, bifid. Capsule depressed-globose, trilobed, smooth. Seeds with about 5 longitudinal lines on the back.—*P. Niruri*, var. *debilis*, Müll. Arg. in DC. Prodr. xv. ii. 407, partly. *P. niruroides*, Stapf in Johnston, Liberia, ii. 648, not of Müll. Arg. *P. odontadenius*, var. *ramosa*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 56. *P. Chevalieri*, var., Beille, l.c. 57 (not the type). *P. Niruri*, var. *ndellensis*, Beille, l.c., and var. *genuinus*, Beille, l.c. 58, partly, not of Müll. Arg.

Upper Guinea. Liberia: Monrovia and Sinoe Basin, *Whyte!* Ivory Coast: Bingerville, *Chevalier*, 16023! Gold Coast: frequent, *Thonning!* Accra, *Moloney!* Togo: Sokode, *Schröder*, 61! Lagos: Dobisowo, *Dawodu*, 24! 365! Eyinolobe, *MacGregor*, 365! Southern Nigeria: Attah (Idda), *Vogel!* Old Calabar, *Milne!* Fernando Po, *Vogel!*

North Central. Upper Ubangi River, *Chevalier*, 5668! Lake Iro region, *Chevalier*, 8795! Korbo, south of Bagirmi, *Chevalier*, 8326! Krebedje (Fort Sibut), *Chevalier*, 5668! 5687!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2063!

Lower Guinea. Loango, *Soyaux*, 199! Lower Congo, *Burton!*

Mozamb. Distr. German East Africa: Tanga, *Holst*, 2070! Amboni, *Holst*, 2770!

37. **P. Paxii,** *Hutchinson in Kew Bulletin*, 1911, 316. A small shrub; stems erect, very slender, woody, terete, glabrous; flowering branchlets distant, up to 4½ in. long, very slender, terete, glabrous. Leaves lanceolate or elliptic-lanceolate, narrowed to both ends, sharply mucronate at the apex, 2–6 lin. long, 1–2 lin. broad, thinly chartaceous, glabrous on both surfaces; lateral nerves about 11 on each side, conspicuous on the lower surface; petiole ½ lin. long, slightly fleshy; stipules subulate, a little longer than the petiole. Flowers monœcious, axillary, females solitary in about two or three leaf-axils towards the ends of the branchlets, males geminate, occupying the lower part of the branchlets; male pedicel slender, short, female stout and thickened towards the top, about 2 lin. long, glabrous. Male flowers: Sepals 5, oblong-elliptic, obtuse, ¾ lin. long, faintly 1-nerved, margins membranous. Disk-glands 5, small, conspicuously warted. Stamens 3; filaments connate their full length; anthers slightly connate, cells parallel, dehiscing longitudinally. Female flowers: Sepals 5, ovate, obtuse, 1½ lin. long, ¾ lin. broad, slightly coriaceous, glabrous, with membranous entire margins. Disk saucer-shaped or cupular, thin, margin crenulate. Ovary rather deeply lobed, smooth; styles slightly divergent, rather deeply bifid; stigmas not swollen. Ripe capsule not seen.

Mozamb. Distr. British Central Africa: North Nyasaland, *Whyte!*

38. **P. hutchinsonianus,** *S. Moore in Journ. Linn. Soc.* xl. 192. A small shrub; flowering branchlets produced singly, angular or very slightly winged, glabrous. Leaves elliptic, rounded to a minute point, rounded at the base, 3–4 lin. long, 1¾–2¼ lin. broad, green, very thin, glabrous on both surfaces; lateral nerves about 3 on each side, faint below, invisible above, margins slightly recurved; petiole ¼ lin. long, glabrous; stipules ovate-triangular, acute, ½–¾ lin. long, membranous, brown, glabrous. Flowers monœcious. Male flowers: Sepals 5–6, obovate, rounded at the apex, about ½ lin. long, glabrous. Disk-glands 5–6, rounded, smooth. Stamens 2–3; filaments connate to the top; anthers dehiscing at the side. Female flowers: Sepals oblong-ellipsoid, rounded at the apex, 1¼ lin. long, ¾ lin. broad, with membranous margins, glabrous. Disk flat, entire or slightly undulately lobed, glabrous. Ovary subglobose, 6-lobed, glabrous; styles erect, bilobed to below the middle, lobes not swollen at the tips. Capsule about 1½ lin. in diam. Seeds trigonous, convex on the back, 1 lin. long, with about 7 lines on the back.—*P. rotundifolius*, var. *leucocalyx*, Baker f. in Trans. Linn. Soc. Bot. ser. 2, iv. 38, not of Müll. Arg.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Mountains; Ubena, *Goetze*, 794! Portuguese East Africa: Gazaland; Chimanimani Mountains, *Swynnerton*, 1524! British Central Africa: Nyasaland; Mount Mlanji, *Whyte! Mahon! Adamson*, 354! and without precise locality, *Buchanan*, 987!

Since Mr. Moore described this species I have associated with it several other specimens which appear to me to be the same. They show variation in the number of sepals (5–6) and stamens (2–3), a variation which appears to occur but rarely in the genus, so far as I can judge after dissecting numerous examples of many of the species.

39. **P. Bœhmii,** *Pax in Engl. Jahrb.* xv. 525. A glabrous annual; stem slender up to 15 in. high, slightly sulcate; flowering branchlets distant, up to 2 in. long, very slender, slightly angular or winged, bearing about 8 pairs of leaves. Leaves elliptic or oblong-elliptic, rounded at the apex, slightly narrowed to the base, 2–4 lin. long, 1–2 lin. broad, thinly chartaceous, with reddish margins; lateral nerves not visible; petiole about ¼ lin. long; stipules filiform-subulate, about twice the length of the petiole. Flowers monœcious, males small and two or three together towards the base of the branchlets, females larger and solitary in the upper half of the branchlets; pedicel of the female 1 lin. long, of the male much shorter. Male flowers: Sepals 5, small, 1-nerved, oblanceolate, rounded at the apex. Disk-glands 5, rounded, fleshy, smooth. Stamens 3; filaments connate to near the top; anthers dehiscing longitudinally. Female flowers: Sepals 5, obovate, rounded at the apex, ¾ lin. long, ½ lin. broad, without a distinct midrib. Disk fleshy, cupular, undulately lobed, minutely beaded. Ovary globose, distinctly lobed, smooth; styles erect or suberect, bilobed, lobes not swollen at the apex. Capsule 1½ lin. in diam., surrounded by the membranous persistent sepals. Seeds marked on the back with about 15 very close lines. —Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. Abyssinia: Begemeder; Selamuka, near Debra Tabor, *Schimper,* 1165!

Mozamb. Distr. German East Africa: Ugunda; swamp near Gonda, *Böhm,* 149!

40. **P. Dekindtii,** *Hutchinson.* An annual up to 1 ft. high, more or less branched; stem and flowering branches terete, glabrous. Leaves elliptic or obovate-elliptic, obtuse or slightly mucronulate, a little narrowed at the base, about 2 lin. long and 1¼ lin. broad, with purplish or carmine minutely serrulate margins, glabrous, lateral nerves not visible; petiole very short; stipules subulate, about ½ lin. long. Flowers monœcious, males small and one or two together towards the base of the branchlets, females larger and solitary in the upper part of the branchlets. Male flowers: pedicel ⅓ lin. long. Sepals 5, oblong-obovate, rounded at the apex, ¾ lin. long, membranous. Disk-glands 5, coarsely warted. Stamens 3; filaments connate to the apex; anthers dehiscing at the side. Female flowers: Sepals larger than those of the male. Disk crenulate, flat. Ovary shortly stipitate, subglobose, smooth; styles spreading over the top of the ovary, bilobed, not swollen at the tips. Capsule slightly trilobed, 1 lin. in diam., smooth. Seeds marked with about fifteen lines on the back.

Lower Guinea. Angola: Pungo Andongo, *Teuscz,* 38! Huilla: Mounyino, *Dekindt,* 273! 283!

41. **P. Dinteri,** *Pax in Engl. Jahrb.* xliii. 75. A woody undershrub about 3 ft. high; stems much branched; flowering branchlets up to 2½ in. long, distinctly asperulate. Leaves obovate, subacute, 2–3 lin. long, 1–2 lin. broad, coriaceous, glabrescent or asperulate; lateral nerves 3–4 on each side, slightly prominent below; petiole short, glabrous;

stipules lanceolate, very acute, ¾ lin. long, brownish and somewhat membranous. Flowers diœcious, solitary or subsolitary ; pedicel very short. Male flowers : Sepals 6, sub–1-seriate, obovate, subacute, ⅔ lin. long, with a very broad green median portion, margins membranous and transparent, glabrous. Disk-glands 6, contiguous, rounded, flattened, with a few fairly prominent warts on the upper surface. Stamens 3 ; filaments connate to the top ; anthers dehiscing obliquely or nearly transversely. Female flowers : Sepals larger than those of the male, 1-seriate, ¾ lin. long, ⅔ lin. broad. Disk saucer-shaped, fleshy, slightly crenulate. Ovary globose, lobed, glabrous ; styles stout, spreading, free almost to the base ; stigmas swollen and slightly bifid. Capsule depressed-globose, slightly 3-lobed, smooth. Seeds with about 9 fine close lines on the back.

Lower Guinea. German South-west Africa : between Okahandya and Swakopmund and at Wilhelmstal, 4000 ft., *Dinter*, 213 ! Okarumateru, *Dinter*, 1376 ! Omburo, *Dinter*, 1395 !

42. **P. suffrutescens,** *Pax in Engl. Jahrb.* xv. 523. An undershrub ; stems arising from a woody rhizome, about 6½ in. long, deeply sulcate or angular, glabrous ; flowering branchlets up to 3 in. long, compressed, glabrous. Leaves lanceolate or linear-oblong, obtuse at both ends, rarely mucronate at the apex, ¼–¾ in. long, 1–3 lin. broad, thinly chartaceous, glabrous on both surfaces ; lateral nerves 3–4 on each side, not visible above, slightly raised below ; veins not evident ; petiole short ; stipules lanceolate, entire. Flowers diœcious (or at least the male and female on separate shoots), axillary, solitary, shortly pedicellate. Male flowers : Sepals 6, oblong-elliptic, 1-nerved. Disk-glands 6, fleshy, rounded, nearly smooth. Stamens 3 ; filaments connate their full length ; anthers subconnate, cells subparallel and dehiscing longitudinally. Female flowers : Sepals 6, in two distinct series, the outer 3 ovate, subcordate at the base, 1 lin. long, ⅔ lin. broad, the inner 3 oblong-oblanceolate, all obtuse and with a rather broad green midrib. Disk thick and fleshy, supporting the ovary, slightly wrinkled, glabrous. Ovary 6-lobed, smooth ; styles connate at the base, suberect, shortly bilobed, lobes terete. Fruit not seen.—Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. British East Africa : Ukamba ; Kitui, *Hildebrandt*, 2692 ! Uganda : Nandi, *Scott-Elliot*, 7047 !

Mozamb. Distr. German East Africa : Urundi ; hills near the Ruvuvu River, *Scott-Elliot*, 8158 !

43. **P. prostratus,** *Welw. ex Müll. Arg. in Journ. Bot.* 1864, 330. A perennial herb or small shrub ; rootstock thick ; stems and branches numerous, prostrate or ascending, with the habit of some species of *Polygonum ;* flowering branches up to 1¾ in. long, subterete, glabrous. Leaves elliptic, produced into a sharp spinescent apex, slightly narrowed to the base, 2–3 lin. long, 1–1½ lin. broad, rather thick and coriaceous, with reddish and slightly thickened margins, no evident midrib or nerves, glabrous on both surfaces ; petiole ¼ lin. long, glabrous ; stipules

lanceolate, acuminate, acute, ¾ lin. long, membranous. Flowers monœcious, males axillary and geminate in the lower part of the branches, females solitary towards the apex, fewer than the males. Male flowers: Sepals 6, sub–1-seriate, subequal, oblong, obtuse, 1-nerved, ¾ lin. long, ⅓ lin. broad, membranous towards the margin. Disk-glands 6, orbicular, thin, smooth. Stamens 3; filaments connate to the top; anthers dehiscing extrorsely. Female flowers: Sepals as in the male, but in 2 series, 3 outer, 3 inner. Disk annular, small, entire. Ovary globose, slightly lobed, glabrous; styles free to the base, erect, bifid; stigmas capitate, globose. Capsule depressed-globose, nearly 2 lin. in diam.; seeds laterally compressed, convex on the back, ¾ lin. long, closely longitudinally striate with about 20 lines on the back.—Müll. Arg. in DC. Prodr. xv. ii. 361; Hiern in Cat. Afr. Pl. Welw. i. 959; Pax in Baum, Kunene-Samb. Exped, 281. *Diasperus prostratus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Lower Guinea. Angola: Huilla; Empalanca, in the Lopollo country, *Welwitsch*, 333! by the Longa River, above Minnesera, 4160 ft., *Baum*, 686! near the Mission Station, Massaca Luelai, *Gossweiler*, 2683! 2688!

44. **P. Urinaria,** *Linn. Sp. Pl. ed.* i. 982. An annual about 9–12 in. high; stem somewhat woody at the base, longitudinally sulcate, subterete, about 1 lin. in diam., glabrous; flowering branchlets ascending, about 2 in. long, compressed and narrowly winged, wings asperulate or ciliolate. Leaves oblong, shortly pointed and minutely mucronate, rounded and slightly unequal-sided at the base, ¼–½ in. long, 1–2 lin. broad, membranous, dark green above, glaucous below, glabrous on both surfaces, margins asperulate or minutely ciliolate; lateral nerves about 5 on each side, slender, spreading, looped close to the margin, scarcely visible on the upper surface, more distinct on the lower; petiole very short and compressed, glabrous; stipules broad and auriculate at the base, narrowed into a filiform point, about ¾ lin. long. Flowers monœcious, solitary and subsessile, males in the upper third, females in the lower two-thirds of the branchlets. Male flowers very small: Sepals 6, elliptic, subacute, glabrous. Disk-glands 6, very small. Stamens 3; filaments connate, very short; anthers subparallel, connate, dehiscence longitudinal. Female flowers: Sepals 6, ⅓ lin. long, 1-nerved, margins membranous. Disk saucer-shaped, thin, crenulately lobed. Ovary depressed-globose, densely covered with conspicuous warts; persistent sepals reflexed; styles very short, spreading, bifid. Seeds with about 10 prominent transverse ribs on the back.—Roxb. Fl. Ind. iii. 660; Müll. Arg. in DC. Prodr. xv. ii. 364; Benth. Fl. Hongk. 310, and Fl. Austral. vi. 102; Hook. f. Fl. Brit. Ind. v. 293. *P. leprocarpus*, Wight, Ic. t. 1895, fig. 4. *Diasperus Urinaria*, O. Kuntze, Rev. Gen. Pl. ii. 601.—*Tjeru-kirganeli*, Rheede, Hort. Malab. x. t. 16.

Upper Guinea. Sierra Leone: open places on augite rocks near Regent, *Scott-Elliot*, 4102!

A common tropical weed, but apparently very rare in Africa.

45. **P. maderaspatensis,** *Linn. Sp. Pl. ed.* i. 982. A woody undershrub, very variable in habit; flowering branchlets sharply angular, almost winged or variously compressed, glabrous or minutely asperulate. Leaves linear-lanceolate or oblanceolate, variable in size, up to 1½ in. long and ½ in. broad, rather rigidly membranous or thinly chartaceous, glabrous or slightly asperulate; lateral nerves about 7 on each side, usually prominent below; petiole short, glabrous; stipules lanceolate, acuminate, broad and auriculate at the base, nearly 1½ lin. long, ¾ lin. broad at the base, membranous and often purplish, glabrous. Male and female flowers sometimes together in the leaf-axils, or the females more often solitary, much larger than the males; pedicel about 1 lin. long. Male flowers: Sepals 6, oblong-lanceolate, ⅔ lin. long, very thin and membranous, glabrous. Disk-glands 6, very thin and smooth, flat. Stamens 3; filaments connate; anthers dehiscing longitudinally. Female flowers: Sepals 6, 2-seriate, 3 outer ovate-elliptic or rounded, slightly apiculate, 1 lin. long, ¾ lin. broad, coriaceous, glabrous, 3 inner slightly narrower, with a narrow membranous margin. Disk of 6 separate flat thin glands. Ovary lobed; styles 3, distinct, suberect, thick, bifid. Capsule depressed-globose, 1½ lin. in diam., 3-lobed, smooth. Seeds trigonous, convex on the back, ¾ lin. long and broad, and marked with 9–10 fine lines of dots on the back.—Willd. Sp. Pl. iv. 575; Roxb. Fl. Ind. iii. 654; Grah. Cat. Bomb. Pl. 180; Wight, Ic. t. 1895, fig. 3; Dalz. & Gibs. Bomb. Pl. 233; Benth. Fl. Hongk. 311, and Fl. Austral. vi. 103; Müll. Arg. in Linnæa, xxxii. 19, and in DC. Prodr. xv. ii. 362; Schweinf. Beitr. Fl. Aethiop. 37; Oliv. in Trans. Linn. Soc. ser. 2, Bot. ii. 349; Hook. f. Fl. Brit. Ind. v. 292; Watt, Dict. Econ. Prod. India, vi. i. 221; Penzig in Atti Congr. Bot. Genova, 1892, 360; Pax in Engl. Hochgebirgsfl. Trop. Afr. 282, and in Engl. Pfl. Ost-Afr. C. 236; Trim. Handb. Fl. Ceylon, iv. 20; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 304; Hiern in Cat. Afr. Pl. Welw. i. 959; Prain, Bengal Pl. 935; Cooke, Fl. Bombay, ii. 586; S. Moore in Journ. Linn. Soc. xl. 192. *P. andrachnoides*, Willd. Sp. Pl. iv. 575. *P. cuneatus*, Willd. Enum. Pl. Hort. Bot. Berol. Suppl. 65. *P. Thonningii*, Schum. & Thonn. Beskr. Guin. Pl. 418. *P. javanicus*, Poir ex Spreng. Syst. Veg. iii. 21. *P. gracilis*, Roxb. Fl. Ind. iii. 654. *P. obcordatus*, Willd. ex Roxb. l.c. 656. *P. longifolius*, Sond. in Linnæa, xxiii. 135, not of Lam. *P. venosus*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 254; Schweinf. Beitr. Fl. Aethiop. 37. *P. arabicus*, Hochst. ex Baill. Adansonia, i. 86. *P. vaccinioides*, Klotzsch in Peters, Reise Mossamb. Bot. 105, not of Sond. *Diasperus maderaspatensis*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. Gold Coast: Christiansborg, *Thonning!* Cameroons: Duli, *Ledermann*, 4440!

North Central. Bagirmi: north of Dar-el-Hadjer and Dagana, *Chevalier*, 9867!

Nile Land. Nubia: between Suakin and Berber, *Schweinfurth*, 303! coast-region, *Bent!* and without precise locality, *Hochstetter!* Eritrea: Keren, *Steudner*, 549! Togodele, *Ehrenberg!* Hababb, *Hildebrandt*, 612! Galabat, *Schweinfurth*, 910! 912! 913! 915! Abyssinia: Hamedo Plain, *Schimper*, 191! 199! near

Gapdia, *Schimper*, 814! near Gafta, *Schimper*, 1231! Begemeder, *Schimper*, 1374! Sokota, *Rohlfs & Stacker!* Galla Highlands, *Ellenbeck*, 1931! Somaliland: *Drake-Brockman*, 421! 424! *Ellenbeck*, 937! Boran country, *Ellenbeck*, 2100! Sudan, *Broun*, 1592! 1693! Kordofan: various localities, *Pfund*, 150! *Kotschy*, 30! 184! 389! British East Africa: various localities, *Hildebrandt*, 2535! 2693! Kibwesi, *Scheffler*, 56! Mount Maboko, *Scott-Elliot*, 6562! Ruwenzori, Salt Lake, *Scott-Elliot*, 7935!

Lower Guinea. Angola: Loanda, *Welwitsch*, 321! *Gossweiler*, 376! German South-west Africa: Okahandya, *Dinter*, 397! 834! Omatope, *Schinz*, 892! Wilhelmsthal, *Dinter*, 1578!

Mozamb. Distr. German East Africa: Usambara; Duga, *Holst*, 3194! Pangani, *Stuhlmann*, 94! Kilimanjaro, *Johnston! Volkens*, 2123! Portuguese East Africa: near the headwaters of the Quaqua River, *Scott!* opposite Sena, *Kirk! Peters;* Lower Buzi River, *Swynnerton*, 1521! British Central Africa: Nyasaland; banks of the River Shire, *Scott!* Nyika plateau, *McClounie*, 180! Rhodesia; Mazoe, *Eyles*, 245! near Chirinda, *Swynnerton*, 333!

Common in tropical and extra-tropical regions of the Old World.

Four varieties were distinguished by Mueller chiefly on account of the size and form of the leaves, but as they gradually pass into one another I have not been able to retain them.

46. **P. Dusenii,** *Hutchinson in Kew Bulletin*, 1911, 314. Stems about 1 ft. high, arising from a perennial rootstock, slightly flexuous, puberulous; internodes 2–3 lin. long; flowering branchlets crowded towards the top of each stem, spreading, up to 5 in. long, conspicuously winged, minutely puberulous. Leaves linear-lanceolate, minutely mucronate, rounded or subcuneate at the base, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $1\frac{1}{2}$–3 lin. broad, membranous, glabrous on both surfaces; lateral nerves 7–9 on each side, curved and looped near the margin, prominent on the lower surface; petiole rather thick, $\frac{1}{2}$ lin. long, glabrous; stipules elongate-lanceolate, very acute, $1\frac{1}{4}$ lin. long, glabrous. Flowers monœcious, solitary, males occupying the greater portion of the branchlet, about one female in the axil of the uppermost leaf; pedicel short, of the female slightly winged. Male flowers: Sepals 6, oblanceolate-spathulate, 1-nerved, margins membranous, about $1\frac{1}{4}$ lin. long. Disk-glands 6, small, prominently warted. Stamens 3; filaments united to the top into a long slender column; anthers free from each other, cells parallel and contiguous, dehiscing longitudinally. Female flowers: Sepals as in the male, but longer, $1\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad. Disk small, annular, slightly undulate, glabrous. Ovary subglobose, smooth, slightly stipitate; styles erect, connate towards the base, bifid or almost bilobed, the divisions not swollen at the apex. Ripe capsule not seen.

Upper Guinea. Cameroons: without precise locality, *Dusén*, 296!

47. **P. welwitschianus,** *Müll. Arg. in Journ. Bot.* 1864, 330. A small shrub about $1\frac{1}{2}$–3 ft. high; stems several, erect, arising from a woody many-headed rootstock, purple, slightly sulcate, glabrous. Leaves oblong-elliptic or ovate-elliptic, rounded and mucronate at the apex, sometimes slightly emarginate, cordate at the base, $\frac{1}{2}$–$1\frac{1}{6}$ in. long, 5–10

lin. broad, rather thinly chartaceous, glabrous on both surfaces, glaucous-green below; lateral nerves 6–8 on each side, often much branched, distinct on both surfaces, slightly prominent below; veins distinct and rather lax; petiole very short and flattened, about ½ lin. long, slightly and transversely wrinkled on the back, glabrous; stipules subulate from a broadened base, about 1 lin. long, glabrous. Flowers monœcious, males chiefly in the upper part of the shoots, females in the lower. Male flowers: pedicel about 1½ lin. long, glabrous. Sepals 6, in 2 distinct whorls, 3 outer, 3 inner, the outer much smaller, oblong, coriaceous, the inner much larger and ovate, glabrous. Disk-glands 6, large, fleshy, suborbicular, minutely pitted. Stamens 3; filaments joined into a stout column; anthers sessile on the top of the column, their tips coherent into a point, their bases diverging. Female flowers: pedicel a little longer and stouter than that of the male. Sepals in 2 distinct series, subequal, ovate, 1½ lin. long, 1 lin. broad, entire, glabrous, 3 outer with fimbriate appendages on the margin at the base. Disk annular, much twisted and wrinkled, very thick, glabrous. Ovary lobed, smooth; styles 3, erect, very thick, connate for a little more than half their length, free portion erect or ascending, bifid, glabrous. Capsule 4½ lin. in diam., much depressed-globose, 6-lobed, slightly wrinkled. Seeds 2 lin. long, 1½ lin. broad, with numerous lines of minute tubercles on the back.—Müll. Arg. in DC. Prodr. xv. ii. 351; Hiern in Cat. Afr. Pl. Welw. i. 958; Pax in Baum, Kunene-Samb. Exped. 282. *Diasperus welwitschianus*, O. Kuntze, Rev. Gen. Pl. ii. 601.

Lower Guinea. Angola: Pungo Andongo; between Quitage and Bumba, *Welwitsch*, 330! Huilla; near Lopollo, *Welwitsch*, 331! by the Longa River at Minnesera, *Baum*, 648! Girandougombe, *Gossweiler*, 4065 partly! Valley of the River Bunja-Cuto, *Gossweiler*, 2557!

48. **P. Gossweileri,** *Hutchinson in Kew Bulletin*, 1911, 315. An annual about 1 ft. high; stem and branches terete, glabrous; flowering branchlets elongated, up to 6 in. long. Leaves lanceolate or oblong-lanceolate, acute, slightly rounded at the base, 3–6 lin. long, 1–1¾ lin. broad, somewhat thick, glabrous and dull on both surfaces; lateral nerves not visible on either side; petiole very short; stipules subulate, ½ lin. long. Flowers monœcious. Male flowers 2–3 together in each leaf-axil on the lower part of each branchlet: Sepals 6, obovate-elliptic, rounded at the apex, glabrous, slightly membranous towards the margins. Disk-glands 6, very small, rounded, smooth. Stamens 3; filaments connate to the top; anthers free among themselves, cells subparallel and dehiscing longitudinally. Female flowers solitary in the axils of the upper leaves; pedicel 1 lin. long. Sepals 6, oblong-elliptic, rounded at the apex, slightly membranous at the margins, 1¼ lin. long, ¾ lin. broad, entire, glabrous. Disk rather small and slightly 5–6-lobed. Ovary slightly lobed, smooth; styles ascending, bilobed, not swollen at the apex. Capsule slightly depressed-globose, 2 lin. in diam., smooth. Seeds 1 lin. long, with 8 longitudinal lines on the back.

Lower Guinea. Angola: Kassuango Kurini, a weedy herb occurring here and there in open thickets, *Gossweiler*, 4198!

49. **P. omahakensis,** *Dinter & Pax in Engl. Jahrb.* xlv. 234. A small annual 2–4 in. high, branched; stem and branches slender, asperulate. Leaves lanceolate or oblong-lanceolate, mucronate, obtuse and slightly unequal at the base, 3–4 lin. long, 1–1½ lin. broad, purple on the margins, glabrous, without visible lateral nerves; petiole short, smooth; stipules subulate-filiform, very acute, ½–¾ lin. long, glabrous. Flowers monœcious. Male flowers solitary or in pairs in the upper leaf-axils; pedicel very short, glabrous. Sepals 6, obovate, rounded at the apex, ½ lin. long, membranous. Disk-glands rounded, smooth. Stamens 3; filaments connate to the top; staminal column swollen towards the base; anthers free among themselves, cells parallel and dehiscing longitudinally. Female flowers solitary towards the base of each branchlet; pedicel ¾ lin. long. Sepals 6, obovate-oblanceolate, with membranous margins. Disk crenulately lobed. Ovary smooth; styles slightly connate in the lower part, bilobed; stigmas globose. Capsule subglobose, 1¼ lin. in diam. Seeds with about 10 lines on the back.

Lower Guinea. German South-west Africa: Otjituos, *Dinter*, 877!

50. **P. Chevalieri,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 57. An annual 1½–2½ ft. high; stem terete near the base, purple, green towards the apex, angular; flowering branchlets spreading, angular, glabrous. Leaves narrowly oblong-lanceolate or almost linear-lanceolate, narrowed to the apex, obtuse at the base, ¾–1½ in. long, 1½–2½ lin. broad, slightly paler on the lower surface; lateral nerves indistinct. Flowers monœcious, males geminate and axillary in the lower parts of the branchlets, females solitary in the upper parts, shortly pedicellate. Male flowers small: Sepals 6, ovate. Disk-glands 6, small but distinct. Stamens 3; filaments connate, very short; anther-cells diverging from the apex, dehiscence appearing to be transverse. Female flowers: Sepals 6, ovate or oblong-ovate, with a green median nerve, the margins membranous and minutely serrulate. Disk saucer-shaped, spreading, crenate. Ovary lobed, smooth; styles shortly bilobed, recurved, lobes not swollen at the tips. Capsule depressed-globose, 1½ lin. in diam., smooth. Seeds brown, with about 10 longitudinal lines of minute warts on the back.

North Central. Wadai: Lake Iro region; Koulfé, *Chevalier*, 9166!

The variety with oblong leaves described by Beille (*l.c.*) is *P. amarus*, Schumach. & Thonn.

51. **P. mittenianus,** *Hutchinson.* Stems terete or slightly angular, glabrous; branches spreading horizontally, slightly zigzag, narrowly winged on each side, tinted with red in a fresh state, glabrous. Leaves ovate, obtusely pointed, broad and rounded or truncate at the base, ½–1½ in. long, ⅓–¾ in. broad, membranous, glabrous on both surfaces, green above, pallid or purplish below; lateral nerves 5–6 on each side, slender, fading away before reaching the margin, distinct below, very slightly impressed above; veins very lax, scarcely evident; petiole ½–1 lin. long, rather fleshy, glabrous; stipules subulate-lanceolate, tapered to an acute apex, about 1½ lin. long, often purplish, glabrous.

Male and female flowers few together in each leaf-axil; pedicel up to 1½ lin. long, thicker towards the apex, glabrous. Male flowers: Sepals 6, joined at the base, subequal, in a single series, oblong, rounded at the apex, 1¼ lin. long, ½ lin. broad, 1-nerved, membranous. Disk-glands 6, large, flat, covered with 5–8 wart-like protuberances, very minutely pitted, ¼ lin. in diam. Stamens 3; filaments united to the top; anthers dehiscing obliquely. Female flowers: Sepals much broader and more imbricate than in the male, in 2 series of 3 each, subequal, several-nerved, 1¾ lin. long, 1¼ lin. broad, rounded at the apex. Disk irregularly crenate or lobulate, glabrous. Ovary subglobose, slightly lobed, glabrous; styles thick, slightly recurved, free to the base, thickened and fist-shaped or slightly bilobed at the apex, glabrous. Capsule not seen.

Mozamb. Distr. German East Africa: Usagara Mountains, raised and grown at Kew from seeds collected by *Bishop Hannington!* also *Hort. Mitten!*

52. **P. myrtaceus,** *Sond. in Linnæa*, xxiii. 134. A shrub; branches flattened and slightly winged, glabrous; flowering branchlets flexuous, compressed. Leaves ovate or rarely ovate-elliptic, obtuse, more or less rounded at the base, ¾–1¼ in. long. ⅓–¾ in. broad, submembranous, glabrous on both surfaces, glaucous below; lateral nerves 6–7 on each side, slender, looped; veins not distinct; petiole ½–¾ lin. long, glabrous; stipules lanceolate, acuminate, about 1 lin. long, denticulate, glabrous. Flowers diœcious. Male flowers axillary, solitary or in pairs: pedicel filiform, up to 2 lin. long, glabrous. Sepals 6, in 2 series, subequal, outer ovate, inner slightly obovate, obtuse, 1 lin. long, ½–¾ lin. broad, entire, membranous, glabrous. Disk-glands 6, nearly flat and orbicular, slightly warted above. Stamens 3; filaments connate in the lower two-thirds into a slender column; anthers subglobose, cells diverging, dehiscing obliquely. Female flowers solitary: pedicel 3–4 lin. long, slightly thickened towards the apex, glabrous. Sepals 6, in 2 series, outer ovate-elliptic, subobtuse, 2 lin. long, 1¼ lin. broad, inner obovate, rounded at the apex, 2½ lin. long, 1¾ lin. broad, more distinctly veined than the outer. Disk thick, undulately lobed, glabrous. Ovary smooth; styles spreading, slender, bilobed, lobes terete, not swollen at the tips. Complete capsule not seen. Seeds smooth (*Sonder*).—Müll. Arg. in DC. Prodr. xv. ii. 397; S. Moore in Journ. Linn. Soc. xl. 192. *P. revolutus*, E. Meyer in Drège, Zwei Pfl. Documente, 153, 211; Sond. l.c. 135, name only. *P. Bachmanni*, Pax in Engl. Jahrb. xxiii. 520. *Diasperus myrtaceus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Mozamb. Distr. Gazaland: Pene and Chimanimani Mountains, *Swynnerton*, 1522! 1523! 6155A!

Occurs also in Natal and Pondoland.

53. **P. Pseudo-niruri,** *Müll. Arg. in Flora*, 1864, 539. An annual about 1 ft. high; stem erect, terete in the lower part, deeply grooved, flattened or slightly winged in the upper part, glabrous; branches winged. Leaves obovate or obovate-elliptic, obtuse, subacute or rounded at the base, 4–6 lin. long, 2–4 lin. broad, membranous,

glabrous on both surfaces; lateral nerves 5–6 on each side, distinct on the lower surface, scarcely evident above; veins very slender, scarcely visible; petiole $\frac{1}{4}$ lin. long, glabrous; stipules subulate from a broadened base, 1 lin. long, glabrous. Male flowers very small, 2 or 3 together in the axils of the lower leaves, shortly pedicellate; females larger, solitary in the axils of the upper leaves. Male sepals 6, 1-seriate, ovate-elliptic, $\frac{1}{3}$ lin. long, 1-nerved, membranous, glabrous. Disk-glands 6, pitted. Stamens 3; filaments connate; anthers dehiscing extrorsely or towards the side. Female sepals 2-seriate, 3 outer ovate-elliptic, subacute, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, 1-nerved, membranous, glabrous, 3 inner a little narrower and longer than the outer. Disk deeply 6-lobed, glabrous. Ovary globose, glabrous; styles very slender, free to the base, bilobed, lobes recurved. Capsule not seen.—Müll. Arg. in DC. Prodr. xv. ii. 365; Oliv. in Trans. Linn. Soc. xxix. 145; Pax in Engl. Pfl. Ost-Afr. C. 236. *P. Niruri*, T. Thoms. in Speke, Journ. Nile, App. 647, not of Linn. *Diasperus Pseudo-niruri*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Nile Land. Uganda: Unyoro, *Speke & Grant!* German East Africa: Kilimanjaro, *Merker*, 611! Usambara, *Holst*, 13!

54. **P. odontadenius,** *Müll. Arg. in Journ. Bot.* 1864, 331. Annual; stem 2–3 ft. long; branches slender, ascending, flattened and winged, glabrous. Leaves oblong, obtuse, rounded at the base, $\frac{1}{3}$–$\frac{3}{4}$ in. long, 3–5 lin. broad, membranous, glabrous on both surfaces; lateral nerves 7–8 on each side, slightly raised on the lower surface; veins not visible; petiole $\frac{1}{2}$ lin. long, glabrous; stipules subulate or filiform, very acute, 1 lin. long. Male flowers few together in the axils of the lower leaves of the branches; pedicel very short. Sepals 6, subequal, oblong, $\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad, very obtuse, membranous, 1-nerved. Disk-glands very small, lobulate. Stamens 3; filaments connate; anthers dehiscing extrorsely. Female flowers solitary in the leaf-axils of the upper two-thirds of the branches, much larger than the males; pedicel about 1 lin. long, thickened towards the top, angular or flattened, glabrous. Sepals 6, in 2 series, the outer ovate, $1\frac{1}{3}$ lin. long, $\frac{3}{4}$ lin. broad, the inner oblong, $1\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, all obtuse, membranous, and 1-nerved. Disk annular, closely crenate, glabrous. Ovary globose, glabrous; styles short, slender, suberect, free to the base, bilobed, lobes filiform, glabrous. Capsule enclosed by the whitish persistent sepals, globose, about $1\frac{1}{2}$ lin. in diam., slightly trilobed. Seeds subtriquetrous, convex on the back, longitudinally 6-striate, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad.—Müll. Arg. in DC. Prodr. xv. ii. 365; Hiern in Cat. Afr. Pl. Welw. i. 959; Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 48, ii. 56. *P. santhomensis*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 56. *Diasperus odontadenius*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. Gold Coast: Aburi Hills, *Johnson*, 471! Togo, *Büttner*, 134! Southern Nigeria: between Ibadan and Abeokuta, *Schlechter*, 12345! Cameroons: Barombi, *Preuss*, 260!

Lower Guinea. Island of St. Thomas, *Chevalier*, 14518! Angola: San Salvador, *Büttner*, 276! Pungo Andongo; deep sandy places on the Calemba Island in the River Cuanza, near Condo, *Welwitsch*, 317!

Var. *Braunii*, Hutchinson. Flowers much smaller than those of the type.—*P. Braunii*, Pax in Engl. Jahrb. xv. 525.

Upper Guinea. Cameroons: cultivated at the Berlin Botanic Garden from seeds sent by *Braun!*

Pax described in De Wild. & Durand's Contrib. Fl. Congo, i. 48, a variety *micranthus* with small flowers, of which I have not seen a specimen. It may be identical with var. *Braunii*.

55. **P. leucanthus,** *Pax in Engl. Jahrb.* xv. 524. An annual glabrous herb; stem slightly angular or very narrowly winged, smooth; flowering branchlets spreading, up to 5 in. long, narrowly winged, wings very minutely toothed or asperulate. Leaves elliptic or oblong-elliptic, obtusely pointed, narrowed or rounded at the base, $\frac{1}{2}$–1 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, thinly membranous, glaucous on the lower side; lateral nerves about 9 on each side, spreading, looped near the margin, slightly prominent on the lower surface; petiole $\frac{1}{2}$ lin. long; stipules subulate or subulate-lanceolate, a little longer than the petiole. Flowers monœcious, males small and 2 or 3 together in the lower part of the branchlets, females larger and solitary, shortly pedicellate. Male flowers: Sepals 6, oblanceolate, $\frac{1}{2}$ lin. long, narrowly 1–nerved, membranous. Disk-glands 6, small, slightly warted. Stamens 3; filaments connate for about three-quarters of their length, free at the top; anthers dehiscing longitudinally. Female flowers: Sepals 6, sub–1-seriate, obovate, $1\frac{1}{4}$ lin. long. Disk slightly 5-lobed, but not crenate, ovary shortly stipitate, subglobose, scarcely lobed, smooth; styles free to the base, linear, slender, spreading over the top of the ovary, bilobed, lobes not swollen at the tips. Capsule hardly lobed, $1\frac{1}{2}$ lin. in diam. Seeds marked with 6 lines on the back.—Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. Abyssinia: without precise locality, *Quartin-Dillon & Petit! Schimper*, 659!

South Central. Belgian Congo: Kantu, *Kässner*, 2405!

Mozamb. Distr. German East Africa: banks of the Wala River near Tabora, *Böhm*, 83! Usambara; Bumbuli, *Meinhof*, 71! Kwai, *Eick*, 159! British Central Africa: Nyasaland; Masuku Plateau, 6500–7000 ft., *Whyte!* Manganja Hills, *Waller!* and without precise locality, *Buchanan*, 879!

56. **P. Rivæ,** *Pax in Ann. Istit. Bot. Roma*, vi. 182. Stems woody, quadrangular, puberulous between the angles; flowering branchlets spreading, up to $3\frac{1}{2}$ in. long, angular, glabrescent or minutely puberulous. Leaves elliptic, obtuse at both ends, $2\frac{1}{2}$–3 lin. long, $1\frac{1}{4}$–2 lin. broad, somewhat membranous, glabrescent; lateral nerves about 4 on each side, a little prominent below; petiole about $\frac{1}{4}$ lin. long; stipules subulate-lanceolate, about twice the length of the petiole. Flowers monœcious, males small, 2 or 3 together in the axils of the lowermost leaves, females much larger, solitary, and more numerous than the males; pedicel short. Male flowers: Sepals 6, in 2 series, the outer ovate, $\frac{3}{4}$ lin. long, $\frac{1}{3}$ lin. broad, the inner narrower, all 1-nerved, membranous and white. Disk-glands 6, flat, rounded, conspicuously warted. Stamens 3; filaments connate to the top; anthers dehiscing at the side. Female flowers: Sepals 6, in 2 distinct series, the outer broadly ovate,

subcordate at the base, $1\frac{1}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, the inner oblanceolate, subacute, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, all with a broad green midrib and membranous. Disk entire, rather thick, fleshy, not at all crenulate. Ovary smooth, lobed; styles slightly spreading, rather stout; stigmas swollen and slightly bifid at the apex. Capsule depressed-globose, slightly lobed, about $1\frac{1}{4}$ lin. in diam. Seeds with 6 longitudinal lines on the back.

Nile Land. Somaliland: mountains near Hamara Burgi, in the valley of the River Sagan, *Riva*, 1590! 1758.

57. **P. aspericaulis,** *Pax in Engl. Jahrb.* xliii. 218. A small shrub; branches angular, distinctly asperulate; flowering branchlets $1\frac{1}{2}$–2 in. long, asperulate. Leaves obovate, mucronate, cuneate at the base, 2–4 lin. long, $1\frac{1}{2}$–3 lin. broad, chartaceous, asperulate on the nerves on both surfaces; lateral nerves 3–4 on each side, spreading; petiole $\frac{3}{4}$ lin. long, glabrous; stipules lanceolate, $\frac{3}{4}$ lin. long, membranous, margins serrate-ciliate. Flowers monœcious, axillary, one female and about two males in each leaf-axil, the males much smaller than the females; pedicel short, glabrous. Male flowers: Sepals 6, ovate, with a rather broad midrib. Disk-glands 6, fleshy, rounded, slightly warted. Stamens 3; filaments connate for a little more than half their length; anther-cells diverging, dehiscing at the side. Female flowers: Sepals 6, larger than those of the male, subacute. Disk fleshy, annular, undulate. Ovary 6-lobed, subglobose, smooth; styles short, suberect, slightly swollen and bifid at the apex. Capsule depressed-globose, slightly 6-lobed. Seeds with 6–7 longitudinal lines on the back.

Mozamb. Distr. German East Africa: East Ukerewe; among granite rocks above Kugunguli, *Uhlig*, 117!

58. **P. Fischeri,** *Pax in Engl. Jahrb.* xix. 77. A small glabrous annual or subshrub; stems more or less quadrangular; flowering branchlets rather slender, up to $4\frac{1}{2}$ in. long, angular, smooth. Leaves oblong or oblong-elliptic, rounded at both ends, sometimes minutely mucronate at the apex, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 3–5 lin. broad, thin; lateral nerves about 8 on each side, slender and not or very slightly elevated on the lower surface; petiole $\frac{3}{4}$ lin. long; stipules ovate-lanceolate or lanceolate, reddish-purple, a little longer than the petiole. Flowers monœcious, 3 or 4 males together, females solitary; male pedicel short, female $1\frac{1}{4}$ lin. long. Male flowers: Sepals 6, ovate-oblong, subacute. Disk-glands 6, flat, rounded, conspicuously warted. Stamens 3; filaments connate in the lower two-thirds, free above; anthers at length spreading, the dehiscence continuous at the top of the cells. Female flowers: Sepals 6, in 2 distinct series, the outer 3 ovate, the inner oblanceolate, obtuse. Disk large and conspicuous, cupular, the margin incised like the teeth of a comb, the whole enveloping nearly half of the ovary when somewhat young. Ovary lobed, smooth; styles free to the base, somewhat slender and suberect, bilobed, lobes linear and not at all swollen at the apex. Capsule rather deeply 3-lobed, about $1\frac{1}{4}$ lin. in diam. Ripe seeds not seen.—Pax in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. British East Africa: Eldama Ravine, 7000–7500 ft., *Whyte!* Mau Plateau, *Baker*, 42!

Mozamb. Distr. German East Africa: Usambara; Kwai, *Eick*, 141! and without precise locality, *Fischer*, 24!

59. **P. mannianus,** *Müll. Arg. in Flora*, 1864, 514. Herbaceous, about 4 ft. high; stems sharply angular or slightly winged; branches spreading, slender, sharply angled, glabrous. Leaves obovate or obovate-elliptic, rounded to an acute point at the apex, subacute at the base, 4–6 lin. long, 2½–3 lin. broad, membranous, glabrous on both surfaces; lateral nerves about 7 on each side, slightly impressed on both surfaces; veins lax and indistinct; petiole about ½ lin. long, glabrous; stipules conspicuous, subulate-lanceolate, acute, 1½ lin. long, somewhat membranous and purplish, glabrous. Flowers monœcious. Male flowers 1–3 in each leaf-axil; pedicel slender, about 1 lin. long, glabrous. Sepals 6, joined at the base, 1-seriate, subequal, oblong, obtuse, 1 lin. long, ½ lin. broad, membranous, 1-nerved, glabrous. Disk-glands 6, large, flat, covered with several wart-like protuberances, ¼ lin. in diam. Stamens 3; filaments united to the top; anthers dehiscing obliquely. Female flowers the same size as the male; pedicel much thickened towards the apex. Sepals in 2 series, 3 outer ovate-elliptic, 3 inner slightly narrower, otherwise as in the male. Disk annular, only very slightly crenulate, glabrous. Ovary subglobose, lobed, glabrous; styles thick, free to the base, bilobed for about one-third their length, lobes terete, recurved, glabrous. Seeds subtriquetrous, convex on the back, ¾ lin. long, marked with close longitudinal lines, about 7 of them on the outer convex side.—Müll. Arg. in DC. Prodr. xv. ii. 365. *Diasperus mannianus*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Upper Guinea. Cameroons: Cameroon Mountain, 5000–8000 ft., *Mann*, 1231! 1998! *Johnston*, 69! and without precise locality, *Dusén*, 421!

60. **P. Volkensii,** *Engl. Pfl. Ost-Afr. C.* 236. A shrub; flowering branchlets up to 2½ in. long, sharply angular, glabrous, purplish. Leaves oblong-elliptic or oblanceolate, mucronate, slightly narrowed to the base, 3–5 lin. long, 1–2½ lin. broad, thinly chartaceous, glabrous on both surfaces; lateral nerves very faint, about 4 on each side; petiole very short; stipules purple, lanceolate, acuminate, 1 lin. long, glabrous. Flowers monœcious. Male flowers few in the axils of the lower leaves; pedicel rather slender, glabrous. Sepals 6, oblong-obovate, rounded at the apex, 1⅓ lin. long, ¾ lin. broad, 1-nerved, membranous, glabrous. Disk-glands 6, very large, thick and flattened, thickly covered with prominent wart-like protuberances. Stamens 3; filaments connate; anthers dehiscing at the side. Female flowers solitary in the axils of the upper leaves; pedicel much thickened towards the base of the flower, 1 lin. long, glabrous. Sepals 6, larger than in the male. Disk flat, rounded, crenate, glabrous. Ovary deeply trilobed, lobes again slightly bilobed, glabrous; styles free to the base, slender, bilobed; stigmas subglobose. Capsule deeply trilobed, about 1 lin. in diam.

Seeds laterally compressed, convex on the back, marked with several longitudinal lines.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 5500 ft., *Volkens*, 768 !

61. **P. Niruri,** *Linn. Sp. Pl. ed.* i. 981. An annual herb about 1 ft. high; stem closely sulcate, smooth; flowering branchlets up to 4 in. long, compressed or slightly winged, smooth or nearly so. Leaves oblong or oblong-elliptic, rounded at both ends, 3–6 lin. long, 1½–3 lin. broad, membranous, glabrous on both surfaces; lateral nerves about 5 on each side, sometimes nearly invisible; petiole very short; stipules lanceolate-subulate, membranous, glabrous. Flowers monœcious, solitary, males in the lower, females in the upper parts of the branchlets; female pedicel about ¾ lin. long when in fruit, glabrous. Male flowers: Sepals 6, small, 1-nerved with membranous margins. Disk-glands 6, small. Stamens 3; filaments connate. Female flowers: Sepals 6, larger than in the male. Disk thin and flat, about 10-toothed. Ovary subglobose, smooth; styles very short, suberect, bifid. Capsule depressed-globose, more or less trilobed, about 1¼ lin. in diam. Seeds with about 6 lines on the back.—Willd. Sp. Pl. iv. 583; Müll. Arg. in Linnæa, xxxii. 43, and in DC. Prodr. xv. ii. 406; Roxb. Fl. Ind. iii. 659; Hook. f. Fl. Brit. Ind. v. 298; Pax in Engl. Pfl. Ost-Afr. C. 236, in Bolet. Soc. Brot. x. 157, and in Bull. Soc. Bot. Belg. xxxvii. 103; Schweinf. Beitr. Fl. Aethiop. 37; Trim. Handb. Fl. Ceylon, iv. 23; Hiern in Cat. Afr. Pl. Welw. i. 960; De Wild. & Durand, Contr. Fl. Congo, i. 48, and Reliq. Dewevr. 204; De Wild. Miss. É. Laurent, 127, and Études Fl. Bas- et Moyen-Congo, ii. 266; Rendle in Journ. Linn. Soc. xxxvii. 210; Gibbs, l.c. 469; Beille in Bull. Soc. Bot. France, lv. Mém. viii. 57, partly. *Urinaria indica*, Burm. Thes. Zeyl. t. 93, fig. 2. *Nymphanthus Niruri*, Lour. Fl. Coch. 545. *Diasperus Niruri*, O. Kuntze, Rev. Gen. Pl. ii. 600.—*Kirganeli*, Rheede, Hort. Malab. x. t. 15.

Upper Guinea. *Thonning.* Senegambia: *Perrottet.* Northern Nigeria: Nupe, a weed in cultivated ground, *Barter*, 825 !

North Central. Wadai: Koulfé, *Chevalier*, 8858 bis !

Nile Land. Kordofan: Arashkol Mountain, *Kotschy*, 115 ! Ethiopia, *Kotschy*, 92 ! Uganda: near Mulema, *Bagshawe*, 351.

Mozamb. Distr. Portuguese East Africa: near Shupanga, *Kirk !* British Central Africa: Nyasaland; between Kondowe and Karonga, *Whyte !* Rhodesia; Matoppo Hills, *Gibbs*, 314.

A weed widely spread in the tropics.

62. **P. rotundifolius,** *Klein ex Willd. Sp. Pl.* iv. 584. An annual herb about 1 ft. high; stems and branches usually angular and asperulate; flowering branchlets spreading or drooping, up to 3 in. long, asperulate. Leaves rounded-obovate, cuneate or slightly rounded at the base, 2–5 lin. long, 1½–4 lin. broad, membranous or slightly chartaceous, glabrous on both surfaces; petiole short, glabrous; stipules subulate-lanceolate, ½ lin. long. Flowers monœcious, 2 or 3 males and 1 female together in each leaf-axil, shortly pedicellate. Male flowers: Sepals 6,

1-nerved, membranous. Disk-glands 6, slightly wrinkled or warted. Stamens 3; filaments connate to near the top; anthers dehiscing at the side. Female flowers: Sepals larger than those of the male, ovate, with a broad midrib. Disk crenulate, small. Ovary depressed-globose, glabrous; styles distinct, spreading, bifid. Seeds marked with about 7 longitudinal lines on the back.—Müll. Arg. in Linnæa, xxxii. 43, and in DC. Prodr. xv. ii. 405, excl. var. *leucocalyx*, Müll. Arg.; Pax in Engl. Pfl. Ost-Afr. C. 236; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 303, and in Höhnel, Disc. Lakes Rudolf and Stephanie, ed. Engl. ii. 355; Penzig in Atti Congr. Bot. Genova, 1892, 360. *P. Niruri*, Wall. Cat. 7895A, partly, not of Linn. *P. scabrellus*, Webb ex Hook. Niger Flora, 175; J. A. Schmidt, Beitr. Flora Cap. Verd. Ins. 309. *Diasperus rotundifolius*, O. Kuntze, Rev. Gen. Pl. ii. 600.

Nile Land. Nubia: coast region, *Bent!* Eritrea: Mount Bosco, near Saati, *Schweinfurth*, 568! Somaliland: *Lort-Phillips! Cole! Drake-Brockman*, 178!

Occurs also in Cape Verde Islands, Arabia, and India.

63. **P. parvus,** *Hutchinson in Kew Bulletin*, 1911, 316. A small annual about 5 in. high; stem slender, terete, reddish, glabrous; flowering branchlets up to $1\frac{1}{2}$ in. long, subterete, glabrous. Leaves linear, subacute, 4–5 lin. long, $\frac{3}{4}$–$1\frac{1}{4}$ lin. broad, membranous, green above, light reddish-green below, margins recurved and reddish; petiole very short; stipules subulate or almost filiform, $\frac{1}{2}$ lin. long, entire. Flowers monœcious, axillary, females solitary in the upper two-thirds of the branchlets, males 2–3 together in the lower third; pedicel short. Male flowers very small: Sepals 5, obovate, entire, glabrous. Disk-glands 5, small, rounded, nearly smooth. Stamens 2; filaments connate to the apex; anthers dehiscing at the side. Female flowers: Sepals 5, in a single series, oblanceolate, acute, about $\frac{3}{4}$ lin. long, with a broad green midrib, margins membranous and serrulate, glabrous. Disk saucer-shaped, thin, slightly undulately lobed, glabrous. Ovary subglobose, slightly lobed, smooth; styles short, spreading in a stellate manner over the top of the ovary, bifid; stigmas not swollen. Capsule depressed-globose, 1 lin. in diam. Seeds smooth on the back.

Mozamb. Distr. German East Africa: between Lakes Tanganyika and Rukwa, at about 6000 ft., *Nutt!*

64. **P. diandrus,** *Pax in Engl. Jahrb.* xxxiii. 276. A shrub about 10 ft. high; young branchlets narrowly winged, glabrous. Leaves oblong or elliptic-oblong, caudate-acuminate, shortly cuneate at the base, 2–5 in. long, 1–2 in. broad, entire, rather rigidly and thinly chartaceous, glabrous on both surfaces; lateral nerves 6–7 on each side, prominent on both surfaces, especially below, strongly looped well within the margin, forming a wavy intramarginal nerve; veins very few, distinct below; petiole about 1 lin. long, wrinkled; stipules triangular, acute, auriculate at the base, $\frac{3}{4}$ lin. long and broad, glabrous. Flowers diœcious, males numerous in each fascicle, females solitary in each leaf-axil. Male pedicel slender, up to 2 lin. long, glabrous: Sepals 6,

obovate-elliptic, thin, glabrous. Disk-glands large, fleshy, nearly contiguous, smooth. Stamens 2; filaments very slightly connate at the base; anther-cells distinct, diverging from the apex. Female pedicel 1½–2 in. long, very slender, glabrous: Sepals 6, ovate, obtuse, 1¼ lin. long, 1 lin. broad, glabrous. Disk very thick; outer margin undulately lobed, glabrous. Ovary depressed-ovoid, smooth; styles spreading over the top of the ovary, flattened, bilobed, ½ lin. long, lobes linear, acute.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2400A! 2998!

Lower Guinea. Gaboon: near Libreville, *Klaine*, 1195!

65. **P. petræus,** *Chevalier ex Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 58, *partly*. A shrub 3–7 ft. high; branches slightly sulcate, with a broad line of short crisped hairs up each side when young, at length nearly glabrous. Leaves elliptic, oblong-elliptic or oblanceolate, obtusely pointed, obtuse or subcuneate at the base, 1½–4 in. long, ⅓–1½ in. broad, thinly chartaceous or membranous, glabrous on both surfaces, often glaucous below, margins recurved; lateral nerves 9–10 on each side, looped some distance from the margin, prominent below; petiole 1–1½ lin. long, somewhat fleshy, glabrous; stipules subulate or filiform from a broader and auriculate base, brown, membranous, 1–2 lin. long, margins fimbriate or laciniate. Flowers diœcious, axillary, males several in each fascicle with numerous membranous laciniate bracts at the base, females few or subsolitary. Male flowers: pedicel about 2 lin. long, very slender, glabrous. Sepals 4, ovate-orbicular, nearly 1 lin. broad, not membranous, glabrous on both surfaces. Disk-glands 4, rounded or subreniform, fleshy, very minutely pitted. Stamens 2; filaments united into a very slender column; anther-cells quite separated, very small. Female flowers: Sepals 5–6, very broadly ovate, 1¼ lin. broad, coriaceous, glabrous. Disk saucer-shaped, fleshy, undulately lobed, glabrous. Ovary much depressed-globose, slightly trilobed, glabrous; styles spreading stellately over the top of the ovary, bilobed, lobes terete and not at all swollen at the tips. Capsule trilobed, 3 lin. in diam. Seeds 3-sided, convex on the back, 1 lin. long, ¼ lin. broad, minutely and closely pitted.

Upper Guinea. French Guinea: Fouta Jallon; between the Santa River and Timbo, *Chevalier*, 12610! on the road to Kouria-Longuery, *Caille*, 14628! 14646! Kouria, *Caille*, 14991! by the Scarcies River at Wallia, *Scott-Elliot*, 4637!

66. **P. Beillei,** *Hutchinson*. A shrub 3–7 ft. high; branches terete, with a membranous deciduous bark; flowering branchlets puberulous; internodes very close. Leaves rather elongate-oblong or oblong-elliptic, rounded or truncate and sometimes slightly emarginate at the apex, never pointed, rounded at the base, ½–1¾ in. long, ¼ to nearly 1 in. broad, membranous, glabrous on both surfaces, somewhat glaucous below, margin thickened and recurved; lateral nerves 13–16 on each side, very slender, spreading almost at right angles to the midrib, anastomosing and gradually fading near the margin, very slightly raised on the lower surfaces; transverse nerves oblique and rather close, distinct below; petiole ½–1 lin. long, slightly wrinkled, not hairy; stipules subulate or almost

filiform from a broader auriculate base, about 1½ lin. long, subentire. Male flowers not known. Female flowers solitary or subsolitary : pedicel (supporting the fruit) 2 lin. long, thickened towards the apex, glabrous. Sepals 6, obovate, distinctly narrowed to the base, about 1 lin. long, prominently striate inside, glabrous. Disk saucer-shaped, margin undulate, glabrous. Complete capsule not seen ; exocarp thin, conspicuously reticulate on the inside ; endocarp thicker, bony. Seeds 3-sided, convex on the back, 1½ lin. long and broad, covered with numerous longitudinal rows of very small closely arranged wart-like protuberances.—*P. petræus*, Chevalier ex Beille in Bull. Soc. Bot. France, lv. Mém. viii. 58, partly.

Upper Guinea. Togo, *Kersting*, 44 !

North Central. Eastern Shari region : Dar Banda ; between the Kaga Dje and the Lower Bamingui, near the water, *Chevalier*, 6612 ! source of the Ndelli River, *Chevalier*, 6846 !

A specimen collected by *Scott-Elliot* (3961) on the upper part of Sugarloaf Mountain, Sierra Leone, is very probably this species, but as the material is rather incomplete I cannot be quite certain.

Imperfectly known species.

67. **P. Gilletii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 266. A small shrub ; branches woody, longitudinally striate, glabrous, more or less angular when young ; branchlets furnished at the base with numerous more or less scarious bracts, solitary or in fascicles, flexuous, usually not again branched, more or less villous, striate, polygonal, ½–2½ in. long, the flowering ones shorter than those bearing only leaves. Leaves very shortly petiolate, obovate, elliptic or nearly suborbicular, 1–4 lin. long, ¾–3½ lin. broad, glabrous on both surfaces except for a few hairs on the lateral nerves on the lower side ; lateral nerves few and inconspicuous ; stipules linear-lanceolate, 1 lin. long. Flowers monœcious, solitary, males towards the base of the branchlets : pedicel slender, ½–¾ lin. long. Sepals 6, white when dry, 1¼ lin. long. Stamens 3 ; filaments connate. Female pedicel 2 lin. long, angular when dry. Sepals 6, 2-seriate, 3 inner smaller than the outer, up to 2 lin. long. Ovary glabrous ; styles free, with enlarged stigmas. Capsule about 1½ lin. high. Seeds strongly striate, ¾ lin. long.

Lower Guinea. Lower Congo : Banana district ; Moanda, *Gillet*, 3208, 4034.

68. **P. mœroensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, i. 273, *t.* 64. Stems from a rhizome, glabrous. Leaves sessile or subsessile, oblong-lanceolate, sharply mucronate, narrowed to the base, 5–12 lin. long, 1–2½ lin. broad, greyish on both surfaces when dry ; stipules ovate-lanceolate, more or less cordate at the base, acute, ¾–1½ lin. long. Male flowers not seen. Female flowers solitary : pedicel glabrous, about 2½ lin. long. Sepals 5, ovate, obtuse, 1½ lin. long, glabrous. Ovary glabrous, supported on a small disk ; styles 3, divergent, shortly 2-lobed. Capsule subglobose, about 2¼ lin. in diam. Seeds glabrous, brown, striate on the back.

South Central. Belgian Congo: Katanga district; basin of Lake Moero, *Verdick.*

69. **P. Pynærtii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 267. A tree; branches glabrous, longitudinally sulcate; branchlets solitary or more often in fascicles, provided at the base with 3 triangular subacute bracts, middle bract a little more developed than the others. Leaves ovate or oblong, more or less shortly acuminate, rounded or subcordate at the base, $1\frac{1}{4}$–$3\frac{1}{4}$ in. long, $\frac{3}{4}$-$1\frac{3}{4}$ in. broad, glabrous on both surfaces, paler beneath. Male flowers: Sepals 1 lin. long. Stamens free to the base. Disk entire. Female flowers and capsules not known.

South Central. Belgian Congo: Equateur district; Eala, *Pynaert*, 379, 1159. Bangala district; Bumba, *Pynaert*, 25.

70. **P. Verdickii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, i. 274, *t.* 63. An undershrub; branches more or less compressed. Leaves oblong or ovate-oblong, mucronate, rounded or wedge-shaped at the base, very shortly petiolate, 5–7 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad; stipules filiform, $\frac{3}{4}$ lin. long. Male flowers generally at the base of the branchlets, 2 or 3 in each leaf-axil, shortly pedicellate: Sepals 5, obovate, $\frac{3}{4}$ lin. long. Stamens 3; filaments connate; anthers free. Female flowers in the upper part of the branchlets; pedicel up to $1\frac{1}{2}$ lin. long. Sepals 5, obovate, rounded at the apex, accrescent, attaining when in fruit $1\frac{1}{4}$ lin. long. Ovary glabrous; styles 3, enlarged at the apex. Capsule $1\frac{1}{4}$ lin. in diam. Seeds more or less reniform, about $\frac{3}{4}$ lin. long, striate.

South Central. Belgian Congo: Katanga district; Lukafu, *Verdick*, 407.

71. **P. oxycoccifolius,** *Hutchinson.* Stems arising from a woody rhizome, elongated, about $2\frac{1}{2}$ ft. long, terete, glabrous; flowering branchlets distant, spreading, up to 3 in. long, subterete, glabrous; internodes about $1\frac{1}{2}$ in. long. Leaves broadly ovate, acute or mucronate, rounded or subcordate at the base, 3–6 lin. long, 2–4 lin. broad, rigidly chartaceous, strongly reticulate, with a thickened reddish margin, glabrous; petiole about $\frac{1}{4}$ lin. long; stipules lanceolate-subulate, acute, 1 lin. long, glabrous. Male flowers not known. Female flowers: Sepals subfoliaceous, broadly obovate, rounded at the apex, $2\frac{1}{2}$–3 lin. long, 2–3 lin. broad, glabrous, with a distinct midrib and lateral nerves. Disk thick and fleshy, entire, conspicuously beaded. Ovary 3-lobed, smooth, shining; styles slender, free to the base, bilobed for about one-third their length, lobes slightly swollen at the tips. Capsule about $2\frac{1}{2}$ lin. in diam. Seeds trigonous, with about 15 lines on the back, 1 lin. long.

Lower Guinea. Angola: Munongue, here and there in open thickets, *Gossweiler*, 3597 !

72. **P. retinervis,** *Hutchinson.* Stems slender, woody, about 6 in. long, apparently arising from a woody rootstock, subterete, glabrous; flowering branchlets 1–$1\frac{1}{2}$ in. long, bearing 3–5 pairs of leaves, slightly angular, glabrous. Leaves ovate-oblong or oblong-elliptic, rounded at

both ends, 2–4 lin. long, 1½–2½ lin. broad, coriaceous, densely covered on both surfaces with minute glands, glabrous, margins slightly recurved; lateral nerves 5–6 on each side, thick and prominent on the lower surface, much branched; petiole short; stipules lanceolate with filiform points, 1 lin. long, reddish and somewhat membranous, margins serrate. Flowers dicœcious, males not known. Females solitary pedicel stout, 3 lin. long, slightly angular, glabrous. Sepals 5, broadly obovate, 1 lin. long, ¾ lin. broad, rather thick and yellowish-green, without any distinct median nerve, margins membranous and transparent. Disk cupular, thin, faintly crenulate. Ovary slightly lobed, globose, smooth and glabrous; styles long, free, bilobed to about the middle, lobes linear, not swollen at the tips. Capsule subglobose, slightly lobed, 1½ lin. in diam., rather fleshy. Mature seeds not seen.

Mozamb. Distr. Nyasaland: Fwambo, near Lake Tanganyika, *Carson!*

32. **FLUGGEA,** Willd.; Benth. et Hook. f. Gen. Pl. iii. 276.

Flowers dicœcious. Petals absent. Male flowers: Sepals 5, imbricate. Stamens 5, alternating with the disk-glands; filaments free; anthers introrse, erect, cells distinct, dehiscing longitudinally. Rudimentary ovary large, deeply 2–3-partite. Female flowers: Calyx as in the male. Disk flat, annular, entire or nearly so. Ovary 3-celled; styles connate at the base or nearly absent, recurved or spreading, bifid; ovules 2 in each cell. Fruit slightly fleshy; pericarp thin. Seeds subtriquetrous, rounded on the back; testa thick and crustaceous; albumen scanty; embryo incurved with broad and flat cotyledons.—Shrubs or trees. Leaves alternate, petiolate, entire. Flowers small, in axillary fascicles, male often numerous, female few or subsolitary.

About 10 species in the tropics generally.

Leaves usually obovate and rounded, obtusely pointed or emarginate; fruits not or only very slightly lobed .	1. *F. microcarpa.*
Leaves elliptic, acute or subacute at both ends; fruit trilobed	2. *F. fagifolia.*

1. **F. microcarpa,** *Blume, Bijdr.* 580. A shrub or small tree about 12 ft. high; branches and branchlets usually angular, glabrous. Leaves elliptic or obovate, obtusely pointed or the smaller ones emarginate, cuneate, subacute or obtuse at the base, up to 2½ in. long and 1¼ in. broad, rather rigidly membranous, glabrous on both surfaces, often glaucous below; lateral nerves 5–9 on each side, slightly prominent on the lower surface; veins fine and close; petiole 1½–3 lin. long, glabrous; stipules lanceolate, margin slightly jagged. Flowers dicœcious. Male flowers numerous, in axillary fascicles: pedicel slender, 1½–2 lin. long, glabrous. Sepals 5, unequal, the larger obovate, 1 lin. long and ⅔ lin. broad, the smaller oblong, ½ lin. long, ¼ lin. broad, margins membranous and jagged or ciliate, otherwise glabrous. Disk-glands usually large and fleshy, somewhat angular, with 3 or 4 depressions or pits on the outside, glabrous. Stamens 5; filaments longer than the rudimentary ovary; anthers ½ lin. long. Rudimentary ovary tripartite; segments free for about

two-thirds their length, terete, reflexed and often thickened in the upper part, a small second lobe often developed at the bend, glabrous. Female flowers numerous. Calyx as in the male. Disk annular, glabrous. Ovary ovoid, glabrous; styles connate at the base, or rarely nearly absent, bilobed, lobes spreading, flattened or subterete. Fruits white, depressed-globose, about 2 lin. in diam.; styles persistent. Seeds shining, with several longitudinal lines of pits on the back and sides.—Hook. f. Fl. Brit. Ind. v. 328; Hiern in Cat. Afr. Pl. Welw. i. 961; S. Moore in Journ. Linn. Soc. xl. 193. *F. virosa*, Baill. Étude Gén. Euphorb. 593. *F. abyssinica*, Baill. l.c. *F. angulata*, Baill. Adansonia, i. 80. *F. obovata*, Baill. l.c. ii. 41; Pax in Engl. Pfl. Ost-Afr. C. 235, and in Engl. Jahrb. xxviii. 418, xxx. 338; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 299; De Wild. & Durand, Contrib. Fl. Congo, i. 48, and Reliq. Dewevr. 205; De Wild. Études Fl. Katanga, 79; Th. & Hél. Durand, Syll. Fl. Congol. 483. *F. obovata*, var. *luxurians*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 55. *F. senensis*, Klotzsch in Peters, Reise Mossamb. Bot. 106. *Phyllanthus virosus*, Roxb. ex Willd. Sp. Pl. iv. 578. *P. lucidus*, Hort. ex Willd. Enum. Pl. Hort. Bot. Berol. 329. *P. angulatus*, Schum. & Thonn. Beskr. Guin. Pl. 415. *P. dioicus*, Schum. & Thonn. l.c. 416. *P. polygamus*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 256. *Xylophylla obovata*, Willd. Enum. Pl. Hort. Bot. Berol. 329. *Securinega abyssinica*, A. Rich. l.c.; Schweinf. Beitr. Fl. Aethiop. 38. *S. obovata*, Müll. Arg. in DC. Prodr. xv. ii. 449; Benth. Fl. Austral. vi. 115. *Acidoton obovatus*, O. Kuntze, Rev. Gen. Pl. ii. 592.

Upper Guinea. Senegal, *Sieber*, 49! *Leprieur! Perrottet*, 750, 751. Sierra Leone: *Scott-Elliot!* Gold Coast: Cape Coast Castle, *Vogel*, 86! common on plains, *Thonning! Brown*, 934! *Johnson*, 1092! Togo: near Lome, *Warnecke*, 297! Lagos, *Foster*, 58! *Millen*, 80! *Phillips*, 5! *Rowland! Irving*, 133! Northern Nigeria: Nupe, *Barter*, 1496! Katagum district, *Dalziel*, 207! Southern Nigeria; Tiediana, *Chevalier*, 997! Cameroons: Sanaga, *Zenker*, 1454!

North Central. Central Shari region: Koulfi, *Chevalier*, 8911!

Nile Land. Eritrea: Bogos, *Beccari*, 113! Gallabat, *Schweinfurth*, 908! Abyssinia: various localities, *Petit*, 204! *Schimper*, 287! 877! 1698! Sudan: various localities, *Muriel*, 33! 82! *Broun*, 1081! 1685! *Petherick! Schweinfurth*, 1094! Niamniam, *Schweinfurth*, 3220! 3705! Jur, *Schweinfurth*, 2383! Uganda: various localities, *Dawe*, 80! 748! *Scott-Elliot*, 7895! British East Africa: various localities, *Scott-Elliot*, 6731! *Whyte! Hildebrandt*, 1246B!

Lower Guinea. Angola: Loanda; near Forte de Penedo, *Welwitsch*, 627! *Gossweiler*, 363! Bumbo; near the base of the Serra da Xella, *Welwitsch*, 337!

South Central. Belgian Congo: near Kabanga, *Dewèvre;* near Lukafu, *Verdick*.

Mozamb. Distr. Zanzibar, *Kirk*, 29! *Last! Lyne*, 30! 58! German East Africa: various localities, *Holst*, 2020! *Holtz*, 396! *Goetze*, 131! 400! 650! *Merker*, 591! Portuguese East Africa: Lower Zambesi, *Kirk! Menyharth*, 877! Gazaland; various localities, *Swynnerton*, 1719! 1727! 1728! 1729! 1730! British Central Africa: Rhodesia; Livingstone, *Rogers*, 7243! Sabi River, *Swynnerton*, 1911!

2. **F. fagifolia,** *Pax in Engl. Pfl. Ost-Afr. C.* 236. A tree 60–70 ft. high; young branchlets somewhat angular or compressed, glabrous.

Leaves elliptic, acute or subacute at both ends, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–2 in. broad, membranous, glabrous on both surfaces; lateral nerves 10–12 on each side, spreading, branched and becoming fainter towards the margin, distinct on both surfaces, more prominent on the lower; tertiary nerves subparallel, very few; veins close, scarcely raised; petiole $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, glabrous; stipules deciduous. Male and female flowers not known. Capsule slightly trilobed, depressed, $\frac{1}{4}$ in. in diam., lobes rounded, reticulate, glabrous. Seeds with the two sides flattened, concave and wrinkled or reticulate on the back, about 2 lin. long.

Mozamb. Distr. German East Africa: Kilimanjaro; Himo River, at 3300 ft., *Volkens;* Amani, *Warnecke*, 352! and without precise locality, *Kersting*, 98! 1737!

Only fruiting specimens of *F. fagifolia* are known, and I am very doubtful if it is a true *Fluggea*. It seems closely allied to *Phyllanthus discoideus*, Müll. Arg., with which it is probably congeneric.

33. **CLUYTIANDRA**, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 272.

Flowers monœcious. Petals absent. Male flowers: Sepals 5, imbricate. Disk saucer-shaped, undulately lobed, lobes opposite the sepals. Stamens 5; filaments connate in their lower half, free above; anther-cells parallel, dehiscing longitudinally. Rudimentary ovary at the apex of the staminal column, tripartite or subentire. Female flowers: Calyx and disc as in the male. Ovary 3-celled; styles short, spreading or suberect, bifid or bipartite; ovules 2 in each cell. Capsule dehiscing into 2-valved cocci. Seeds with fleshy albumen, without a strophiole; cotyledons flat and broad.—Shrubs or undershrubs. Leaves alternate, thin, entire, penninerved. Flowers in axillary fascicles, males small, shortly pedicellate, females often solitary; pedicel elongating in fruit.

Species 3, confined to Tropical Africa and South-east Arabia.

Stems arising from a many-headed rhizome; rudimentary ovary tripartite . . . . . 1. *C. trichopoda.*
Shrubs; rudimentary ovary subentire.
  Flowering branchlets more or less sharply angular or asperulate . . . . . 2. *C. somalensis.*
  Flowering branchlets terete, glabrous or minutely puberulous . . . . . 3. *C. fruticans.*

1. **C. trichopoda,** *Müll. Arg. in Journ. Bot.* 1864, 328. Stems numerous, up to 15 in. high, arising from a many-headed rhizome (*Welwitsch*), glabrous. Leaves ovate or rounded-ovate, subacute or slightly mucronate, rounded at the base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, membranous, glabrous and somewhat glaucous on both surfaces; lateral nerves 4–5 on each side, fairly distinct; petiole $1\frac{1}{2}$ lin. long, slender, glabrous; stipules small, ovate-triangular, slightly toothed, membranous. Male flowers: pedicel short, slender. Sepals ovate-orbicular, membranous, glabrous. Disk membranous. Female flowers: Sepals and disk as in the male. Ovary glabrous; styles suberect; stigmas globose. Capsule depressed-globose. Seeds coarsely wrinkled; fruiting pedicel

1 in. long, very slender, glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 225; Hiern in Cat. Afr. Pl. Welw. i. 956.

Lower Guinea. Angola: Golungo Alto; dry mountain slopes between Calolo and Muria, *Welwitsch*, 327! Loanda district, *Gossweiler*, 377!

2. **C. somalensis,** *Pax in Engl. Jahrb.* xxxiii. 277, *partly*. A small undershrub; branches subterete or slightly angular; flowering branchlets more or less sharply angular, asperulate or nearly glabrous. Leaves as in *C. trichopoda*. Male flowers: Sepals 5, broadly obovate, entire, membranous, $\frac{2}{3}$ lin. long, $\frac{1}{3}$ lin. broad, glabrous. Disk saucer-shaped, undulately 5-lobed, membranous, glabrous. Stamens connate around an entire fleshy rudimentary ovary. Female flowers: Sepals ovate-lanceolate, slightly acuminate, subacute, 1 lin. long. Disk as in the male. Ovary globose, smooth; styles suberect, with globose stigmas. Seeds deeply pitted.—*Phyllanthus capillariformis*, Pax in Engl. Jahrb. xv. 523, and in Engl. Pfl. Ost-Afr. C. 236.

Nile Land. Somaliland: Dagaga, *Ellenbeck*, 1026A! British East Africa: Ukamba; Kitui, *Hildebrandt*, 2696! east side of Albert Edward Nyanza, *Scott-Elliot*, 8063!

Occurs also in South-east Arabia.

3. **C. fruticans,** *Pax in Engl. Jahrb.* xxxiii. 276. A small much-branched shrub; older branches covered with a grey bark, which peels off; flowering branchlets up to 3 in. long, sharply angular, rounded or slightly angular, glabrous or minutely asperulate. Leaves ovate or ovate-elliptic, sometimes slightly mucronate, rounded at the base, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $3\frac{1}{2}$–7 lin. broad, very thin and flaccid, glabrous on both surfaces, slightly glaucous below; lateral nerves 4–6 on each side, arcuate, distinct below; veins invisible; petiole slender, 1–2 lin. long, glabrous; stipules subulate, subentire. Male flowers: pedicel about $1\frac{1}{2}$ lin. long, glabrous. Sepals 5, ovate, subacute. Disk slightly 5-lobed, thin, saucer-shaped. Stamens 5; filaments connate in their lower half, supporting a fleshy subentire rudimentary ovary. Female flowers as in *C. somalensis*.—*C. Engleri*, Pax, l.c. xxxiv. 368.

Mozamb. Distr. German East Africa: Tanga, *Holst*, 2108! Derema, *Scheffler*, 139! between Muhesa and Lungusa, *Engler*, 353!

Pax stated in his description of *C. Engleri* that no male flowers were present; on the type specimen, however, I found about three very small ones. I am unable to separate it from *C. fruticans*.

34. ZIMMERMANNIA, Pax in Engl. Jahrb. xlv. 235.

Flowers monœcious. Petals absent. Male flowers: Sepals 5, imbricate. Disk flat, very slightly 5-lobed, lobes alternate with the sepals. Stamens 5; filaments free, inserted around the base of a small rudimentary ovary; anther-cells parallel, dehiscing longitudinally. Rudimentary ovary small, slightly trilobed. Female flowers: Calyx and disk as in the male, but larger. Ovary 3-celled; styles ascending, entire, swollen at the apex; ovules 2 in each ovary-cell. Capsule not

known.—A shrub. Leaves alternate, membranous, entire, penninerved, shortly petiolate; stipules large and foliaceous. Flowers in axillary fascicles, males few, pedicellate, females solitary, long-pedicellate, pedicel hardening in fruit.

Species 1, endemic.

1. **Z. capillipes,** *Pax in Engl. Jahrb.* xlv. 235. A shrub; branchlets slightly and obtusely angular, sparingly lenticellate, glabrous. Leaves oblong or oblong-elliptic, triangular-acuminate, sharply mucronate, obtuse or subacute at the base, 5–7 in. long, 2–2½ in. broad, entire, membranous, glabrous; lateral nerves 9–10 on each side, spreading and arcuate, looped near the margin, prominent on both surfaces; veins very lax, distinct below; petiole 3–5 lin. long, closely grooved above, glabrous; stipules foliaceous, broadly reniform, oblique, subcordate at the base, encircling the branchlets, mucronate or shortly acuminate, about 3 lin. long and ½ in. broad, nervose, glabrous. Flowers monœcious, axillary, few. Male flowers: pedicel about 2 lin. long, glabrous. Sepals 5, rounded-elliptic, rounded at the apex, 1 lin. long, membranous, glabrous. Disk flat, adnate to the base of the sepals, very slightly 5-lobed; lobes rounded, alternate with the sepals, slightly verrucose. Stamens 5; filaments free to the base, about 1 lin. long, glabrous; anthers large, oblong-ellipsoid, ⅔ lin. long, glabrous. Rudimentary ovary very small, slightly trilobed, glabrous. Female flowers about ½ in. in diam. when flattened and spread out; pedicel attaining 1½ in. in length, slender, glabrous. Sepals ovate, obtuse, 2½ lin. long, 1¾ lin. broad, submembranous, nervose from the base, glabrous. Disk as in the male. Ovary ovoid-globose, smooth; styles 3, ascending, entire and slightly swollen at the tips, nearly 1 lin. long, glabrous.

Mozamb. Distr. German East Africa: Amani, on the Dodwa River, *Zimmermann*, 2547!

34A. **ANDROSTACHYS**, Prain in Kew Bulletin, 1908, 438.

Flowers diœcious. Petals and disk absent. Male flowers: Calyx composed of 2–5 bract-like free spirally arranged sepals. Stamens very many, spirally arranged on a prolonged axis; lowest filaments very short and recurved, remaining anthers sessile; anthers elongated, more or less applied to the axis; cells distinct, adnate to the connective, dehiscing longitudinally. Rudimentary ovary absent. Female flowers: Calyx 5-partite; segments ovate, acuminate, imbricate. Ovary 3-celled, densely pilose; styles connate into a pilose column; stigmas 3, spreading; ovules 2 in each cell. Capsule breaking up into three 2-valved cocci; endocarp crustaceous. Seeds compressed, ovate; albumen fleshy; cotyledons flat, much broader than the radicle.—A tall erect tree; branchlets more or less silky-hairy, angular and articulated. Leaves opposite, decussate, long-petiolate, coriaceous, more or less silky beneath; stipules large, coriaceous, connate, interpetiolar and intrapetiolar forming a sheath enclosing the flowers and young leaves.

Flowers axillary on silky-hairy peduncles, males 3-nate, females solitary in each leaf-axil; male peduncles usually more or less connate, the lateral rather shorter than the central.

A single endemic species.

This genus has unfortunately been omitted from the key, but it may be at once distinguished from all the other African genera of *Phyllantheæ* by the opposite leaves (they are opposite, but compound, in *Oldfieldia*), by the remarkable intrapetiolar stipules, and by the numerous stamens arranged on an elongated receptacle.

1. **A. Johnsonii,** *Prain in Kew Bulletin*, 1908, 439. A tall hard-wooded tree, providing valuable timber; branchlets angular and articulated. Leaves opposite, decussate, ovate, obtuse, rounded or subcordate at the base, 1¼–2 in. long, 1–1½ in. broad, entire, rigidly coriaceous, glabrous above, more or less silky-hairy below; stipular sheath ¾ in. long, silky-pubescent outside; petioles ¼–⅓ in. long, silky-hairy. Flowers yellow; peduncles ¼–⅓ in. long. Males: Sepals petaloid, lanceolate, with retuse or 2-lobed tips, long-pilose outside. Staminal axis ½–1 in. long. Females: Calyx-segments ¼ in. long. Ovary densely pilose; style ¼ in. long, silky. Capsule depressed, ½ in. long. Seeds ⅓ in. long, ¼ in. broad; testa brown and shining.—Prain in Kew Bulletin, 1909, 201.

Mozamb. Distr. Portuguese East Africa: Inhambane, *O'Neill!* near Beira, *Johnson*, 283!

35. **MICRODESMIS,** Planch.; Benth. et Hook. f. Gen. Pl. iii. 287.

Flowers dicœcious. Petals present, conspicuous. Male flowers: Sepals 5 (rarely 4 or 6), imbricate. Petals the same in number as the sepals, but larger, imbricate-contorted. Stamens 5 or 10, 1–2-seriate, when 2-seriate the outer series opposite the sepals, inserted on a fleshy receptacle or disk adnate to the rudimentary ovary; anthers erect, cells parallel or subparallel, distinct, dehiscing longitudinally. Rudimentary ovary columnar, ovoid or trifid. Female flowers: Perianth as in the male. Disk absent. Ovary fleshy, 2–3-celled; styles short, bipartite, papillose-laciniate; ovules solitary in each cell. Drupe indehiscent, rugose outside. Seeds with a membranous or slightly crustaceous testa; albumen fleshy; cotyledons ovate, flat.—Shrubs with alternate, shortly petiolate, entire or dentate penniveined leaves, pellucid-dotted in the African species. Flowers small, shortly pedicellate, fasciculate in the leaf-axils; males often numerous, females few or nearly solitary.

Species 3, the two following, and one extending from Ceylon to Southern China and the Malay Archipelago.

Stamens inserted at the base of the rudimentary ovary; disk absent	1. *M. puberula.*
Stamens inserted on a fleshy disk surrounding and adnate to the rudimentary ovary	2. *M. Zenkeri.*

1. **M. puberula,** *Hook. f. ex Planch. in Hook. Ic. Pl. t.* 758. A bush or shrub about 10 ft. high; branchlets slender, woody, pubescent.

Leaves oblong, oblong-elliptic or oblong-obovate, more or less caudate-acuminate, acumen mucronate, cuneate and unequal-sided at the base, 1½–6 in. long, ¾–2 in. broad, dentate or subentire, thinly but firmly chartaceous, dotted with numerous pellucid glands, glabrous on both surfaces or slightly pubescent on the nerves beneath; lateral nerves 4–6 on each side, prominent below, looped and freely branched well within the margin; tertiary nerves lax and reticulate, very distinct on the lower surface; petiole 2–4 lin. long, sparingly puberulous or nearly glabrous; stipules very small and deciduous. Male flowers fasciculate in the leaf-axils of the young shoots; pedicel up to 1¼ lin. long, puberulous or almost tomentellous. Sepals 5, oblong-ovate, subacute, ½ lin. long, densely puberulous outside, nearly glabrous within. Petals 5, obovate-oblanceolate, narrowed to the base, about ¾ lin. long, rather fleshy, puberulous on both sides. Stamens 5, inserted at the base of the rudimentary ovary; filaments short. Rudimentary ovary columnar, short, slightly swollen at the apex, puberulous. Female flowers few or solitary in each leaf-axil; pedicel stout, up to 1½ lin. long, puberulous. Sepals 5, broadly ovate, slightly mucronate, ½ lin. long and broad, coriaceous, ciliate and adpressed-pubescent outside, glabrous within. Ovary ovoid, rather fleshy, shortly setulose; styles very short, laciniate. Fruits globose, muricate, 3 lin. in diam.—Hook. f. Niger Flora, 514, t. 26; Baill. Adansonia, i. 65; Müll. Arg. in DC. Prodr. xv. ii. 1041 (excl. Mann's Gaboon and Welwitsch's Angolan specimens); Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 106, partly. *M. puberula*, var. *Chevalieri*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 84.

Upper Guinea. Senegambia, *Heudelot*, 832! Sierra Leone: various localities, *Don! Scott-Elliot*, 3941! 4386! 5543! 4729! 4784! 4838! French Guinea: Ivory Coast; Bingerville, *Chevalier*, 15220! 15222! 15223! 15225! 15528! 16224! Gold Coast: Aquapim Hills, *Johnson*, 589! Aburi, *Johnson*, 479! 955! *Brown*, 321! Fundu, *Smythe*, 206! Assin-yan-Kumasi, *Cummins*, 161! Lagos: various localities, *Rowland! Millson! Millen*, 6! 19! 25! 29! *Chevalier*, 13982! 14191! 14112! *Irving*, 89! *Foster*, 114! Southern Nigeria: various localities, *Barter*, 282! 1640! 1805! *Unwin*, 69! *Holland*, 109! Fernando Po, *Vogel*, 169! 175! *Barter*, 1725! *Mann*, 86!

Sir A. Moloney states that the leaves when boiled are used for feeding babies, and they are said to cure them of spleen.

In many of the specimens the inflorescence is paniculate, a condition which appears to be abnormal and is probably caused by the presence of a gall.

Several specimens which I have not seen, collected in the Congo State and quoted by De Wildeman as this species in most of the Belgian publications, are probably *M. Zenkeri*, Pax.

2. **M. Zenkeri,** *Pax in Engl. Jahrb.* xxiii. 531. A shrub 6–10 ft. high; branchlets slender, slightly flexuous, pubescent. Leaves elliptic, oblong-elliptic or narrowly oblong, rather abruptly acuminate, midrib running out into a hardened point, mostly broadly cuneate and unequal-sided at the base, 3–6 in. long, 1–3 in. broad, margin closely crenate, dentate, undulate or quite entire, very thinly chartaceous or almost membranous, glabrous on both surfaces except the puberulous midrib and lateral nerves on the upper surface; lateral nerves 6–8 on each side

strongly looped well within the margin, lowermost one running along the margin to above the middle of the leaf-blade, slightly immersed above, very prominent below; primary transverse nerves few, prominent below, with several more or less parallel less conspicuous veins; petiole 2–4 lin. long, pubescent with stiff short hairs; stipules short, pubescent. Male flowers about 3 lin. in diam. when fully developed; pedicel rather slender, up to 3 lin. long, tomentellous. Sepals and petals as in *M. puberula*, but a little larger. Stamens inserted about the middle of the rudimentary ovary, with the lobes of a disk protruding between the filaments. Rudimentary ovary conical, glabrous. Female flowers as in *M. puberula*. Fruits not seen.—*M. puberula*, Müll. Arg. in DC. Prodr. xv. ii. 1041, partly, as to Mann's Gaboon and Welwitsch's Angola specimens; Hiern in Cat. Afr. Pl. Welw. i. 967; Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 106, partly, not of Hook. f.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, *Staudt*, 545! Victoria, *Kalbreyer*, 28! Yaunde, *Zenker & Staudt*, 42! 61! 318, 354, 572! 607! 672! *Zenker*, 707! Lolodorf, *Staudt*, 29! 147! Bipinde, *Zenker*, 1014! 1187! 1693! 1960! 2736! 3068! Batanga, *Bates*, 152! 339! Efulen, *Bates*, 355!

Lower Guinea. Spanish Guinea: on the way to Nserang, *Tessmann*, 709! Gaboon: Sibange Farm, *Soyaux*, 41! 92! Gaboon River, *Mann!* Angola: forests of the Alto Queta Mountains, from Camilungo to Sange, *Welwitsch*, 355! 355B! 356!

36. **HEVEA**, Aubl.; Benth. et Hook. f. Gen. Pl. iii. 290.

Flowers monœcious. Petals absent. Male flowers: Calyx ovoid or globose in bud, 5-lobed, 5-dentate or truncate, valvate. Disk-glands conspicuous. Stamens 5–10; filaments connate into a column; anthers arranged regularly or irregularly around the column in 1–2 series, subsessile, those of the lower series alternating with the calyx-lobes. Rudimentary ovary terminating the staminal column, mostly longer than the anthers. Female flowers: Calyx as in the male. Ovary ovoid, 3-celled; stigmas thick, spreading, entire or slightly 2-lobed; ovules solitary in each ovary-cell. Capsule large, breaking up into 2-valved cocci; exocarp slightly fleshy; endocarp thick and somewhat woody. Seeds large, oblong, smooth, without a strophiole; testa crustaceous; albumen absent or much reduced; cotyledons thick, fleshy, equal in size.—Trees, often abounding in latex. Leaves alternate, long-petiolate, trifoliolate; leaflets stalked, entire, penninerved, membranous or coriaceous. Flowers in panicles of cymules, the central flower of each cymule ♀, the rest ♂.

Species about 18, occurring in the tropics of South America. A description of *Hevea brasiliensis*, Müll. Arg., the well-known Parà rubber tree, is included in this work on account of its extensive cultivation in Africa.

1. **H. brasiliensis,** *Müll. Arg. in Linnæa*, xxxiv. 204. A tree attaining a height of 60 ft.; branchlets subterete, glabrous. Leaves digitately trifoliolate; leaflets stalked, elliptic or elliptic-oblanceolate, acuminate to an obtuse or subacute apex, more or less narrowed to the

base, 3–8 in. long, 1–3 in. broad, entire, membranous or thinly chartaceous, glabrous on both surfaces, often somewhat glaucous below; lateral nerves about 20 on each side of the midrib, looped quite close to the margin, distinct on both surfaces, prominent below; tertiary nerves parallel, numerous, prominent on both surfaces; stalks of the leaflets 3–7 lin. long, each provided at the base with a large flat orbicular gland, the glands often contiguous or almost merged into one; petiole $2\frac{1}{2}$–9 in. long, faintly longitudinally sulcate, with a narrow groove on the upper side, glabrous. Panicles several below the tufts of leaves on each young shoot, 3–$5\frac{1}{2}$ in. long; axis slightly pubescent or glabrous, more or less angular or sulcate; lateral branchlets up to $2\frac{1}{2}$ in. long, terminating in a solitary pedicellate female flower, the remaining lateral flowers all male. Male flowers numerous, shortly pedicellate: Buds ovoid, acuminate, tomentellous, about $1\frac{3}{4}$ lin. long just before opening. Calyx-lobes 5, narrowly lanceolate, acuminate, subacute, about $\frac{1}{4}$ lin. long, tomentellous on both sides. Disk small, pubescent. Anthers 10, in two series of 5 each on the column; column obtuse, pubescent. Female pedicel about 2 lin. long, thickened upwards towards the base of the flower. Buds ellipsoid, narrowed to the base, acuminate to the apex, $1\frac{1}{2}$–2 lin. long, densely puberulous. Calyx-tube about 1 lin. long, puberulous outside, nearly glabrous within; lobes narrowly lanceolate, tapered to an acute apex, 2–$2\frac{1}{2}$ lin. long, densely puberulous or almost tomentellous on both surfaces. Ovary triangular-ovoid, sulcate, tomentellous; stigmas 3, sessile or subsessile, suborbicular, glabrous. Capsule 3-lobed, about $1\frac{3}{4}$ in. in diam.; lobes about 1 in. broad, slightly keeled. Seeds broadly oblong or oblong-ellipsoid, about 1 in. long and $\frac{3}{4}$ in. broad; testa mottled and speckled, slightly shining.—Müll. Arg. in DC. Prodr. xv. ii. 718, in Collins, Caout. 1, and in Fl. Bras. xi. ii. 302; Engl. Pfl. Ost-Afr. B. 440; Köhler, Mediz. Pfl. iii. with fig.; Der Tropenpflanzer, 1898, 271, with fig.; 1905, Beih. No. 1, 7 and 23, with figs.; Hemsl. in Hook. Ic. Pl. xxvi. t. 2573, figs. 1–7; Bull. Econ. Indo-Chine, 1905, 690, 691, 693, with figs.; Yves Henry, Caoutch. Afr. Occ. Fr. 197, with fig.; Huber in Bol. Mus. Goeldi, Para, iv. 637; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 121. *H. janeirensis*, Müll. Arg. in Fl. Bras. xi. ii. 706. *Siphonia brasiliensis*, Kunth. in Humb. & Bonpl. Nov. Gen. et Sp. Pl. vii. 171; Jussieu, Euph. t. 12, fig. 38, B; Klotzsch in Hayne, Arzneik. xiv. t. 5; Benth. in Hook. Kew Journ. Bot. 1854, 369. *S. kunthiana*, Baill. Étude Gén. Euph. 326.

Native of Brazil; cultivated in various parts of Africa.

37. **RICINODENDRON**, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 297.

Flowers dicœcious. Petals present. Male flowers: Calyx subglobose; segments 5, imbricate, unequal. Petals connate into a 5-lobed tube. Disk-glands 5, large, erect, more or less ovate. Stamens 10–16; filaments central, free, often hairy at the base; anthers oblong, dorsifixed; cells parallel, dehiscing longitudinally. Rudimentary ovary absent. Female flowers: Sepals and petals as in the male. Disk saucer-shaped,

fleshy, toothed or lobed. Ovary 1–3-celled; styles bilobed or bipartite; ovules solitary in each cell. Fruit indehiscent; exocarp fleshy; endocarp woody. Seeds estrophiolate, with fleshy albumen and flat broad cotyledons (*Müller*).—Trees with stout branchlets. Leaves alternate, long-petiolate, digitat el compound. Stipules broad, reniform, toothed. Flowers in lax pyramidal panicles of cymules; bracts linear.

Species 2, endemic.

R. Staudtii, Pax in Engl. Jahrb. xxiii. 532, and in Engl. Pflanzenr. Euphorb.-Cluytieæ, 49, has hermaphrodite flowers, and is therefore not Euphorbiaceous. It seems to belong to *Anacardiaceæ*, of which order it may represent a new genus.

Leaflets sessile, acuminate, glabrous when mature; stamens 10	1. *R. africanum.*
Leaflets stalked, obtuse, stellate-puberulous or tomentellous on both surfaces when mature; stamens 15–16 . .	2. *R. Rautanenii.*

1. **R. africanum,** *Müll. Arg. in Flora*, 1864, 533 (*africanus*). A tree about 30–70 ft. high; trunk straight, divested of branches from the base to two-thirds its height; branchlets rather stout, rusty-puberulous when young, at length glabrous. Leaves digitately 3–5-foliolate; leaflets sessile, obovate or obovate-elliptic, gradually or somewhat caudate-acuminate, usually narrowed to the base, the lateral ones often oblique and smaller, 2½–8 in. long, 1–5 in. broad, glandular-denticulate, membranous, stellate-puberulous or tomentellous on both surfaces when young, soon becoming glabrous or nearly so; lateral nerves 10–16 on each side of the midrib, looped close to the margin, prominent on both surfaces; tertiary nerves parallel, slender; petiole 2½–8 in. long; stipules large and conspicuous, foliaceous, persistent, suborbicular, up to 1 in. long and 1¼ in. broad, digitately nerved and rather deeply toothed, stellate-puberulous or tomentellous. Male panicles large and slender, about 1 ft. long; axis somewhat angular or compressed, puberulous; branches spreading, slender, up to 6 in. long, with the flowers collected towards the ends; bracts subulate or linear, up to 3 lin. long. Flowers shortly pedicellate or subsessile, yellow-tomentose. Sepals obovate, rounded at the apex, 1¾ lin. long, 1 lin. broad. Petals about 2 lin. long, united. Disk-glands erect, contiguous, elliptic, glabrous, ¾ lin. long, ½ lin. broad. Stamens 10; filaments ¾ lin. long, glabrous; anthers slightly exserted, ⅓ lin. long. Receptacle densely pilose. Female panicle stouter and smaller than the male. Sepals and petals similar to the male. Disk saucer-shaped, undulately lobed, glabrous. Ovary ovoid, stellate-tomentose; styles 2, rather slender, bipartite. Fruit 2-lobed, 2-celled, ¾ in. long, 1¼ in. in diam., 2-seeded.—Müll. Arg. in DC. Prodr. xv. ii. 1111; Benth. in Hook. Ic. Pl. t. 1300; Ficalho, Pl. Uteis, 251; Pax in Engl. Pflanzenfam. iii. 5, 88, fig. 54, c. d.; Hiern in Cat. Afr. Pl. Welw. i. 971; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47; De Wild. Miss. É. Laurent, i. 141, and in Études Fl. Bas- et Moyen-Congo, ii. 288. *R. Heudelotii*, Pierre ex Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 46, fig. 16 and fig. 17 E. *Jatropha Heudelotii*, Baill. Adansonia, i. 64; Müll. Arg. in DC. Prodr. xv. ii. 1083. *Barrettia umbrosa*, Sim, Forest Fl. of Portuguese East Africa, 103, t. lxxi.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 825! French Guinea: Fouta Jallon, *Heudelot*, 857! Gold Coast: near Janbin, *Johnson*, 635! Aburi, *Johnson*, 448! Southern Nigeria: Calabar district, *Williams*, 6! Lagos; Yoruba, *Schlechter*, 12321! Cameroons: Bipinde, *Zenker*, 1684! 2287! 2323! 2796! 3442! 3711! and without precise locality, *Mansfield!* *Preuss*, 1158; *Schorkopf*, 24; *Schultze*, 80; *Winkler*, 675. Fernando Po, *Mann*, 229!

Nile Land. Uganda: Semliki Forest, *Dawe*, 637! Budongo Forest, *Dawe*, 802! 1012!

Lower Guinea. Gaboon: Libreville, *Klaine*, 92, 246! 568! 980! Spanish Guinea: Mandok, *Tessmann*, 357! 840! Angola: Golungo Alto, *Welwitsch*, 443! Cazengo, *Welwitsch*, 444! *Gossweiler*, 4898!

Mozamb. Distr. German East Africa: Usambara; Derema, *Scheffler*, 207! Portuguese East Africa: Quilimane district, *Sim*, 6394.

2. **R. Rautanenii,** *Schinz in Bull. Herb. Boiss.* vi. 744. A large tree with a broad crown; branchlets stout, whitish- or reddish-tomentellous when young, at length puberulous. Leaves digitately 5–7-foliolate; leaflets stalked, elliptic or oblong-elliptic, obtuse, rounded or truncate and unequal-sided at the base, 2–4½ in. long, 1¼–2¼ in. broad, glandular-denticulate, membranous or subchartaceous, rather dark-coloured above, hoary below, stellate-puberulous or tomentellous on both surfaces; lateral nerves 7–11 on each side, looped and branched near the margin, prominent below; tertiary nerves subparallel, rather lax; petiole 2–5 in. long, about 1¼ lin. in diam., whitish-tomentellous; petiolules ½–¾ in. long; stipules small, suborbicular, toothed. Male panicles slender, few-flowered, up to 6 in. long, whitish- or pinkish-tomentellous; branches spreading, up to 2½ in. long; bracts subulate, about 1¼ lin. long; pedicels 2 lin. long. Sepals ovate, obtuse, 2½ lin. long, 1⅓ lin. broad, yellow-tomentellous. Petals connate nearly their full length, 3–3½ lin. long, glabrous. Disk-glands quadrangular, glabrous, about ½ lin. broad. Stamens 15–16; filaments 2 lin. long, hairy in the lower part; anthers ½ lin. long. Female panicles much shorter than the male, very few-flowered: Sepals 4½ lin. long, 3 lin. broad. Petals the same length as the sepals. Disk irregularly toothed, glabrous. Ovary densely tomentose; style bilobed, fleshy, lobes with a wrinkled stigmatic surface on the inner face. Fruit ellipsoid, about 1¼ in. long. Seeds not seen.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 48, fig. 17, A–D.

Lower Guinea. German South-west Africa: Olukonda, *Rautanen*, 225! 232! 233! *Schinz*, 2074; Neitsas, *Dinter*, 669; Goms, *Dinter*, 1348; Caprivi Peak, *Seiner*, 35.

Mozamb. Distr. Rhodesia: Victoria Falls, *Kirk!* Broken Hill, *Rogers*, 8638! and without precise locality, *Allen*, 191!

38. **CROTON**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 293.

Flowers monœcious or more rarely dicecious. Petals usually present in the males, often absent from or rudimentary in the females. Male flowers: Sepals 5, rarely 4 or 6, valvate or slightly imbricate. Petals equal to the sepals or shorter. Disk-glands opposite the sepals, small

and fleshy. Stamens 5–∞, inserted on a usually pilose receptacle; filaments free, inflexed in bud, at length erect; anthers pendulous on the inflexed filaments in bud, at length erect; cells parallel, dehiscing longitudinally. Rudimentary ovary absent. Female flowers: Sepals often narrower than in the male. Petals when present often smaller than in the males, rudimentary or entirely absent, rarely represented by tufts of hairs. Disk annular or divided into glands. Ovary usually 3-celled; styles usually recurved, 1–3 times bifid or partite, rarely multifid or partite; ovules solitary in each cell. Capsule breaking up into 2-valved cocci, rarely subindehiscent. Seeds smooth, provided with a small strophiole; testa crustaceous or woody; albumen plentiful, fleshy; embryo straight; cotyledons broad and flat.—Trees, shrubs, or rarely herbs, of diverse habit, usually clothed with stellate hairs or orbicular scales. Leaves alternate or rarely opposite or subverticillate, entire, toothed, rarely lobed, penninerved or 3–∞-nerved from the base, provided at the base with 2 usually stalked glands, the latter very rarely absent. Flowers spicate or racemose, when monœcious the males in the upper part of the inflorescence, the females in the lower, or sometimes both sexes mixed. Bracts small.

Species over 600, distributed throughout the tropics, with comparatively few in subtropical regions.

Leaves digitately 3–5-lobed to near the base . . 1. *C. lobatus.*
Leaves not or rarely slightly lobed.
*Leaves entire.
Leaves clustered on much-abbreviated branchlets, glabrous and not scaly on either surface . 2. *C. Scarciesii.*
Leaves laxly arranged on more or less elongated branchlets, pubescent with stellate hairs or scaly on both surfaces or only below, rarely nearly glabrous.
†Petals absent from or very rudimentary in the female flowers.
Racemes about 4 in. long; sepals of the female flowers acuminate . . . 3. *C. polytrichus.*
Racemes shorter; sepals of the female not acuminate.
Ovary scaly, without stellate hairs.
Leaves glabrous above when mature, with a few scattered hairs only towards the margin when young . 4. *C. dichogamus.*
Leaves permanently stellate-pubescent above . . . . . 5. *C. Menyhartii.*
Ovary villous, tomentose or pubescent with stellate hairs.
Leaves rounded at the base, or if cordate then pinnately nerved; ovary pubescent or tomentose.
Leaves thinly chartaceous or subcoriaceous, tomentose or tomentellous below; racemes not slender, rather dense-flowered.
Leaves $\frac{1}{2}$–$1\frac{3}{4}$ in. long, always

entire; female pedicels 1½ lin. long . . . . . 6. *C. somalensis.*
Leaves 2½–3½ in. long, mostly minutely denticulate; female pedicels ½ in. long or more . 7. *C. integrifolius.*
Leaves membranous, nearly glabrous or thinly pubescent below; racemes slender and lax-flowered.
Leaves quite glabrous above; pedicels glabrous . . . 8. *C. Dybowskii.*
Leaves pubescent above; pedicels hairy.
Leaves without glands at the base; stamens 10 . . 9. *C. membranaceus.*
Leaves with stipitate glands at the base; stamens about 13 10. *C. madandensis.*
Leaves deeply cordate and digitately 5–7-nerved at the base; ovary long-villous or subsetose . . . . 11. *C. niloticus.*
††Petals present and well developed in the female flowers.
Young leaves quite glabrous above.
Racemes much abbreviated, giving the flowers a clustered appearance; leaves subverticillate . . . . . 12. *C. pseudopulchellus.*
Racemes more or less elongated; leaves not or scarcely verticillate.
Leaves acutely acuminate; petals oblong 13. *C. amabilis.*
Leaves mostly emarginate; petals more or less ovate . . . . 14. *C. zambesicus.*
Young leaves minutely stellate-puberulous, pubescent or tomentose on the upper surface.
Styles once divided, short and adpressed to the top of the ovary . . . 15. *C. Mubango.*
Styles 4–6 times divided, ascending.
Fruits 1¼–1½ in. long . . . . 16. *C. megalocarpus.*
Fruits about ½ in. long . . . 17. *C. oligandrum.*
**Leaves toothed or rarely shortly lobed.
Leaves very coarsely dentate or lobately toothed.
Leaves coarsely and doubly dentate with numerous teeth . . . . . 18. *C. Draconopsis.*
Leaves shortly 5-lobed or coarsely 5-toothed . 19. *C. jatrophoides.*
Leaves denticulate, serrulate, serrate or crenate-serrate.
Racemes unisexual.
Leaves villous or tomentose below, especially when young.
Leaves gradually and acutely long-acuminate; stamens 20–25 . . . 20. *C. megalobotrys.*
Leaves shortly and obtusely acuminate; stamens about 16 . . . . 21. *C. Seineri.*
Leaves glabrous or shortly pubescent below.
†Leaves shortly pubescent below.
Leaves obtuse or rounded at the base; fruits ellipsoid, ⅓ in. long, not lobed 22. *C. asperifolius.*

Leaves mostly cordate at the base; fruits subglobose, ½ in. long, tri-obed . . . . . 38. *C. macrostachys.*

††Leaves glabrous below or rarely with a few scattered hairs on the nerves.

Leaves broadly rounded and subcordate at the base, scarcely 1½ times as long as broad; male inflorescence many-flowered, about 6 in. long . . 23. *C. dispar.*

Leaves slightly narrowed to an obtuse base, more than twice as long as broad; male inflorescence few-flowered, 2½ in. long or less . . 35. *C. nigritanus.*

Racemes bisexual.

Petals present in both sexes.

Leaves grey-tomentellous below . . 24. *C. Poggei.*

Leaves glabrous or rarely with few hairs on both surfaces.

Leaves oblong or oblong-elliptic, obtuse and not or only slightly acuminate; petiole about ½ in. long . . 25. *C. alienus.*

Leaves ovate, acuminate; petiole ¾–1½ in. long.

Leaves 5–6 in. long, slightly toothed 26. *C. bukobensis.*

Leaves 1¼–3½ in. long, rather coarsely crenate-serrate . . . . 27. *C. Gossweileri.*

Petals absent from the female flowers or very rudimentary.

Leaves woolly-tomentose or very densely pubescent below, especially when young.

Leaves small and subentire, 1–2 in. long . . . . . 3. *C. polytrichus.*

Leaves distinctly toothed, 2–5½ in. long.

Styles twice bilobed . . . 28. *C. Gubouga.*

Styles once bilobed.

Female flowers confined to the lower part of the inflorescence, not mixed with the males.

Leaves minutely and closely denticulate; female flowers long-pedicellate . . 7. *C. integrifolius.*

Leaves serrate; female flowers sessile or subsessile . . 29. *C. barotsensis.*

Female flowers scattered amongst the males . . . . 30. *C. leuconeurus.*

Leaves thinly pubescent or glabrous below.

Stamens 10–12.

Leaves more or less rounded at the base; petioles 1¼–3 in. long; styles connate at the base for ⅓–½ their length.

Leaves remotely serrulate; male buds glabrous except at the tips; female flowers each in the middle of a cluster of males . 31. *C. Pynærtii.*

Leaves closely crenate; male buds pubescent; female flowers confined to the lower third of the inflorescence . . . . 32. *C. pyrifolius.*
Leaves more or less narrowed to an obtuse base; petioles $\frac{3}{4}$ in. long or less; styles free to the base or nearly so.
Female flowers several on each inflorescence; basal leaf-glands mostly stalked.
Leaves about 2 in. broad; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long; inflorescence 6 in. long . . . . 33. *C. nudifolius.*
Leaves about 1 in. broad or less; petiole 1–4 lin. long; inflorescence about $2\frac{1}{2}$ in. long 34. *C. Chevalieri.*
Female flowers 1–2 on each inflorescence or absent; basal leaf-glands sessile . . . 35. *C. nigritanus.*
Stamens 15–20.
Leaves glabrous below, rarely with a few scattered hairs.
Leaves gradually acuminate, closely serrulate; female flowers in the lower half of each inflorescence 36. *C. congensis.*
Leaves shortly and abruptly acuminate; female flowers scattered amongst the males . . 37. *C. sylvaticus.*
Leaves puberulous or pubescent below.
Filaments pubescent in their lower part . . . . . 38. *C. macrostachys.*
Filaments glabrous.
Sepals of the female flowers subfoliaceous, much larger than those of the male . . 39. *C. Scheffleri.*
Sepals of the female flowers neither foliaceous nor larger than the male.
Inflorescence few-flowered, 1–$3\frac{1}{2}$ in. long.
Leaves acute; female pedicels $\frac{1}{2}$ lin. long, slender; styles hairy on the lower part . . 40. *C. angolensis.*
Leaves obtuse; female pedicels nearly 2 lin. long, stout; styles hairy to the apex . . . 41. *C. schimperianus.*
Inflorescence many-flowered, $4\frac{1}{2}$–5 in. long . . 42. *C. oxypetalus.*

1. **C. lobatus,** *Linn. Sp. Pl. ed.* i. 1005. An erect annual, 2–3 ft. high; stem woody towards the base, glabrescent; branches more or less sulcate and pubescent; young branchlets stellate-pubescent. Leaves

digitately 3–5-partite, 1–4 in. long and broad; segments oblanceolate or obovate, gradually or more or less caudate-acuminate, narrowed to the base, crenate or crenate-serrate, membranous, stellate-pubescent or glabrescent on both surfaces; petiole up to 4 in. long, sulcate, pubescent or glabrous; stipules subulate-filiform, about 1½ lin. long. Flowers monœcious. Inflorescences axillary and terminal, slender, up to 5 in. long, the lower half consisting of subsessile female flowers, the upper part of much smaller males; axis angular or sulcate, pubescent. Male flowers: pedicel very slender, scarcely 1 lin. long; bracts 2-flowered, lanceolate, about 1 lin. long, sparingly ciliate. Sepals 5, elliptic, rounded at the apex, ⅔ lin. long, membranous, green in the middle, transparent at the margins, glabrous. Petals 5, oblanceolate, membranous, glabrous, a little shorter than the sepals. Stamens 10–13; filaments glabrous; anther-cells divergent. Receptacle glabrous. Female flowers subsessile: Sepals 5, green and glabrous, linear-lanceolate, acute, 3 lin. long, ⅔ lin. broad, sparingly stellate-pubescent, ciliate and with a few gland-tipped hairs on the margin towards the base. Petals represented by a hair, scarcely reaching one-third the length of the sepals. Disk shortly 5-lobed, glabrous. Ovary stellate-pubescent and setose; styles 3, free to the base, glabrous or setulose, 6–7-lobed to a little below the middle; lobes linear or almost filiform. Capsule about 3½ lin. long, setose and stellate-pubescent, at length nearly glabrous. Seeds oblong, truncate, 3 lin. long, 1½ lin. broad; testa silvery, contracted into groups of small wart-like protuberances.—Lam. Encycl. ii. 215; Beauv. Fl. Owar. i. 59, t. 36; Geiseler, Crot. Monogr. 75; Baill. Adansonia, i. 68; Aublet, Pl. Guin. ii. 883; Ait. Hort. Kew. ed. 1, iii. 376; Vahl, Symb. Bot. i. 78. *C. trilobatus*, Forsk. Fl. Ægypt.-Arab. 163, ex Schumach. & Thonn. *C. trilobatus*, Willd. Sp. Pl. iv. 556; Schumach. & Thonn. Beskr. Guin. Pl. 411. *C. riparius*, Kunth in Humb. & Bonpl. Nov. Gen. et Sp. Pl. ii. 90. *C. lobatus*, var. *riparius* and *genuinus*, Müll. Arg. in DC. Prodr. xv. ii. 668; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 305. *C. perrotetianum*, Baill. Adansonia, i. 67. *C. Courteti* and *C. Decorsei*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 71 and 72. *Schradera scandens*, Willd. in Goett. Journ. Wiss. i. (1797) 1. *Astræa lobata*, Klotzsch in Wiegm. Archiv. vii. 194; Hook. Niger Fl. 509.

Upper Guinea. Senegambia, *Adanson*, *Leprieur*, *Beauvois*, *Richard!* *Heudelot*, 465! *Thonning!* *Perrottet*, 190! Gold Coast: Salaga, *Krause!* and without precise locality, *Cummins!* French Sudan: Sikasso, *Chevalier*, 750! Dahomey, *Burton!* *Testu*, 199! Northern Nigeria: Nupe, *Barter*, 1158! Vango, Malabu Hills, *Dalziel*, 158! Katagum district, *Dalziel*, 211! 212! Lokoja, *Parsons*, 40! Lagos, *Millen.* 36! 142! *Moloney!* *Dawodu*, 30! 147! *Dennett*, 498! Fernando Po, *Mann*, 405! *Barter!* *Vogel*, 217!

North Central. Central Shari: Souka, *Chevalier*, 9026! Koulfe, *Chevalier*, 9200! south of Bagirmi, *Chevalier*, 9288! 9572! Fort Archambault, *Chevalier*, 10542! Dar Banda; Ndelli, *Chevalier*, 6842! 7657!

Nile Land. Eritrea: Bogos; Sciotel, *Beccari*, 102! Abyssinia: in the Mountains of Mawerr, *Schimper*, 2215! Kordofan, *Kotschy*, 21! 85! *Pfund*, 129! 386! White Nile, *Broun*, 44!

2. **C. Scarciesii,** *Scott-Elliot in Journ. Linn. Soc.* xxx. 96. A shrub; branches slender, terete, glabrous; young lateral flowering branchlets very short, about $\frac{1}{4}$ in. long. Leaves crowded, oblanceolate or almost obovate, rounded at the apex, slightly cuneate or obtuse at the base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, 4–8 lin. broad, entire, membranous, glabrous and dull on both surfaces; lateral nerves 4–6 on each side, distinct on both surfaces; petiole 1–2 lin. long, shortly adpressed-pubescent; stipules rigid, scaly, subulate and very acute from a broadened base, $1\frac{1}{2}$ lin. long, adpressed-pubescent. Flowers monœcious. Male racemes very short, about 5-flowered, $\frac{1}{4}$ in. long; bracts ovate, membranous, ciliate, $\frac{3}{4}$ lin. long; pedicels $1\frac{1}{2}$ lin. long, minutely puberulous. Calyx campanulate, 5-lobed; lobes ovate, obtuse, $\frac{1}{2}$ lin. long, membranous, ciliate, sparingly stellate-pubescent outside. Petals about $\frac{1}{3}$ the size of the calyx-lobes, obovate, obtuse, glabrous outside. Disk-glands very small, opposite the sepals, glabrous. Stamens 5–6; filaments very short, pubescent in the middle; anthers oblong. Receptacle nearly glabrous. Female flowers solitary on a branchlet separate from the males; pedicel up to $1\frac{1}{2}$ lin. long, puberulous. Calyx 5-lobed; lobes ovate-triangular, acute, adpressed-pubescent on the outside, glabrous within. Petals absent. Disk fleshy, 5-lobed; lobes broadly ovate, apiculate, glabrous. Ovary slightly trilobed, densely hirsute; styles 3, spreading, bilobed to near the base; lobes linear, terete, $\frac{3}{4}$ lin. long, glabrous. Capsule bristly with tubercular-based hairs. Seeds reddish-brown, dull, nearly 2 lin. long.

Upper Guinea. Sierra Leone: on rocks partly in water near Mofari, Scarcies River, *Scott-Elliot,* 4432! near Sasseni, Scarcies, *Scott-Elliot,* 4518! Ivory Coast; Comoe River, between Alepe and Malamalassa, *Chevalier,* 17513! Abiati, *Chevalier,* 17539!

3. **C. polytrichus,** *Pax in Engl. Jahrb.* xv. 533. Branches terete, glabrous; young branchlets densely yellow- or rusty-tomentose. Leaves oblong-ovate or oblong-elliptic, rather abruptly and acutely acuminate, rounded or very slightly cordate and biglandular at the base, 1–2 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, minutely serrulate or subentire, rigidly membranous or thinly chartaceous, rusty-tomentose when young, at length shortly stellate-pubescent on both surfaces, 5-nerved at the base, remaining lateral nerves about 4 on each side, nearly straight, curved and fading near the margin, prominent on the lower surface; tertiary nerves parallel, distinct below; petiole 3-6 lin. long, villous; stipules minute. Flowers monœcious. Racemes terminal, the lower third entirely female, the upper two-thirds male; female pedicels very short, male about 2 lin. long, slender, rusty stellate-pilose; bracts linear, $1\frac{3}{4}$ lin. long, rusty stellate-pubescent. Male flowers: Sepals 5, ovate-elliptic, 1 lin. long, rusty stellate-pubescent outside. Petals 5, oblong, as long as the sepals, densely villous on the margin, especially at the base and apex. Disk-glands small, fleshy, suborbicular. Stamens 15; filaments glabrous; anthers $\frac{1}{2}$ lin. long. Receptacle pilose. Female flowers: Sepals 5, lanceolate, acuminate, $1\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, thinly rusty stellate-pubescent outside. Petals represented by tufts of hairs. Disk thin, undulately lobed, glabrous. Ovary rusty stellate-tomentose; styles

3, spreading, linear, bilobed to the middle, slightly hairy below, lobes glabrous. Fruits not seen.

Nile Land. Jur: Abu Gurun Seriba, *Schweinfurth*, 1845!

Pax states in his description that the glands at the base of the leaf-blade are absent, but they are present, though sometimes nearly hidden by the indumentum, in both the Berlin and Kew specimens.

4. **C. dichogamus,** *Pax in Engl. Jahrb.* xliii. 78. A shrub or tree with pyramidal crown; branches subterete, glabrous; young branchlets densely covered with brown overlapping scales, not hairy. Leaves ovate-lanceolate or elliptic-lanceolate, obtuse or slightly pointed, rounded at the base, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, entire, almost membranous, glabrous and yellowish-brown on the upper surface, densely covered with silvery scales beneath with a few brownish ones scattered here and there, not at all hairy; lateral nerves 8–10 on each side, spreading, faint and looped on the upper surface, usually slightly raised below; glands 2 at the base of the blade, cupular, subsessile, fleshy, glabrous; petiole 3–6 lin. long, densely covered with scales; stipules minute. Flowers monœcious. Racemes terminating lateral branchlets, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, few-flowered, the females at the base, the males in the upper part; axis angular, densely scaly. Male flowers: pedicel 1–$1\frac{1}{2}$ lin. long. Sepals 6, broadly ovate, obtuse, 1 lin. long, $\frac{3}{4}$ lin. broad, densely scaly outside, shortly villous on the margin, glabrous within. Petals oblong, obtuse, 1 lin. long, $\frac{1}{3}$ lin. broad, villous on the margin, otherwise glabrous. Disk-glands rounded, fleshy, glabrous. Stamens 20; filaments pubescent. Receptacle pilose. Female flowers: pedicel rather stout, 2 lin. long, scaly. Sepals 5, ovate, obtuse, $\frac{3}{4}$ lin. long, $\frac{2}{3}$ lin. broad, scaly outside, shortly villous on the margin, glabrous within. Petals absent. Disk annular, fleshy, glabrous. Ovary covered with orbicular overlapping membranous scales; styles bipartite to near the base; segments linear, glabrous, slightly swollen and minutely bifid at the apex. Fruits not known.

Nile Land. Abyssinia: Galla country; Belana, *Ellenbeck*, 337! Daroli, *Ellenbeck*, 1924! Harar, *Ellenbeck*, 635! British East Africa: Kibwezi, *Scheffler*, 1! between Kibwezi and Machakos, *Scott-Elliot*, 6711!

Mozamb. Distr. German East Africa: Wudeh, *Uhlig*, 558.

5. **C. Menyhartii,** *Pax in Bull. Herb. Boiss.* vi. 733. A woody shrub, 3–6 ft. high, much-branched; branchlets slender, stellate-tomentose, at length glabrous with a grey bark. Leaves oblong-ovate or oblong-elliptic, obtuse and emarginate, rounded and slightly cordate and unequal-sided at the base, $\frac{3}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{3}$–1 in. broad, subchartaceous, entire, green and thinly stellate-pubescent on the upper surface, densely covered with silvery orbicular scales and stellate pubescence beneath; petiole 1–$1\frac{1}{2}$ lin. long, tomentose; stipules small and subulate. Flowers monœcious. Racemes terminating lateral branchlets, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, 5–15-flowered, densely covered with pale yellow orbicular scales and stellate hairs; male flowers on pedicels 2–3 lin. long in the upper part of the inflorescences, females fewer, on pedicels 1 lin. long at the base of each

inflorescence; bracts small, pubescent. Male flowers: Sepals 5, ovate, subacute, 1 lin. long, $\frac{2}{3}$ lin. broad, glabrous within. Petals narrowly oblanceolate, obtuse or subacute, $1\frac{1}{4}$ lin. long, shortly pubescent on the inner side and ciliate. Stamens 15; filaments slightly hairy. Receptacle pilose. Female flowers: Calyx 5-lobed to two-thirds of the way down; lobes ovate, obtuse, 1 lin. long, $\frac{3}{4}$ lin. broad, scaly outside, slightly pubescent within. Petals absent. Disk annular, fleshy, entire, glabrous. Ovary subglobose, densely covered with light brown orbicular scales; styles 3–4, deeply bilobed, lobes linear, entire or bifid, incurved, $\frac{3}{4}$ lin. long, glabrous. Fruits 3 lin. long, scaly. Seeds light brown, oblong-ellipsoid, $2\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. broad, slightly shining, smooth.—*C. pulchellus*, Müll. Arg. in DC. Prodr. xv. ii. 572, partly, as to syn. Klotzsch, not of Baill. *C. kwebensis*, N. E. Br. in Kew Bulletin, 1909, 140. *Argyrodendron bicolor*, Klotzsch in Peters, Reise Mossamb. Bot. 102 (not *Croton bicolor*, Roxb.).

Nile Land. British East Africa: Tula River, *Kirk!* near Samburu, *Kässner*, 482! without precise locality, 40 miles from the coast, *Johnston!*

Lower Guinea. German South-west Africa: Great Namaqualand; Auas Mountains, *Dinter*, 819!

Mozamb. Distr. German East Africa: road to Sonja, *Merker*, 575! Portuguese East Africa: near Tete, *Kirk!* Tete, *Peters!* Boruma, *Menyharth!* on the Marenga, *Menyharth*, 796, 797.

South Central. Ngamiland: Kwebe Hills, *Lugard*, 34! *Mrs. Lugard*, 41!

6. **C. somalensis,** *Vatke & Pax in Engl. Jahrb.* xv. 535. A shrub; branches terete, slightly glaucous; young branchlets covered with grey orbicular fringed scales. Leaves ovate, obtuse or slightly mucronate, rounded or subcordate at the base, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, $\frac{1}{4}$–1 in. broad, entire or undulate, thinly chartaceous, rather softly pubescent with slender short stellate hairs above, tomentellous with stellate hairs and scales below; lateral nerves 6–8 on each side, nearly straight, faded towards the margin, very slightly impressed and nearly invisible above, prominent below; petiole 3–6 lin. long, tomentellous; stipules small, subulate, $\frac{1}{2}$ lin. long. Flowers monœcious. Racemes terminal, about 1 in. long, bisexual or only female at the base, the males in the upper part; bracts linear, $\frac{1}{2}$ lin. long, tomentose. Male flowers: Sepals 5, ovate, 1 lin. long, $\frac{3}{4}$ lin. broad, stellate-pubescent outside, glabrous within. Petals 5, oblong-oblanceolate, $1\frac{1}{4}$ lin. long, densely villous on the margin. Disk-glands opposite the sepals, fleshy, glabrous. Stamens 12–16; filaments glabrous. Receptacle pilose. Female flowers: Sepals as in the male. Petals none or reduced to 1, linear, nearly as long as the sepals, densely pubescent. Disk fleshy, slightly pubescent. Ovary globose, stellate-tomentose; styles spreading, bilobed, pubescent on the back.

Nile Land. Somaliland: Ahl Mountains, *Hildebrandt*, 1530! Widaba, *Mrs. Lort Phillips!*

7. **C. integrifolius,** *Pax in Bull. Herb. Boiss.* vi. 732. A small shrub $1\frac{1}{2}$–3 ft high; branches broadly sulcate, densely tomentellous.

Leaves broadly ovate or rounded-ovate, obtuse or subacute, cordate at the base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–$3\frac{1}{2}$ in. broad, entire or very minutely and closely denticulate, thinly coriaceous, with several stipitate glands at the base, densely stellate-tomentellous above, tomentose below; lateral nerves 8–11 on each side, spreading, distinct above, prominent below; petiole $\frac{3}{4}$–$1\frac{3}{4}$ in. long, stout, tomentose; stipules filiform, $\frac{1}{4}$ in. long, tomentose. Flowers monœcious. Racemes terminal, up to 3 in. long, a few females towards the base, the remainder males; bracts linear-filiform, $\frac{1}{2}$–2 lin. long, tomentose. Male flowers: pedicel $\frac{1}{4}$ in. long in the open flower, densely pubescent. Sepals ovate, subacute, $1\frac{1}{2}$ lin. long, 1 lin. broad, densely pubescent outside, glabrous within. Petals as long as the sepals, glabrous outside, villous within. Stamens about 15; filaments glabrous. Receptacle villous. Female flowers: pedicel stout, $\frac{1}{2}$ in. long, tomentose, attaining nearly 1 in. in fruit. Sepals larger than those of the male, tomentellous outside, shortly pubescent on the upper part inside, glabrous on the lower half. Petals very rudimentary. Disk very small. Ovary slightly trilobed, shortly stellate-tomentose; styles 3, subentire or bilobed, incurved, slender, glabrous. Capsule $\frac{1}{2}$ in. long, tomentose. Seeds shining, $3\frac{1}{2}$ lin. long.

Lower Guinea. Angola: Benguella; Chibia, *Antunes*, 770!

Pax quotes *Dekindt* as the collector, but on the original label in the Paris Herbarium it is *Antunes*. The leaves, described by Pax as entire, are more frequently minutely and closely denticulate.

8. **C. Dybowskii,** *Hutchinson*. Branches terete, covered with grey glabrous bark; young flowering branchlets slender, subterete, shortly and sparingly puberulous with stellate hairs. Leaves ovate, obtusely acuminate, rounded at the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, $\frac{1}{3}$–1 in. broad, entire, membranous, glabrous above, very sparingly stellate-puberulous below, dull on both surfaces; lateral nerves 3–5, indistinct; petiole 2–4 lin. long, puberulous; stipules minute. Flowers monœcious. Racemes terminal, very slender, 1–$1\frac{1}{2}$ in. long, few-flowered, 2 or 3 females towards the base, the remainder males; bracts ovate-lanceolate, $\frac{1}{3}$ lin. long. Male flowers: pedicel 1–$1\frac{1}{4}$ lin. long, slender, glabrous. Sepals elliptic, obtuse, $\frac{1}{2}$ lin. long, slightly pubescent towards the tips, membranous. Petals as long as the sepals, woolly-ciliate. Stamens 10; filaments glabrous. Receptacle villous. Female flowers: pedicel stouter than in the males, 1 lin. long, glabrous. Sepals oblong-elliptic, subacute, 1 lin. long, membranous, glabrous. Petals absent. Disk-glands small, pubescent. Ovary globose, stellate-pubescent; styles 3, filiform, slightly connate at and bilobed to near the base, glabrous. Capsule $2\frac{1}{2}$ lin. long, very sparingly pubescent. Mature seeds not seen.

Lower Guinea. French Congo: Sette Cama country, *Dybowski*, 76!

9. **C. membranaceus,** *Müll. Arg. in Flora*, 1864, 534. Plant 3 ft. high; branches slender, slightly angular, stellate-pubescent. Leaves ovate, acutely acuminate, rounded and not glandular at the base, 1–3 in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, entire, membranous, stellate-

pubescent on both surfaces, the middle hair often longer than the others; lateral nerves about 5 on each side, very slender and inconspicuous; petiole 2–6 lin. long, pubescent; stipules very small. Flowers monœcious. Racemes axillary and terminal, few-flowered, up to 2 in. long, the lower part female, the upper part male. Male flowers: Sepals stellate-pilose. Petals obovate, woolly on the margin in the upper part. Stamens 10; filaments glabrous. Receptacle pilose. Female flowers: Sepals narrowly lanceolate. Petals rudimentary or absent. Ovary tomentose; styles bilobed for about one-third their length, slender. Capsule ellipsoid.—Müll. Arg. in DC. Prodr. xv. ii. 623.

Upper Guinea. Northern Nigeria: near Wuru, *Barter*, 814! confluence of the Niger and Benue, *Barter*, 615! Southern Nigeria: Onitsa, *Barter*, 574!

10. **C. madandensis,** *S. Moore in Journ. Linn. Soc.* xl. 195. A large shrub; branches terete, slender, glabrous, with a few scattered lenticels; young branchlets stellate-pubescent or tomentellous. Leaves elliptic or ovate-rotundate, shortly and gradually acuminate, rounded and biglandular at the base, 1–2½ in. long, ½–1½ in. broad, membranous, entire, rather thinly stellate-pubescent and dull on both surfaces; lateral nerves 3–5; petiole 1½–4 lin. long, tomentellous; stipules subulate, deciduous. Flowers monœcious. Racemes about 1½ in. long, a few females towards the base, the remainder males. Male flowers: pedicel short, tomentose. Sepals ovate-oblong, obtuse, densely pubescent outside. Petals oblong-obovate, obtuse. Stamens about 13; filaments puberulous. Receptacle pilose. Female flowers: pedicel 2–3 lin. long, tomentellous. Sepals lanceolate, acute, 1 lin. long. Petals absent. Ovary subglobose, stellate-pubescent; style-branches short.

Mozamb. Distr. Gazaland: Madanda forests, 400 ft., *Swynnerton*, 1408! 1779!

11. **C. niloticus,** *Müll. Arg. in Flora*, 1864, 537. Branches sparingly and minutely lepidote; young flowering branchlets sulcate, about 1½ lin. thick at the base, lepidote. Leaves of the flowering branchlets very broadly ovate or ovate-rhomboid (the youngest obliquely ovate), very shortly and obtusely pointed, slightly cordate or rounded at the base, 2–4½ in. long, 1½–4 in. broad, entire, very thinly chartaceous, very sparingly stellate-puberulous above, stellate-tomentellous below, digitately 5-nerved from the base, remaining lateral nerves about 5 on each side, diverging from the midrib at an angle of 45°, prominent on both surfaces; tertiary nerves parallel, about 2 lin. apart, raised below; leaves of the older branchlets very large, deeply cordate at the base, about 1 ft. long and broad, digitately 7-nerved at the base; petiole of the smaller leaves 1–1½ in. long, terete, about 1 lin. thick, stellate-puberulous, of the larger leaves over 6 in. long, 3 lin. thick, closely sulcate, glabrous; stipules subulate, 1½ lin. long, tomentellous. Flowers apparently dicœcious, the males not known. Female racemes axillary and terminal, about 3½ in. long;

axis shortly stellate-tomentellous, slightly compressed; bracts small, triangular; pedicels $\frac{3}{4}$ lin. long, tomentellous. Sepals 5, reflexed, oblong, obtuse, glabrous within, pubescent outside, about $\frac{2}{3}$ lin. long. Petals absent. Disk saucer-shaped, entire, rather thin but fleshy, quite glabrous. Ovary subglobose, villous or subsetose; styles spreading, deeply bilobed, lobes linear, slightly pubescent outside. Ripe fruit not seen.—Müll. Arg. in DC. Prodr. xv. ii. 598; Pax in Engl. Pfl. Ost-Afr. C. 237; Oliv. in Trans. Linn. Soc. xxix. 145.

Nile Land. Uganda: low moist ground of Madi, *Speke & Grant*, 706!

12. **C. pseudopulchellus,** *Pax in Engl. Jahrb.* xxxiv. 371. A shrub 6–12 ft. high; branchlets slender, twiggy, covered with rust-coloured scales when young. Leaves fragrant, subverticillate, lanceolate or elliptic-lanceolate, more or less narrowed to an obtuse or slightly emarginate apex, obtuse or subacute at the base, $\frac{1}{2}$–3 inches long, $\frac{1}{4}$–$1\frac{1}{6}$ in. broad, rigidly chartaceous, entire, mostly very dark brown and always glabrous above when dry, covered below with silvery scales with yellow centres; lateral nerves 9–12 on each side, slightly raised above, not visible or only a little raised below; glands at the base absent; petiole up to 1 in. long, scaly; stipules minute. Flowers monœcious. Racemes very much abbreviated, giving the flowers a clustered appearance at the apex of each shoot. Male flowers: pedicel about 2 lin. long at the opening of the flower. Sepals ovate, 1 lin. long, $\frac{3}{4}$ lin. broad, coriaceous, covered on the outside with numerous large overlapping orbicular scales, glabrous within except towards the puberulous margin. Petals oblong-lanceolate, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{1}{3}$ lin. broad, submembranous, glabrous on both sides, margin villous. Disk-glands very small. Stamens 15–18; filaments flattened below, sparingly pilose in the lower half. Receptacle pubescent. Female flowers: Sepals as in the males. Petals oblanceolate, as long as the sepals. Disk very thin, glabrous. Ovary densely covered with numerous large overlapping scales; styles bipartite to near the base; segments subterete, glabrous. Capsule trilobed, $\frac{1}{3}$ in. long, covered with numerous overlapping scales. Seeds ellipsoid, brown, $\frac{1}{4}$ in. long, $\frac{1}{6}$ in. broad.—*C. pulchellus*, Müll. Arg. in DC. Prodr. xv. ii. 572, partly, excl. Madagascar spec. and syn. Klotzsch, not of Baill.

Nile Land. Somaliland: Banas, *Riva*, 1486! British East Africa: Samburu, *Scott-Elliot*, 6133! between Mombasa and Lamu, *Whyte!* between Ribe and the Galla country, *Wakefield!*

Mozamb. Distr. Zanzibar, *Bojer! Stuhlmann*, 599! German East Africa: between Kipambui and Uwenji, *Fischer*, 526! Usambara; Masheua, *Holst*, 3581! Bagamoyo, *Stuhlmann*, 127! Buru, *Engler*, 1907! and without precise locality, *Hildebrandt*, 1296! Portuguese East Africa: above Tete, *Kirk!* Tete, *Kirk!*

13. **C. amabilis,** *Müll. Arg. in Flora*, 1864, 537. A small straight-growing tree; branchlets sulcate, grey, scaly. Leaves oblong-lanceolate or oblong-elliptic, shortly, gradually and rather acutely acuminate, rounded at the base, $1\frac{1}{2}$–6 in. long, $\frac{1}{2}$–$2\frac{1}{4}$ in. broad, entire, rigidly chartaceous, scaly and silvery-grey below, glabrous and dull

dark brown above; lateral nerves about 12 on each side, spreading almost at right angles to the midrib, slightly impressed above, a little prominent below, but fading away towards the margin; veins not visible; petiole $\frac{1}{6}$–$\frac{3}{4}$ in. long, scaly and slightly puberulous; stipules linear, terete, $1\frac{1}{2}$ lin. long, covered with scales. Flowers dicœcious. Male racemes often crowded towards the end of the shoots, 2–$3\frac{1}{2}$ in. long; pedicels about 1 lin. long; bracts subulate, scaly, as long as the pedicels. Sepals 5, connate at the base, ovate-triangular, obtuse, $1\frac{1}{4}$ lin. long, 1 lin. broad, covered with silvery shortly ciliate scales on the outside, pubescent within. Petals 5, as long as the sepals, oblong, obtuse, fimbriate-scaly on the outside, densely ciliate, slightly pubescent within. Stamens 13–15; filaments rather slender, thinly pilose in the lower part. Receptacle pubescent. Female racemes $1\frac{1}{2}$–2 in. long; pedicels and bracts as in the male. Sepals a little narrower than those of the male. Petals oblong-linear, obtuse, $1\frac{1}{4}$ lin. long, fimbriate-scaly on the outside, glabrous within, with a tuft of hairs on the margin at the top. Ovary fimbriate-scaly; styles tripartite, segments bifid. Capsule subglobose, 4 lin. in diam., covered with yellow orbicular scales. Seeds $3\frac{1}{4}$ lin. long, $2\frac{1}{2}$ lin. broad, convex on the back; testa light brown, dull and smooth.—Müll. Arg. in DC. Prodr. xv. ii. 516.

Upper Guinea. Sierra Leone: in gardens, *Daniell!* Waterloo, *Kirk*, 27! Northern Nigeria: Ilorin, cultivated about the Yoruba towns, *Barter*, 3323! Kontagora, *Dalziel*, 281! Southern Nigeria: Ebute Metta, *Millen*, 14! near Lagos, *Rowland! Foster*, 33! *Punch*, 20! Abeokuta, *Irving!* Okumi, *Holland*, 173! Oban, *Talbot*, 109!

14. **C. zambesicus,** *Müll. Arg. in Flora*, 1864, 483. Branchlets sulcate or angular when young, scaly. Leaves elliptic-lanceolate, obtuse or slightly acuminate, emarginate, narrowly cordate at the base, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–$1\frac{3}{4}$ in. broad, entire, submembranous, glabrous and dull brown on the upper surface, silvery and scaly below, with 2 conspicuous linear glands at the base; lateral nerves 12–14 on each side of the midrib, spreading, slightly immersed above, raised below, gradually fading towards the margin; veins not visible; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. long, subterete, channelled above, scaly; stipules linear-filiform or obsolete, 3–4 lin. long, scaly. Flowers monœcious. Racemes up to 4 in. long, with a few female flowers towards the base, the remainder males; axis angular, densely covered with scales; bracts subulate-lanceolate, scaly, 1 lin. long, soon falling off. Male flowers: pedicel 1–2 lin. long, densely scaly. Sepals 5, ovate, obtuse, $1\frac{1}{4}$ lin. long, 1 lin. broad, coriaceous, densely covered with small fimbriate scales on the outside, very shortly pubescent within and on the margin. Petals 5, ovate, as large as the sepals, scaly outside, villous on the margin, thinly pilose or glabrescent within. Disk-glands fleshy, glabrous. Stamens 16–20; filaments thinly pilose in the lower part; anthers $\frac{1}{2}$ lin. long. Receptacle pilose. Female flowers: Sepals as in the male. Petals oblong-lanceolate, obtuse, $1\frac{3}{4}$ lin. long, $\frac{3}{4}$ lin. broad. Disk minute. Ovary covered with fringed scales; styles spreading,

4–6-partite; segments entire, bifid or trifid, glabrous above, slightly puberulous on the back towards the base. Capsule trilobed, 5 lin. long and in diam., covered with yellow fimbriate scales. Ripe seeds not seen.—Müll. Arg. in DC. Prodr. xv. ii. 515; Pax in Engl. Pfl. Ost-Afr. C. 237; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 278. *C. welwitschianus*, Müll. Arg. in Journ. Bot. 1864, 338, and in DC. Prodr. xv. ii. 515; Hiern in Cat. Afr. Pl. Welw. i. 970; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47; Th. & Hél. Durand, Syll. Fl. Congo. 481. *C. Antunesii*, Pax in Engl. Jahrb. xxiii. 523, and in Baum, Kunene-Samb. Exped. 282. *C. amabilis*, N. E. Br. in Kew Bulletin, 1909, 140, not of Müll. Arg.

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 320. Angola: Huilla, *Welwitsch*, 341! *Antunes*, 178, 298, 709! Jonkoa Mountain, near the mouth of the River Longa, *Baum*, 556! Cazengo, *Gossweiler*, 4909! German South-west Africa: Ombalambuenge, *Rautenen*, 18! Amboland, *Rautanen*, 308!

Mozamb. Distr. Portuguese East Africa: Sena, on the Zambesi, *Kirk* (2)! British Central Africa: Rhodesia; Victoria Falls, *Allen*, 418 (partly)! *Rogers*, 5146! Ngamiland: Kwebe, *Lugard*, 33! 246! *Mrs. Lugard*, 35! and without precise locality, *Baines!*

South Central. Belgian Congo: Welle district; Donge village, *Seret*, 594.

15. **C. Mubango,** *Müll. Arg. in Journ. Bot.* 1864, 338. An elegant tree, 12–20 ft. high; trunk 6–12 in. in diam.; head widely spreading, depressed at the top, dense; branches spreading; branchlets drooping, longitudinally sulcate, lepidote and slightly stellate-pubescent. Leaves ovate-elliptic, subcaudately or gradually acuminate, cordate and with 2 large glands at the base, $2\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, entire, thinly and rigidly chartaceous, minutely stellate-puberulous and dark-coloured on the upper surface, scaly and grey below, sometimes with a few stellate hairs on the midrib and lateral nerves; lateral nerves 14–18 on each side of the midrib, spreading, branched and fading before reaching the margin, prominent below; veins invisible; petiole 1–3 in. long, scaly and shortly stellate-pubescent, channelled on the upper side; stipules 4–5-partite, segments linear, subterete, 4–5 lin. long, stellate-pubescent. Flowers monœcious, about 4 lin. in diam. Racemes 3–8 in. long; pedicels stout, spreading, 3 lin. long, scaly; bracts small. Male flowers: Sepals 5, triangular, obtuse, 2 lin. long, $1\frac{1}{2}$ lin. broad, coriaceous, scaly outside, tomentose within. Petals 5, rhomboid-elliptic, $2\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. broad, subcoriaceous, entire, scaly outside, subtomentose within. Stamens about 30; filaments flattened, minutely papillose on the margin; anthers 1 lin. long. Receptacle pubescent. Female flowers: Sepals and petals as in the male. Ovary depressed-globose, scaly; styles short, depressed, contiguous, bifid. Fruits subglobose, $\frac{3}{4}$ in. in diam., scaly. Seeds $\frac{3}{4}$ in. long, nearly $\frac{1}{2}$ in. broad; testa dull-brown when dry.—Müll. Arg. in DC. Prodr. xv. ii. 514; Ficalho, Pl. Uteis, 251; Hiern in Cat. Afr. Pl. Welw. i. 969; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 836, and Reliq. Dewevr. 208; De Wild. Miss. É. Laurent, 128, and

Études Fl. Bas- et Moyen-Congo, i. 276, ii. 277 ; Th. & Hél. Durand, Syll. Fl. Congo. 481.

Lower Guinea. Lower Congo: Kisantu, *Gillet*. Angola: Golungo Alto; Sobato de Bumba, *Welwitsch*, 348! Malange district, *Gossweiler*, 966! Cazengo, *Gossweiler*, 4507! 4790! 4791!

South Central. Belgian Congo: Kwango district; Boala, *Lescrauwaet;* Kasai district; Kanda-Kanda, *Gentil;* Lusambo, *Laurent;* Kitebwa, *Gentil*, *Sapin!*

16. **C. megalocarpus,** *Hutchinson*. A tree 70–80 ft. high; branchlets tomentellous with stellate hairs or scaly. Leaves oblong-lanceolate or elliptic-oblong, shortly and subacutely acuminate, rounded and often subcordate at the base, 1½–5 in. long, ½–3 in. broad, rigidly chartaceous, margin entire or slightly undulate, minutely stellate-puberulous and dark-coloured above, lighter coloured and densely covered with small scales below; lateral nerves spreading, 16–20 on each side, slender, often nearly invisible above, slightly raised below, gradually fading towards the margin; veins not evident; petiole ⅓–3 in. long, stellate-tomentose or covered with scales; stipules linear, 4 lin. long, terete, stellate-tomentellous. Flowers monœcious. Racemes up to 10 in. long, many-flowered, a few females towards the base, the remainder males; axis angular, slightly flexuous, densely scaly and often stellate-pubescent; bracts small and caducous. Male flowers: pedicel ¼–½ in. long, angular, covered with scales. Sepals 5, ovate-triangular, obtuse, 2 lin. long, 1⅓ lin. broad, densely scaly outside, shortly pubescent within, with a tuft of hairs at the apex. Petals obovate-oblanceolate, rounded at the apex, 2⅓ lin. long, 1 lin. broad, covered with fringed scales on the back, villous on the margin and on the inner side. Disk-glands fleshy, glabrous. Stamens 25; filaments rather slender, thinly pilose in the lower part; anthers ¾ lin. long. Receptacle pilose. Female flowers: pedicel stout. Sepals as in the male, but without the tuft of hairs at the apex. Petals linear, 2⅓ lin. long, scaly on the back, villous within and on the margin. Disk minute. Ovary densely covered with fringed scales; styles spreading, bipartite, segments again divided once or twice, pubescent on the back. Capsule ellipsoid, 1¼–1½ in. long; exocarp crustaceous, thin, covered with scales; endocarp hard, nearly 2 lin. thick. Seeds narrowly ellipsoid, with a small apiculus at one end, 1 in. long, 6–7 lin. broad, faintly ribbed and slightly wrinkled on the back.—*C. elliottianus*, Pax & Engl. in Engl. Jahrb. xxxiii. 289, not *C. elliotianus*, Baill.

Nile Land. British East Africa: Nairobi, *Elliott*, 51! *Battiscombe*, 47! Kibwezi, *Scheffler*, 172! Masailand, *Hollis!* Uganda: Mabira Forest, *Dawe*, 13! *Ussher*, 4! Toro, *Dawe*, 498!

17. **C. oligandrum,** *Pierre MSS.* A tree 30–50 ft. high; branchlets sulcate or angular, closely beset with small brown scales. Leaves oblong-elliptic or elliptic-lanceolate, subcaudate and rather acutely acuminate, rounded at the base, 1½–4½ in. long, ¾–2¼ in. broad, thinly and rigidly chartaceous, entire, minutely stellate-puberulous and darker coloured above, lighter and densely covered with small

scales below; lateral nerves spreading, 12–16 on each side, slender, slightly impressed above, slightly prominent below, gradually fading and branched towards the margin; veins not evident; glands 2 at the base of the leaf, stipitate, coriaceous; petiole $\frac{1}{2}$–$2\frac{1}{2}$ in. long, rather slender, scaly; stipules minute. Flowers monœcious. Racemes terminal, up to 6 in. long, many-flowered, a few females towards the base, the remainder males; axis angular or sulcate, densely covered with scales; bracts small and caducous. Male flowers: pedicel $1\frac{1}{2}$–2 lin. long, subterete, covered with silvery scales. Sepals ovate-triangular, obtuse, $1\frac{1}{2}$ lin. long, 1 lin. broad, coriaceous, densely scaly outside, very shortly pubescent within and on the margin. Petals elliptic-oblanceolate, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, covered with silvery-white fringed scales on the outside, villous on the margin and within. Disk-glands fleshy, glabrous. Stamens 15; filaments slender, thinly pilose in the lower half; anthers $\frac{3}{4}$ lin. long. Receptacle pilose. Female flowers: pedicel as in the male. Sepals lanceolate, $1\frac{1}{2}$ lin. long, scaly outside. Petals oblong-linear, scarcely 1 lin. long, villous. Disk glabrous, fleshy. Ovary densely covered with fringed scales; styles 5–6-partite, segments linear, subterete, pubescent on the back. Capsule oblong-obovoid, truncate at the top, about $\frac{1}{2}$ in. long and 4 lin. in diam., covered with scales giving it a warted appearance. Seeds oblong, convex on the back, 5 lin. long, 3 lin. broad, slightly shining and a little wrinkled.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 739B!

Lower Guinea. Gaboon: Libreville, *Klaine*, 71! 556! Sibange Farm, *Soyaux*, 3! Spanish Guinea: *Tessmann*, 832!

18. **C. Draconopsis,** *Müll. Arg. in Journ. Bot.* 1864, 338. A tree up to 20 ft. high; branchlets stout, sulcate, pubescent. Leaves broadly ovate, acute or shortly and acutely acuminate, cordate at the base, $2\frac{1}{2}$–6 in. long, $1\frac{1}{2}$–$4\frac{1}{2}$ in. broad, coarsely and doubly dentate with numerous teeth, membranous or thinly chartaceous, thinly stellate-pubescent above when young, at length glabrous, softly stellate-pubescent below in the mature state, digitately 5-nerved from the base, remaining lateral nerves 3–5 on each side, diverging from the midrib at an angle of 45°, all prominent below; transverse nerves rather distant, subparallel, distinct below in the older leaves; petiole $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, tomentellous; stipules linear-subulate, 2–3 lin. long, pubescent. Flowers monœcious. Racemes terminal, many-flowered, 4–6 in. long, a few females towards the base, the remainder males, or all males; axis rather stout, stellate-tomentose; bracts very small. Male flowers: pedicel slender, 3 lin. long, puberulous. Sepals 5, ovate-oblong, $1\frac{1}{2}$ lin. long, shortly ciliate. Petals 5, elliptic-oblanceolate, very densely villous on the margin, $1\frac{1}{4}$ lin. long. Disk-glands fleshy, triangular, bifid, glabrous. Stamens 15; filaments very slender, $1\frac{1}{2}$ lin. long, glabrous. Receptacle villous. Female flowers similar to the male. Ovary 2-celled, densely hairy; styles broad, bifid.—Müll. Arg. in DC. Prodr. xv. ii. 522; Hiern in Cat. Afr. Pl. Welw. i. 970; De Wild. Études Fl. Bas- et Moyen-Congo, i. 277.

Lower Guinea. Lower Congo: Cataract district, without collector's name in *Brussels Herbarium*. Angola: Ambriz, *Welwitsch*, 343! *Monteiro!* Cazengo, *Welwitsch*, 347! Golungo Alto, *Welwitsch*, 345! 347B!

19. **C. jatrophoides,** *Pax in Engl. Jahrb.* xliii. 79. A tree or possibly a shrub; branches whitish stellate-pubescent when young, soon becoming glabrous. Leaves broadly ovate, acutely cordate-acuminate, cordate at the base, $2\frac{1}{2}$–4 in. long, 2–$3\frac{1}{2}$ in. broad, shortly 5-lobed or coarsely 5-toothed, chartaceous, shortly stellate-pubescent when young, at length glabrous but slightly roughened with the persistent bases of the hairs, permanently densely white-pubescent below, digitately 5-nerved from the base, remaining lateral nerves 3–4 on each side, all prominent below; transverse nerves very few; petiole 1–$2\frac{1}{4}$ in. long, pubescent; stipules filiform, 4 lin. long, thinly stellate-pubescent. Flowers apparently diœcious. Male racemes terminal, many-flowered, up to 7 in. long; axis densely pubescent with white hairs; bracts small; pedicels 2–$2\frac{1}{2}$ lin. long, pubescent. Sepals 5, ovate-lanceolate, obtuse, $1\frac{1}{3}$ lin. long, 1 lin. broad, pubescent. Petals obovate-oblanceolate, very similar to the sepals, margins villous. Disk-glands subulate, fleshy, glabrous. Stamens 15–16; filaments glabrous. Receptacle villous. Female flowers not known.

Mozamb. Distr. German East Africa: Amani; on the Pangani River at Friedrich Hoffmann's Plantation, *Braun*, 1516!

20. **C. megalobotrys,** *Müll. Arg. in Flora*, 1864, 537. A tree 20–30 ft. high; trunk 5–6 ft. in circumference; branches subterete, with numerous light-coloured lenticels; young leafy flowering branchlets stellate-pubescent with whitish hairs. Leaves ovate or ovate-lanceolate, gradually narrowed or tapered to an acute apex, rounded or truncate and biglandular at the base, $1\frac{1}{2}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, membranous, unevenly serrate, glabrous or nearly so above, white-villous below when young, at length thinly stellate-pilose; lateral nerves 5–6 on each side, raised on both surfaces; petiole $\frac{1}{2}$–1 in. long, pubescent; stipules subulate-lanceolate, $1\frac{1}{2}$–2 lin. long, glabrous. Flowers diœcious, green. Male racemes terminating short lateral branchlets, many-flowered, 1–3 in. long; pedicels up to 3 lin. long, pubescent; bracts linear, half the length of the pedicels. Sepals 5, elliptic, obtuse, 2 lin. long, 1 lin. broad, submembranous, slightly pubescent. Petals 5, lanceolate-elliptic, subacute, equal in length to the sepals but a little narrower, shortly villous on the margin. Stamens 20–25; filaments $1\frac{1}{2}$ lin. long; anthers oblong-ellipsoid, $\frac{2}{3}$ lin. long. Receptacle densely villous. Female flowers not known. Fruit the size of a walnut (*McCabe*).—Müll. Arg. in DC. Prodr. xv. ii. 598; Pax in Engl. Pfl. Ost-Afr. C. 237; N. E. Br. in Kew Bulletin, 1909, 140.

Mozamb. Distr. Ngamiland: banks of the Tamalakane River, *McCabe in Herb. Atherstone*, 17! 39! Lake River, *Lugard*, 17!

21. **C. Seineri,** *Pax in Engl. Jahrb.* xliii. 78. A shrub about 15 ft. high; branchlets at first stellate-tomentose, at length pubescent

or nearly glabrous. Leaves ovate or ovate-elliptic, shortly and obtusely acuminate, rounded at the base, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, irregularly crenate-serrate, chartaceous or thinly coriaceous, glabrous or with very few stellate hairs on the upper surface, at first softly tomentose below, at length becoming thinly pubescent; lateral nerves 6–9 on each side, looped, prominent below; tertiary nerves lax; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. long, thinly stellate-tomentose; glands 2 at the base of the leaf, stipitate, cupular; stipules linear-oblong, subacute, 2–3 lin. long, with a few stellate hairs. Flowers diœcious. Male racemes terminal, dense-flowered, pedunculate, up to 3 in. long, yellow-tomentose; bracts narrowly lanceolate, acute, 1 lin. long, pubescent; pedicels 1–2 lin. long, slender, tomentose. Sepals 5, obovate, obtuse, $1\frac{3}{4}$ lin. long, 1 lin. broad, stellate-pubescent outside, thinly adpressed-villous within. Petals oblong, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{2}{3}$ lin. broad, glabrous inside, thinly villous on the outside, with dense villous fringe around the margin. Stamens about 16; filaments $1\frac{1}{2}$ lin. long, glabrous; anthers $\frac{1}{3}$ lin. long. Receptacle densely villous with weak white hairs. Female flowers not known.

Mozamb. Distr. Rhodesia: forest near Old Livingstone, 6 miles above the Victoria Falls, *Seiner*, 18! (not 15 as quoted by Pax).

22. **C. asperifolius,** *Pax in Engl. Jahrb.* xliii. 79. A small tree; young branchlets sulcate, yellow-pubescent with short stellate hairs, the older ones terete and quite glabrous. Leaves elliptic or ovate-elliptic, gradually and somewhat acutely acuminate, obtuse or rounded and with 2 subsessile glands at the base, $3\frac{1}{2}$–5 in. long, $2\frac{1}{4}$–$3\frac{1}{2}$ in. broad, rigidly subchartaceous, denticulate, quite glabrous above from the beginning, at first shortly stellate-pubescent, at length nearly glabrous below, 5-nerved at the base, remaining lateral nerves 5–7 on each side, very prominent below, slightly sunken above; tertiary nerves very lax, prominent below; petiole $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, subterete, minutely puberulous or glabrous; stipules small, deciduous. Flowers probably diœcious, but neither sex seen. Female racemes in fruit about $4\frac{1}{2}$ in. long; axis angular, puberulous; pedicels stout, $1\frac{1}{4}$ lin. long. Sepals triangular, coriaceous, about $1\frac{1}{4}$ lin. long, subacute, stellate-pubescent. Disk 5-lobed; lobes triangular, acute, glabrous. Fruit ellipsoid, subacute, 4 lin. long, 3 lin. in diam., rusty-tomentellous. Seeds ellipsoid, nearly flat on the inner side, convex outside, light brown, nearly smooth, 3 lin. long, $2\frac{1}{4}$ lin. broad.

South Central. Belgian Congo: Kondue; on the Sankuru River, *Ledermann*, 5!

23. **C. dispar,** *N. E. Br. in Journ. Linn. Soc.* xxxvii. 113. Branchlets subterete, about 1 lin. thick, minutely and sparingly rusty-lepidote, at length glabrous; internodes $\frac{3}{4}$–1 in. long. Leaves broadly elliptic-ovate or oblong, obtusely subcuspidate-acuminate, broadly rounded and emarginate or subcordate at the base, 2–3 in. long, 1–2 in. broad, very thinly chartaceous, minutely denticulate with glandular teeth, glabrous on both surfaces, slightly shining above, trinerved and biglandular at the base,

remaining lateral nerves 3–5 on each side, looped and branched near the margin, all prominent on both surfaces; tertiary nerves spreading almost at right angles from the midrib; petiole ½–1 in. long, very sparingly lepidote. Flowers apparently diœcious, the females not known. Male racemes terminal, 6 in. long, slender; axis rusty-lepidote; pedicels 2 lin. long, minutely stellate-puberulous; bracts small, deciduous. Sepals 5, subequal, ovate, glabrous except for the ciliate apex, about 1 lin. long. Petals 5, obtuse, 1 lin. long, glabrous outside, lanate within. Disk-glands 5, subulate. Stamens 10–12; filaments 1½ lin. long, glabrous; anthers curved, ⅓ lin. long. Receptacle densely villous.—Stapf in Johnston, Liberia, ii. 648.

Upper Guinea. Liberia: Monrovia, *Whyte!*

24. **C. Poggei,** *Pax in Engl. Jahrb.* xv. 534. A tree; branches scurfy-puberulous, slightly angular when young. Leaves ovate, more or less gradually acuminate, acumen slightly mucronate, rounded or subcordate at the base, with 2 small glands, 1¾–3 in. long, 1–2 in. broad, chartaceous, denticulate, glabrous, shining and somewhat black on the upper surface, permanently grey stellate-tomentellous below, 5-nerved from the base, remaining lateral nerves about 3 on each side, all very prominent on the lower surface; transverse nerves very lax; petiole 1–1½ in. long, sulcate or slightly angular, tomentellous with very short hairs; stipules very small. Flowers monœcious. Racemes terminal, with numerous males and several females disposed together along the axis; axis angular, densely scurfy-tomentellous; bracts subulate, about 1 lin. long, puberulous. Male flowers: pedicel 1¼ lin. long, stellate-tomentellous. Sepals 5, ovate-oblong, obtuse, subcoriaceous, 1⅓ lin. long, ⅔ lin. broad, very sparingly stellate-puberulous outside, glabrous within. Petals 5, oblong-elliptic, obtuse, 1¼ lin. long, ⅔ lin. broad, glabrous outside, hirsute on the margin and within the apex. Stamens about 15; filaments glabrous. Receptacle pilose. Female flowers nearly sessile. Sepals ovate-triangular, subacute, about 1 lin. long and ¾ lin. broad, coriaceous, sparingly stellate-puberulous outside, glabrous within. Petals 5, linear-lanceolate, as long as the sepals, with densely villous margins. Disk 5-lobed, nearly glabrous. Ovary globose, densely tomentellous; styles spreading over the top of the ovary, bipartite; segments linear, entire, about ⅔ lin. long, glabrous. Immature fruit subglobose, rusty-tomentellous.—Durand & Schinz, Études Fl. Congo, 244.

South Central. Belgian Congo: Bashilange district; Mukenge, *Pogge,* 1368!

25. **C. alienus,** *Pax in Engl. Jahrb.* xliii. 80. A tree of moderate size; branches sparingly pubescent with short stellate hairs when young, at length quite glabrous. Leaves oblong or oblong-elliptic, obtuse at the apex, slightly narrowed, obtuse and with 2 stalked glands at the base, 1½–2½ in. long, ¾–1⅙ in. broad, rather rigidly chartaceous, remotely denticulate, quite glabrous and slightly shining on both surfaces; lateral nerves 7–8 on each side, spreading, looped well within the margin, prominent on both surfaces; tertiary nerves lax and branched; petiole 2–3½ lin. long,

shortly pubescent; stipules subulate, about 1 lin. long. Flowers monœcious. Racemes axillary and terminal, up to 4½ in. long, few-flowered, one or two females towards the base, the remainder males; axis somewhat compressed, rusty stellate-puberulous; bracts lanceolate, obtuse, glabrescent. Male flowers: pedicel 1½ lin. long, rusty-pubescent. Sepals ovate-elliptic, obtuse, 1 lin. long, ½ lin. broad, slightly membranous at the margin, shortly ciliate in the upper part, slightly stellate-pubescent near the base on the outside. Petals 5, lanceolate-elliptic, subacute, as long as the sepals, glabrescent outside, white-villous on the inside and margin. Disk-glands fleshy. Stamens 10–12; filaments glabrous. Receptacle white-villous. Female flowers: pedicel stout, 2 lin. long, sparingly pubescent. Sepals broadly ovate, obtuse, 1½ lin. long and broad, coriaceous, nearly glabrous outside. Petals rather unequal, ovate to lanceolate, about three-quarters the length of the sepals, glabrous outside, long-villous on the margin and within. Disk very small. Ovary globose, stellate-pubescent; styles bipartite nearly to the base, glabrous. Fruits not known.

Nile Land. British East Africa: Kikuya Mountains, near Nairobi, *Stuhlmann*, 938! Senia, 5000–6000 ft., *Battiscombe*, 17!

26. **C. bukobensis,** *Pax in Engl. Jahrb.* xliii. 77. A tree; branches and branchlets glabrous, or with very few scattered stellate hairs. Leaves elliptic or ovate-elliptic, rarely ovate-lanceolate, gradually tapered to an acute apex, subcuneate or slightly rounded at the base, 3½–6 in. long, 1½–2¾ in. broad, membranous rather distantly crenate-serrate, glabrous or with extremely few stellate hairs on both surfaces, 5-nerved and 2–4-glandular at the base, remaining lateral nerves 4–6 on each side, slightly prominent below; transverse nerves very lax and branched, faint; petiole ¾–2 in. long, subterete, slightly stellate-pubescent or glabrous; stipules very small and fugacious. Flowers monœcious. Racemes terminal, about 7 in. long, with numerous males and fewer females disposed along the shortly stellate-pubescent axis; bracts small. Male flowers: pedicel 2 lin. long, scantily puberulous. Sepals 5, oblong-lanceolate, obtuse, about 1 lin. long, membranous, sparingly pubescent. Petals 5, similar in shape and size to the sepals, but more hairy. Disk-glands subulate, large, glabrous. Stamens about 12; filaments slender, glabrous. Receptacle pilose. Female flowers subsessile: Sepals as in the male. Petals filiform, small, about one-third the length of the sepals, villous. Disk lobed, glabrous. Ovary ovoid-globose, rusty stellate-tomentellous; styles bipartite; segments slender, spreading, linear, entire, glabrous. Fruit not known.

Mozamb. Distr. German East Africa: Bukoba; Bamgodjo, *Holtz*, 1649!

27. **C. Gossweileri,** *Hutchinson.* A tree 30–40 ft. high, with the habit of a *Populus;* branches longitudinally wrinkled or sulcate, puberulous; young flowering branchlets thinly villous with stellate hairs. Leaves ovate or oblong-ovate, more or less caudate-acuminate, acumen mucronate, rounded to a subacute base, 1¼–3½ in. long, 1–2 in.

broad, thinly chartaceous or submembranous, rather coarsely crenate-serrate, glabrous and dull on both surfaces; lateral nerves 6–10 on each side, slender, slightly raised on both surfaces, fading and branched towards the margin; cross-nerves faint and very lax; glands at the base of the leaf cupular, stipitate, coriaceous; petiole slender, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, very sparingly pubescent; stipules deciduous. Flowers monœcious. Racemes terminal, up to 6 in. long, a few female flowers at the base of each, the remaining upper part consisting of numerous males, or all male; axis laxly villous with stellate hairs; bracts small, subulate, $\frac{1}{2}$ lin. long. Male flowers: pedicel 1–2 lin. long, terete, pubescent. Sepals 5, oblong-elliptic, obtuse, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, slightly membranous, stellate-pubescent on the back, glabrescent within. Petals linear-oblong, obtuse, 1 lin. long, glabrous outside, pilose at the base and apex within. Disk-glands small, fleshy, glabrous. Stamens 20; filaments slender, glabrous. Female flowers: pedicel stout, 1 lin. long, pubescent. Sepals oblong, obtuse, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, stellate-pilose outside, glabrous within, except for a few stellate hairs towards the apex. Petals reduced to 1 or 2, linear-filiform, $\frac{2}{3}$ lin. long, pilose. Disk fleshy, villous. Ovary tomentose; styles 5, recurved-spreading, bipartite to near the base, segments linear, entire, 1 lin. long, glabrous. Capsule ellipsoid-globose, obtusely trilobed, nearly $\frac{1}{2}$ in. in diam., scaly with the persistent bases of the stellate hairs; exocarp and endocarp thin. Seeds oblong-ellipsoid, $4\frac{1}{2}$ lin. long, $3\frac{1}{2}$ lin. broad, smooth and slightly mottled.

Lower Guinea. Angola: by the River Kubango, near Fort Princeza Amelia, *Gossweiler*, 1989!

28. **C. Gubouga,** *S. Moore in Journ. Linn. Soc.* xl. 196. Branches terete, rather densely covered with lenticels; young flowering branchlets rather slender, woolly-tomentose when young, at length becoming nearly glabrous. Leaves ovate or ovate-lanceolate, acutely and rather long-acuminate, rounded and more or less cordate at the base, 2–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–$2\frac{1}{2}$ in. broad, irregularly serrate, membranous, stellate-tomentose below and pubescent above when young, at length quite glabrous, digitately 5-nerved from the base, remaining lateral nerves 4–5 on each side, looped and branched some distance from the margin, distinct on both surfaces; petiole $\frac{3}{4}$–$1\frac{3}{4}$ in. long, with 2–4 scattered glands at the apex, tomentose; stipules deciduous, linear-lanceolate, 3 lin. long, nearly glabrous. Flowers monœcious. Racemes terminal, $1\frac{1}{2}$–2 in. long, the lower two-thirds containing about 12 female flowers, the upper third with about the same number of males; bracts similar to the stipules, but stellate-pubescent; female pedicels about $1\frac{1}{4}$ lin. long, stellate-pubescent, the males 2 lin. long. Male flowers: Sepals 5, oblong-ellipsoid, $1\frac{1}{3}$ lin. long, 1 lin. broad, thin, striate, glabrous on both sides, rather densely ciliate in the upper half. Petals 5, narrowly elliptic, subacute at both ends, 2 lin. long, $\frac{3}{4}$ lin. broad, trinerved, glabrous on both surfaces, densely ciliate. Disk-glands 5, fleshy, glabrous. Stamens 15–16; filaments glabrous. Receptacle villous. Female flowers: Sepals 5, ovate-oblong, obtuse,

$2\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, shortly ciliate in the upper half, a few stellate hairs down the middle on the outside. Petals absent. Disk fleshy and crenulate, glabrous. Ovary globose, densely white-tomentose; styles 3, deeply bilobed, the lobes again bipartite to near the base, segments linear, fleshy, slightly wrinkled. Fruit apparently indehiscent, ellipsoid, not lobed, $1\frac{1}{4}$ in. long, a little over $\frac{3}{4}$ in. in diam., shortly stellate-puberulous or glabrous. Seeds large, oblong-ellipsoid, truncate at each end, 10 lin. long, 7 lin. broad; testa light brown with grey spots, dull.

Mozamb. Distr. Portuguese East Africa: Lupata, *Kirk!* Boruma, *Menyharth*, 795! Lower Umswirizwi River, *Swynnerton*, 153! British Central Africa: Nyasaland; Zomba, *Purves*, 182! Chiromo, *Scott-Elliot*, 2805! Rhodesia: Sabi River, *Swynnerton*, 1123! 1125!

29. **C. barotsensis,** *Gibbs in Journ. Linn. Soc.* xxxvii. 469. A tree 25–30 ft. high; branches stellate-pubescent; young branchlets rather stout, stellate-tomentose with light yellow hairs; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves ovate, more or less gradually acuminate to an obtuse apex, rounded at the base, 3–$5\frac{1}{2}$ in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. broad, unequally and obtusely serrate, subchartaceous, light green, stellate-pubescent above, at length glabrous, greyish, stellate-tomentose below; lateral nerves 7–9 on each side, much-branched; petiole $\frac{3}{4}$–1 in. long, tomentose; stipules linear, $2\frac{1}{2}$ lin. long, pubescent, at length glabrous, deciduous. Flowers monœcious, racemose or subspicate, the lower half or lowermost third of the inflorescence female, the upper part male; inflorescence $4\frac{1}{2}$–5 in. long; axis tomentose; bracts similar to the stipules; pedicels short, those of the males slightly longer than the females. Male flowers: Sepals 5, oblong-lanceolate, obtuse, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, yellow-pubescent outside. Petals 5, oblong, equal to the sepals, rather densely pubescent within. Stamens 16–18; filaments glabrous; anthers oblong-ellipsoid, $\frac{1}{2}$ lin. long. Receptacle villous. Female flowers: Sepals 6, lanceolate, subacute, $1\frac{1}{4}$ lin. long, pubescent outside, subglabrous within. Petals absent. Disk annular, small, densely pilose. Ovary ovoid-globose, yellow-tomentose; styles 3, spreading, bilobed almost to the base, glabrous; segments linear, subterete, $1\frac{1}{2}$ lin. long.

Mozamb. Distr. British Central Africa: Rhodesia; islands and banks of river at Victoria Falls, *Miss Gibbs*, 109! *Allen*, 175! 416! *Galpin*, 7049!

30. **C. leuconeurus,** *Pax in Engl. Jahrb.* xv. 533. A tree 15–20 ft. high; young branchlets slightly sulcate, stellate-pubescent, at length glabrous. Leaves ovate or elliptic-ovate, rather shortly and gradually acuminate, rounded at the base, 2–$5\frac{1}{2}$ in. long, 1–3 in. broad, thinly chartaceous or membranous, shortly crenate-serrate, with a shortly stipitate coriaceous gland in the sinus of each tooth, thinly stellate-pubescent above when young, densely so below, at length becoming quite glabrous; lateral nerves 7–8 on each side, conspicuous on both surfaces, branching freely well within the margin; glands at the base of the leaf shortly stalked, coriaceous, cupular at the apex; petiole $\frac{1}{2}$–$1\frac{1}{2}$

in. long, tomentellous or at length nearly glabrous; stipules subulate-lanceolate, glabrescent, about 1½ lin. long, soon falling off. Flowers monœcious. Racemes terminal, interrupted, up to 7 in. long, a few female flowers scattered here and there amongst the males; axis tomentose; bracts small, soon falling off. Male flowers: pedicel slender, up to 2 lin. long, tomentellous. Sepals 5, oblong-lanceolate, subacute, 1½ lin. long, ½ lin. broad, thin, glabrous within, thinly stellate-pubescent on the outside. Petals 5, oblanceolate-elliptic, obtuse, 1½ lin. long, ⅔ lin. broad, glabrous outside, densely villous on the margin, pubescent inside. Disk-glands small and fleshy, glabrous. Stamens about 18; filaments glabrous. Receptacle pilose. Female flowers: pedicel short and very stout, tomentose. Sepals 5, lanceolate, obtuse, 1 lin. long, ⅓ lin. broad, shortly stellate-pubescent. Petals rudimentary, subulate, pilose. Disk fleshy, glabrescent. Ovary globose, densely tomentose; styles recurved-spreading, bilobed for two-thirds their length; lobes linear, curled, glabrous. Fruits not known.—*C. kamerunicus*, Pax & K. Hoffm. in Engl. Jahrb. xlv. 237.

Upper Guinea. Cameroons: swampy places between Bejsu and Berim, *Ledermann*, 2482!

Nile Land. Mittu; Mvolo, *Schweinfurth*, 2831!

31. **C. Pynærtii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, iii. 220. A shrub; branches glabrous. Leaves broadly ovate or ovate-elliptic, shortly and obtusely acuminate, 2½–5 in. long, 1½–3 in. broad, chartaceous, remotely serrate or undulately serrulate, shining and glabrous on both surfaces, paler below, biglandular at the base; petiole 1¼–1½ in. long, glabrous; stipules small and deciduous. Flowers monœcious. Racemes terminal, pedunculate, 10 in. long; male flowers numerous and clustered, pedicellate, females solitary in the middle of each male cluster. Male flowers: pedicel about 1 lin. long, slender, puberulous. Sepals ovate, obtuse, 1 lin. long, glabrous outside, with a tuft of hairs at the apex. Petals about the same size, densely woolly-ciliate, but otherwise glabrous outside. Stamens 10–12; filaments glabrous; anthers ⅓ lin. long. Receptacle villous. Female flowers: pedicel ½–1 lin. long, pubescent. Sepals narrowly oblong, obtuse, nearly glabrous except at the tips. Petals absent. Disk rather thin, 5-lobed, glabrous. Ovary stellate-tomentellous; styles connate in the lower half, bilobed, glabrous; branches recurved. Fruits broadly ellipsoid, about 3 lin. long, 2½–3 lin. in diam., minutely and very sparingly stellate-pubescent, tipped by the persistent styles.

South Central. Belgian Congo: Bangala district; Bumba, *Pynaert*, 93! *Seret*, 14!

32. **C. pyrifolius,** *Müll. Arg. in Journ. Bot.* 1864, 338. A tree 20 ft. high; trunk 1½ ft. in diam. at the base; branchlets sulcate, stellate-puberulous when young. Leaves ovate or elliptic-ovate, shortly acuminate, rounded and biglandular at the base, 3½–5½ in. long, 1¾–3 in. broad, thinly and rigidly chartaceous, closely crenate, glabrous above, with very few short scattered stellate hairs below, at length quite

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glabrous; lateral nerves 6–7 on each side, curved and branched near the margin, slightly raised on both surfaces; petiole 2–3 in. long, subterete, sparingly stellate-puberulous when young, at length glabrous; stipules linear, 2 lin. long, glabrous. Flowers monœcious. Racemes terminal, 10–12 in. long, the lower third consisting of female flowers, the upper two-thirds of males; axis about 1 lin. in diam. at the base, sulcate, puberulous; bracts linear-subulate, 1 lin. long, nearly glabrous. Male flowers: Sepals 5, ovate-elliptic, obtuse, 1 lin. long, $\frac{3}{4}$ lin. broad, rather thinly coriaceous, very slightly stellate-pubescent outside, not scaly, not ciliate except for a tuft of hairs at the top. Petals 5, elliptic, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, glabrous and without scales outside, densely villous inside. Stamens 12; filaments glabrous. Receptacle villous. Female flowers: Sepals 5, linear-oblong, subacute, about 1 lin. long, very sparingly stellate-pubescent outside. Petals minute, terete, resembling glands. Disk rather thin, 5-lobed, lobes triangular, glabrous. Ovary stellate-pubescent; styles 3, connate at the base, very shortly bifid at the apex, glabrous, $1\frac{1}{2}$ lin. long. Capsule ellipsoid, obtusely trilobed, $\frac{1}{2}$ in. long, 5 lin. in diam.; exocarp and endocarp membranous, the former spotted sparingly with small white stellate hairs. Seeds usually solitary in each capsule, ellipsoid, 5 lin. long, 3 lin. broad, smooth and slightly shining.—Müll. Arg. in DC. Prodr. xv. ii. 550; Hiern in Cat. Afr. Pl. Welw. i. 971.

Lower Guinea. Angola: Golungo Alto; forests by the River Quiapoze in Sobato de Mussengue, at Bumba de Bango, and at Capopa spring near Sange, *Welwitsch*, 344! Benguella: along the River Kubango, near Fort Princeza Amelia, *Gossweiler!*

33. **C. nudifolius,** *Baker & Hutchinson.* Branches almost fleshy, green, very sparingly puberulous. Leaves elliptic or oblong-elliptic, acutely acuminate, slightly narrowed to an obtuse base, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, about 2 in. broad, crenate, membranous, glabrous and dull on both surfaces, biglandular at the base; lateral nerves 5–8 on each side, slender, distinct on both surfaces; veins very lax; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, puberulous; stipules minute. Flowers monœcious. Racemes slender, up to 6 in. long, with several female flowers in the lower two-thirds, the remainder males; axis sparingly puberulous; bracts minute. Male flowers nearly sessile: Sepals sparingly puberulous. Petals small. Stamens about 10; filaments glabrous. Female flowers: pedicel about $\frac{1}{2}$ lin. long. Sepals ovate, obtuse, $\frac{3}{4}$ lin. long, $\frac{1}{3}$ lin. broad, membranous, nearly glabrous. Petals absent. Ovary tomentose; styles bilobed to near the base, slender, glabrous. Fruits not seen.

Upper Guinea. Sierra Leone: near Kahreni, Limba, *Scott-Elliot,* 5583! Sasseni, Scarcies, *Scott-Elliot,* 4429!

34. **C. Chevalieri,** *Beille in Bull. Soc. Bot. France,* lxvii. *Mém.* viii. 123. A shrub; branches terete, covered with a glabrous grey bark; young branchlets stellate-pubescent. Leaves lanceolate, obtuse, narrowed to, but obtuse at the base, $\frac{3}{4}$–$3\frac{1}{2}$ in. long, $\frac{1}{4}$–$1\frac{1}{6}$ in. broad, crenate

or crenate-serrate, thinly and rigidly chartaceous, glabrous and dull on both surfaces; lateral nerves 7–9 on each side, slender, looped towards the margin, distinct but not prominent on both surfaces; petiole 1–4 lin. long, stellate-puberulous; glands at the base of the leaf stipitate, funnel-shaped, coriaceous, glabrous; stipules small, deciduous. Flowers monœcious. Racemes terminal or terminating lateral branchlets, up to $2\frac{1}{2}$ in. long, the male flowers few at the top, the females more numerous in the lower part; axis angular, very sparingly stellate-puberulous; bracts ovate, $\frac{1}{2}$ lin. long, pubescent. Male pedicel 1 lin. long, nearly glabrous: Sepals 5, ovate-oblong, $\frac{3}{4}$ lin. long, densely ciliate at the apex. Petals 5, linear-spathulate, $\frac{3}{4}$ lin. long, villous towards the apex. Stamens 11; filaments glabrous. Receptacle pilose. Female flowers subsessile: Sepals 5, ovate-oblong, obtuse, nearly 1 lin. long, with a tuft of hairs at the apex, very sparingly stellate-pubescent outside. Petals absent. Disk thick and fleshy, very slightly 5-lobed, glabrous, lobes oblong and not apiculate. Ovary stellate-tomentose; styles 3, spreading, bilobed to slightly below the middle, lobes linear, terete, glabrous, about $\frac{2}{3}$ lin. long. Capsule slightly trilobed, about $2\frac{1}{2}$ lin. in diam., stellate-puberulous but not scaly. Seeds nearly 2 lin. long, with a dull smooth light yellow testa.

Upper Guinea. Ivory Coast: banks of the Cavally River at Prolo, *Chevalier*, 19861!

35. **C. nigritanum,** *Scott-Elliot in Journ. Linn. Soc.* xxx. 97. An undershrub; branches subterete, covered with a grey bark, becoming glabrous; young flowering branchlets short, sparingly rusty-puberulous. Leaves elliptic or lanceolate-elliptic, obtuse or slightly acuminate, slightly narrowed to, but obtuse at the base, 1–3 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, obtusely and shortly serrate, membranous or thinly chartaceous, glabrous on both surfaces except for a few scattered stellate hairs on the nerves below; lateral nerves 5–7 on each side of the midrib, slender, looped towards the margin, distinct but not prominent on both surfaces; petiole 1–6 lin. long, puberulous; glands at the apex subsessile, coriaceous, glabrous; stipules lanceolate-subulate, 1 lin. long, rusty-tomentose. Flowers diœcious or submonœcious. Male racemes terminating short lateral branchlets, slender, few-flowered, sometimes a few females towards the base, up to $2\frac{1}{2}$ in. long; axis very sparingly puberulous; bracts 1–2-flowered, subulate, $\frac{1}{2}$ lin. long, slightly pubescent; pedicel slender, up to 2 lin. long, nearly glabrous. Sepals 5, ovate, obtuse, $\frac{3}{4}$ lin. long, $\frac{2}{3}$ lin. broad, stellate-pubescent outside, glabrous within. Petals 5, spathulate, as long as the sepals, densely ciliate at the apex. Stamens 10; filaments glabrous. Receptacle densely pilose. Female racemes similar to the male but stouter and angular; bracts 1-flowered, as long as the pedicels; pedicel stout, $\frac{3}{4}$ lin. long. Sepals 5, oblong, obtuse, stellate-pubescent outside. Petals very rudimentary. Disk not present. Ovary globose, shortly setulose; styles bilobed, at length spreading, lobes linear, glabrous. Capsule about $2\frac{1}{2}$ lin. in diam., covered with yellow orbicular scales.

Seeds dark brown, convex on the back, shining, nearly 2 lin. long.—*C. Dinklagei*, Pax & K. Hoffm. in Engl. Jahrb. xlv. 237.

Upper Guinea. French Guinea: Sangora district; Farana, woods along the banks of the Niger, *Scott-Elliot*, 5379! 5380! Liberia: Webba, on the Cavally River, *Dinklage*, 2664!

36. **C. congensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 276. A tree; branches glabrous, more or less longitudinally sulcate. Leaves ovate-elliptic, obtusely and gradually acuminate, cuneate or subacute at the base, 3–5 in. long, about 2½ in. broad, chartaceous, crenulate, quite glabrous on both surfaces, with two opposite stipitate glands at the base; lateral nerves 7–8 on each side, oblique; petiole 1–2 in. long, at length glabrous. Flowers monœcious. Racemes terminal, about 8 in. long; axis angular, tomentellous; female flowers together with a few males in the lower, the males fasciculate in the upper part; bracts very small. Male flowers: pedicel 2½ lin. long. Sepals 5, ovate, 1 lin. long, pubescent. Stamens 15–16; filaments glabrous, 1½ lin. long. Receptacle tomentose. Female flowers shortly pedicellate; pedicel tomentose, 1 lin. long. Sepals 5, oblong, 1 lin. long. Petals absent. Disk thin. Ovary densely tomentose; styles spreading, deeply bilobed, glabrous. Fruits not known.

South Central? Belgian Congo: without precise locality, *Ducoffre!*

37. **C. sylvaticus,** *Hochst. in Flora*, 1845, 82. A shrub; branches sulcate, glabrous; young flowering branchlets rusty stellate-puberulous. Leaves ovate, subcaudate-acuminate, rounded and biglandular at the base, 1½–2½ in. long, 1–1½ in. broad, serrulate, thinly chartaceous, glabrous on both surfaces or with a few stellate hairs below when young; lateral nerves about 4 on each side, slender, slightly raised on both surfaces, the lower much branched towards the margin; cross nerves very faint and lax; petiole slender, 1–1¼ in. long, shortly stellate-pubescent; stipules small, soon falling. Flowers monœcious. Racemes terminal, up to 6 in. long, with numerous male flowers and a few females scattered amongst them; axis sulcate, rather densely stellate-tomentellous; bracts subulate-lanceolate, ½ lin. long. Male flowers: pedicel 1–1¼ lin. long, tomentellous. Sepals 5, narrowly lanceolate, obtuse, 1 lin. long, ½ lin. broad, submembranous, thinly stellate-pubescent outside. Petals 5, narrowly oblong, as long as the sepals, ⅓ lin. broad, glabrous outside, white-villous on the margin and within the apex. Disk-glands small. Stamens about 20; filaments very slender, 1 lin. long, glabrous; anthers ¼ lin. long. Receptacle white-villous. Female flowers shortly pedicellate. Sepals similar to those of the male but not so membranous. Petals rudimentary. Disk deeply 5-lobed, glabrous. Ovary tomentose; styles bilobed to the base; segments linear, entire, 1¾ lin. long, glabrous. Fruit subglobose, 4½ lin. in diam., shortly stellate-pubescent.—Müll. Arg. in DC. Prodr. xv. ii. 602; S. Moore in Journ. Linn. Soc. xl. 195. *C. Stuhlmanni*, Pax in Engl. Jahrb. xix. 80.

Nile Land. Uganda: Sesse Islands in Lake Victoria, *Stuhlmann*, 1210!

Mozamb. Distr. Rhodesia: Gazaland; Chirinda forest, *Swynnerton*, 4!
Occurs also in Natal.

38. **C. macrostachys,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 251. A tree up to 30 ft. or more; branchlets slightly sulcate, pubescent. Leaves ovate, shortly and obtusely acuminate, rounded or cordate at the base, 1½–4 in. long, 1–3 in. broad, crenulate, thinly and rigidly chartaceous, shortly stellate-puberulous on both surfaces, at length nearly glabrous, with 2 or 4 coriaceous shortly stipitate glands at the base below, 5–7-nerved at the base, remaining lateral nerves 4–7 on each side, raised below; veins rather close, but not prominent; petiole up to 2¼ in. long, tomentellous; stipules linear, 2–3 lin. long, glabrescent, deciduous. Flowers normally dicœcious or at least on separate shoots or sometimes a few females accompanying the males. Male inflorescence up to 10 in. long, many-flowered; axis tomentose; bracts small, pubescent; pedicel up to ½ in. long, tomentose. Sepals 5, ovate or ovate-triangular, obtuse, 1¼ lin. long, ⅔ lin. broad, pubescent on both sides. Petals oblong-oblanceolate, obtuse, densely villous on the margin and within, 1½ lin. long, ⅓ lin. broad. Disk-glands hairy. Stamens 15; filaments sparingly villous in the lower part. Receptacle villous with rather long interlacing hairs. Female inflorescences up to 4 in. long; bracts subulate-linear, subcoriaceous, about 2 lin. long, stellate-pubescent or nearly glabrous. Female flowers subsessile: Sepals 5, lanceolate or ovate-lanceolate, obtuse, 2 lin. long, 1 lin. broad at the base, subcoriaceous, shortly stellate-pubescent outside, hirsute on the margin, stellate-pilose within. Petals absent. Disk fleshy, puberulous. Ovary slightly trilobed, densely covered with fringed scales; styles bipartite, spreading, segments linear, slightly pubescent on the back. Capsule slightly trilobed, ½ in. in diam., tomentellous. Seeds broadly ellipsoid, about 3½ lin. long and 3 lin. broad; testa slightly wrinkled, shining.—Schweinf. Beitr. Fl. Aethiop. 35; Müll. Arg. in DC. Prodr. xv. ii. 528; Oliv. in Trans. Linn. Soc. ser. 2, ii. 349; Pax in Engl. Pfl. Ost-Afr. C. 237, and in Engl. Jahrb. xxviii. 419; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 305; Rendle in Journ. Linn. Soc. xxxvii. 211. *C. acuminatum,* R. Br. in Salt, Abyss. App. iv. p. lxv. *Rottlera Schimperi*, Hochst. ex A. Rich. l.c.

Nile Land. Eritrea: near Saganeiti, *Schweinfurth & Riva,* 1759! Abyssinia: Chahague, *Quartin-Dillon,* 92! Shoioda Mountain, *Schimper,* 196! near Shoata, *Schimper,* 1134! near Jelajeranne, *Schimper,* 1665! near Adowa, *Steudner,* 999! West Sidamo, *Drake-Brockman,* 206! and without precise locality, *Schimper,* 184! *Plowden!* British East Africa: Mombasa, *Wakefield!* Fort Hall district, *Battiscombe,* 15! Uganda: Buddu, *Dawe,* 278! Mabira Forest, *Dawe,* 181! Western Ankole, *Dawe,* 408! Entebbe, *Brown,* 221! Buvuma Islands, Lake Victoria, *Bagshawe,* 648! Usoga, *Scott-Elliot,* 7204! Wimi, Ruwenzori, *Scott-Elliot,* 7844!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth,* 3410!

Mozamb. Distr. German East Africa: Kilimanjaro, *Johnston!* Uhehe; Ukano Mountain, *Goetze,* 691! Portuguese East Africa: near Mingazi, *Kirk!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 70! Namasi, *Cameron,* 10! and without precise locality, *Buchanan,* 209! 1058!

39. **C. Scheffleri,** *Pax in Engl. Jahrb.* xliii. 78. A shrub?; branches terete, glabrescent; young flowering branchlets slender, stellate-pubescent or tomentose. Leaves broadly ovate or rhomboid-ovate, caudate-acuminate, rounded at the base, 1–3½ in. long, ½–2½ in. broad, minutely serrulate, thinly chartaceous, stellate-pubescent above, tomentose below when young, but at length only pubescent, 5-nerved at the base, remaining lateral nerves 3–4 on each side, looped near the margin, prominent below; tertiary nerves few, prominent below in the young leaves, at length almost invisible; glands at the base of the leaf long-stipitate; petiole slender, ¾–1½ in. long, tomentellous or glabrescent; stipules linear-oblanceolate, 2 lin. long, stellate-pubescent. Flowers monœcious. Inflorescences solitary, terminating slender lateral branchlets, 3–4 in. long, 2–4 females towards the base, the males numerous in the upper part; bracts filiform, 1 lin. long. Male flowers: pedicel 1–2½ lin. long, tomentose. Sepals 5, ovate, obtuse, 1⅓ lin. long, submembranous, densely stellate-pubescent on the outside, reticulate and glabrous within. Petals 5, oblong, 1½ lin. long, 1 lin. broad, glabrous outside, villous on the margin and inside at the base. Disk-glands rather small, fleshy, glabrous. Stamens 15–20; filaments glabrous. Receptacle villous. Female flowers: pedicel 3–4 lin. long, tomentose. Sepals 5, much overlapping, foliaceous, lanceolate or oblong-elliptic, obtuse or subacute, 2–4 lin. long, ¾–2 lin. broad, green, 1-nerved, with several side nerves, sparingly stellate-pubescent outside. Petals minute, subulate, pilose. Disk 5-lobed, lobes rounded or truncate, glabrous. Ovary globose, stellate-tomentose; styles incurved, bilobed to near the base, pubescent outside; lobes linear, subacute, terete. Young fruits trilobed, 3½ lin. long, 3 lin. in diam., tomentose.

Nile Land. British East Africa: Kibwezi, *Scheffler*, 2 ! and without precise locality, *Scott-Elliot !*

Mozamb. Distr. German East Africa: Msilala, *Hannington !* Kilimatinde, *Prittwitz*, 2A.

40. **C. angolensis,** *Müll. Arg. in Journ. Bot.* 1864, 339. A shrub up to 13 ft. high; branches spreading, twiggy, leafy towards the apex, glabrous; young branchlets stellate-tomentellous. Leaves obovate or rhomboid-elliptic, acutely and gradually or subcaudate-acuminate, very slightly cordate at the base, 1½–3 in. long, ¾–1½ in. broad, serrulate, membranous, rather sparingly stellate-puberulous on both surfaces, ciliate; lateral nerves 4–6 on each side, slender, distinct but not prominent on either surface; petiole ½–¾ in. long, stellate-tomentellous; stipules minute. Flowers monœcious. Racemes terminating short lateral branchlets, 1½–3½ in. long, slender; female flowers few towards the base, males more numerous in the upper part. Male flowers: pedicel slender, about 1½ lin. long, shortly pubescent. Sepals ovate-oblong, obtuse, 1 lin. long, ½ lin. broad, glabrous, very shortly ciliate. Petals about the same length as the sepals, oblanceolate, shortly ciliate, otherwise glabrous. Stamens 15; filaments glabrous. Receptacle pilose. Female flowers: pedicel scarcely ½ lin. long, pubescent. Sepals ovate, acuminate, ¾ lin. long, shortly pubescent. Petals absent. Disk annular,

subentire, glabrous. Ovary subglobose, stellate-tomentose; styles suberect, deeply bilobed, thinly pubescent in the lower part. Fruits not seen.—Müll. Arg. in DC. Prodr. xv. ii. 602; Hiern in Cat. Afr. Pl. Welw. i. 971; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 276.

Lower Guinea. Lower Congo: near Kisantu, *Gillet*, 2012. Angola: Pungo Andongo; Mata de Pungo, *Welwitsch*, 392 ! between Sermongo and Lifuni River, *Gossweiler*, 4914 ! Huilla; Chella, *Antunes*, 780 !

41. **C. schimperianus,** *Müll. Arg. in Linnæa*, xxxiv. 82. Branchlets subterete, covered with fringed scales when young, at length glabrous. Leaves ovate or lanceolate, shortly and obtusely acuminate, truncate, rounded or subcordate at the base, $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, minutely crenulate or denticulate, thinly and rigidly chartaceous, stellate-pubescent on both surfaces when quite young, very soon almost glabrous; lateral nerves 5–6 on each side, prominent below, much-branched and becoming faint well within the margin; veins rather lax, distinct but not raised below, invisible above; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, more or less covered with stellate hairs; stipules small and deciduous. Flowers monœcious. Racemes terminal, short, about 1 in. long; axis slightly angular, tomentellous; bracts 1-flowered, linear, 1 lin. long, densely pubescent. Male flowers about 6 in the upper part of the inflorescence: pedicel $1\frac{1}{4}$ lin. long. Sepals 5, ovate, stellate-pubescent outside, glabrous within, about $1\frac{1}{4}$ lin. long. Petals 5, obovate-elliptic, rounded at the apex, glabrous outside, sparingly pilose within, especially towards the base, ciliate. Disk-glands almost contiguous, glabrous. Stamens about 15; filaments glabrous. Receptacle pilose. Female flowers 3–4 at the base of the inflorescence: pedicel stout, nearly 2 lin. long. Sepals ovate or ovate-lanceolate, 2 lin. long, 1 lin. broad, shortly stellate-pubescent outside, nearly glabrous within. Petals absent. Disk fleshy, saucer-shaped, glabrous. Ovary covered with flat stellate many-rayed hairs; styles bilobed nearly to the base, segments linear, stellate-pubescent on the back, the tips incurved. Capsule subglobose, about 4 lin. in diam., covered with stellate hairs. Seeds brown, about 2 lin. long, smooth.—Müll. Arg. in DC. Prodr. xv. ii. 528; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 305.

Nile Land. Eritrea: Anderara, *Schweinfurth*, 91 ! Abyssinia: near Goelleb, *Schimper*, 2140 !

42. **C. oxypetalus,** *Müll. Arg. in Journ. Bot.* 1864, 339. A tree 15–20 ft. high; head widely spreading, hemispherical, depressed at the top; branchlets subterete, shortly stellate-pubescent. Leaves elliptic or lanceolate, slightly rounded at the base, gradually acuminate to a subacute apex, 2–4 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, rather obscurely serrate, thinly chartaceous or almost membranous, shortly stellate-pubescent on both surfaces, at length glabrous above; lateral nerves 4–6 on each side, ascending, slightly impressed above, prominent below; veins few and inconspicuous; petiole $\frac{1}{2}$–2 in. long, rather slender,

shortly stellate-pubescent; stipules linear-subulate, 1¼ lin. long, pubescent. Flowers monœcious, subsessile on the axis of the inflorescence, the upper third male, the lower two-thirds female, the whole 4½–5 in. long; axis hirsute with yellow stellate hairs; bracts linear, pubescent, 1–2 lin. long. Male flowers: Sepals 5, connate at the base, broadly ovate, subacute, ½ lin. long, pubescent outside. Petals 5, oblong-lanceolate, acuminate, 1 lin. long, villous at the base on both sides, otherwise glabrous. Stamens 15; filaments terete, glabrous; anther-cells distinct, one slightly larger than the other. Receptacle densely villous. Female flowers: Sepals oblong-lanceolate, obtuse, 1¼ lin. long, stellate-pubescent on the outside. Petals absent. Disk-segments opposite the sepals, ovate-triangular, obtuse, subcoriaceous, glabrous. Ovary ovoid, tomentose with yellow hairs; styles 3, bilobed to the base; segments linear, glabrous and black towards the apex, about 1 lin. long. Young fruits ovoid, rusty tomentellous, 4 lin. long, 2½ lin. in diam.—Müll. Arg. in DC. Prodr. xv. ii. 543; Ficalho, Pl. Uteis, 251; Hiern in Cat. Afr. Pl. Welw. i. 971; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 277.

Lower Guinea. Belgian Congo: Stanley Pool district; Dembo, *Gillet*, 2108; between Kisantu and the Kwango, *Büttner in Herb. Gillet*, 3725; near Kitabi, *Lecomte*, A,111! Angola: Pungo Andongo; in Mata de Cabondo, *Welwitsch*, 346!

South Central. Belgian Congo: Welle district; between Amadis and Poko, *Seret*, 843; Kasai district; Lubue, *Laurent*.

Imperfectly known species.

43. **C. Verdickii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 277. A large tree; branchlets glabrous. Leaves elliptic, pointed at both ends, obtuse, 3–3½ in. long, 1½–2 in. broad, thinly chartaceous, glabrous and dull on both surfaces; lateral nerves about 5 on each side, ascending, prominent below; secondary nerves subparallel, distinct below; petiole biglandular at the apex, ¾–1¼ in. long, with a puberulous groove on the upper side, otherwise glabrous; stipules obliquely lanceolate, 1½ lin. long, glabrous, membranous. Male and female flowers not known, but flowers probably monœcious. Fruiting racemes terminal; pedicel stout, 1¼ lin. long, tomentose. Sepals lanceolate, thinly pubescent or nearly glabrous. Fruits ellipsoid or ovoid, 3–4 lin. long, about 2½ lin. in diam., densely yellowish-tomentellous.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 298!

Described from imperfect fruiting material.

39. **JATROPHA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 290.

Flowers monœcious, rarely diœcious. Petals usually present. Male flowers: Sepals 5, imbricate, often slightly connate. Petals 5, mostly imbricate, connate into a 5-lobed tube or free, rarely absent. Disk entire or more often divided into 5 glands. Stamens 8 (in the African species), in two series; filaments partially connate, the 5 outer opposite

the petals; anthers ovate or oblong, erect, cells parallel and contiguous, dehiscing longitudinally. Rudimentary ovary absent. Female flowers: Sepals and petals as in the male. Disk annular, often 5-lobed or broken up into glands. Ovary 2–3- (rarely 4–5-) celled; styles connate at the base, spreading above, often shortly divided into 2 branches; ovules solitary in each cell. Capsule ovoid or subglobose, dehiscing into 2-valved cocci; endocarp crustaceous or hardened. Seeds ovoid or oblong; caruncle often much divided; testa crustaceous; albumen fleshy; cotyledons flat, broad.—Herbs or shrubs, rarely arborescent or herbs arising from a thick perennial rhizome. Leaves alternate, crowded or lax, sessile or petiolate, entire or more often variously digitately lobed, rarely pinnately divided; indumentum simple, sometimes glandular; stipules usually much divided into setaceous segments, rarely rigid and spiny. Flowers arranged in terminal dichotomous cymes, the female solitary and terminating each axis, the males lateral.

Species about 160, distributed throughout the Tropics and extending into South Africa and North America.

Leaves fasciculate and crowded on short arrested cushion-shaped branchlets, the latter often in the axils of spiny stipules.	
Stipules much shorter than the leaves.	
Leaves undivided, spathulate or spathulate-oblanceolate, glabrous.	
Stipules large and spiny	1. *J. Rivæ.*
Stipules minute, not spiny	2. *J. Robecchii.*
Leaves trilobed to or below the middle, glabrous.	
Leaves divided nearly to, and cuneate at the base	3. *J. aspleniifolia.*
Leaves divided to about the middle, truncate or subcordate at the base	4. *J. spinosa,* var. *somalensis.*
Leaves undivided or undulately trilobed, ovate-orbicular, tomentose below	5. *J. ferox.*
Stipules nearly twice as long as the leaves	6. *J. crinita.*
Leaves not fasciculate or crowded, arranged more or less regularly on elongated branchlets; stipules rarely spiny.	
Leaves all undivided, penninerved.	
Leaves linear or linear-lanceolate, $3\frac{1}{2}$–6 in. long	7. *J. neriifolia.*
Leaves ovate or lanceolate, $\frac{1}{2}$–3 in. long.	
Leaves pubescent on both surfaces; branches decumbent	8. *J. Seineri.*
Leaves glabrous; branches erect or suberect.	
Stipules minute; leaves subsessile, lanceolate	9. *J. Baumii.*
Stipules conspicuous, divided into filiform segments; leaves petiolate, ovate or ovate-lanceolate	10. *J. prunifolia.*
Leaves (most of them) variously divided or if subentire then digitately nerved.	
Leaves pinnately divided	11. *J. erythropoda.*
Leaves digitately divided.	

Petioles furnished with numerous stipitate glands resembling the stipules . . . 12. *J. gossypifolia.*
Petioles not glandular.
Leaf-segments pinnatisect or pinnately lobed.
Leaves glaucous below; segments 11–12, pinnatisect but not toothed . . . 13. *J. multifida.*
Leaves not glaucous below; segments 5–7, lobed and glandular-serrulate . . 14. *J. kilimandscharica.*
Leaf-segments or lobes toothed or rarely entire, never lobed.
*Leaves glabrous or nearly so.
Leaves sessile or very shortly petiolate; if the latter then petiole not more than $\frac{3}{4}$ in. long.
Leaf-segments entire or subentire . 15. *J. campestris.*
Leaf-segments with numerous teeth.
Leaves sessile; anthers pubescent . 16. *J. tuberosa.*
Leaves shortly petiolate; anthers (where known) glabrous.
Leaves sharply and rather closely serrulate; stipules about $1\frac{1}{2}$ lin. long . . . . 17. *J. melanosperma.*
Leaves somewhat remotely glandular-denticulate; stipules 3 lin. long . . . 18. *J. somalensis.*
Leaves long-petiolate; petiole 1 in. long or more (rarely $\frac{3}{4}$ in.).
†Leaves coarsely dentate or the lobes 2–3-glandular-mucronate.
Leaves lobed to near the base; segments spathulate-oblanceolate, usually with a broad sinus between.
Leaves not crowded; stipules short, 1–$1\frac{1}{2}$ lin. long . . 19. *J. palmatifida.*
Leaves somewhat crowded; stipules $\frac{1}{2}$–$\frac{3}{4}$ in. long . . 20. *J. Brockmanii.*
Leaves lobed to about the middle; lobes ovate, oblong or obovate-oblong, with a narrow sinus between.
Leaf-lobes with numerous teeth, more or less doubly dentate 21. *J. lobata.*
Leaf-lobes about 6-toothed, more or less gradually rounded to an acute apex.
Bracts and sepals gland-toothed . . . . 22. *J. Chevalieri.*
Bracts and sepals entire . 23. *J. aceroides.*
Leaf-lobes glandular-mucronate and often with 2 lateral mucros, truncate and more or less emarginate . . 24. *J. tropæolifolia.*
††Leaves closely serrulate with often more or less glandular teeth.

Male flowers spicate; sepals entire; leaves lobed to near the base . 25. *J. spicata.*
Male flowers not spicate; sepals entire; leaves lobed to between the middle and the base . . 26. *J. pseudoglandulifera.*
Male flowers not spicate; sepals toothed; leaves lobed to the middle . . . . . 27. *J. confusa.*

†††Leaf-lobes entire or with slightly undulate margins.
Leaves slightly 5-lobed or undivided; petals more or less connate . . . . . 28. *J. Curcas.*
Leaves lobed to or below the middle; petals free or nearly so.
Leaves large, about 10 in. long and broad . . . . 29. *J. macrophylla.*
Leaves small, 1–1$\frac{3}{4}$ in. long, 1$\frac{1}{2}$–3 in. broad . . . 30. *J. Hildebrandtii.*

**Leaves tomentose or pubescent.
Stipules reduced to a mass of sessile glands . . . . . 31. *J. glandulosa.*
Stipules filiform or spiny, often gland-tipped.
Leaves more or less cuneate or slightly rounded at the base, usually 3-lobed (rarely entire), closely serrate or laciniate-toothed (repand-dentate in 36, *Phillipseæ*).
Ovary tomentose or pubescent; leaves lobed to about the middle.
Leaves with subulate gland-tipped teeth; bracts pectinately toothed . . . 32. *J. gallabatensis.*
Leaves shortly toothed; bracts entire . . . . 33. *J. Schweinfurthii.*
Ovary glabrous; leaves lobed nearly to the base or below the middle.
Leaves trilobed to near the base; lobes acute, serrulate; bracts not glandular . . . 34. *J. æthiopica.*
Leaves trilobed to below the middle; lobes acute, glandular-serrulate; bracts glandular . . . . 35. *J. kamerunica.*
Leaves trilobed to a little below the middle; lobes rounded at the apex, repand-dentate; bracts glandular . . 36. *J. Phillipseæ.*
Leaves cordate at the base, usually 5-lobed (see 6, *crinita*), dentate.
Stipules slender and not spiny.
Leaves lobed to much below the middle.

Male sepals pubescent . . 37. *J. Stuhlmannii.*
Male sepals glabrous.
Ovary slightly tubercular . 38. *J. batawe.*
Ovary smooth . . . 39. *J. mollis.*
Leaves lobed to $\frac{1}{3}$ or $\frac{1}{2}$ their length.
Female flowers petaliferous; flowering branchlets slender . . . . 40. *J. velutina.*
Female flowers without petals; flowering branchlets thick and fleshy . . . 41. *J. acerifolia.*
Stipules spiny, stout, 2–3-furcate.
Leaf-lobes rounded at the apex; stipules pubescent.
Leaves 5-lobed, longer than the stipules . . . 42. *J. Ellenbeckii.*
Leaves 3-lobed or entire, shorter than the stipules 6. *J. crinita.*
Leaf-lobes acutely acuminate; stipules soon becoming glabrous . . . . . 43. *J. fissispina.*

1. **J. Rivæ,** *Pax in Ann. Istit. Bot. Roma,* vi. 185. A shrub; branches somewhat fleshy, covered with smooth purple-brown bark, slightly puberulous when young. Leaves clustered on much abbreviated branches in the axils of 2–3 rigid spiny stipules, sessile, spathulate-oblanceolate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, 5–6 lin. broad, entire, membranous, with about 5 faint lateral nerves on each side of the midrib, glabrous. Cymes small, shortly pedunculate, about $\frac{1}{2}$ in. long; peduncle $\frac{1}{2}$ in. long, puberulous; bracts linear-lanceolate, entire, the lower 3 lin. long, pubescent, the upper smaller. Male flowers: Sepals lanceolate, entire, pubescent. Petals about the same length as the sepals. Disk-glands small. Stamens 8; filaments almost free. Female flowers: Sepals obovate, subacute, minutely glandular-denticulate, 2 lin. long. Petals oblong, obtuse, shorter than the sepals. Disk deeply lobed. Ovary glabrous. Capsule 5 lin. long. Seeds smooth, $2\frac{1}{2}$ lin. long, with a deeply sulcate caruncle.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 57, fig. 21.

Nile Land. Somaliland: Boran Country; near Dolo, on the Daua River, *Riva,* 1102! 1218; Web Karanle, *Riva,* 973!

2. **J. Robecchii,** *Pax in Ann. Istit. Bot. Roma,* vi. 184. A shrub (or tree?), glabrous in all its parts; branches covered with greyish bark. Leaves sessile in clusters, arising from cushion-shaped arrested branchlets, spathulate, slightly emarginate, 5–7 lin. long, 3–4 lin. broad, subcoriaceous, entire, with indistinct nerves; stipules minute. Cymes very small and few-flowered, seen only in a young state. Flowers glabrous. Stamens 8. Female flowers and fruits not known.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 83.

Nile Land. Somaliland, without precise locality, *Robecchi!*

3. **J. aspleniifolia,** *Pax in Engl. Jahrb.* xix. 108. A shrub about 6 ft. high; branches woody, covered with dark brown longitudinally wrinkled glabrous bark. Leaves fern-like, produced on much abbreviated cushion-shaped branchlets, deeply trilobed, cuneate at the base, about $\frac{1}{2}$ in. long; lobes subspathulate, lacerate-undulate, glabrous, fleshy; stipules not evident. Cymes few-flowered, congested, shortly pedunculate, about $\frac{3}{4}$ in. long, glabrous; bracts small, toothed. Male flowers: Sepals glandular-denticulate, glabrous (seen only in a young state). Female sepals oblong, as in the male. Petals $1\frac{1}{3}$ lin. long, about twice the length of the calyx, obovate or oblanceolate. Disk-glands small. Ovary glabrous, contracted into a short style; stigmas thick, bifid. Capsule 5 lin. long, light straw-coloured, slightly wrinkled. Seeds 4 lin. long, grey, with a large palmately sulcate caruncle.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 83.

Nile Land. Somaliland: foothills of the Ahl Mountains, *Hildebrandt*, 871!

4. **J. spinosa,** Vahl, var. **somalensis,** *Pax in Engl. Pflanzenr. Euphorb.-Jatroph.* 56. A small shrub about $1\frac{1}{2}$ ft. high; branches minutely asperulate. Leaves crowded on short branchlets, trilobed to about the middle, truncate or rounded and subcordate at the base, $\frac{1}{2}$–$\frac{3}{4}$ in. long, submembranous, glabrous on both surfaces; lobes oblong or obovate-oblong, truncate or rounded at the apex, remotely denticulate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, glabrous; stipules spiny, branched from the base, rigid, 1–2 lin. long, glaucous. Cymes overtopping the leaves, pedunculate, few-flowered; peduncle slender, $1\frac{1}{2}$ in. long; bracts triangular-ovate, acute, entire, glabrous, the largest about $\frac{1}{2}$ lin. long. Male flowers: Sepals oblong, rounded at the apex, $\frac{2}{3}$ lin. long, entire, glabrous. Petals about twice the length of the sepals, glabrous. Stamens 8; filaments partially connate. Young female flowers not seen. Capsule 4 lin. long, slightly warted, not hairy. Seeds oblong-ellipsoid, 3 lin. long, with a multifid reddish caruncle.

Nile Land. Somaliland: Somadu, *Ellenbeck*, 283! Elmis, *Hirsch.*

Differs from the typical form, which is found in Arabia, in having smaller trilobed remotely denticulate leaves; it may be a distinct species.

5. **J. ferox,** *Pax in Ann. Istit. Bot. Roma*, vi. 185. An arborescent shrub 9–12 ft. high; branches pubescent, soon becoming glabrous, covered with a smooth dark purplish bark. Leaves clustered on very short cushion-shaped branchlets produced in the axils of 2–3 large stipular spines, ovate-orbicular, about $1\frac{1}{2}$ in. in diam., undulately trilobed or not lobed, minutely denticulate, shortly pubescent above, more or less tomentose below; lateral nerves about 5 on each side; petiole 3–4 lin. long, tomentose; stipular spines $\frac{3}{4}$ in. long, very acute, rigid. Cymes shortly pedunculate, many-flowered, tomentose; bracts lanceolate, tomentose, gland-toothed. Male flowers: Sepals linear-lanceolate, acuminate, villous, slightly glandular-denticulate, 3 lin. long. Petals clawed, $\frac{1}{2}$ in. long, 2 lin. broad, pubescent outside. Disk-glands conical-cylindric. Stamens 10; filaments partially connate; anthers $\frac{3}{4}$ lin. long. Female flowers: Sepals with numerous glands on

the margin. Petals 7 lin. long, linear-lanceolate, tomentose outside. Disk 10-lobed, the lobes opposite the sepals larger than the others. Ovary tomentose, truncate; styles slender, connate to about the middle, 3 lin. long, tomentellous; stigmas bilobed. Capsule tomentose, nearly 1 in. long. Seeds large, 8 lin. long, 6 lin. broad; caruncle very large, flat, much cut up into filiform segments.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 56.

Nile Land. Somaliland: Merehan, *Robecchi*, 59, 269! *Riva*, 446, 506. Boran Country; Malkare, *Ellenbeck*, 2147! Malka Dida, *Ellenbeck*, 2119!

6. **J. crinita,** *Müll. Arg. in Linnæa*, xxxiv. 207. Stems about 6 in. high, branched, thick, fleshy, villous, densely leafy, clothed with the persistent long hardened stipules after the fallen leaves. Leaves slightly longer than the petiole, ovate in outline, 3-lobed or entire, obtuse, cordate at the base, scarcely $\frac{3}{4}$ in. long, sharply serrate-dentate, villous-pubescent on both surfaces; stipules $1\frac{1}{4}$ in. long, 2–3-partite, pubescent when young, at length glabrous, black. Cymes few-flowered; bracts linear-lanceolate, incised-dentate. Male flowers: Sepals lanceolate-ovate, $1\frac{1}{4}$ lin. long, glandular-ciliate. Petals lanceolate-obovate, obtuse. Disk-glands free. Female flowers: Sepals linear-lanceolate, 4 lin. long, glandular-ciliate. Disk-glands connate. Ovary pubescent; styles expanded into thick twice bifid subcrenulate stigmas.—Müll. Arg. in DC. Prodr. xv. ii. 1079; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 58.

Mozamb. Distr. Zanzibar, *Boivin.*

An example of the above has not been seen, but from the description it appears to differ from the other African species by the size of the stipules, which are said to be considerably longer than the leaves.

7. **J. neriifolia,** *Müll. Arg. in Flora*, 1864, 486. Stems about 1 ft. high, sulcate, pubescent in the upper part, glabrous or nearly so below. Leaves sessile, linear or linear-lanceolate, acute at the apex, $3\frac{1}{2}$–6 in. long, 3–8 lin. broad, not lobed, denticulate, rigidly chartaceous, pilose on both surfaces especially on the nerves below; lateral nerves very numerous, ascending, prominent below; stipules about 3 times laciniate, segments setose, glandular at the apex, slightly pubescent in the lower part. Cyme very shortly pedunculate, few-flowered; bracts narrowly lanceolate, glandular-toothed, glabrous. Male flowers not known. Female flowers pedicellate: pedicel 1 lin. long, pubescent. Sepals lanceolate, subacute, $1\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, gland-toothed, glabrous. Petals larger than the sepals. Disk 5-lobed; lobes transversely oblong, entire, glabrous. Ovary subglobose, glabrous; styles rather short, swollen and bifid at the apex.—Müll. Arg. in DC. Prodr. xv. ii. 1089; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 65.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 1679!

The type specimen is very imperfect, no male flowers being present.

8. **J. Seineri,** *Pax in Engl. Jahrb.* xliii. 84. A dwarf perennial herb; underground stem brown, glabrous, bearing a few deltoid scales,

dividing at the surface into 2–6 decumbent simple leafy branches 2–4 in. long; branches fleshy, softly pubescent with short spreading hairs. Leaves lanceolate, acute, obtuse or rounded at the base, undivided, 1–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, not toothed, membranous, thinly pubescent with short spreading hairs on both sides; lateral nerves 10–18 on each side, slender, spreading, looped within the margin; petiole 2–5 lin. long, thinly pubescent, not glandular; stipules soon falling off, subulate-filiform, entire, scarcely 1 lin. long, glabrous, not glandular at the apex. Cymes terminating the central axis of the plant, lax, shortly pedunculate; bracts ovate-lanceolate, acute, entire, $\frac{2}{3}$–$1\frac{3}{4}$ lin. long, slightly puberulous, not glandular. Male flowers rather crowded, shortly pedicellate: Sepals 1–$1\frac{1}{2}$ lin. long, oblong, subacute, slightly pubescent. Petals $2\frac{3}{4}$ lin. long, $\frac{2}{3}$ lin. broad, spathulate-oblanceolate, glabrous. Stamens 8; outer filaments free, inner connate; anthers nearly 1 lin. long. Female sepals oblong-lanceolate, acute, $1\frac{1}{4}$ lin. long, pubescent. Petals spathulate-oblanceolate, about twice as long as the sepals. Disk 5-lobed. Ovary pubescent; styles bilobed. Capsule depressed-globose, about 5 lin. in diam., pubescent. —*J. humilis*, N. E. Br. in Kew Bulletin, 1909, 139.

Lower Guinea. German South-west Africa: Caprivi Peak, *Seiner*, 109! Omandongo, *Schinz*, 12! Omaheke, *Dinter*, 837!

Mozamb. Distr. Ngamiland: Kwebe, *Lugard*, 56! 159!

9. **J. Baumii,** *Pax in Baum, Kunene-Samb. Exped.* 283. Root tuberous, about 2 in. in diam.; stem simple, about 4 in. high, sulcate, glabrous. Leaves subsessile, lanceolate, subacute, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 2 lin. broad, with strongly undulate margins, glabrous on both surfaces; lateral nerves 9–12, distinct; stipules minute, setose. Cymes terminal, small, several-flowered, glabrous; bracts subulate-lanceolate, acute, the largest about 2 lin. long, serrulate. Male flowers: Sepals oblong-oblanceolate, obtuse, entire, not glandular, about $\frac{3}{4}$ lin. long. Petals spathulate, oblong, obtuse, a little longer than the calyx. Disk-glands small. Stamens 8; filaments partially connate. Female flowers and fruit not known.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 64.

Lower Guinea. Angola: between Lionspan and the Kunene River, *Baum*, 122A!

10. **J. prunifolia,** *Pax in Engl. Pfl. Ost-Afr. C.* 240. An undershrub about 1 ft. high; stem glabrous except when quite young, covered by grey or yellowish-grey bark. Leaves undivided, ovate or ovate-lanceolate, subacute, rounded or subcordate at the base, 1–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, membranous, serrulate, glabrous on both surfaces; lateral nerves about 6 on each side, more distinct on the lower surface; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. long, thinly pilose; stipules deeply divided into 3–5 filiform segments, the latter not glandular at the apex. Cymes axillary and terminal, pedunculate, about $\frac{3}{4}$ in. long; peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in. long, slightly puberulous; bracts lanceolate, subacute, 1–$1\frac{1}{2}$ lin. long, glabrous, not glandular. Male flowers: Sepals ovate-lanceolate, entire, glabrous. Petals similar to the sepals. Disk-glands small. Stamens 8. Female

flowers: Sepals as in the male. Petals absent. Disk deeply 5-lobed. Ovary oblong, glabrous. Ripe fruit not seen.—Pax in Engl. Jahrb. xxiii. 530, and in Engl. Pflanzenr. Euphorb.-Jatroph. 54.

Nile Land. British East Africa: Kilimanjaro Expedition, 40-60 miles from the coast, *Johnston!*

Mozamb. Distr. German East Africa: Usambara; Muoa, *Holst*, 2994!

11. **J. erythropoda,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Jatroph.* 66. Tuber 4 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. in diam.; stems 2-3 from each tuber, up to 8 in. high, pubescent, about 1 lin. in diam. Leaves subsessile, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, irregularly pinnatisect; lobes linear, pinnately lobed, dentate or undulate; stipules setaceous, bilobed or simple, small. Cymes shortly pedunculate, small, shorter than the leaves, shortly pubescent; bracts subulate-lanceolate, denticulate. Male flowers: Sepals triangular-ovate, acute, denticulate, $1\frac{1}{4}$ lin. long, glabrous. Petals nearly twice as long as the sepals, obovate, glabrous. Stamens 8; filaments partially connate. Female flowers larger than the male: Sepals oblong-lanceolate, subacute, about $1\frac{1}{2}$ lin. long, toothed, glabrous. Petals linear-lanceolate, subacute, about twice the length of the sepals, entire, glabrous. Ovary glabrous; stigmas linear, about 1 lin. long. Capsule depressed-globose, about 5 lin. in diam., slightly warted.

Lower Guinea. German South-west Africa: Omaheke, Neitsas, *Dinter*, 671!

12. **J. gossypifolia,** *Linn. Sp. Pl. ed.* i. 1006. A shrub up to 6 ft. high; branches stout, glabrous. Leaves more or less orbicular in outline, cordate at the base, 3–5-lobed beyond the middle, $1\frac{1}{2}$–5 in. in diam., gland-toothed and shortly pubescent on the margin, membranous, glabrous on both surfaces; lobes obovate or obovate-lanceolate, usually acute, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad; lateral nerves to each lobe about 9–12, slender, looped near the margin, distinct on both surfaces; veins rather lax, distinct below; petiole up to $4\frac{1}{2}$ in. long, furnished with numerous forked gland-tipped appendages resembling the stipules, slightly pubescent; stipules multisect, about 2 lin. long; segments linear, gland-tipped, glabrous. Cymes pedunculate, lax; peduncle up to 4 in. long; bracts linear-lanceolate, acute, up to $\frac{1}{2}$ in. long, stipitate, gland-toothed, glabrous. Male flowers rather crowded: Sepals lanceolate, acuminate, $1\frac{1}{2}$ lin. long, with numerous glandular teeth, very slightly pubescent. Petals obovate, rounded at the apex, 2 lin. long, $1\frac{1}{4}$ lin. broad, entire, multistriate, glabrous. Disk-glands slightly wrinkled, rounded. Stamens 8; filaments connate for $\frac{3}{4}$ their length. Female flowers: Sepals lanceolate, acutely acuminate, 4 lin. long, $1\frac{1}{2}$ lin. broad, gland-toothed, glabrous. Petals absent. Disk lobed. Ovary thinly pubescent; styles erect, swollen and bifid at the apex, slightly connate at the base. Capsule $\frac{1}{2}$ in. long, glabrous or nearly so. Seeds oblong-ellipsoid, 4 lin. long, greyish-yellow, slightly mottled; caruncle about 10-segmentate.—Jacq. Ic. iii. t. 623; Lodd. Bot. Cab. t. 117; Müll. Arg. in DC. Prodr. xv. ii. 1086, incl. var. *elegans*, and in Fl. Bras. xi. ii. 491; Hook. f. Fl. Brit. Ind. v. 383; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 26.

J. elegans, Klotzsch in Seem. Bot. Voy. Herald, 102. *Adenoropium elegans*, Pohl, Pl. Brasil. Ic. et Descr. i. 15. *A. gossypifolium*, Pohl, l.c. 16.

Upper Guinea. Without locality, *Don!* Senegal, *Lelievre!* French Guinea: Santana, *Chevalier*, 515! Comakry, *Chevalier*, 12126! Sierra Leone: near Kambia, Scarcies, *Scott-Elliot*, 4624! and without precise locality, *Afzelius*. Gold Coast: *Krause*, 10, 40, 99. Cape Coast Castle, *Vogel!* Togo: near Lome, *Warnecke*, 286! and without precise locality, *Döring*, 37, *Kersting*, 32, *Kling*, 46; Dahomey, *Testu*, 288! *Poisson!* Southern Nigeria: Lagos, *Phillips*, 17! *Dawodu*, 256! Oloke Meji, *Foster*, 273! in fences of all Yoruba towns, *Barter*, 3353!

Var. *staphysagriæfolia*, Müll. Arg. in DC. Prodr. xv. ii. 1087. Leaves tomentellous above, tomentose below; petiole softly pubescent.—Müll. Arg. in Fl. Bras. xi. ii. 491; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 27. *J. staphysagrifolia*, Mill. Dict. ed. 8, n. 9; Bot. Reg. t. 746. *J. Jacquini*, Baill. Adansonia, iv. 268. *Adenoropium Jacquini*, Pohl, Pl. Brasil. Ic. et Descr. i. 15.

Upper Guinea. Senegambia, *Lelievre! Perrottet*, 733. *Leprieur!*

Widely distributed in the Tropics.

13. **J. multifida,** *Linn. Sp. Pl. ed.* i. 1006. A shrub or tree up to 20 ft. high; branchlets stout, glabrous. Leaves digitately 11–12-partite; segments lanceolate, narrowed into a long tail at the apex, narrowed to the base, 4–6 in. long, 1–2 in. broad, deeply pinnatilobed, with very acute lobes, or rarely subentire, glabrous on both surfaces, more or less glaucous below; petiole 5–6 in. long, glabrous, not glandular; stipules laciniate, about $\frac{1}{2}$ in. long, segments filiform, not glandular at the apex. Cymes corymbose, pedunculate, 1–2 in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad; peduncle 5–$6\frac{1}{2}$ in. long, rather stout, glabrous; bracts subulate, acute, $\frac{3}{4}$–1 lin. long, glabrous, entire, not glandular. Male flowers pedicellate, red: pedicel up to 3 lin. long, glabrous. Sepals connate at the base, ovate-triangular, acute, entire, glabrous, $\frac{3}{4}$–1 lin. long. Petals free to the base, obovate, emarginate, 3 lin. long, $1\frac{1}{2}$ lin. broad, striate, entire, glabrous. Disk-glands large, erect, subcontiguous, glabrous. Stamens 8; filaments quite free to the base, $1\frac{1}{3}$ lin. long, glabrous; anthers very large, sagittate at the base, $1\frac{1}{3}$ lin. long. Female flowers solitary on the primary and secondary axes of the cyme. Sepals and petals as in the male. Disk large, deeply 5-lobed, lobes fleshy, ovate or rounded, entire, glabrous. Ovary ovoid, glabrous; styles connate in the lower half, bifid and swollen at the apex. Capsule depressed, trilobed, about $1\frac{1}{4}$ in. in diam., lobes very slightly keeled. Seeds mottled, broadly ellipsoid, a little over $\frac{3}{4}$ in. long.—H. B. & K. Nov. Gen. et Sp. ii. 105; Miquel, Fl. Ind. Bat. i. 2, 392; Müll. Arg. in DC. Prodr. xv. ii. 1089, and in Fl. Bras. xi. 2, 495, t. 69, fig. 1; Baker, Fl. Maurit. 322; Hook. f. Fl. Brit. Ind. v. 383; Sesse & Moç. Fl. Mex. ii. 224; Pax in Engl. Pfl. Ost-Afr. C. 240; Hiern in Cat. Afr. Pl. Welw. i. 969; Urban, Symb. Antill. iv. 350; Durand & Schinz, Études Fl. Congo, 243; Durand & De Wild. Mat. Fl. Congo, ii. 62, and in Bull. Herb. Boiss. 2me sér. i. 47; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 40, fig. 13; *J. Janipha*, Blanco, Fl. Filip. ed. i. 758; ed. 3, iii. 159, with fig. *Adenoropium multifidum*, Pohl, Pl. Brasil. Ic. et Descr. i. 16.

Upper Guinea. Senegal, *Roger!* Niayes, *Chevalier*, 2631! Sierra Leone: about Freetown, *Welwitsch*, 298; near Kambia, Scarcies River, *Scott-Elliot*, 4708! in gardens, *Barter!* French Guinea: Galombombo, *Paroisse!* Togo: near Lome, *Warnecke*, 373! and without precise locality, *Döring*, 93; *Kersting*, 267; *Graf Zech.* Southern Nigeria: Lagos, *Phillips*, 43! Annye, *Unwin*, 136! and without precise locality, *Flegel.* North Cameroons, *Talbot!*

A native of America, occurring from South-west Texas, Mexico and the West Indies southwards to Brazil; cultivated in Africa and elsewhere.

14. **J. kilimandscharica,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Jatroph.* 40. An undershrub 1–1½ ft. high, glabrous. Leaves 5–7-lobed to near the subtruncate base, 3–4 in. in diam., membranous, glabrous on both surfaces; lobes lanceolate, acute, more or less irregularly lobulate, glandular-serrulate; petiole 1¼–2 in. long, slender, glabrous; stipules divided into filiform gland-tipped segments, 3 lin. long. Cymes pedunculate, few-flowered, glabrous; bracts gland-toothed, up to 1¼ lin. long. Male flowers: Sepals lanceolate, acute, entire, glabrous. Petals spathulate, glabrous. Stamens 8; filaments connate. Female flowers: Sepals and petals as in the male. Ovary glabrous; styles short.

Nile Land. British East Africa: Ndi, *Scott-Elliot*, 6173! plains between Tsavo and Kibwezi, *Scott-Elliot*, 2324! Kilimanjaro Region; between Taveta and the Buru Mountains, *Engler*, 1914!

15. **J. campestris,** *S. Moore in Journ. Linn. Soc.* xl. 196. A herb with rather fleshy glabrous stems and branches. Leaves sessile or subsessile, digitately 5–7-lobed to near the base, 2–4 in. long, 1½–2½ in. broad, glabrous on both surfaces, somewhat glaucous below; segments linear-lanceolate, entire or rarely with one or two teeth, up to 8 lin. broad; stipules small and filiform, soon falling off. Cymes pedunculate, many-flowered, about 1½ in. long, glabrous; bracts subulate-lanceolate, up to 3½ lin. long, entire. Male flowers: Sepals ovate, rounded at the apex, entire, about 1 lin. long and ⅔ lin. broad. Petals free almost to the base, entire, about twice the length of the sepals. Stamens 8; filaments free nearly to the base. Female flowers: Sepals similar to and the petals narrower than those of the male. Ovary glabrous; styles erect. Capsule about 7 lin. long, wrinkled. Seeds oblong, blackish and shining, 5 lin. long, 3 lin. broad, with a large 5–6-partite dark-coloured caruncle.

Mozamb. Distr. Portuguese East Africa: Gazaland; Umswirizwi Flats, *Swynnerton*, 311!

16. **J. tuberosa,** *Pax in Engl. Jahrb.* xix. 111. Stems 1–2 ft. high, arising from a rhizome, terete, glabrous; rhizome turnip-shaped, about 3 in. long, 1¼ in. in diam. Leaves sessile, the upper deeply trilobed, 6 in. long, 5½ in. broad, or entire, the lower entire, lanceolate, acute, slightly narrowed or rounded at the base, 3–5½ in. long, ½–1¾ in. broad, sharply serrulate, rigidly membranous, glabrous on both surfaces; stipules laciniate, about ¾ lin. long, segments setose, not glandular at the apex, glabrous. Cymes shortly pedunculate, small, few-flowered;

bracts narrowly lanceolate, acute, $2\frac{1}{2}$ lin. long, glandular-toothed, glabrous. Male flowers pedicellate: Sepals ovate or ovate-oblong, obtuse, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, minutely serrulate, glabrous. Petals spathulate-obovate, rounded at the apex, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, entire, glabrous. Disk-glands obovate-cuneate, slightly truncate, glabrous. Stamens 8; the 5 outer filaments nearly free to the base, the 3 inner more or less connate; anthers scarcely $\frac{1}{2}$ lin. long, pubescent. Female flowers pedicellate: Sepals lanceolate, acute, $1\frac{1}{2}$ lin. long, toothed but scarcely glandular, glabrous. Petals oblong-lanceolate, obtuse, $2\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, slightly thickened at the base, entire, glabrous. Disk 5-lobed; lobes transversely oblong, bifid or toothed, glabrous. Ovary smooth; styles suberect, bifid and swollen at the apex. Ripe capsule not seen.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 68, fig. 27.

Nile Land. Jur: Mangob, *Schweinfurth*, 1583, 1850!

17. **J. melanosperma,** *Pax in Engl. Jahrb.* xix. 110. Stem herbaceous, about 18 in. high, glabrous. Leaves deeply trilobed or subentire, $2\frac{1}{2}$–6 in. long, $1\frac{1}{4}$–$5\frac{1}{2}$ in. broad, thinly and rigidly chartaceous, glabrous on both surfaces; lobes ascending, lanceolate or oblong-lanceolate, acute, sharply serrulate; lateral nerves of each lobe 4–9 on each side, looped near the margin, prominent below; petiole stout, nearly $\frac{1}{2}$ in. long, glabrous, not glandular; stipules about 3 times laciniate, about $1\frac{1}{2}$ lin. long, segments setose, glabrous, not glandular at the apex. Cymes small, very shortly pedunculate; flowers crowded; bracts subulate-lanceolate, acute, about 1 lin. long, toothed, but not glandular, glabrous. Male flowers shortly pedicellate: Sepals oblong, obtuse, $1\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, not glandular, entire or minutely serrulate, glabrous. Petals obovate, obtuse and very minutely emarginate at the apex, entire, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, glabrous. Disk-glands small, glabrous. Stamens 8; filaments partially connate, glabrous; anthers $\frac{1}{2}$ lin. long. Female flowers pedicellate: Sepals oblong, subacute, $1\frac{1}{3}$ lin. long, toothed but not glandular, glabrous. Petals free, lanceolate, subacute, $2\frac{3}{4}$ lin. long, $\frac{5}{6}$ lin. broad, entire, glabrous on both sides. Disk 5-lobed; lobes rounded or transversely oblong, entire, glabrous. Ovary slightly wrinkled, glabrous; styles free to the base, suberect, swollen and bifid at the apex, glabrous. Capsule trilobed, about 5 lin. in diam.; lobes rounded. Seeds oblong-ellipsoid, $3\frac{1}{2}$ lin. long, 2 lin. broad, blackish and slightly shining when dry; caruncle subentire or slightly lacerate, about 1 lin. broad.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 68.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 1952! Niamniam, *Schweinfurth*, 3898!

18. **J. somalensis,** *Pax in Engl. Pflanzenr. Euphorb.-Jatroph.* 68. A small glabrous shrub about $2\frac{1}{2}$ ft. high. Leaves deeply 3–5-lobed, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 2–5 in. broad, membranous, dull on both surfaces; segments ascending, oblong-lanceolate or oblanceolate, subacute, glandular-denticulate; lateral nerves of each segment 5–7 on each side,

looped near the margin, distinct on both surfaces; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, not glandular; stipules filiform, about 3 lin. long, gland-tipped. Flowers not seen. Capsule 5 lin. long, nearly smooth. Seeds $3\frac{1}{2}$ lin. long, with a large multisect yellow caruncle, shining.

Nile Land. South Somaliland: Djuba; Ferschit, *Ellenbeck*, **2342**!

19. **J. palmatifida,** *Baker in Kew Bulletin*, 1895, 227. A shrub?; branches woody, subterete, glabrous, with a slightly glaucous bark. Leaves deeply 4–5-lobed; lobes spathulate-oblanceolate, narrowed to the base, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, 2–7 lin. broad, sharply repand-dentate in the upper widened portion, entire in the lower narrowed part, rigidly membranous or subchartaceous, glabrous on both surfaces; lateral nerves about 5 on each side, not raised on either surface; petiole 1 in. long, glabrous, not glandular; stipules 3–5-partite, segments setaceous, gland-tipped, 1–$1\frac{1}{2}$ lin. long. Cymes long-pedunculate, about 2 in. long; peduncle 4–$4\frac{1}{2}$ in. long, glabrous; bracts lanceolate, 2–3 lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, subcoriaceous, glabrous, stipitate-glandular on the margin. Male flowers subsessile: Sepals lanceolate or ovate, slightly unequal in width, 1 lin. long, $\frac{1}{3}$–$\frac{2}{3}$ lin. broad, coriaceous, glabrous, shortly glandular-toothed. Petals connate for about $\frac{1}{3}$ lin. at the base, obovate-spathulate, thin, 2 lin. long, $\frac{3}{4}$ lin. broad. Disk-glands rounded, glabrous. Stamens 8; filaments connate to near the top, about 1 lin. long; anthers $\frac{1}{4}$ lin. long. Female flowers shortly pedicellate: Sepals subequal, ovate-lanceolate, $1\frac{3}{4}$ lin. long, $\frac{3}{4}$ lin. broad, coriaceous, glabrous, with numerous glandular teeth. Petals absent. Disk 5-lobed; lobes rounded, glabrous. Ovary obovoid, slightly 3-lobed, glabrous; styles slightly swollen and bifid at the apex.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 34.

Nile Land. Somaliland: Golis Range, *Mrs. Lort Phillips!*

20. **J. Brockmanii,** *Hutchinson in Kew Bulletin*, 1911, 360. Branches thick and fleshy, glabrous, covered with a light yellow bark. Leaves trilobed to near the base, subcuneate at the base, about $1\frac{1}{2}$ in. long and broad, rigidly membranous, glabrous on both surfaces; segments oblong-oblanceolate, coarsely dentate with sharp gland-tipped teeth; lateral nerves to each segment about 8 on each side, distinct on both surfaces; petiole a little more than $\frac{3}{4}$ in. long, glabrous; stipules crowded, divided into about 6 filiform glabrous gland-tipped segments $\frac{1}{2}$–$\frac{3}{4}$ in. long. Cymes pedunculate, few-flowered; peduncle $1\frac{1}{2}$ in. long, glabrous; bracts ovate-lanceolate, pectinately gland-toothed, 2 lin. long, the lower resembling the stipules but much smaller. Male flowers: Sepals oblong-obovate, acute, $1\frac{1}{4}$ lin. long, gland-toothed in the upper half, otherwise glabrous. Petals obovate, free to the base, entire, glabrous, a little longer than the sepals. Disk-glands rounded, smooth and fleshy. Stamens 8; filaments connate to near the apex. Female flowers pedicellate: Sepals as in the male but larger. Petals not seen. Disk saucer-shaped, undulately lobed. Ovary and fruit not seen.

Nile Land. Somali'and: Golis Range, *Drake-Brockman*, **131**!

21. **J. lobata,** *Müll. Arg. in DC. Prodr.* xv. ii. 1085 (*excl. var. senegalensis, Müll. Arg.*). An erect undershrub about 1 ft. high, branched from the base; stems longitudinally wrinkled when dry, glabrous. Leaves broadly obovate or suborbicular in outline, more or less cuneate at the base, 1½–3 in. long, 1½–4 in. broad, digitately 3–5-lobed to the middle or a little below it, rigidly subchartaceous, sharply repand-dentate with numerous teeth, more or less glaucous, glabrous on both surfaces or rarely slightly pubescent on the principle nerves below; lobes more or less obovate, mostly acute; lateral nerves to each lobe 5–6 on each side, distinct, looped and branched within the margin; veins very few or absent; petiole ¾–2½ in. long, glabrous or shortly pubescent, not glandular; stipules multisect, about ¼ in. long, segments filiform or setaceous, gland-tipped, glabrous. Cymes few-flowered, pedunculate, about 1 in. in diam., glabrous or shortly pubescent; peduncle ¾–1 in. long; bracts narrowly lanceolate, acute, gland-toothed, up to ¼ in. long, glabrous. Male flowers very shortly pedicellate: Sepals ovate-lanceolate, acute, 1 lin. long, ½ lin. broad, gland-toothed in the upper half, glabrous. Petals the same length as the sepals. Disk-glands small. Stamens 8; filaments nearly all free. Female flowers: Sepals and petals larger than in the male. Disk lobed. Ovary glabrous; styles very short, bilobed. Capsule scarcely ½ in. long, pale straw-coloured. Seeds oblong-ellipsoid, 4 lin. long, pale brown; caruncle much divided.—*J. glauca,* Vahl, Symb. i. 78, partly; A. Rich. Tent. Fl. Abyss. ii. 250; Schweinf. Beitr. Fl. Aethiop. 37. *J. ricinifolia,* Fenzl ex Baill. Adansonia, i. 63. *J. lobata,* vars. *genuina* and *richardiana,* Müll. Arg. in DC. Prodr. xv. ii. 1085–6. *J. lobata,* subsp. *glauca,* Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 32. *Adenoropium glaucum,* Pohl, Pl. Bras. Ic. et Descr. i. 15.

Nile Land. Kordofan, *Kotschy,* 251! *Pfund,* 200! 394, 395, 396, 397, 398, 486. Nubia, *Schweinfurth,* 128! 843, 844! Abyssinia: near Goelleb, *Schweinfurth,* 2311! Arussi and Boran countries, *Drake-Brockman,* 91! and without precise locality, *Roth!*

22. **J. Chevalieri,** *Beille in Bull. Soc. Bot. France,* lv. *Mém.* viii. 83. A shrub about 3 ft. high; branches longitudinally striate, glabrous. Leaves rounded or broadly ovate in outline, deeply cordate at the base, digitately 5-lobed to near the middle, 1–3 in. long and broad, very thinly and rigidly chartaceous, glabrous on both surfaces, slightly glaucous below; lobes ovate, sharply sinuately 5–8-dentate; lateral nerves to each leaflet 4–6 on each side, spreading, branched; veins usually distinct on both surfaces, somewhat lax; petiole ¾–1½ in. long, glabrous, not glandular; stipules divided into filiform glabrous gland-tipped segments, about 2 lin. long. Cymes pedunculate, about 1 in. long; peduncle 1¼ in. long, glabrous; bracts lanceolate, acutely acuminate, up to 3 lin. long, pectinate with gland-tipped teeth, glabrous. Male flowers: Sepals ovate, acutely acuminate, 2–2¼ lin. long, entire or with a few gland-tipped teeth, glabrous. Petals ovate-elliptic, obtuse, a little longer than the sepals, entire, glabrous. Disk-glands fleshy. Stamens 8; filaments partially connate. Female flowers: Sepals ovate, acutely

acuminate, 3–4 lin. long, $1\frac{3}{4}$ lin. broad, glandular-pectinate, glabrous. Petals oblong-obovate, rounded at the apex, $4\frac{1}{2}$ lin. long, about 2 lin. broad, striate, glabrous. Disk fleshy, undulately lobed. Ovary glabrous; styles partially connate, swollen and bilobed at the apex. Capsule $\frac{1}{2}$ in. long, tipped by the persistent base of the style. Seeds oblong-ellipsoid, 4 lin. long, $2\frac{1}{4}$ lin. broad, smooth, not mottled; caruncle large and 5–6-partite.—*J. lobata*, var. *senegalensis*, Müll. Arg. in DC. Prodr. xv. ii. 1086, partly (excl. Welw. spec.). *J. lobata*, subsp. *senegalensis*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph, 33, partly.

Upper Guinea. Senegambia: Cayor, *Leprieur!* Senegal, *Richard! Roger*, **143**! *Brunner*, 138! *Lelievre, Perrottet*, 158! **733**! Mayes, *Chevalier*, 2629!

Welwitsch's 299, quoted by Müller under his var. *senegalensis*, is quite distinct and is the type of *J. confusa*, Hutchinson.

23. **J. aceroides,** *Hutchinson.* A small shrub, branched from the base; branches spreading, longitudinally wrinkled when dry, glaucous; young branchlets much abbreviated, glabrous. Leaves suborbicular or reniform in outline, truncate or slightly cordate at the base, $\frac{3}{4}$–3 in. long, 1–4 in. broad, digitately 5-lobed for about one-third their length, rigidly subchartaceous, very sparingly, coarsely and acutely dentate, subentire, glaucous when young, glabrous on both surfaces; lobes broadly ovate, rounded to an acute apex; lateral nerves to each lobe 4–5 on each side, slightly prominent on both surfaces, freely branched within the margin; veins lax and inconspicuous; petiole 6–8 lin. long, glabrous, not glandular; stipules deeply 2–3 times divided into filiform glabrous segments about 4 lin. long. Cymes pedunculate, few-flowered; peduncle $\frac{3}{4}$–$1\frac{1}{2}$ in. long, glabrous; bracts subulate-lanceolate, acute, entire, up to $1\frac{1}{4}$ lin. long, glabrous. Male flowers: Sepals lanceolate, subacute, slightly keeled, entire, glabrous, $1\frac{1}{4}$ lin. long. Petals free to the base, elliptic, obtuse, entire, glabrous, $2\frac{1}{4}$ lin. long, 1 lin. broad. Disk-glands large and rounded, contiguous, fleshy, glabrous. Stamens 8; filaments partially connate; anthers $\frac{1}{2}$ lin. long. Female flowers shortly pedicellate: Sepals larger than in the male, but similar. Petals absent. Disk deeply 5-lobed; lobes rounded, smooth. Ovary smooth, glabrous; styles erect, as long as the ovary. Fruits not seen.—*J. lobata*, subsp. *aceroides*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 34.

Nile Land. Sudan: Red Sea Province; Khor Ashat, *Broun*, 1229! Nubia: Ataba, *Schweinfurth*, 129, 842!

24. **J. tropæolifolia,** *Pax in Engl. Pflanzenr. Euphorb.-Jatroph.* 56. Stem thick and fleshy, simple, about 15 in. high, about 1 in. in diam. Leaves 5-lobed to about the middle, up to 3 in. long and $3\frac{1}{2}$ in. broad, chartaceous, glabrous and somewhat glaucous; lobes rounded-obovate, truncate at the apex and with a gland-tipped mucro, entire or with 2–3 gland-tipped teeth; lateral nerves to each lobe looped well within the margin, 4–5 on each side; petiole 4–5 in. long, sulcate, glabrous, $\frac{3}{4}$ lin. in diam.; stipules spiny, about $\frac{1}{2}$ in. long, broader at the base. Flowers and fruit not known.

Nile Land. Somaliland: Merehan, *Robecchi*, 105, 275!

25. **J. spicata,** *Pax in Engl. Jahrb.* xix. 109. An undershrub about 3 ft. high, glabrous in all its parts. Leaves 5-partite to near the base, up to 2½ in. long and broad; segments lanceolate or oblanceolate, narrowed to the base, gradually tapered to an acute or subacute apex, up to 2¼ in. long and ½ in. broad, rather closely serrulate, subchartaceous, with numerous spreading lateral nerves; petiole ¾–1¼ in. long, slightly glaucous; stipules divided into setaceous segments 1½–2 lin. long, with glandular tips. Cymes slender, pedunculate, about 2 in. long; peduncle 1½ in. long; bracts subulate-lanceolate, acute, 1–2 lin. long, with very few glandular teeth. Male flowers sessile: Sepals oblong-elliptic, rounded at the apex, ½ lin. long, ⅓ lin. broad, entire, coriaceous, glabrous. Petals free nearly to the base, obovate, rounded at the apex, 1 lin. long, glabrous. Disk-glands oblong, small, glabrous. Stamens 8; filaments partially connate; anthers ½ lin. long. Female flowers 1½ lin. long (*Pax*). Sepals as in the male. Petals truncate at the apex, denticulate. Disk lobed. Ovary glabrous. Capsule nearly ½ in. long, slightly wrinkled. Seeds oblong, 4 lin. long, 2 lin. broad, greyish-brown, and slightly spotted, with a much-divided yellow caruncle.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 36.

Nile Land: British East Africa: Taita; Ndara, *Hildebrandt,* 2428!

26. **J. pseudoglandulifera,** *Pax in Engl. Pflanzenr. Euphorb.-Jatroph.* 1910, 34. An undershrub; root thick; stems erect, glabrous, 1–2 ft. long. Leaves digitately 5–6-lobed to beyond the middle, 1½–3 in. long, ¼–1 in. broad; segments lanceolate or obovate-lanceolate, tapered to an acute apex, rigidly membranous, glabrous on both surfaces, toothed with stalked glands on the margin; lateral nerves of the segments about 10 on each side, branched towards the margin, distinct but not raised on either surface; petiole 1–4 in. long, glabrous, not glandular; stipules multisect, less than ¼ in. long; segments linear-setaceous, tipped by a small club-shaped gland. Cymes shortly pedunculate, about ½ in. long; bracts lanceolate, 1½–2 lin. long, toothed with stipitate glands, glabrous. Male flowers subsessile, much smaller than those of the female. Sepals ovate, subacute, about ½ lin. long and broad, entire, glabrous, not glandular. Petals connate at the base, obovate, rounded at the apex, about 1¼ lin. long and ½ lin. broad, glabrous. Disk-glands fleshy, small, rounded, glabrous. Stamens 8; filaments united for about half their length, glabrous; anthers ⅓ lin. long. Female flowers pedicellate: pedicel 1¼ lin. long, slightly hairy in the lower part. Sepals ovate, subacute, 1½ lin. long, ¾ lin. broad, entire or slightly serrulate, glabrous. Petals free to the base, obovate, 2¼ lin. long, 1⅓ lin. broad, entire, glabrous. Disk 5-lobed, lobes almost contiguous at the edges, entire, glabrous. Ovary subglobose, slightly trilobed, glabrous; styles erect, connate for two-thirds their length, ¾ lin. long, swollen and bifid at the apex. Fruit not seen.—*J. glandulifera,* Müll. Arg. in DC. Prodr. xv. ii. 1084, partly; Hiern in Cat. Afr. Pl. Welw. i. 969, not of Roxb. *J. gossypiifolia,* Welw. Apont. Phyto-Geogr. 564, sub n. 153, not of Linn.

Lower Guinea. Angola: Loanda; in dry places on hard sand, *Welwitsch,*

309! maritime slopes, near Loanda, *Gossweiler*, 118! at Penedo, Maianga do Povo, &c., *Welwitsch*, 308!

27. **J. confusa,** *Hutchinson in Kew Bulletin*, 1911, 361. An erect, branched, fleshy shrub, 5–6 ft. high; branches thick, about $\frac{1}{4}$ in. in diam. 6 in. from the apex, terete, glabrous. Leaves suborbicular in outline, cordate at the base, $2\frac{1}{2}$–4 in. long, $3\frac{1}{2}$–$5\frac{1}{2}$ in. broad, digitately 5-lobed to about the middle, rigidly subchartaceous, sharply glandular-serrulate, glabrous except for the sparingly puberulous nerves above; lobes oblong-ovate, acute, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad; lateral nerves to each lobe 6–8 on each side, distinct on both surfaces, spreading, looped and branched near the margin; veins lax, distinct below; petiole $1\frac{1}{4}$–4 in. long, glabrous, not glandular; stipules divided into about 10 linear segments, about 2 lin. long, gland-tipped, glabrous. Cymes long-pedunculate, subthyrsoid, about $1\frac{1}{2}$ in. in diam.; peduncle stout, 4 in. long glabrous; bracts narrowly lanceolate, very acute, up to 4 lin. long glandular-pectinate, glabrous. Male flowers: Sepals ovate, subacute, $2\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, glabrous, pectinately toothed. Petals obovate, rounded at the apex, 4 lin. long, $2\frac{1}{2}$ lin. broad, entire, glabrous. Disk-glands very large, ovate, fleshy, 1 lin. long. Stamens 8; filaments short; anthers large, oblong, $1\frac{3}{4}$ lin. long. Female flowers: Sepals similar to but much larger than the male. Petals obovate-elliptic, entire, $\frac{1}{2}$ in. long, $3\frac{1}{2}$ lin. broad, multistriate. Disk cupular, undulately lobed, glabrous. Ovary glabrous; styles short, bilobed, with thickened stigmas.—*J. lobata*, var. *senegalensis*, Müll. Arg. in DC. Prodr. xv. ii. 1086, partly. *J. lobata*, subsp. *senegalensis*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 33, partly. *J. glauca*, var. *senegalensis*, Hiern in Cat. Afr. Pl. Welw. i. 969.

Lower Guinea. Angola: Mossamedes; by fences around cotton plantations, half wild and in thickets at the edges of mandioc fields near the mouth of the River Bero, *Welwitsch*, 299!

28. **J. Curcas,** *Linn. Sp. Pl. ed.* i. 1006. A shrub or tree up to 20 ft. high; branchlets thick, glabrous. Leaves ovate-rounded, widely cordate at the base, undulately 5-lobed or undivided, $3\frac{1}{2}$–$5\frac{1}{2}$ in. long and broad, digitately 5–7-nerved from the base, rigidly subchartaceous, glabrous and distinctly veined on both surfaces; petiole $3\frac{1}{2}$–7 in. long, sulcate, glabrous; stipules small. Cymes much shorter than the leaves; peduncle $1\frac{1}{2}$–2 in. long, glabrous or nearly so; bracts lanceolate to linear, entire, the largest $2\frac{1}{2}$ lin. long, shortly and sparingly pubescent. Male flowers: Sepals ovate-elliptic, subacute, $1\frac{3}{4}$ lin. long, 1 lin. broad, glabrous, entire. Petals oblong-obovate, connate in the lower half, densely pilose within, about twice the length of the sepals. Disk-glands columnar, about $\frac{1}{2}$ lin. long, cylindric, glabrous. Stamens 8; outer filaments nearly free, the inner connate. Female flowers: Sepals as in the male but larger. Petals free, oblong, obtuse, 3 lin. long, 1 lin. broad, entire, pilose within near the middle. Disk deeply 5-lobed, glabrous. Ovary glabrous; styles short, connate at the base. Capsule ellipsoid, scarcely lobed, about 1 in. long. Seeds $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. broad.—Jacq. Hort. Vindob. iii. 36, t. 63; Miq. Fl. Nederl. Ind. i. ii. 392;

Müll. Arg. in DC. Prodr. xv. ii. 1080; in Mart. Fl. Bras xi. ii. 487, t. 68; Baker, Fl. Maurit. 322; Blanco, Fl. Filip. ed. 3, iii. 159; Hook. f. Fl. Brit. Ind. v. 383; Pax in Engl. Pflanzenfam. iii. 5, 75, f. 45; in Engl. Pfl. Ost-Afr. C. 240; Hiern in Cat. Afr. Pl. Welw. i. 968; Cook & Collins in Contr. U. S. Nat. Herb. viii. 171, t. 42; Urban, Symb. Fl. Antill. iv. 349; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 77. *J. acerifolia*, Salisb. Prodr. 389. *J. afrocurcas*, Pax in Engl. Jahrb. xliii. 83; in Engl. Pflanzenr. Euphorb.-Jatroph. 79. *Curcas purgans*, Medik. Ind. Pl. Hort. Manhern. i. 90; Baill. Étud. Gén. Euphorb. 314, t. 19, ff. 10–11. *C. indica*, A. Rich. in Ramon de la Sagra, Fl. Cub. Fanerog. iii. 208. *C. Adansonii*, Endl. ex Heynh. Nom. ii. 176. *Castiglionia lobata*, Ruiz & Pav. Fl. Peruv. Prodr. 139, t. 37.

Upper Guinea. Senegambia, *Perrottet*, 732. Sierra Leone: Bagauro, used as hedges, *Scott-Elliot*, 4067B! Gold Coast: near Cape Coast Castle, *Cummins! Krause*, 12. Togo: near Lome, *Warnecke*, 358! *Baumann*, *Büttner*, 615, *Graf Zech*, 321. Fernando Po, *Mann*, 169!

North Central. Eastern Chari; Ndelli, *Chevalier*, 7905!

Nile Land. British East Africa: Witu, *Thomas*, 182! Mombasa, *Wakefield!*

Lower Guinea. Island of St. Thomas, *Moller*. Gaboon: *Jolly*, 52! 61! *Griffon du Bellay*, 45! Angola: Golungo Alto, *Welwitsch*, 303!

Mozamb. Distr. Zanzibar, *Schmidt*, 45. German East Africa: Sseki, *Jaeger*, 342! Amboni, *Holst*, 2684! and without precise locality, *Busse*, 507, 1126, *Conrad*, 367, *Fischer*, 513, *Thomas*, 182. Portuguese East Africa: Mozambique, *Peters*, 8! Tete, *Kirk!* Shupanga, *Kirk!* Boruma, *Menyharth*, 925! British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 250! Mount Mlanji, *McClounie*, 46!

The form described by Pax as *J. afrocurcas* occurs also in America and India, and intermediate specimens are so numerous that I have been unable to retain it even as a distinct variety.

29. **J. macrophylla,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Jatroph.* 80. Leaves 5-lobed to the middle, about 10 in. long and broad, truncate or widely cordate at the base, membranous; lobes ovate, acuminate, entire, pilose on the nerves below; stipules not seen; petiole about 6 in. long, glabrescent. Cymes long pedunculate, many-flowered, glabrous; bracts small, triangular, acute. Male sepals connate at the base, ovate, obtuse, 1 lin. long, glabrous. Petals almost free, ovate, acute, $1\frac{1}{2}$–2 lin. long, glabrous. Disk-glands free. Stamens 8; 3 inner monadelphous Female flowers and fruits not known.

Mozamb. Distr. Nyasaland, *Buchanan*, 670!

Pax describes the male petals as "fere libera" and places the species in the section *Curcas* which is characterised by having connate petals!

30. **J. Hildebrandtii,** *Pax in Engl. Jahrb.* xix. 108. An undershrub about 6 ft. high; branches finely pubescent, almost tomentose when young. Leaves usually 3- (rarely 4–5-) lobed to well below the middle, 1–$1\frac{3}{4}$ in. long, $1\frac{1}{2}$–3 in. broad, glabrous on both surfaces; lobes oblanceolate or oblong-oblanceolate, subacute, entire or rarely with one or two very minute teeth; lateral nerves about 6 on each side, branched, distinct but not prominent on either surface; petiole $\frac{3}{4}$-$1\frac{1}{4}$ in. long, slender, glabrous, not

glandular; stipules very small. Cymes pedunculate, few-flowered, about ¾ in. long; peduncle 1–2½ in. long, pubescent or nearly glabrous; lower bracts subulate-lanceolate, acute, 2–2½ lin. long, ½ lin. broad at the base, coriaceous, glabrous, glandular-toothed. Male flowers very shortly pedicellate: Sepals obovate-elliptic, rounded at the apex, 1 lin. long, ¾ lin. broad, entire, glabrous. Petals suborbicular, with a slight claw at the base, ¾ lin. in diam., entire, glabrous. Disk-glands small, glabrous. Stamens 8; filaments connate in the lower part; anthers ¼ lin. long. Female flowers: pedicel 1 lin. long. Sepals narrowly lanceolate, acute, 3 lin. long, ¾ lin. broad at the base, gland-toothed, glabrous. Petals slightly connate at the base, oblong-lanceolate, subacute, 2¼ lin. long, 1 lin. broad, shortly pubescent inside on the lower half, otherwise glabrous. Disk fleshy, undulately lobed, glabrous. Ovary oblong-ellipsoid, glabrous; styles erect, free to the base, swollen and bifid at the apex. Capsule oblong, 5 lin. long, about 4 lin. in diam. Seeds oblong-ellipsoid, 4 lin. long, 2¼ lin. broad, provided with a large fimbriate caruncle at the base, smooth, slightly mottled or spotted.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 35.

Nile Land. British East Africa: Lamu Island, *Hildebrandt*, 1910!

31. **J. glandulosa,** *Vahl, Symb.* i. 80. A shrub about 3 ft. high; branches thick, shortly villous when young, at length glabrous. Leaves shortly 3–5-lobed, orbicular in outline, 1–2½ in. long, 1–2¾ in. broad, rigidly subchartaceous, villous on both surfaces, lobes rounded or emarginate, closely glandular-dentate; nerves distinct on both surfaces; petiole 1–2¼ in. long, villous, not glandular; stipules reduced to a mass of glands. Cymes few-flowered, long-pedunculate, the largest about 2 in. in diam., villous; peduncle 1½–2½ in. long; bracts oblong-lanceolate, glandular-toothed, densely pubescent. Male flowers subsessile: Sepals slightly oblanceolate, subacute, 1 lin. long, slightly glandular-toothed, pubescent outside. Petals connate in the lower two-thirds; corolla-tube subcampanulate, 1⅓ lin. long, glabrous outside, pubescent within; lobes broadly ovate, rounded at the apex, 1 lin. long and broad, glabrous. Disk-glands oblong-obovoid, fleshy, glabrous. Stamens 8; filaments connate for about half their length, glabrous; anthers ⅓ lin. long. Female flowers very shortly pedicellate: Sepals densely pubescent, gland-toothed. Petals absent. Disk 5-lobed; lobes fleshy, subentire or slightly toothed, glabrous. Ovary ovoid-globose, glabrous; styles erect, free to almost the base, swollen and slightly bifid at the apex.—Desr. in Lam. Encyl. iv. 7. *J. pelargoniifolia*, Courb. in Ann. Sci. Nat. 4me sér. xviii. 150. *J. villosa*, including var. *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 1085. *J. villosa*, var. *glandulosa*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 45. *Croton villosum*, Forsk. Fl. Ægypt.-Arab. 163. *Adenoropium Forskalii*, Pohl, Pl. Bras. Icon. & Descr. i. 15.

Nile Land. Nubia: Gebel Iskeneb, *Schweinfurth*, 934! Eritrea: Massowa, *Hildebrandt*, 737! Somaliland; Merehan, *Robecchi*, 105. Galla Highlands; Boran, *Ellenbeck*, 2185.

Occurs also in Southern Arabia.

32. **J. gallabatensis,** *Schweinf. in Verh. Zool.-Bot. Gesell. Wien,* xviii. 661. Rhizome woody, dividing into long branches spreading horizontally; stem herbaceous, erect, subsimple, subtrichotomously branched at the apex, 1–3 ft. high, terete, pilose below or becoming glabrous, subtomentose in the upper part when young, leafy from the base. Leaves shortly petiolate or the upper sessile, the lower entire (*Schweinfurth*), broadly ovate, oblique, acute, rounded or truncate at the base, the remainder 3-lobed to the middle, subcuneate at the base, 2–3 in. long, 1½–4 in. broad, rigidly membranous, almost laciniate-toothed, teeth with a small apical gland, pilose on both surfaces; nerves numerous and prominent below; petiole of the lower leaves about ¼ in. long, pubescent, not glandular; stipules laciniate, about 1½ lin. long, segments tipped by a small apical gland. Cymes terminal, shortly pedunculate, about 1¼ in. in diam.; bracts linear, acuminate, 3½ lin. long, ½ lin. broad, with several stipitate glands along the margin, pubescent on the back. Male flowers shortly pedicellate: Sepals oblong-elliptic, subacute, 1⅓ lin. long, slightly toothed in the upper half, not glandular. Petals free to the base, oblanceolate-obovate, rounded and very minutely emarginate at the apex, 2 lin. long, scarcely 1 lin. broad, entire, glabrous. Disk-glands flat, oblong-elliptic, truncate at the apex, glabrous. Stamens 8; outer filaments more or less free to near the base, inner connate; anthers ¾ lin. long, glabrous. Female flowers shortly pedicellate: Sepals ovate, acute, 2 lin. long, 1 lin. broad, pubescent outside, laciniate-toothed, teeth tipped by a gland. Petals lanceolate, obtuse, 2¾ lin. long, 1 lin. broad, entire, glabrous. Disk 5-lobed; lobes transversely oblong, entire, thin, glabrous. Ovary ellipsoid, pubescent; styles short. Capsule ½ lin. long, pilose or at length glabrous. Seeds pallid, smooth, 4 lin. long.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 69.

Nile Land. Gallabat; Matamma, *Schweinfurth*, 932! 933, *Steudner*, 540.

33. **J. Schweinfurthii,** *Pax in Engl. Jahrb.* xix. 110. Stem herbaceous, branched at the apex, densely tomentose. Leaves 3-lobed to about the middle, rigidly membranous, 3–6 in. long, 1¼–4½ in. broad, tomentose below, more or less pilose above, serrate; lobes oblong or lanceolate, subacute; petiole thick, about 2 lin. long, tomentose, not glandular; stipules soon deciduous, subulate, scarcely 1 lin. long, pubescent, not glandular. Cymes overtopping the leaves, pedunculate, tomentose, more or less corymbose; peduncle up to 3 in. long; bracts subulate, acute, 2 lin. long, pubescent on the back, not glandular. Male flowers rather crowded, subsessile: Sepals obovate, subacute, slightly keeled on the back, 1¼ lin. long, ½ lin. broad, coriaceous, pubescent outside, not glandular. Petals obovate, rounded at the apex, 1⅓ lin. long, entire, glabrous. Disk-glands obovate-cuneate, entire, glabrous. Stamens 8; 5 outer filaments free nearly to the base, 3 inner connate; anthers ½ lin. long, glabrous. Female flowers: Sepals lanceolate, subacute, 1¾ lin. long, ¾ lin. broad, entire, pubescent outside, glabrous within, not glandular. Petals free to the base, oblong-lanceolate, 2 lin. long, ⅔ lin. broad, entire, glabrous. Disk 5-lobed; lobes transversely oblong or rounded, entire, glabrous. Ovary ellipsoid-obovoid, tomentose; styles

suberect, deeply bifid, pubescent, scarcely swollen at the apex. Capsule tomentose, ½ in. long. Seeds ellipsoid, 4 lin. long, shining, smooth; caruncle lacerate, large.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 70. *J. sp.*, Speke, Journ. App. 647; Oliv. in Trans. Linn. Soc. xxix. 148.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 1780, 1930! Bongo: Gir, *Schweinfurth*, 1887! Uganda: Madi, *Speke & Grant*, 736!

34. **J. æthiopica,** *Müll. Arg. in Flora*, 1864, 485. Stems herbaceous, stout, up to 9 in. high, densely rusty-tomentose. Leaves 3-lobed nearly to the base, rigidly chartaceous, up to 4 in. long and broad, sharply serrulate, densely tomentose on both surfaces; lobes narrowly lanceolate, acute; petiole 4 lin. long, or absent from the upper leaves, not glandular; stipules laciniate, gland-tipped, pubescent. Cymes pedunculate, about 1½ in. in diam.; peduncle 1–1½ in. long, stout, tomentose; bracts narrowly lanceolate, acute, up to 1¾ lin. long, sharply toothed, slightly pubescent on the outside, not glandular. Male flowers subsessile: Sepals elliptic, rounded at the apex, 1⅓ lin. long, ¾ lin. broad, keeled and pubescent on the back, toothed in the upper half. Petals free to the base, elliptic, subacute, 1⅓ lin. long, ¾ lin. broad, entire, glabrous. Stamens 8; filaments all free nearly to the base; anthers ⅔ lin. long, glabrous. Female flowers: Sepals elliptic, subacute, 2 lin. long, 1 lin. broad, laciniate-toothed but not glandular, pubescent on the outside, glabrous within. Petals free to the base, oblong, rounded at the apex, 2½ lin. long, 1 lin. broad, entire, glabrous outside, very slightly pubescent within. Disk 5-lobed; lobes rounded, entire, glabrous. Ovary ellipsoid, glabrous; styles erect, bifid and slightly swollen at the apex. Ripe capsule not seen.—Müll. Arg. in DC. Prodr. xv. ii. 1088; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 70. *J. Sabdariffa*, Schweinf. Beitr. Fl. Aethiop. 37.

Nile Land. Sennar, *Kotschy*, 398! Fazokl, *Cienkowski*. Jur, *Schweinfurth*, 1589.

35. **J. kamerunica,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Adrianeæ*, 102. Stem herbaceous, subsimple, 2–2½ ft. high, tomentose, nearly glabrous towards the base. Leaves 3-lobed to below the middle, obtuse at the base, 3½–6 in. long, 3½–4½ in. broad, glandular-serrulate, canescent, whitish below, pubescent; lobes lanceolate, acute; petiole ½–⅔ in. long; stipules dissected, glandular at the apex, 2 lin. long. Cymes pedunculate; bracts linear-lanceolate, glandular-ciliate. Male sepals connate at the base, 1–1½ lin. long, pubescent, glandular-ciliate. Petals free, spathulate-oblong, 2–2½ lin. long, greenish-yellow, villous inside at the base. Stamens 8; outer filaments connate to the middle, inner longer connate. Disk-glands free. Female sepals and petals narrower than those of the male. Petals lanceolate, 2½ lin. long. Ovary glabrous; styles ¾ lin. long, free. Capsule slightly warted, glabrous. Seeds 4 lin. long, smooth, brown; caruncle palmatifid.

Upper Guinea. Cameroons: sandy savannahs at Dangadji, *Ledermann*, 3646. Garua, *Ledermann*, 3342.

36. **J. Phillipseæ,** *Rendle in Journ. Bot.* 1898, 30. A shrub; branches sulcate, densely pilose with white soft hairs. Leaves triangular

at the base, 3- (or very rarely 5-) lobed to a little below the middle, the side lobes smaller, about 2½ in. long and 3 in. broad; lobes rounded or obtuse, glandular-repand-dentate, pilose with white spreading hairs on both surfaces; petiole 2½–6 lin. long; stipules dissected, gland-tipped, 5 lin. long. Cymes axillary, pubescent; lower bracts up to 7 lin. long, ovate, pectinately glandular-toothed. Male flowers: Sepals 1½ lin. long, broadly oblanceolate, pubescent, glandular-dentate. Petals 2¼ lin. long, spathulate, obtuse. Stamens 8; filaments connate. Female sepals (in fruit) about 3 lin. long, ovate, glandular-toothed. Capsule 4½ lin. long, wrinkled, glabrous. Seeds brownish, 3 lin. long, with a 2-lobed caruncle, lobes crenulate.

Nile Land. Somaliland: Waggar Mountains, *Mrs. Lort-Phillips!*

37. **J. Stuhlmannii,** *Pax in Engl. Pfl. Ost-Afr. C.* 240. Stems herbaceous, tomentose. Leaves 5-partite to near the base, up to 2½ in. long and 3½ in. broad; segments oblanceolate, acute, narrowed to the base, up to 2 in. long and ¾ in. broad, dentate, subcoriaceous, subtomentose on both surfaces; lateral nerves of the segments about 10 on each side, arcuate, fairly distinct on both surfaces; petiole 1–1½ in. long, tomentose; stipules divided into setaceous segments; segments about 1½ lin. long, gland-tipped, pubescent in the lower half. Cymes long-pedunculate, about 2 in. long; peduncle 2½–3 in. long, tomentose; bracts linear-lanceolate, acute, 3 lin. long, with numerous glandular teeth, pubescent. Sepals oblong-elliptic, obtuse, 1⅓ lin. long, entire, shortly pubescent. Petals obovate-oblanceolate, rounded at the apex, entire, 2 lin. long, 1 lin. broad, slightly rusty-pubescent within near the middle. Female flowers: Sepals lanceolate, obtuse, 2 lin. long, with several glandular teeth, pubescent. Petals absent. Disk 5-lobed, glabrous. Ovary glabrous; styles erect, swollen and bilobed at the apex. Capsule ½ in. long.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 39.

Mozamb. Distr. German East Africa: Usaramo, Dar-es-Salaam, *Stuhlmann,* 6797! 7488! 7515!

38. **J. batawe,** *Pax in Engl. Jahrb.* xxviii. 420. This is probably only a variety of *J. Stuhlmannii,* from which it differs merely in having glabrous male sepals.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 40.

Mozamb. Distr. German East Africa: flats south of Rufidji, *Goetze,* 86!

39. **J. mollis,** *Pax in Ann. Istit. Bot. Roma,* vi. 184. Stem pilose, the young flowering parts densely pubescent. Leaves 5-partite to near the base, glandular-denticulate, tomentose with whitish hairs on both surfaces when young; stipules divided into numerous setaceous gland-tipped pubescent segments. Cymes very small, few-flowered; bracts triangular or lanceolate, with numerous gland-tipped teeth. Male flowers: Sepals lanceolate, glabrous. Petals obovate-oblong, obtuse, glabrous. Disk-glands very small. Stamens 8; filaments partially connate. Female flowers: Sepals narrowly lanceolate, subacute, 2 lin. long, entire or usually with a few gland-tipped teeth, pubescent. Petals oblanceolate, obtuse. Disk deeply 5-lobed. Ovary glabrous; styles

as in *J. Stuhlmannii*. Capsule not seen.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 39.

Nile Land. Somaliland: Tomba, *Riva*, 486! 511.

40. **J. velutina,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Jatroph.* 37. Branches softly tomentose. Leaves reniform in outline, 5-lobed to about one-third their length, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $1\frac{1}{4}$–2 in. broad, rather shortly villous on both surfaces, especially on the nerves below; lobes ovate, dentate, with a stalked gland at the apex of each tooth; lateral nerves about 4 on each side of each principal nerve, spreading, branched near the margin; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, villous, not glandular; stipules dissected, about $1\frac{1}{2}$ lin. long, segments setaceous, with an apical gland. Cymes long-pedunculate, scarcely $\frac{1}{2}$ in. long, few-flowered; peduncle 1–$2\frac{1}{2}$ in. long, shortly villous; bracts subulate-lanceolate or narrowly lanceolate, 3 lin. long, $\frac{3}{4}$ lin. broad, with a few long gland-tipped teeth on the margin, shortly and rather densely pubescent. Male flowers subsessile: Sepals ovate-lanceolate, acute, gland-toothed, $1\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, shortly pubescent outside, glabrous within. Petals free to the base, obovate, obtuse, 2 lin. long, 1 lin. broad, entire, glabrous. Disk-glands small. Stamens 8; filaments nearly wholly connate; anthers $\frac{1}{4}$ lin. long. Female flowers subsessile: Sepals lanceolate, 3 lin. long, $\frac{3}{4}$ lin. broad, stipitate gland-toothed, densely and softly pubescent. Petals free to the base, soon falling off, obovate-spathulate, 2 lin. long, $\frac{3}{4}$ lin. broad, hairy within at the base, otherwise glabrous. Disk 5-lobed, thin, lobes rounded, entire. Ovary ellipsoid, glabrous; styles erect, slightly connate at the base, swollen and bifid at the apex, glabrous. Fruit not seen.

Nile Land. British East Africa: Taro, *Kässner*, 499!

41. **J. acerifolia,** *Pax in Engl. Jahrb.* xix. 109. A small shrub; flowering branches very thick and fleshy, softly pubescent with white hairs. Leaves and stipules as in *J. velutina*. Cymes shortly pedunculate, small and few-flowered, shortly whitish-tomentose; bracts subulate-lanceolate, $1\frac{1}{2}$ lin. long, with a few glandular teeth. Male flowers: Sepals lanceolate, acute, gland-toothed, pubescent. Petals spathulate, cohering nearly up to the middle. Disk-glands free. Stamens 6; filaments connate. Female flowers: Sepals linear-lanceolate, acute, $1\frac{1}{2}$ lin. long, with numerous glandular teeth, pubescent on both sides. Petals absent. Disk slightly 5-lobed, glabrous. Ovary glabrous; styles erect, slightly connate at the base, glabrous, swollen and 2-lobed at the apex. Capsule not seen.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 37.

Nile Land. British East Africa: Buityuma, near Taita, *Hildebrandt*, 2377!

42. **J. Ellenbeckii,** *Pax in Engl. Jahrb.* xxxiii. 284. A shrub about 3 ft. high; young branches thick, densely and softly pubescent. Leaves digitately 5-lobed to below the middle, widely cordate at the base, about 3 in. long and 4 in. broad, membranous, whitish-pubescent on both surfaces; lobes obovate, rounded at the apex, coarsely glandular repand-dentate; lateral nerves to each lobe about 5

on each side; petiole 1½–4 in. long, densely pubescent; stipules spiny, 2–3-furcate above the middle, about ½ in. long, gland-tipped, shortly pubescent to the apex. Cymes longer than the leaves, few-flowered, densely pubescent; peduncle 3–4 in. long; bracts linear, gland-toothed, up to 4 lin. long, pubescent. Male flowers seen only in a young state. Sepals linear, pubescent, slightly glandular. Female sepals in the fruiting stage linear, with long-stalked glands on the margin. Ovary glabrous. Young capsule nearly ½ in. long.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 58, fig. 22.

Nile Land. Harar: Wabi, *Ellenbeck*, 1135!

43. **J. fissispina,** *Pax in Engl. Jahrb.* xliii. 83. A shrub with thick somewhat fleshy branches, the latter softly tomentose when young. Leaves deeply 5–6-partite, about 2½ in. long and 3 in. broad; segments oblanceolate, acute, glandular-dentate, thinly chartaceous, pubescent on both surfaces; petiole 1¼–2 in. long, softly tomentose; stipules modified into 2–3-lobed hard wide-based pubescent spines, about 5 lin. long. Cymes lax, long-pedunculate, the flowering part about 2 in. long; peduncle 2–3½ in. long; bracts linear, up to 3 lin. long, with several glandular teeth, softly pubescent. Male flowers: Sepals lanceolate, acutely acuminate, 1 lin. long, glandular-toothed, pubescent. Petals oblong, acute, glabrous, about as long as the sepals. Disk-glands small. Stamens 8; filaments partially connate. Female sepals similar to the male but longer. Ovary glabrous.—Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 58.

Mozamb. Distr. German East Africa: eastern base of Ol Dongo, *Merker*, 570!

40. **MILDBRÆDIA**, Pax in Engl. Jahrb. xliii. 319.

Flowers diœcious. Petals present. Male flowers: Sepals 5, imbricate. Petals 5, free, imbricate, equalling or exceeding the sepals. Disk-glands 5, fleshy, glabrous, opposite the sepals. Stamens 10–20, inserted on a hairy receptacle; outer filaments free, short, the inner slightly connate at the base; anthers introrse, dehiscing at the side, erect in bud. Rudimentary ovary absent. Female flowers: Sepals and petals a little larger than in the male, but otherwise similar. Disk annular or 5-lobed, hairy or glabrous. Ovary 3-celled; styles free or slightly connate at the base, bifid, bilobed or tripartite; ovules solitary in each cell. Capsule loculicidal, trilobed; exocarp thin, crustaceous; endocarp a little thicker, slightly woody. Seeds subglobose or ellipsoid, about ¼ in. in diam.; testa mottled, slightly shining, smooth.—Shrubs or trees with stellate or subsimple indumentum. Leaves alternate, long-petiolate, penninerved or digitately nerved and 3–7-lobed, dentate; stipules subulate, deciduous. Flowers in axillary or supra-axillary pedunculate few-flowered racemes of cymules.

Species 4, endemic.

Pax described the inflorescence of *Mildbrædia* as paniculate, and that of *Neojatropha* (= *Mildbrædia*) as cymose. It seems to me to be cymose in both cases,

but in the female plant of *Mildbrædia paniculata* only the terminal flower of each cymule is fully developed, the lateral ones being aborted, the inflorescence then resembling a panicle.

Leaves 3–7-lobed or sometimes a few on each shoot undivided; stamens 10 . . . . . 1. *M. klaineana.*
Leaves all undivided; stamens 15–20 (not known in 4, *carpinifolia*).
  Young leaves sparingly setulose with simple or subsimple hairs on the upper surface (sometimes only on the nerves), stellate-pubescent below, at length glabrous or nearly so . . . . . 2. *M. paniculata.*
  Young leaves pubescent with stellate hairs or nearly glabrous above, rather densely and shortly stellate-pubescent below when mature.
    Male peduncles 4–6 lin. long; female peduncles 2–2½ in. long, few-flowered . . . . 3. *M. fallax.*
    Male peduncles 1½–2¼ in. long; female peduncles about 1 in. long, 1–3-flowered . . . . 4. *M. carpinifolia.*

1. **M. klaineana,** *Hutchinson.* A shrub; young branchlets stellate-puberulous or tomentellous. Leaves undivided and oblong-elliptic or mostly 2–3- (rarely up to 7-) lobed to near the middle, acutely acuminate, cordate at the base, 2–8 in. long, 1¼–6 in. broad, repand-dentate or denticulate, rigidly membranous, setulose with simple hairs only on the nerves above, shortly stellate-pubescent below, becoming nearly glabrous, slightly glossy and strongly reticulate on the upper surface, duller below, digitately 5–7-nerved from the base, nerves prominent on both surfaces; transverse nerves very distinct and subparallel; petiole ¾–4½ in. long, subterete, pubescent or puberulous; stipules linear, 3½ lin. long, tomentellous, soon falling off. Male inflorescence slightly supra-axillary towards the apex of the shoots, very slender, up to 10 in. long, puberulous; bracts linear, 2–3 lin. long, puberulous. Sepals 5, broadly ovate-elliptic, rounded at both ends, 1½ lin. long, 1 lin. broad, membranous, 1–3-nerved, sparingly stellate-pubescent outside, glabrous within. Petals 5, suborbicular, 1 lin. in diam., glabrous. Disk-glands 5, opposite the sepals, rounded, fleshy, glabrous. Stamens 10, in two series, inserted on a hairy receptacle; filaments 1½ lin. long, glabrous; anthers rounded. Female inflorescences slightly supra-axillary, long-pedunculate, few-flowered, 5½–6½ in. long; rhachis and pedicels stellate-tomentellous; bracts subulate-lanceolate, acute, up to ¼ in. long, shortly pubescent; cymules about ½ in. long, about 3-flowered, only the terminal flower developing into fruit; pedicels about 1½ lin. long. Sepals lanceolate, subacute, about 1⅓ lin. long and ½ lin. broad, tomentellous outside, glabrous within. Petals ovate or elliptic-ovate, obtuse, 1½ lin. long, 1 lin. broad, striate, glabrous. Disk deeply 5-lobed, glabrous; lobes rounded. Ovary slightly trilobed, densely setose or tomentose; styles spreading, bi- or tripartite, about ¾ lin. long, glabrous. Capsule deeply trilobed, nearly ½ in. across, loculicidal, finely muricate; styles subpersistent. Seeds broadly ellipsoid, 2½ lin. long, mottled, smooth.—*Plesiatropha klaineana*, Pierre MSS. and Icon.

Lower Guinea. Gaboon: Gaboon River, *Mann*, 926! near Libreville, *Klaine*, 846! 1129! 1261! 1926! 2929!

2. **M. paniculata,** *Pax in Engl. Jahrb.* xliii. 319. A tree; young branchlets stellate-tomentellous, at length glabrous or nearly so. Leaves undivided, lanceolate-obovate or oblanceolate-elliptic, shortly and acutely acuminate, very obtuse at the base, $1\frac{1}{4}$–6 in. long, $\frac{1}{2}$–$2\frac{1}{2}$ in. broad, repand-dentate with acute teeth, membranous, sparingly setose with simple hairs on the upper surface when young, slightly stellate-pubescent below, at length glabrous; lateral nerves 7–10 on each side, distinct and raised on both surfaces; tertiary nerves subparallel, distinct on both surfaces; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. long, subterete, stellate-tomentellous; stipules subulate, $1\frac{1}{4}$ lin. long, setulose. Male cymes few-flowered: peduncle slightly supra-axillary, slender, about $1\frac{3}{4}$ in. long, stellate-puberulous; bracts linear-subulate, $1\frac{1}{3}$ lin. long, pubescent; pedicels about 1 lin. long, shortly pubescent: Sepals broadly oblong, truncate at the apex, 1 lin. long, $\frac{3}{4}$ lin. broad, stellate-puberulous on the lower half outside, submembranous and glabrous around the margin in the upper part, glabrous within. Petals orbicular, striate, glabrous, about $\frac{3}{4}$ lin. in diam. Disk-glands fleshy, pubescent. Stamens 20; filaments glabrous. Receptacle shortly setulose. Female cymules arranged in a lax raceme, the terminal flower of each cymule developed, the rest abortive; peduncle 4–7 in. long, stellate-pubescent; bracts subulate-filiform, up to $\frac{1}{4}$ in. long; branches spreading, slender, up to $2\frac{1}{2}$ in. long; pedicels $\frac{1}{4}$ in. long, stellate-puberulous. Sepals ovate, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, subcoriaceous, stellate-puberulous outside, glabrous within. Petals ovate, obtuse, $1\frac{3}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, membranous, striate, glabrous outside, shortly pubescent in the lower half within. Disk saucer-shaped, densely setulose-pubescent. Ovary slightly trilobed, setose and stellate-pubescent; styles spreading, bilobed to near the base, glabrous, lobes slightly flattened. Mature fruit not seen.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 11, fig. 2. *Croton cavalliensis*, Beille MSS.

Upper Guinea. Ivory Coast: Cavally River basin, between Oubi and Fort Binger, *Chevalier*, 19283 bis! Keeta village, *Chevalier*, 19332! between the Greater Sassandra and the middle Cavally Rivers, *Chevalier*, 19259! 19286!

South Central. Belgian Congo: Ituri District; Njiapanda, *Mildbraed*, 2920! 3189! 3197.

3. **M. fallax,** *Hutchinson.* Branchlets densely and stellately pubescent. Leaves undivided, obovate or oblong-elliptic, very acutely acuminate, rounded or slightly narrowed to a very obtuse or subcordate base, $1\frac{1}{2}$–7 in. long, $\frac{1}{2}$–3 in. broad, remotely denticulate or repand-dentate in the upper part, entire in the lower fourth, chartaceous or membranous, shortly and rather densely stellate-pubescent below, the same at first above but at length glabrous; lateral nerves 5–8 on each side, distinct and raised on both surfaces; tertiary nerves lax, subparallel, prominent on both sides; petiole $\frac{1}{4}$–$1\frac{3}{4}$ in. long, stellate-tomentellous; stipules linear-subulate, $2\frac{1}{2}$ lin. long, pubescent. Male cymes axillary, peduncu-

late, few-flowered, $\frac{1}{2}$–$\frac{3}{4}$ in. long; peduncle 4–6 lin. long, shortly stellate-pubescent; bracts subulate, $\frac{1}{2}$–1 lin. long, pubescent. Sepals 5, ovate or elliptic, obtuse, 2 lin. long, 1–$1\frac{1}{4}$ lin. broad, subcoriaceous, minutely stellate-pubescent, becoming glabrous where another sepal has overlapped, the margin minutely ciliolate. Petals very broadly obovate or orbicular, several-nerved, glabrous, nearly 2 lin. in diam. Disk-glands fleshy, slightly pubescent. Stamens 15; filaments glabrous. Receptacle shortly pubescent. Female cymes pedunculate, inserted about 4 lin. above the leaf-axils, few-flowered; peduncle 2–$2\frac{1}{2}$ in. long, flattened, stellate-pubescent; bracts as in the male; pedicels about 4 lin. long. Sepals ovate, obtuse, stellate-pubescent. Disk small, pubescent. Ovary ovoid, densely setose with simple hairs and stellate-pubescent; styles erect, pubescent in the lower part. Capsule not known.—*Jatropha fallax*, Pax in Engl. Jahrb. xxxiii. 284. *Neojatropha fallax*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 115, fig. 41.

Nile Land. British East Africa: near Magi Chumoi, *Kässner*, 458!

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Holtz*, 388!

4. **M. carpinifolia,** *Hutchinson.* A shrub about 7 ft. high; branchlets rather densely stellate-pubescent. Leaves, petiole and stipules as in *N. fallax.* Male cymes slightly supra-axillary, few-flowered; peduncle $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, shortly stellate-pubescent; bracts subulate, up to 2 lin. long; pedicels short. Male flowers not seen. Female cymes few-flowered, supported by a peduncle about 1 in. long. Sepals ovate-lanceolate, stellate-pubescent. Petals broadly oblong, obtuse. Disk, ovary, fruit and seeds as in *M. fallax.*—*Jatropha carpinifolia*, Pax in Engl. Pfl. Ost-Afr. C. 240, and in Engl. Jahrb. xxiii. 529. *Neojatropha carpinifolia*, Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 114.

Mozamb. Distr. Zanzibar: Kidoti, *Hildebrandt*, 1118! German East Africa: Usaramo; Kidenge, *Stuhlmann*, 6372!

More complete material of the last two species will probably show that the differences given in the key are of little value.

41. CLUYTIA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 302.

Flowers diœcious or very rarely monœcious. Petals present. Male flowers: Sepals 5, imbricate. Petals more or less equalling the sepals, clawed, with 1 to several glands within the base. Disk-glands 3–5-lobed at the base of or adnate to the sepals. Stamens 5; filaments connate around and supporting a dilated rudimentary ovary; anthers short, dorsifixed, dehiscing longitudinally. Female flowers: Sepals and petals as in the male. Disk often as in the male, but sometimes the bottom of the calyx eglandular. Ovary 3-celled; styles free or shortly connate at the base, bifid or bilobed; ovules solitary in each cell. Capsule small, subglobose, septicidally dehiscent into 3 entire or bifid valves; septa thin, free or adhering to the columella. Seeds ovoid, carunculate; testa crustaceous, black and shining; albumen fleshy; cotyledons flat and

broad.—Shrubs or undershrubs, rarely climbers. Leaves alternate, entire, mostly small (especially in the South African species). Flowers small, the males pedicellate in axillary fascicles, the females often solitary and with longer pedicels.

Species about 57, mostly South African, a few occurring in Arabia.

Stems simple or subsimple, arising from a woody many-headed rhizome.
Leaves glabrous.
Male pedicel 1 lin. long or less, pubescent . . 1. *C. benguelensis.*
Male pedicel 3–6 lin. long, glabrous.
Leaves suborbicular or broadly elliptic, rounded at the base, densely pustulate below; male pedicel $\frac{1}{2}$ in. long . . . . . 2. *C. monticola.*
Leaves oblanceolate or obovate-elliptic, narrowed to the base, usually about $\frac{1}{2}$ in. broad, not pustulate below; male pedicel about $\frac{1}{3}$ in. long 3. *C. Stuhlmanni.*
Leaves narrowly oblanceolate, about $\frac{1}{4}$ in. broad, pustulate below, with recurved cartilaginous margins; male pedicel about $\frac{1}{3}$ in. long . . 4. *C. stelleroides.*
Leaves rather densely adpressed-pilose . . . 5. *C. inyangensis.*
Stems more or less branched, not from a rhizome; shrubs or climbers.
Leaves crowded and overlapping, subsessile, rather deeply emarginate; flowers monœcious . . 6. *C. conferta.*
Leaves usually more or less laxly arranged, not or very slightly emarginate.
Flowers monœcious; leaves narrowly lanceolate . 7. *C. kamerunica.*
Flowers dicœcious.
Male petals with a solitary gland within the base of each.
Leaves more or less ovate, rounded at the base 8. *C. Whytei.*
Leaves never ovate, mostly narrowed to the base, or if somewhat rounded then oblong or oblong-elliptic.
Male pedicel very slender, about 3 lin. long, glabrous or nearly so.
Branches yellowish- or greyish-tomentellous; female pedicel almost capillary . 9. *C. pedicellaris.*
Branches glabrous or nearly so; female pedicel stouter . . . . . 10. *C. abyssinica.*
Male pedicel stouter, $1\frac{1}{2}$ lin. long or less, glabrous or hairy.
Leaves petiolate, membranous . . . 11. *C. mollis.*
Leaves subsessile, subchartaceous . . 12. *C. rotundifolia.*
Male petals with 2 or more glands within the base of each.
Stems climbing (always?); lateral nerves of the leaves invisible or nearly so.
Ovary tomentose . . . . . 13. *C. volubilis.*
Ovary glabrous . . . . . 14. *C. gracilis.*
Stems never climbing; lateral nerves of the leaves usually distinct.
Leaves small, usually less than 1 in. long . 15. *C. Paxii.*
Leaves usually more than 2 in. long.

Leaves very narrow, linear to linear-lanceolate, usually less than ½ in. broad	16. *C. angustifolia.*
Leaves broader, oblong, oblong-lanceolate or elliptic, usually well over ½ in. broad.	
Ovary pubescent.	
Leaves crowded towards the apices of the shoots, with very short internodes, soon falling off from the lower parts of the branchlets	17. *C. richardiana.*
Leaves laxly arranged along the shoots, separated by long internodes	18. *C. Swynnertonii.*
Ovary glabrous.	
Sepal-scales 2–3-partite	19. *C. robusta.*
Sepal-scales 5-partite	20. *C. polyadenia.*

1. **C. benguelensis,** *Müll. Arg. in Journ. Bot.* 1864, 337. Stems annual, arising from a woody many-headed rhizome, unbranched, tomentellous when young, at length pubescent. Leaves subsessile, oblong-lanceolate or lanceolate, acute, slightly narrowed to the base, ¾–1¼ in. long, 2½–5 lin. broad, entire, subchartaceous, somewhat glaucous, indistinctly nerved, glabrous. Flowers diœcious. Male flowers 2–3 together in the leaf-axils in the upper half of each stem; pedicel about 1 lin. long or less, pubescent. Sepals obovate, rounded at the apex, 1 lin. long, ¾ lin. broad, glabrous on both sides. Petals a little narrower and more membranous than the sepals. Glands numerous, small and rounded. Filaments connate for three-quarters of their length; anthers ⅓ lin long. Rudimentary ovary cylindric, entire, ⅓ lin. long, glabrous Female flowers (*Pax*): Sepals ovate, obtuse, with a 3–5-lobed scale on the inside at the base. Ovary pubescent.—Müll. Arg. in DC. Prodr. xv. ii. 1052; Hiern in Cat. Afr. Pl. Welw. i. 973 (*Clutia*); Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 67.

Lower Guinea. Angola: Huilla; in rocky thickets near Mumpulla, *Welwitsch*, 338! Tyivingiro, *Dekindt*, 3087! and without precise locality, *Antunes*, 813. Benguella; country of the Ganguellas and Ambuellas, *Gossweiler*, 1993!

2. **C. monticola,** *S. Moore in Journ. Linn. Soc.* xl. 197. Stems annual, evidently arising from a rhizome, simple, about 10 in. high, glabrous. Leaves subsessile, suborbicular or broadly elliptic, shortly and abruptly mucronate, ½–1 in. long, 4–8 lin. broad, somewhat membranous, glabrous, densely pustulate on the lower surface; lateral nerves about 4 on each side, inconspicuous. Flowers white, diœcious, females not known. Male flowers axillary, geminate; pedicel very slender, ½ in. long, glabrous. Sepals obovate-oblong, rounded at the apex, 1⅓ lin. long, ⅔ lin. broad, membranous, glabrous, with a 5-partite scale below the middle within. Petals as long as the sepals, with an ovate obtuse limb and a narrow claw, and about 3 glands within the base of each. Staminal column ¾ lin. long, glabrous; anthers ¼ lin. long. Rudimentary ovary cylindric, slightly expanded at the top, truncate, glabrous.

Mozamb. Distr. South-east Rhodesia: Mount Pene, 6500–7000 ft., *Swynnerton*, 2012! 6159!

3. **C. Stuhlmanni,** *Pax in Engl. Jahrb.* xix. 112. Stems several, arising from a woody rhizome, simple, up to 2 ft. high, subterete, glabrous. Leaves oblanceolate or obovate-elliptic, subacute, more or less cuneate at the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $4\frac{1}{2}$–7 lin. broad, entire, thinly subchartaceous, glabrous and dull on both surfaces; lateral nerves 2–3 on each side, visible below; petiole about $\frac{3}{4}$ lin. long, wrinkled when dry, glabrous; stipules minute. Flowers diœcious, or at any rate on separate stems. Male flowers 2–3 in each leaf-axil; pedicel very slender, 3–4 lin. long, glabrous. Sepals oblong, obtuse, membranous, 1 lin. long, $\frac{1}{3}$ lin. broad, glabrous. Petals obovate-spathulate, abruptly narrowed into a claw, as long as the sepals, membranous, glabrous. Glands numerous in the base of the flower, small. Filaments very shortly connate; anthers $\frac{1}{3}$ lin. long. Rudimentary ovary minutely bifid, glabrous. Female flowers solitary or up to 4 in each leaf-axil; pedicel 4 lin. long, glabrous, attaining $1\frac{1}{4}$ in. in fruit. Sepals as in the male. Petals oblanceolate, gradually narrowed to the base. Disk-glands or lobes 2, opposite each sepal. Ovary glabrous; styles suberect, bilobed, glabrous. Capsule broadly ovoid, about $2\frac{3}{4}$ lin. in diam., slightly wrinkled. Seeds ellipsoid, $1\frac{3}{4}$ lin. long, 1 lin. broad, smooth and shining, dark brown, with a large submembranous yellow caruncle.—Pax in Engl. Pfl. Ost-Afr. C. 241, and in Engl. Pflanzenr. Euphorb.-Cluytieæ, 67.

Nile Land. British East Africa: Lake Nakuru, *Scott-Elliot*, 6829!

Mozamb. Distr. German East Africa: Karagwe; Buhimba, *Scott-Elliot*, 8189! Ukome, *Stuhlmann*, 884! Ruvuvu hills, *Scott-Elliot*, 8156!

4. **C. stelleroides,** *S. Moore in Journ. Linn. Soc.* xl. 198. Stems about 8 in. high, otherwise as in *C. monticola*. Leaves narrowly oblanceolate, obtuse, narrowed to the base, $\frac{3}{4}$–1 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, rigidly membranous, glabrous, densely pustulate below, with recurved cartilaginous margins; petiole 1 lin. long, glabrous. Flowers diœcious, females not known. Male flowers 2–4 in each leaf-axil; pedicel slender, $3\frac{1}{2}$–$4\frac{1}{2}$ lin. long, glabrous. Sepals oblong-elliptic, rounded at the apex, about 1 lin. long, $\frac{2}{3}$ lin. broad, membranous, glabrous, with an 8-partite scale below the middle within. Petals, staminal column and rudimentary ovary as in *C. monticola*.

Mozamb. Distr. Rhodesia: Northern Melsetter district, 5000–6000 ft., *Swynnerton*, 6214!

5. **C. inyangensis,** *Hutchinson*. Stems simple, few, arising from a rhizome, straight, subterete, densely tomentose. Leaves lanceolate or elliptic-lanceolate, subacute, slightly narrowed to the base, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, subchartaceous, adpressed-pilose on both surfaces, more densely so below; lateral nerves indistinct; petiole about $\frac{1}{2}$ lin. long, pubescent. Flowers diœcious. Male flowers several in each leaf-axil; pedicel 1–$1\frac{1}{4}$ lin. long, articulated near the base, densely yellowish-pubescent. Sepals oblanceolate, rounded at the apex, 1 lin. long, $\frac{2}{3}$ lin.

broad, yellowish-pilose outside, glabrous and mottled within, with a tripartite scale below the middle. Petals obovate, rounded at the apex, nearly as long as the sepals, glabrous, each with about 3 minute glands within the base. Staminal column $\frac{1}{2}$ lin. long; anthers $\frac{1}{3}$ lin. long. Rudimentary ovary subcylindric, with a flat expanded top, glabrous. Female flowers not known.

Mozamb. Distr. Rhodesia: Manika; Inyanga Mountains, 6000–7000 ft., *Cecil*, 181!

6. **C. conferta,** *Hutchinson.* An undershrub 2–3 ft. high; stem and branches rough with the scars of the previous season's leaves, angular, glabrous or very thinly pubescent between the angles; lateral branches elongated, simple, up to 8 in. long, leafy at the apex. Leaves crowded, subsessile, oblong, emarginate, slightly narrowed to an obtuse base, 4–6 lin. long, 2–3 lin. broad, entire, rigidly subcoriaceous, glabrous and indistinctly veined on both surfaces; stipules minute. Flowers monœcious. Male flowers axillary, solitary or in pairs; pedicel glabrous, up to 1 lin. long. Sepals obovate, minutely tridentate or entire, 1 lin. long, $\frac{1}{2}$ lin. broad, membranous, glabrous on both surfaces. Petals like the sepals, but a little narrower towards the base. Glands in the bottom of the calyx about 10 in a single ring, very small and rounded. Filaments connate for two-thirds of their length; anthers $\frac{1}{5}$ lin. long. Rudimentary ovary cylindric, entire, glabrous, $\frac{1}{4}$ lin. long. Young female flowers not seen. Sepals and petals in the fruiting stage glabrous, the former 3-glandular near the base. Capsule about 2 lin. in diam., glabrous, slightly wrinkled. Seeds not seen.

Mozamb. Distr. Nyasaland: Tuchila Plateau, 7000 ft., *Purves*, 100!

A very distinct species, and easily recognised amongst those from Tropical Africa by its small crowded emarginate leaves and monœcious flowers.

7. **C. kamerunica,** *Pax in Engl. Jahrb.* xlv. 238. A shrub 3–5 ft. high; young branchlets densely woolly-tomentose with light yellow hairs. Leaves narrowly lanceolate, subacute, narrowed to the base, $2\frac{1}{2}$–5 in. long, $\frac{1}{2}$–1 in. broad, firmly membranous, pubescent only on the nerves above, rather densely so with crisped hairs below; lateral nerves 11–15 on each side, distinct below, looped and branched just within the margin; petiole $\frac{1}{4}$–$\frac{3}{4}$ lin. long, tomentose. Flowers monœcious, several males and one or two females in each leaf-axil. Male pedicel short, articulated in the middle, pubescent. Sepals obovate-elliptic, rounded at the apex, 1 lin. long, slightly pubescent in the lower half, glabrous above, with a tripartite scale inside towards the base. Petals spathulate-oblanceolate, rounded at the apex, as long as the sepals, glabrous, with a solitary rounded gland within the base. Filaments connate for two-thirds of their length; anthers rounded. Rudimentary ovary cylindric, expanded and flat at the apex, glabrous. Female flowers: pedicel attaining $\frac{1}{2}$ in. long when in fruit, tomentose. Sepals oblong, rounded at the apex, $1\frac{1}{2}$ lin. long, pubescent in the lower two-thirds outside, with a bilobed scale at the base inside. Petals obovate-spathulate, $1\frac{1}{4}$ lin. long, glabrous, with a small scale at the base. Ovary pubescent between the

lobes; styles free to the base, recurved, bifid, glabrous. Capsule subglobose, $\frac{1}{4}$ in. in diam., thinly and shortly pubescent. Ripe seeds not seen.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 58.

Upper Guinea. Cameroons: Bambuttu Mountain, near Markt Singwa, 6000 ft., *Ledermann*, 1658!

8. **C. Whytei,** *Hutchinson.* A small tree (*Whyte*); branchlets grooved or angular, slightly pubescent towards the tips, becoming quite glabrous below. Leaves ovate to ovate-lanceolate, obtuse, rounded at the base, 1–2 in. long, $\frac{1}{3}$–$1\frac{1}{4}$ in. broad, entire, rigidly membranous, dull and glabrous on both surfaces; lateral nerves 8–10 on each side, looped some distance from the margin, distinct on both surfaces; petiole about 1 lin. long, glabrous. Flowers dicœcious. Male flowers numerous in each leaf-axil; pedicel about $\frac{3}{4}$ lin. long, somewhat slender, pubescent. Sepals obovate-oblong, rounded at the apex, $\frac{3}{4}$ lin. long, nearly $\frac{1}{2}$ lin. broad, membranous, slightly puberulous towards the base outside, with 3 club-shaped stalked glands towards the base of each within. Petals spathulate, slightly toothed, nearly as long as the sepals, with a solitary large fleshy gland at the base within. Staminal column cylindric, $\frac{3}{4}$ lin. long; free part of filaments spreading or slightly reflexed, $\frac{1}{3}$ lin. long, glabrous. Rudimentary ovary cylindric, truncate, $\frac{1}{3}$ lin. long, glabrous. Female flowers mostly 2–3 together in each leaf-axil; pedicel at first about 2 lin. long, pubescent, at length (in fruit) $\frac{1}{2}$ in. long and more sparingly pubescent. Sepals oblong, rounded at the apex, 1 lin. long, $\frac{1}{2}$ lin. broad, membranous, with 2–3 club-shaped stalked glands at the base within. Petals obovate, rounded at the apex, nearly equalling the sepals, eglandular at the base. Ovary glabrous; styles recurved, slender, bilobed to about the middle. Fruits subglobose, about $2\frac{1}{2}$ lin. in diam., with light-coloured tubercles. Seeds oblong-ellipsoid, $1\frac{1}{3}$ lin. long, black and smooth.

Mozamb. Distr. Nyasaland: between Mpata and the Tanganyika Plateau, 2000–3000 ft., *Whyte!* Nyika Plateau, 6000–7000 ft., *Whyte*, 175!

This species greatly resembles *C. cordata*, Bernh., and *C. heteropĥylla*, Thunb., from South Africa, both of which, however, appear to be rhizomatous plants.

9. **C. pedicellaris,** *Hutchinson.* A shrub; branches subsimple, terete, yellowish- or greyish-tomentellous. Leaves oblanceolate or oblong-oblanceolate, subacute, gradually or rarely abruptly narrowed to an acute base, 2–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, entire, membranous, glabrous on both surfaces except the slightly pubescent midrib below; lateral nerves 8–9 on each side, slightly raised below, looped well within the margin; petiole slender, $\frac{1}{3}$–$\frac{1}{2}$ in. long, tomentellous; stipules very small. Flowers dicœcious. Male flowers several in each leaf-axil; pedicel very slender, $\frac{1}{4}$ in. long, articulated a little below the middle, glabrous or very slightly puberulous. Sepals oblong-elliptic, obtuse, 1 lin. long, $\frac{1}{2}$ lin. broad, membranous, sparingly pubescent towards the base outside, glabrous within and with 3 club-shaped stalked glands at the base. Petals as long as the sepals, with a distinct claw and a solitary gland at the base of each and an ovate-obtuse limb, glabrous. Staminal column very

slender, ¾ lin. long; free part of filaments slightly reflexed, ¼ lin. long. Rudimentary ovary cylindric, truncate, ¼ lin. long, glabrous. Female flowers solitary or subsolitary, axillary; pedicel very slender, 6–7 lin. long, glabrous. Sepals narrowly oblong, rounded at the apex, 1⅓ lin. long, scarcely ½ lin. broad, membranous, glabrous on both sides, with a large bilobed scale within the base. Petals spathulate, obtuse, as long as the sepals, glabrous. Ovary glabrous; styles short. Fruits 2½ lin. in diam., pustulate. Seeds smooth, very dark brown. —*C. richardiana*, var. *pedicellaris*, Pax in Engl. Jahrb. xxiii. 531. *C. abyssinica*, var. *pedicellaris*, Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 57, partly. *C. abyssinica*. var. *desertícola*, Volkens ex Pax, l.c.

Mozamb. Distr. German East Africa: Kilimanjaro; Kilema, *Allaud*, 119! Marangu, *Volkens*, 2240! East Africa, without locality, *Taylor!*

The specimen of *Volkens*, 2240, at Kew is ♂, that at the British Museum ♀.

10. **C. abyssinica,** *Jaub. & Spach, Ill. Pl. Orient.* v. 77, *t.* 468. A shrub about 10 ft. high; branches glabrous or very thinly pubescent. Leaves lanceolate or elliptic-lanceolate, mostly obtuse, gradually narrowed to the base, 1–2½ in. long, ⅓–1 in. broad, entire, membranous or thinly chartaceous, very light green or glaucous when dry, dull and glabrous on both surfaces; lateral nerves 7–9 on each side, mostly distinct, but not at all prominent; petiole 4–7 lin. long, glabrous; stipules small. Flowers diœcious. Male flowers several in each leaf-axil; pedicel slender, about 3 lin. long, glabrous, at length articulated about the middle. Sepals obovate, rounded at the apex, cuneate at the base, about 1 lin. long, ⅔ lin. broad, membranous, glabrous on both surfaces, with 3 more or less slightly club-shaped glands at the base. Petals obovate-spathulate, as long as the sepals, with a solitary orbicular fleshy gland within the base of each. Staminal column ¾ lin. long; free part of filaments ⅓ lin. long, slightly reflexed; anthers ⅓ lin. long. Rudimentary ovary truncate, ⅓ lin. long, glabrous. Female flowers 1–3 together, axillary; pedicel about 2 lin. long when in flower, attaining ½ in. in fruit, glabrous or slightly pubescent. Sepals and petals larger than in the male, the former with 2 glands within the base of each. Ovary subglobose, glabrous or very sparingly pubescent; styles soon falling off, spreading and recurved, bilobed. Capsule about 2½ lin. in diam., reticulately wrinkled, glabrous. Seeds oblong-ellipsoid, 1½ lin. long, black and shining, minutely pitted; caruncles undulately lobed, ¾ lin. broad.—Müll. Arg. in DC. Prodr. xv. ii. 1045. *C. lanceolata*, var. *glabra*, A. Rich. Tent. Fl. Abyss. ii. 253. *C. richardiana?* Oliv. in Trans. Linn. Soc. xxix. 148, not of Müll. Arg. *C. glabrescens*, Knauf in Engl. Jahrb. xxx. 340. *C. myricoides*, Pax, l.c. xxxix. 631. *C. abyssinica*, vars. *glabra*, *firma*, and *calvescens* (partly), Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Cluytieæ, 56, 57.

Nile Land. Abyssinia: Ankober, *Roth*, 7! various localities, *Plowden*, *Schimper*, 96! 1329! Galla country; Arussi, *Ellenbeck*, 1376! Harar, *Ellenbeck*, 783! 785! Somaliland: Bidduma, *Riva*, 1262! Golis Range, *Drake-Brockman*, 199! Dara-as, *Drake-Brockman*, 565! 587! and without precise locality, *Mrs. Lort Phillips! Miss Edith Cole!* British East Africa: Mau Plateau, *Baker*, 93! Uganda: various localities, *Whyte! Dawe*, 26! *Brown*, 322! *Bagshawe*, 693!

Mozamb. Distr. German East Africa: between Kilimanjaro and Meru, *Uhlig*, 1088! Marangu, *Volkens*, 217B! Karagwe, *Speke & Grant*, 479! British Central Africa: Nyasaland; Mount Chiradzulu, *Whyte!* Masuku Plateau, 6500–7000 ft., *Whyte!* Shire Highlands, *Buchanan*, 66! 81! 101! 148! 480! 883!

South Central. Belgian Congo: Lusaka, *Kässner*, 2892!

11. **C. mollis,** *Pax in Engl. Jahrb.* xix. 112. A shrub; young branchlets yellowish-tomentose. Leaves lanceolate, elliptic or oblong-obovate, rounded at the apex, subcuneate at the base, 1–2½ in. long, ½–1½ in. broad, membranous, entire, thinly pubescent above, more densely so below; lateral nerves 4–5 on each side, spreading; petiole 2½–4 lin. long, yellowish-pubescent; stipules small and pubescent. Flowers diœcious. Male flowers numerous in the leaf-axils; pedicel up to 1½ lin. long, articulated in the middle, glabrous. Sepals elliptic, rounded at the apex, ¾ lin. long, ½ lin. broad, with a 2-lobed linear scale at the base inside, pubescent outside. Petals about the same length as the sepals, obovate, with a solitary rounded gland at the base. Filaments connate for two-thirds of their length; anthers rounded, ¼ lin. long. Rudimentary ovary cylindric, truncate, ⅓ lin. long, glabrous. Female flowers: pedicel attaining 7 lin. long in fruit, pubescent. Sepals linear-lanceolate, with membranous glabrous margins, 1 lin. long. Petals similar in shape and size but glabrous. Disk-glands 2 opposite each sepal. Ovary ovoid, pilose; styles free to the base, bilobed, glabrous. Capsule 2¼ lin. long, thinly pubescent. Seeds 1½ lin. long, black and shining, minutely pitted, with a bifid yellow caruncle.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 55. *C. leuconeura*, Pax in Engl. Jahrb. xix. 112, ex Pax, l.c. *C. abyssinica*, vars. *usambarica* and *ovalifolia*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Cluytieæ, 57.

Nile Land. British East Africa: Ndi, Taita Hills, *Hildebrandt*, 2521! Galunka, *Kässner*, 798! Ukamba, *Scott-Elliot*, 2334!

Mozamb. Distr. German East Africa: Amani, *Warnecke*, 507! Usambara; various localities, *Holst*, 144! 8931A! *Buchwald*, 159! 483! *Albers*, 126! *Meinhof*, 101! *Braun*, 2711, 2745, 2805! 2827; *Engler*, 1070! Usumburu, *Keil*, 67! and without precise locality, *Zimmermann*, 1725! *Holtz*, 1864! *Uhlig*, 165!

12. **C. rotundifolia,** *Pax in Engl. Jahrb.* xliii. 85. A tree; branchlets rather densely pubescent when young, at length glabrous. Leaves subsessile, obovate-elliptic or oblong, rounded at the apex, obtuse or rounded at the base, 1½–2 in. long, ¾–1 in. broad, rigidly subchartaceous, glabrous or nearly so above, yellowish-pubescent below; lateral nerves about 6 on each side, very prominent below, looped well within the margin; stipules small. Flowers diœcious. Male flowers axillary, few; pedicel a little longer than the sepals. Sepals suborbicular, pubescent outside, ¾ lin. long, with a 3-fid scale within at the base. Petals oblong, clawed, shorter than the sepals, with a solitary gland at the base. Stamens as in *C. mollis*. Female flowers and fruits not known.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 56.

Mozamb. Distr. German East Africa: Mondul, *Uhlig*, 440!

13. **C. volubilis,** *Hutchinson.* A straggly climber; stem and branches subterete, densely tomentose. Leaves lanceolate, narrowed to both ends, acute, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, 4–6 lin. broad, entire, rigidly chartaceous or subcoriaceous, adpressed-villous on both surfaces, with indistinct nerves; petiole 1-$1\frac{1}{2}$ lin. long, tomentose; stipules small. Flowers diœcious. Male flowers crowded and subsessile in the leaf-axils; Sepals obovate, subobtuse, about 1 lin. long and $\frac{3}{4}$ lin. broad, thick, yellow-pubescent on the outside except towards the thinner margins, glabrous and with a solitary gland just below the middle within. Petals obovate-spathulate, slightly toothed around the top, nearly as large as the sepals, glabrous. Glands several but small in the bottom of the flower. Filaments connate for three-quarters of their length; anthers $\frac{1}{4}$ lin. long. Rudimentary ovary small, entire, glabrous. Female flowers solitary, no young ones seen. Sepals in the fruiting stage narrowly lanceolate, acute, 2 lin. long, $\frac{1}{2}$ lin. broad, coriaceous, pubescent outside, biglandular at the base within. Petals spathulate-oblanceolate, acute, a little shorter than the sepals, pubescent outside. Ovary tomentose; styles not seen. Capsule nearly 3 lin. in diam., whitish-pilose. Seeds ellipsoid, black and shining, $1\frac{1}{2}$ lin. long, 1 lin. broad.

Mozamb. Distr. British Central Africa: Nyasaland; between Kondowe and Karonga, 2000–6000 ft., *Whyte!* Rhodesia: Chimanimani, *Johnson,* 188!

14. **C. gracilis,** *Hutchinson.* A climbing? shrub; branches and branchlets very slender, whitish-tomentose. Leaves lanceolate or oblong-oblanceolate, more or less obtuse at both ends, those on the main branches 1–$1\frac{1}{3}$ in. long, 4–6 lin. broad, those on the ultimate branchlets much smaller, all submembranous, rather densely pubescent on both surfaces, with a distinct midrib but no visible lateral nerves; petiole 1–2 lin. long, densely pubescent. Flowers diœcious. Male flowers about 5 in each leaf-axil; pedicel up to 1 lin. long, slightly pubescent. Sepals oblong-oblanceolate, obtuse, 1 lin. long, $\frac{1}{2}$ lin. broad, membranous, pubescent outside, glabrous and with a 2–3-fid scale below the middle within. Petals spathulate-oblanceolate, midrib distinct, glabrous and with 3 glands within the base of each. Staminal column $\frac{1}{2}$ lin. long, glabrous. Rudimentary ovary short, entire, glabrous. Female flowers: pedicel rather stout, up to 2 lin. long, very sparingly pubescent. Sepals oblong, rounded at the apex, 1 lin. long, $\frac{1}{2}$ lin. broad, slightly fleshy, nearly glabrous outside, glabrous and with an adnate fleshy slightly lobed scale within. Petals obovate-oblanceolate, $\frac{3}{4}$ lin. long, fleshy, glabrous and eglandular. Ovary glabrous; styles erect, short, bifid, glabrous. Capsule ovoid-globose, about $2\frac{1}{2}$ lin. long, smooth. Seeds ellipsoid, $1\frac{1}{4}$ lin. long, black, smooth, with a fleshy bilobed caruncle.—*C. stenophylla,* Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 63, partly.

Mozamb. Distr. Nyasaland: Kondowe to Karonga, 2000–6000 ft., *Whyte,* 362!

15. **C. Paxii,** *Knauf in Engl. Jahrb.* xxx. 341. A shrub about 3 ft. high; branches erect, densely leafy, shortly pubescent. Leaves

elliptic or oblanceolate-elliptic, rounded and obtusely mucronate at the apex, obtuse at the base, $\frac{1}{3}$–1 in. long, 3–6 lin. broad, thinly chartaceous, adpressed-pubescent on the midrib above, very thinly pubescent especially on and near the midrib below; lateral nerves few; petiole very short, scarcely $\frac{3}{4}$ lin. long. Flowers dicœcious. Male pedicel up to 1 lin. long, pubescent, articulated in the middle. Sepals obovate, rounded at the apex, pubescent outside in the lower half, membranous, with a trifid scale within the base. Petals spathulate, shorter than the sepals. Glands around the base of the staminal column about 15, small, rounded. Filaments connate for three-quarters of their length; anthers rounded. Rudimentary ovary short, entire. Female flowers solitary in each leaf-axil; pedicel $\frac{1}{2}$ lin. long, thinly pubescent. Sepals oblong, obtuse, subcoriaceous, 1 lin. long, very thinly pubescent outside, with an erect minutely 3-fid scale (disk-lobe) at the base. Petals spathulate-oblanceolate, nearly as long as the sepals, without a scale or gland at the base. Ovary subglobose, slightly trilobed, glabrous; styles short, recurved, bifid, glabrous. Fruits not known.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 60. *C. phyllanthoides*, S. Moore in Journ. Linn. Soc. xl. 198.

Mozamb. Distr. German East Africa: Ukinga Mountains; Kinyika Mountain, *Goetze*, 947! lower plateau north of Lake Nyasa, *Thomson!* Rhodesia: Melsetter district, 6000 ft., *Swynnerton*, 1120! 1722!

Both Knauf and Pax have omitted to describe the female flowers, which are numerous and exclusively on the right-hand specimen of the type sheet.

Moore (*l.c.*) remarks that *C. Paxii*, Knauf, is described as having no glands at the base of the petals. There are about 3 glands to each petal, however, and they are indicated by Knauf as follows: glandulis interioribus 15 parvis circa columnam staminalem in duos cyclos, etc.

16. **C. angustifolia,** *Knauf in Engl. Jahrb.* xxx. 340. A shrub about 3 ft. high; branches slender, terete, pilose. Leaves linear or linear-lanceolate, acute at both ends, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 2–6 lin. broad, firmly membranous, densely pubescent on both surfaces, with lateral nerves scarcely visible; petiole 1–2 lin. long, densely pubescent. Flowers dicœcious. Male flowers few in each axillary cluster; pedicels short, articulated in the middle, pubescent. Sepals oblong, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, pubescent outside, with a trilobed scale inside at the base. Petals about as long as the sepals, but narrower. Glands in the bottom of the calyx about 20. Rudimentary ovary thinly pilose around the margin of the truncate apex. Female flowers not known.

Mozamb. Distr. German East Africa: Kondeland; Ukangu Mountains, near Langenburg, *Goetze*, 894!

17. **C. richardiana,** *Müll. Arg. in DC. Prodr.* xv. ii. 1044, *excl. var.* β. A shrub; branches densely whitish-pubescent or tomentose. Leaves crowded towards the apices of the shoots, with short internodes, oblong-lanceolate, narrowed to the base, obtuse or rounded at the apex, $1\frac{1}{4}$–4 in. long, $\frac{1}{2}$–1 in. broad, entire, membranous or thinly and rigidly

chartaceous, thinly pubescent on both surfaces; lateral nerves 6–8 on each side, faintly looped some distance from the margin, more or less prominent below; petiole 2–5 lin. long, pubescent; stipules very small and tomentose. Flowers diœcious. Male flowers crowded in the leaf-axils; pedicel short. Sepals obovate, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{2}{3}$ lin. broad, yellowish-pubescent on the outside except on the membranous margin in the upper half, glabrous within. Petals obovate, narrowed to the base, about as long as the sepals, membranous, glabrous. Glands within the base of the petals numerous, small, rounded, black. Filaments connate for more than half their length; anthers $\frac{1}{3}$ lin. long. Rudimentary ovary cylindric, entire, $\frac{1}{3}$ lin. long, glabrous. Female flowers: pedicel about 1 lin. long. Sepals ovate-lanceolate, subacute, about the same size as in the male, pubescent outside. Petals oblong-oblanceolate, shorter than the sepals. Disk subpectinate, glabrous. Ovary oblong-ovoid, pubescent; styles free to the base, bilobed, glabrous. Capsule $3\frac{1}{2}$ lin. in diam., pubescent. Seeds ellipsoid, $1\frac{3}{4}$ lin. long, black and shining. Sepals and petals persistent when in fruit.—*C. lanceolata*, var. *pubescens*, A. Rich. Tent. Fl. Abyss. ii. §253. *C. richardiana*, var. *pubescens*, Müll. Arg. l.c.; Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 64. *C. lanceolata*, Hochst. ex Pax, l.c.

Nile Land. Eritrea: Saganeiti, *Schweinfurth & Riva*, 1208! 1327! 1827! Abyssinia: Shireh Province, *Petit!* Mount Sholoda, near Adowa, *Schimper*, 199! 1536! Ghaba, *Steudner*, 543! British East Africa: without precise locality, *Elliott*, 3!

Occurs also in Arabia.

18. **C. Swynnertonii,** *S. Moore in Journ. Linn. Soc.* xl. 197. A shrub; branches slender, with rather distant internodes, pubescent or almost tomentose. Leaves laxly arranged, lanceolate or oblong-lanceolate, obtuse or rounded at the apex, more or less obtuse at the base, $1\frac{1}{2}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, membranous, rather thinly pubescent and dull on both surfaces; lateral nerves 7–8 on each side, faint and very slender, looped and branched well within the margin; petiole $1\frac{1}{2}$–3 lin. long, densely pubescent. Flowers diœcious. Male flowers pale green, several in each leaf-axil; pedicel up to $1\frac{1}{4}$ lin. long, pubescent. Sepals obovate-lanceolate, rounded at the apex, $1\frac{1}{4}$ lin. long, $\frac{2}{3}$ lin. broad, shortly pubescent outside, with glabrous membranous margins, glabrous within, with a tripartite scale below the middle. Petals broadly spathulate, nearly as long as the sepals, glabrous, with 2 very small glands within the base of each. Staminal column $\frac{3}{4}$ lin. long, glabrous. Rudimentary ovary slightly expanded at the apex, glabrous. Female flowers solitary, shortly pedicellate. Sepals and petals subequal. Ovary densely pubescent; styles bipartite, pubescent in the lower part.

Mozamb. Distr. Rhodesia: Chipete and near Chirinda, 3700–4000 ft., *Swynnerton*, 197! 530A! 530B! 530C!

19. **C. robusta,** *Pax in Engl. Pfl. Ost-Afr. C.* 241. A shrub up to 12 ft. high; branches pubescent or nearly glabrous. Leaves oblong or oblong-oblanceolate, rounded at the apex, narrowed to the base,

2–5 in. long, ¾–1½ in. broad, membranous, sparingly pubescent on both surfaces or glabrous; lateral nerves 4–7 on each side, slender, looped well within the margin, slightly raised below; petiole 4–7 lin. long, pubescent. Flowers diœcious, or at least normally so; males numerous at each node; pedicel about 1¼ lin. long, pubescent. Sepals oblong, rounded at the apex, 1 lin. long, pubescent outside, with a 3–4-fid scale at the base within. Petals obovate-spathulate, nearly as long as the sepals, membranous, glabrous. Glands in the base of the flower 10–20. Female flowers solitary or 2–3 together; pedicel not more than 1 lin. long in fruit, pubescent. Sepals lanceolate, acuminate, 1⅓ lin. long, rather densely pubescent outside, with a 2–3-fid scale at the base inside. Petals spathulate-rhomboid, clawed, 1 lin. long, adpressed-pubescent outside. Ovary triangular, glabrous; styles erect, connate towards the base, bilobed, lobes linear, glabrous. Capsule slightly 6-ribbed, nearly 3 lin. in diam., glabrous. Seeds ellipsoid, 1½ lin. long, black and shining, smooth, with a rather small bifid yellow caruncle.—Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 60. *C. richardiana*, var. *trichophora*, Müll. Arg. in DC. Prodr. xv. ii. 1044. *C. kilimandscharica*, Engl. Hochgebirgsfl. Trop. Afr. 285. *C. brachyadenia*, Volkens ex Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 61. *C. robusta*, vars. *genuina*, *polyphylla* and *kilimandscharica*, Pax, l.c. 61. *C. stenophylla*, Pax & K. Hoffm. l.c. 63, partly.

Nile Land. Abyssinia: without precise locality, *Quartin-Dillon & Petit*, 217! *Schimper*, 1056! British East Africa: Lamuru, *Scheffler*, 233! Mau Plateau, *Baker*, 83! Abora, *Fischer*, 529! Lake Naivasha, *Stuhlmann*, 936!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, *Volkens*, 620! 743! 748! 772! 826! 1460! *Meyer*, 145! 331! Engongo-Engare, *Uhlig*, 506! Iraku, *Jaeger*, 223! Gurui, *Jaeger*, 258! Gazaland: Melsetter district, *Swynnerton*, 1530! Mount Pene, *Swynnerton*, 6042! Chirinda district, *Swynnerton*, 1531A!

Var. *acutifolia*, Volkens ex Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 61. Leaves acute, but otherwise similar to the type.

Nile Land. British East Africa: Aberdare Mountains, *Heller!*

Mozamb. Distr. German East Africa: Kilimanjaro, *Engler*, 1816! Moschi, *Uhlig*, 121! 1117! Mawenzi River, *Volkens*, 888!

Var. *rhododendroides*, Pax in Engl. Jahrb. xliii. 85. Leaves narrowly oblanceolate, subacute, less than ½ in. broad.—*C. robusta*, var. *salicifolia*, Volkens ex Pax in Engl. Pflanzenr. l.c.

Mozamb. Distr. German East Africa: Kilimanjaro; Yumba ya Nguaro, *Volkens*, 2010! slope of Deani volcano, *Jaeger*, 400! north-west sides of Lomalasin, *Jaeger*, 468!

Swynnerton's specimens quoted above, which are entirely female, appear to be a more glabrous form of the typical plant.

20. **C. polyadenia,** *Pax in Engl. Jahrb.* xliii. 84. A shrub; branches terete, pubescent. Leaves narrowly lanceolate, subacute at the apex and base, 1¼–2 in. long, 3–7 lin. broad, firmly membranous, nearly glabrous on both surfaces; lateral nerves about 6 on each side, faint, looped well within the margin; petiole up to 2 lin. long, usually much shorter, slightly pubescent. Flowers diœcious. Male flowers in

axillary clusters : pedicels short, articulated towards the base, pubescent. Sepals obovate, rounded at the apex, membranous, pubescent outside, with a 5-fid scale at the base within. Petals similar to the sepals, but glabrous. Glands in the bottom of the flower 12–14. Rudimentary ovary slightly obconic, truncate, glabrous. Female flowers not known. —Pax in Engl. Pflanzenr. Euphorb.-Cluytieæ, 63.

Mozamb. Distr. German East Africa: meadow region on the Ossirvalager, *Uhlig*, 378 !

42. **ALEURITES,** Forst. ; Benth. et Hook. f. Gen. Pl. iii. 292.

Flowers monœcious or subdiœcious. Petals present. Male flowers: Calyx globose and closed in bud, opening valvately into 2–3 lobes. Petals 5, longer than the calyx. Stamens 8–20, inserted on a conical receptacle, the 5 exterior opposite the petals and alternating with small glands ; filaments free or partially connate, short or elongated ; anthers erect ; cells parallel, dehiscing longitudinally. Rudimentary ovary absent. Female flowers : Perianth as in the male. Disk inconspicuous or consisting of minute glands alternating with the petals. Ovary 2–5-celled ; styles usually divided into 2 thick branches ; ovules solitary in each cell. Fruit large, drupaceous, indehiscent ; exocarp fleshy ; endocarp crustaceous or woody, 2–5-celled or 1-celled by abortion. Seeds with a thick woody testa ; albumen thick, hard ; embryo straight ; cotyledons broad and flat.—Trees with stellate or subsimple hairs. Leaves alternate, long-petiolate, large, 5–7-nerved from the base, entire or lobed ; petiole biglandular at the apex. Flowers in lax cymes ; cymes crowded at the apices of the branchlets.

Species 4, natives of Eastern Asia and the Pacific Islands, the following two cultivated in Tropical Africa.

Leaves pubescent with adpressed simple hairs when young, when lobed then with a large sessile gland at the base of each sinus between the lobes ; flower-buds pointed, glabrescent ; petals nearly 1 in. long ; stamens about 10 . . .	1. *A. cordata.*
Leaves pubescent with stellate hairs when young, when lobed then without a gland in the sinus between the lobes ; flower-buds obtuse, tomentellous ; petals $\frac{1}{4}$ in. long ; stamens about 20	2. *A. triloba.*

1. **A. cordata,** *R. Br. ex Steud. Nomencl. ed.* 2, i. 49. A tree up to 40 ft. high ; branchlets stout, glabrous, lenticellate, sometimes slightly glaucous. Leaves broadly ovate, truncate or cordate at the base, acuminate, entire or 3–5-lobed, 4–7 in. long, $3\frac{1}{2}$–8 in. broad, biglandular at the base ; when lobed with a solitary large more or less stipitate globose gland at the base of each sinus, chartaceous or submembranous, digitately 5-nerved from the base, adpressed-pubescent with simple hairs when very young, soon becoming glabrous except for the tufts of hairs in the axils of the principal and secondary nerves below ; transverse nerves parallel ; petiole $1\frac{1}{2}$–8 in. long, terete, glabrous ; stipules early deciduous. Cymes paniculate, lax-flowered ; branches slightly spreading, up to 4 in.

long, nearly glabrous; pedicels 2–3 lin. long, rather slender; bracts small. Male flowers: buds obovoid-ellipsoid, shortly acuminate, 3–4 lin. long, pubescent at the tip, otherwise glabrous. Calyx 2-lobed, divided more deeply on one side than the other, 4–5 lin. long; lobes ovate, pubescent at the tips. Petals spathulate-oblanceolate, rounded at the apex, nearly 1 in. long, 2–3½ lin. broad, hairy on the inside of the claw, otherwise glabrous. Disk-glands subulate, glabrous, 1½–2 lin. long. Stamens 10–11, in two series; filaments very slightly hairy, those of the outer series connate for nearly half their length, ½ in. long, those of the inner series connate for two-thirds of their length, ¾–1 in. long; anthers ovoid, ¾ lin. long. Female flowers: Calyx and petals as in the males. Disk-segments triangular, subacute, about 1 lin. long, glabrous. Ovary oblong-ovoid, gradually passing into the styles, densely rusty-tomentose; styles 3, connate and hairy towards the base, ½ in. long, bilobed. Ripe fruit not seen.—Müll. Arg. in DC. Prodr. xv. ii. 724, partly; Hemsl. in Kew Bulletin, 1906, 120; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 132. *A. Vernicia*, Hassk. in Flora, 1842, ii. Beibl. 3, 40. *A. japonica*, Blume ex Miq. in Ann. Mus. Bot. Lugd.-Bat. iv. 120. *A. verniciflua*, Baill. Hist. Pl. v. 116. *Dryandra cordata*, Thunb. Fl. Jap. 267, t. 27. *D. oleifera*, Lam. Encycl. ii. 329, not of Wall. Cat. *D. Vernicia*, Correa in Ann. Mus. Par. viii. 69, t. 32, fig. 1. *Elæococca cordata*, Blume, Bijdr. 618. *E. verrucosa*, A. Juss. Euphorb. Gen. Tent. t. 11, fig. 35. *E. Vernicia*, A. Juss. ex Spreng. Syst. Veg. iii. 884 (*Elæococcus*). *Vernicia montana*, Lour. Fl. Cochinch. ed. 1, ii. 587.

Mozamb. Distr. Portuguese East Africa: Chimoilo, *Johnson*, 36!

Probably a native of Japan, Cochin China and the adjacent islands.

2. **A. triloba,** *Forst. Char. Gen.* 112, *t.* 56. A large tree; branchlets scurfy stellate-puberulous, at length glabrous. Leaves entire, 3–5-lobed or rarely with a few coarse teeth, ovate or when lobed suborbicular in outline, truncate, rounded or slightly cordate at the base, 2½–9 in. long, 2–5 in. broad, with 2 sessile rounded contiguous glands at the base, but none at the base of each sinus formed by the leaf-lobes, subchartaceous, digitately 3–5-nerved from the base, pubescent with stellate hairs on both surfaces when young, at length becoming glabrous; transverse nerves faint, more or less branched and not parallel; petiole up to 6 in. long, shortly stellate-puberulous; stipules deciduous. Cymes crowded at the apex of each shoot, densely stellate-tomentellous; branches ascending; pedicels 2–3 lin. long; bracts small. Male flowers: buds ovoid, obtuse, about 1 lin. long, tomentellous. Calyx 2-lobed to the base; segments broadly ovate, obtuse, 1¼ lin. long, 1½ lin. broad, stellate-puberulous outside. Petals spathulate-oblanceolate, obtuse, 3 lin. long, scarcely 1 lin. broad, glabrous except for a few hairs on the inside at the base. Stamens about 20; outer filaments free, very short, the inner connate towards the base, all (with the receptacle) pubescent; anthers ¼ lin. long. Female flowers: Calyx and petals as in the male, but larger. Disk small, crenulate. Ovary sub-globose, tomentellous; styles very short, erect, glabrous. Fruits (*Pax*)

fleshy, nearly 2½ in. in diam., slightly 4-grooved, glabrous, 1–2-seeded. Seeds acute, wrinkled.—Forst. Prodr. 68; Hemsl. in Kew Bulletin, 1906, 121. *A. moluccana*, Willd. Sp. Pl. iv. 590; Müll. Arg. in DC. Prodr. xv. ii. 723, and in Mart. Fl. Bras. xi. ii. 304, t. 45; Benth. Fl. Austral. vi. 128; Hook. f. Fl. Brit. Ind. v. 384; Pax in Engl. Pflanzenfam. iii. 5, 73, fig. 44; Drake del Castillo, Fl. Polyn. Franç. 183; Urban, Symb. Antill. iv. 348; Pax in Engl. Pflanzenr. Euphorb.-Jatroph. 129. *A. commutata*, Geiseler, Crot. Monogr. 82. *A. Ambinux*, Pers. Syn. ii. 587. *A. cordifolia*, Steud. Nomencl. Bot. ed. 2, i. 49, not *Dryandra cordata*, Thunb. *A. lobata*, Blanco, Fl. Filip, ed. i. 756. *A. lanceolata*, Blanco, l.c. 757. *Camirium cordifolium*, Gærtn. Fruct. ii. 195, t. 125, fig. 2. *C. oleosum*, Reinw. ex Blume, Cat. Gew. Buitenz. 104. *Jatropha moluccana*, Linn. Sp. Pl. ed. i. 1006.

Upper Guinea. Cameroons, *Winkler*, 58A.

Mozamb. Distr. German East Africa: Usambara; Derema, *Scheffler*, 178! Portuguese East Africa: cultivated at Mambone, *Johnson*, 14!

A native of Malaya and Polynesia, and naturalised in many tropical countries.

Mallotus Melleri, Sim, Forest Flora of Portuguese East Africa, 107, not of Müll. Arg. (Sim, 5560), possibly belongs here.

43. CYRTOGONONE, Prain in Kew Bulletin, 1911, 231.

Flowers dicœcious, dichlamydeous. Male: Calyx globose, closed in bud, splitting into 2–3 valvate lobes. Petals 5, occasionally 6, contorted-imbricate, as long as or longer than the calyx, free. Stamens usually 27–30, occasionally more numerous, outer distinctly 2-seriate with a few distinctly central, accompanied by as many inter-staminal glands as there are stamens, those of the outer series alternate with, the central ones mixed with, the filaments; filaments free, glabrous, about thrice as long as the anthers; anthers dorsifixed, erect in bud, 2-celled; cells longitudinal, introrse, dehiscence longitudinal. Rudimentary ovary 0.—A medium to lofty tree, twigs, flowers and leaves beneath densely silvery-lepidote. Leaves long-petioled, large, alternate, entire or faintly 3-lobed, penninerved, 2-glandular at the junction with the petiole; petiole thickened at the apex and base; stipules minute. Flowers rather large, in ample terminal panicles of few-flowered cymes; bracts minute.

Species 1, endemic.

1. **C. argentea,** *Prain in Kew Bulletin*, 1911, 232. A tree, 30–100 ft. high; twigs densely silvery-lepidote. Leaves long-petioled, coriaceous, elliptic or obovate-oblong, abruptly acuminate, base wide-cuneate or rounded, margin entire or occasionally with 2 teeth or minute lobes near the apex, 6–10 in. long, 3–5 in. wide, dark green, dull and glabrous above, with 2 distinct glands at the apex of the petiole, beneath uniformly densely silvery-lepidote; petiole lepidote, 2¼–4 in. long; stipules minute. Flowers in ample terminal narrow pyramidal panicles 10–12 in. long, 4 in. across at the base; rhachis lepidote with

15–20 rather distant slightly ascending lepidote branches, the lowest about 3 in. long, each bearing 3–7 cymes; cymes 3–7-flowered, on lepidote peduncles 1½–2½ lin. long; bracts ovate-lanceolate, lepidote, very small; pedicels lepidote, 2–2½ lin. long. Calyx globose in bud, 3–4 lin. wide, densely lepidote, at length 2–3-valved. Petals 5, or sometimes 6, white, orbicular, glabrous, contorted-imbricate, the first petal quite outside, the last quite inside. Stamens usually 27–30, occasionally in 6-petaled flowers more numerous; filaments free, glabrous, about thrice as long as the anthers; anthers erect in bud, dorsifixed, 2-celled; cells parallel, introrse, dehiscence longitudinal. Receptacular glands as many as the stamens, alternate with the filaments of the outer series and mixed with the others all over the convex receptacle; glands resembling abortive sessile anthers, keeled on the back below, hirsute with stellate hairs on their inner face and minutely emarginate at the tip. Rudimentary ovary 0. Female flowers and fruit unknown.—*Crotonogyne argentea*, Pax in Engl. Jahrb. xxxiii. 283.

Upper Guinea. Cameroons: Bipinde district, Mimfia, *Zenker*, 2029! 2359! 3078! 3668! Bijoka, *Zenker*, 3893! 3894!

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessmann*, 28!

Dr. Pax has already pointed out the difficulties attending the reference of this plant to *Crotonogyne*, with which it only agrees as regards its lepidote indumentum; as now appears, the male petals of *Crotonogyne* are almost always united, not free as in *Cyrtogonone*.

44. **GROSSERA**, Pax in Engl. Jahrb. xxxiii. 281.

Flowers dicœcious, dichlamydeous. Male: Calyx ovoid or globose, closed in bud, splitting into 2, less often 3, valvate lobes. Petals 5, contorted-imbricate. Stamens 17–23, several-seriate; filaments short, inserted on an obovoid receptacle; anthers dorsifixed; cells 2, parallel, introrse, connective rather broad; base of receptacle surrounded by a ring of 5 extra-staminal glands alternate with the petals and with the stamens of the lowest whorl. Rudimentary ovary 0. Female: Calyx 5-lobed; tube short-campanulate, lined at the base by the disk; lobes coriaceous, orbicular, imbricate, with finely ciliate margins and a marked thickened external ridge which does not reach the apex. Petals 5, oblong, contorted-imbricate, much longer than the calyx. Disk cupular. Ovary 3-celled, faintly 3-keeled, glabrous; ovules in each cell solitary; styles 3, erect and closely applied in bud, ½-partite, smooth, later reflexed and with the arms slightly divaricate. Fruit a 3-coccous capsule.—Shrubs. Leaves alternate, petioled, penninerved, with 2 prominent glands at the point of junction with the petiole, margins subentire or denticulate. Flowers small or very small, in ample panicles at the ends of the branches; bracts and bracteoles small.—*Fourneaua*, Pierre MSS.

Species 2, endemic.

Lateral nerves 8–10 pairs, leaf-margins entire or slightly denticulate; stamens over 20; buds subglobose . .	1. *G. paniculata.*
Lateral nerves 13–15 pairs, leaf-margins distinctly toothed; stamens under 20; buds distinctly ovoid . . .	2. *G. major.*

1. **G. paniculata,** *Pax in Engl. Jahrb.* xxxiii. 281. Shrub 6–12 ft. high; twigs finely adpressed-pubescent. Leaves distinctly petioled, firmly membranous or chartaceous, obovate-oblong, shortly and abruptly acuminate, narrowed from about the middle to a cuneate or rounded base with two prominent glands at the junction with the petiole, margin entire or very shortly denticulate, 5–11 in. long, 1½–4 in. wide, glabrous; main nerves 8–10 on each side, slightly raised beneath; petiole ¾–1¼ in. long, glabrous, thickened near the apex. Flowers white, in terminal panicles 6–12 in. long; branches 1–1¼ in. apart, 3–6 in. long, naked in the lower half, with short ternary branchlets ⅕–½ in. long; bracts and bracteoles minute, ovate, acute, finely puberulous like the rhachis and branches; pedicel glabrous, ⅒ in. long. Male: Calyx globose or subglobose, closed in bud, 1/16–1/12 in. across, splitting into 2 or at times 3 valvate segments, glabrous externally, thinly membranous. Petals 5, contorted-imbricate, wide-ovate. Stamens 4-seriate, 5 to each whorl, on the elongated glabrous receptacle, with 2–3 terminal and central; base of the receptacle surrounded by 5 extra-staminal glands resembling sessile much-modified anthers, alternate with the filaments of the lowest 5 stamens and with the petals. Female panicles like the males but with shorter branches and with the tertiary branchlets bearing each a solitary flower, its pedicel ultimately ¼ in. long. Calyx-lobes imbricate. Petals narrow oblong, much exceeding the calyx-lobes, white. Ovary glabrous; styles at length spreading, 2-partite to the middle. Capsule ⅖ in. wide. Seed not seen ripe.—*Fourneaua obovata*, Pierre MSS.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1741! 1760! 2070! 2376! 3050! 3088! 3125! 3372! 3460! 3532!

Lower Guinea. Gaboon: near Libreville, *Klaine*, 1927! 3106! Munda, Sibange Farm, *Soyaux*, 82! Angom, 70 miles east of Gaboon, *Bates*, 557! Ufoa, 85 miles east of Gaboon, *Bates*, 539! and without precise locality, *Spire*, 73! 146

2. **G. major,** *Pax in Engl. Jahrb.* xxxiii. 282. Shrub; twigs glabrous. Leaves distinctly petioled, firmly membranous or chartaceous, obovate-oblong, stoutly and abruptly acuminate, narrowed from above the middle to a cuneate base, with two prominent glands at the junction with the petiole, margin distinctly denticulate, 10–12 in. long, 3½–4½ in. wide, glabrous; main nerves 13–15 on each side, distinctly raised beneath; petiole 1½–2½ in. long, glabrous, thickened near the apex. Flowers white, in terminal panicles, 9–18 in. long; branches 1–1½ in. apart, 3–6 in. long, naked in the lower half, with ternary branchlets ½–1½ in. long; bracts and bracteoles minute, lanceolate, glabrous like the rhachis and branches; pedicels glabrous, ⅓–½ in. long. Male: Calyx ovoid, subacute, closed in bud, ⅛ in. across, ⅙ in. long, splitting into 2–3 valvate segments, glabrous, thinly membranous. Petals 5,

contorted-imbricate, wide-ovate. Stamens 3-seriate, 5 to each whorl, on an elongated glabrous receptacle with 2–3 central and terminal; base of receptacle surrounded by 5 extra-staminal glands resembling sessile much-modified anthers, alternate with stamens of lowest whorl and with the petals. Female panicles like the males but with tertiary branchlets bearing each a solitary flower, its pedicel ultimately ¾ in. long. Calyx-lobes imbricate. Petals narrow-oblong, much exceeding the calyx-lobes. Ovary glabrous; styles at length spreading, 2-partite to the middle. Capsule not seen.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1805! 3377! 3684! 4227!

Very nearly allied to *G. paniculata*, Pax, but readily distinguished by its larger flowers with fewer stamens.

45. **MANNIOPHYTON**, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 297.

Flowers dicœcious. Petals present. Male flower: Calyx globose and closed in bud, opening valvately and irregularly. Petals connate. Disk-glands 5, pilose, alternating with the outer stamens and petals. Stamens 15–25, inserted on a pilose convex receptacle; filaments free; anthers erect; cells parallel, dehiscing longitudinally. Rudimentary ovary absent. Female flower: Calyx short, trifid; lobes valvate, soon opening. Petals 5, free, imbricate, longer than the calyx. Disk very small. Ovary setose, 3-celled; styles bipartite; branches spreading, linear; ovules solitary in each cell. Capsule large, deeply trilobed, opening into 2-valved cocci; endocarp thick and hard. Seeds shining, with a crustaceous testa; albumen fleshy.—Shrubs or climbers, hispid with stellate or simple hairs or scaly. Leaves alternate, long-petiolate, entire or 3–5-lobed, 5–7-nerved at the base; tertiary nerves parallel. Panicles long and slender, axillary; male flowers shortly pedicellate, crowded, the females a little larger and with longer pedicels.

Monotypic, endemic.

1. **M. africanum,** *Müll. Arg. in Flora*, 1864, 531. A shrub or climber up to 30 ft. high; branches scabrous with short stellate hairs. Leaves polymorphous, entire and ovate or more or less 2–3-lobed, 3½–6 in. long, 3–8 in. broad, lobes acutely acuminate, chartaceous or thinly coriaceous, scabrous with small stellate hairs on both surfaces, 5-nerved from the base; tertiary nerves prominent below, parallel, petiole up to 4 in. long, pubescent with rough stellate hairs; stipules subulate, rigid, about 1½ lin. long. Male panicles solitary or 2 or 3 together in the axils of the upper leaves, slender, up to 10 in. long, clothed with rough stellate hairs; branches slender, up to 3 in. long; bracts small; pedicels ½–1 lin. long. Flowers clustered. Calyx-lobes triangular, 1½ lin. long, 1¼ lin. broad, rusty-setulose outside, glabrous within. Corolla 1¾ lin. long, glabrous on both sides. Disk-glands very small, setulose inside. Stamens 17–20; filaments free, glabrous. Receptacle setose-pubescent. Female panicles much smaller, fewer-flowered and less

branched than those of the male. Calyx as in the male. Petals tomentellous on the outside, glabrous within. Disk absent. Ovary subglobose, densely and rigidly setose; styles erect, bifid, at length spreading and bipartite, glabrous. Capsule deeply trilobed, about 1 in. long, rusty-tomentose.—Müll. Arg. in DC. Prodr. xv. ii. 720; Benth. in Hook. Ic. Pl. tt. 1267, 1268; Stapf in Johnston, Liberia, ii. 649; De Wild. Fl. Bas- et Moyen-Congo, ii. 279. *M. Chevalieri*, Beille in Bull. Soc. Bot. France, 1908, Mém. viii. 74. *M. Wildemanii*, Beille, l.c. 124.

Upper Guinea. Sierra Leone, *Scott-Elliot*, 5925! *Smythe*, 204! Liberia: Grand Bassa, *Dinklage*, 1758! near Monrovia, *Whyte!* and without precise locality, *Bunting*, 12! Gold Coast: Akwapim Hills, *Johnson*, 795! and without precise locality, *Farmer*, 404! Ivory Coast: Bouroukrou, *Chevalier*, 16691! 16879! Grabo Villiage, *Chevalier*, 19634! Southern Nigeria: Old Calabar River, *Mann*, 2308! Oban, *Talbot*, 180 (Herb. Brit. Mus.)! 614! Cameroons: Yaunde, *Zenker*, 1404! Bipinde, *Zenker*, 3628!

Lower Guinea. Princes Island, *Mann*, 1138! Island of St. Thomas, *Welwitsch*, 463! Spanish Guinea: Nkotentangan, *Tessmann*, 323! Gaboon: near Libreville, *Klaine*, 625! 626! 3170! Sibange Farm, *Soyaux*, 234! French Congo: Brazzaville, *Chevalier*, 11072! Nounzi, *Lecomte*, 45! and without precise locality, *Thollon!*

South Central. Belgian Congo: Monbutta; Bougwa, *Schweinfurth*, 3191, 3581! Niamniam; Yuru River, *Schweinfurth*, 3267! various localities, *Sapin, Gentil, Pynaert*, 223, *Schlechter, Laurent, Hens, C*, 115! *Lescrauwaet, Flamigni.*

Var. *fulvum*, Hutchinson. Young shoots densely clothed with long slightly reflexed fulvous setose hairs.—*M. fulvum*, Müll. Arg. in Journ. Bot. 1864, 332, and in DC. Prodr. xv. ii. 720; Hiern in Cat. Afr. Pl. Welw. i. 972; De Wild. Miss. É. Laurent, i. 129, and Études Fl. Bas- et Moyen-Congo, i. 276; Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 50; De Wild. & Durand, l.c. ii. 56. *Aniso-chlamys polymorpha*, Welwitsch ex Müll. Arg. in Journ. Bot. 1864, 332.

Lower Guinea. Lower Congo: Mayombe, *Laurent;* Sonagongo, *Luja;* Kisantu, *Gillet;* near Sanda, *Oddon.* Angola: Golungo Alto; various localities, *Welwitsch*, 349! 350!

46. **CROTONOGYNE**, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 305.

Flowers diœcious, rarely casually monœcious, dichlamydeous. Male: Calyx usually lepidote, globose, slightly apiculate and closed in bud, splitting into 2–3 valvate lobes. Petals connate in a 4–6- (usually 5-) lobed corolla, rarely free, shorter than the calyx. Stamens 8–15, 1–2-seriate with often 2–5 central, on an elevated cylindric-conical glabrous receptacle surrounded at the base by a ring of free or connate extra-staminal glands alternating with stamens of the outer series; filaments short, free; anthers 2-celled, cells parallel, adnate throughout to a rather broad somewhat produced often slightly emarginate connective, dehiscence longitudinal, subintrorse. Rudimentary ovary 0. Female: Calyx usually 5-lobed, less often 4-lobed; lobes glandular or not on the margin or at the base. Petals 5 or 4, free, white, imbricate, as long as or exceeding the calyx. Disk shallow urceolate, entire or lobed. Ovary usually lepidote with flattened pectinate scales which are some-

times accompanied or replaced by stellate hairs mixed with long simple setæ, 3-celled: ovules solitary in each cell; styles 3, 2- or 3-partite, sometimes each branch again 2-partite, occasionally the arms again 2-fid. Capsule lepidote or pubescent and hispid, breaking up into 3 2-valved cocci. Seeds oblong, estrophiolate, brown overlaid with grey or yellowish blotches.—Shrubs, rarely small trees, with lepidote or occasionally stellate pubescent twigs. Leaves usually short-petioled, rather large, more or less lepidote when young, alternate, scattered or rarely clustered at the ends of twigs, alternate, entire, penninerved, with two large glands on the upper surface at the point of junction with the petiole; petiole lepidote and sometimes also stellate-pubescent, rarely setose; stipules large, ovate, acuminate, lepidote or stellate-pubescent and sometimes also setose, deciduous. Flowers in long axillary interrupted spike-like racemes often exceeding the leaves; bracts small, usually 2-glandular. Male flowers usually shortly rarely distinctly pedicelled, glomerulate or on short clustered spikelets densely clothed with imbricating bracteoles; females solitary, less often in pairs, with long stout pedicels, generally on upper part of racemes only.

Species 13, all endemic.

Male pedicel longer than calyx; male petals free . . 1. *C. Preussii.*
Male pedicel not longer than calyx; male petals united.
  Indumentum lepidote only, or 0; ovary lepidote.
    Male flowers on distinct bracteolate spikelets; female calyx 5-lobed.
      Bracts usually eglandular . . . . . 2. *C. caterviflora.*
      Bracts always 2-glandular.
        Leaves usually abruptly narrowed into a distinct false petiole; male flowers $1\frac{1}{2}$–2 lin. wide . 3. *C. Zenkeri.*
        Leaves narrowed gradually to the base; male flowers 1 lin. wide . . . . . 4. *C. manniana.*
    Male flowers glomerulate; bracts 2-glandular.
      Leaves oblanceolate; female calyx 4-lobed . 5. *C. gabunensis.*
      Leaves linear-lanceolate; female calyx 5-lobed . 6. *C. angustifolia.*
  Indumentum of stellate hairs or setæ or both, associated with or replacing the flattened scales; ovary (when known) setose.
    Leaves abruptly narrowed into a distinct false petiole.
      Male racemes simple; male calyx almost glabrous 7. *C. impedita.*
      Male racemes branched; male calyx closely stellate 8. *C. Laurentii.*
    Leaves gradually narrowed to a cuneate or narrow rounded base.
      Margins of leaves glabrous.
        Leaves oblanceolate-oblong; female calyx 4-lobed . . . . . 9. *C. lasiocarpa.*
        Leaves linear-lanceolate; female calyx 5-lobed 10. *C. parvifolia.*
      Margins of leaves setose or strigose; leaves oblanceolate oblong; female calyx 5-lobed.
        Bracts 2-glandular.
          Twigs stellate-pubescent and lepidote . . 11. *C. ikelembensis.*
          Twigs stellate-pubescent and sparingly setose 12. *C. Poggei.*
        Bracts eglandular; twigs densely strigose with spreading hairs . . . . . 13. *C. strigosa.*

1. **C. Preussii,** *Pax in Engl. Jahrb.* xxiii. 524. Shrub or small tree, 15–25 ft. high, lepidote. Leaves crowded, terminal, short-petioled, membranous, oblanceolate-oblong, acuminate, narrowed to a cordate-auriculate base, 10–20 in. long, 2–5 in. wide; petiole $2\frac{1}{2}$ lin. long; stipules ovate-triangular, acuminate, 5 lin. long. Racemes up to 2 ft. long, simple or sparingly strictly branched; flowers in both sexes occupying the greater part of the rhachis; males on short spikelets in glomerules 2–5 lin. apart, females in simple few-flowered glomerules 2–5 lin. apart; bracts 2-glandular; male pedicel 2 lin., female pedicel 3 lin. long. Male: Calyx globose, closely lepidote, $\frac{1}{2}$ lin. wide, 2–3-lobed. Petals 5, free. Stamens 7–8, 5 outer; extra-staminal glands 5, free. Female: Calyx oblong, closely lepidote, $\frac{1}{7}$ in. long; lobes 5, ovate, obtuse, with a gland at each sinus. Petals 5, free. Disk urceolate. Ovary closely lepidote; styles 3, each 2-partite. Capsule closely lepidote, 3-coccous, $\frac{1}{4}$ in. long. Seeds not seen.

Upper Guinea. Southern Nigeria: Oban, *Talbot,* **691! 694!** Cameroons: Victoria, near Bimbia, *Preuss,* **1220!** near Amarsi, *Winkler,* **355!** Lom, 700–1000 ft., *Ledermann,* **6472!**

This species differs from all the others in its cordate auriculate leaf-bases and in its free male petals. It is, therefore, at least sectionally distinct from the remainder of the genus.

2. **C. cerviflora,** *N. E. Br. ex Stapf in Journ. Linn. Soc.* xxxvii. 114. Shrub, 16–18 ft. high, lepidote. Leaves scattered, short-petioled, firm, oblong-lanceolate, shortly acuminate, narrowed to a cuneate or rounded base, 4–7 in. long, $1\frac{1}{2}$–$2\frac{3}{4}$ in. wide; petiole 5–8 lin. long; stipules ovate-lanceolate, 2–3 lin. long. Racemes 2–6 in. long; male flowers on short spikelets in glomerules $1\frac{1}{2}$–6 lin. apart, females few, solitary towards the apex of the raceme $\frac{1}{4}$–1 in. apart; bracts almost always eglandular; male pedicel $\frac{1}{2}$–1 lin., female pedicel 5–6 lin. long: occasionally the male spikelets also in sessile clusters on old wood below the leaves. Male: Calyx globose, closely lepidote, 1 lin. wide, usually 3-lobed. Corolla wide-campanulate; tube hairy within, not longer than the 5 rounded lobes. Stamens 12–13, 5 outer; extra-staminal glands large, contiguous but free. Female: Calyx oblong, closely lepidote, $\frac{1}{7}$ in. long; lobes 5, triangular, subacute, eglandular. Petals 5, free. Disk urceolate. Ovary closely lepidote; styles 3, each apparently 2-partite. Capsule closely lepidote, 3-coccous, $\frac{1}{3}$ in. long. Seeds not seen.—Stapf in Johnston, Liberia ii. 649.

Upper Guinea. Liberia: Sinoe Basin, *Whyte!* Grand Bassa; Fishtown, *Dinklage,* **1861! 2036! 2045! 2053!** Ivory Coast: between Soubira and Yasu, *Chevalier,* **17783!** Malamalasso on the lower Comoe, *Chevalier,* **17520!**

3. **C. Zenkeri,** *Pax in Engl. Jahrb.* xxvi. 327. Shrub, 4–18 ft. high, lepidote. Leaves scattered, short-petioled, firm, oblong or obovate-oblong, shortly and acutely acuminate, base acute or often abruptly narrowed to a short pseudo-petiole longer than the petiole proper, 8–9 in. long, 3–$3\frac{1}{4}$ in. wide; petiole 3–8 lin. long; stipules ovate, acuminate, $2\frac{1}{2}$ lin. long. Racemes usually 6–8 in. long, occasionally

10–18 in. long, simple; male flowers in spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, in glomerules $\frac{1}{2}$–$1\frac{1}{4}$ in. apart, rarely simply glomerulate and with a solitary central female flower accompanying each glomerule; females few, solitary, rarely in pairs towards the apex of the raceme, $\frac{1}{4}$–$1\frac{1}{2}$ in. apart; bracts always 2-glandular; male pedicel $\frac{1}{2}$–1 lin. long; female pedicel stout $\frac{1}{2}$–$\frac{3}{4}$ in. long; casually male and female racemes on the same branch, and casually a solitary female flower at base of male raceme; occasionally male spikelets also in sessile clusters. Male: Calyx globose, closely lepidote, $1\frac{1}{2}$–2 lin. wide, 3–4-lobed. Corolla wide-campanulate; tube hairy within, much longer than the 6–8 rounded lobes. Stamens 11–19, 6–8 outer; extra-staminal glands 6–8, free. Female: Calyx oblong or ovoid-oblong, closely lepidote, $\frac{1}{6}$ in. long; lobes 5, oblong, obtuse, eglandular or occasionally with 1–2 marginal glands. Petals 5, free. Disk urceolate. Ovary closely lepidote; styles 3, each 2-partite, with the arms usually again 2-partite and occasionally the individual segments 2-fid at the tips. Capsule closely lepidote, 3-coccous, $\frac{1}{3}$ in. long. Seeds oblong, $\frac{1}{4}$ in. long, brown overlaid with silver-grey blotches.

Upper Guinea. Cameroons: Ilende; Elabi, *Ledermann*, 592! Kribi; by the Kribi River, *Ledermann*, 705! Nkolebunda; Mabenauga, 350 ft., *Ledermann*, 724! Slopes of Nanga, 650–750 ft., *Ledermann*, 735! 813! 882! Mbonde, 650 ft., *Ledermann*, 793! near Batanga, *Bates*, 118! *Dinklage*, 1055! 1179! Ebea, *Dinklage*, 202! 202A! Bipindi, *Zenker*, 821! 822! *Staudt*, 272!

Lower Guinea. Gaboon: Libreville and neighbourhood, *Klaine*, 351! 747! 768! 936! 993! 1765! 2048! 3087!

4. **C. manniana,** *Müll. Arg. in Flora*, 1864, 535. Shrub, 10–12 ft. high, lepidote. Leaves scattered, short-petioled, firm, oblanceolate-oblong, abruptly and shortly cuspidate, narrowed from beyond the middle to an acute base, 6–11 in. long, 2–4 in. wide; petiole 3–9 lin. long; stipules ovate, acuminate, $2\frac{1}{2}$ lin. long. Racemes up to 1 ft. long, simple; bracts 2-glandular; male flowers on very short spikelets in glomerules $\frac{1}{4}$–$1\frac{1}{2}$ in. apart, females few, solitary towards the apex of the raceme, about $\frac{3}{4}$ in. apart; pedicel stout, at first $\frac{1}{4}$ in., at length $\frac{3}{4}$ in. long. Male: Calyx globose, closely lepidote, 1 lin. wide, usually 3-lobed. Corolla wide-campanulate; tube hairy within, rather longer than the 5 wide-oblong lobes. Stamens 12–13, 5 outer; extra-staminal glands slightly connate. Female: Calyx oblong, closely lepidote, $\frac{1}{6}$ in. long; lobes 5, lanceolate, subacute, sometimes with a gland at each sinus and with usually 1–2 (occasionally 3) pairs of marginal glands. Petals 5, free, Disk urceolate. Ovary closely lepidote; styles 3, each 3-partite. Capsule closely lepidote, 3-coccous. Seeds not seen ripe.—DC. Prodr. xv. ii. 721; Pax in Engl. Jahrb. xix. 83.

Upper Guinea. Fernando Po, *Mann*, 219! 220!

5. **C. gabunensis,** *Pax in Engl. Jahrb.* xix. 82. Shrub 10–12 ft. high, lepidote, Leaves scattered, short-petioled, firm, oblong-lanceolate, acutely rarely abruptly acuminate, narrowed from beyond the middle to an acute base, rarely abruptly narrowed to a distinct pseudo-petiole

longer than the petiole proper, 9–13 in. long, 3½ in. wide; petiole 6–8 lin. long; stipules ovate, acuminate, 3–4 lin. long. Racemes up to 1½ ft. long, males simple, females simple or sparingly branched; bracts 2-glandular; male flowers in few-flowered glomerules ½–1¼ in. apart, females few, solitary towards the apex of the main rhachis and branches, pedicel ¼–½ in. long. Male: calyx globose, closely lepidote, 1 lin. wide, usually 2-lobed. Corolla wide-campanulate; tube hairy within, longer than the 5 wide-ovate lobes. Stamens about 10, 5 outer; extra-staminal glands slightly connate. Female: Calyx oblong, closely lepidote, ⅙ in. long; lobes 4, wide-ovate, obtuse, eglandular. Petals 4, free. Disk urceolate. Ovary closely lepidote; styles 3, each 3-partite or twice 2-partite. Capsule closely lepidote, 3-coccous, ⅓–½ in. long. Seeds oblong, ¼–⅓ in. long, brown overlaid with pale yellow glistening blotches.

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 257! French Congo; Mayumba forests, *Thollon*, 4006!

6. **C. angustifolia,** *Pax in Engl. Jahrb.* xix. 83. Shrub, 9–11 ft. high, lepidote. Leaves scattered, short-petioled, firm, linear-lanceolate, acute, base narrow-cuneate, 10–13 in. long, 1¼–1½ in. wide; petiole 2½–7 lin. long; stipules ovate-acuminate, 3–3½ lin. long. Racemes up to 12 in. long; male flowers in simple few-flowered glomerules 2–10 lin. apart; females few, solitary or rarely in pairs towards the apex of the raceme, ½–2½ in. apart; bracts 2-glandular; male pedicel ½ lin. long, female pedicel 5–6 lin. long. Male: Calyx globose, closely lepidote, 1 lin. wide, 2–3-lobed. Corolla narrow-campanulate; tube slightly hairy within, considerably longer than the 5 ovate lobes. Stamens 10–11, 5–6 outer; extra-staminal glands 5–6, free. Female: Calyx oblong, closely lepidote; lobes 5, lanceolate, acute, eglandular. Petals 5, free. Disk urceolate, shortly lobed. Ovary closely lepidote; styles 3, each 2-partite, the arms again 2-fid. Capsule closely lepidote, 3-coccous, ⅓ in. long. Seeds oblong, ¼ in. long, brown overlaid with silver-grey blotches.—*C. Soyauxii*, Prain in Kew Bulletin, 1912, 103.

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 256!

7. **C. impedita,** *Prain in Kew Bulletin*, 1911, 264. Shrub, 6–8 ft. high, stellate-pubescent and sparingly lepidote. Leaves scattered, short-petioled, firm, narrow-oblong, acutely acuminate, base abruptly narrowed to a long pseudo-petiole much longer than the petiole proper, 10–12 in. long, 2¼–3½ in. wide; petiole 3–4 lin. long; stipules ovate, acuminate, 2 lin. long, stellate-pubescent and setose with simple hairs. Racemes 6–20 in. long, simple; bracts 2-glandular; male flowers in few-flowered glomerules ¼–⅓ in. apart; females few, solitary towards the apex of the racemes, pedicel stellate-pubescent, ¼–⅔ in. long. Male: Calyx globose, glabrous or with a few scattered stellate hairs, 1 lin. wide, usually 2-lobed. Corolla campanulate, margin entire or slightly undulate; tube hairy within. Stamens about 10, 6 outer; extra-staminal glands connate in a crenulate cup. Female: Calyx oblong, sparingly lepidote and densely stellate-pubescent, ⅙ in. long; lobes 5, narrow-oblong,

obtuse, eglandular or sometimes with a few glands. Petals 5, free. Disk urceolate. Ovary densely stellate-pubescent and setose with long simple stiff hairs; styles 3, each 3-partite, stellate-pubescent at the base outside below the division. Capsule (only seen young) densely stellate-pubescent and sparingly setose.

Upper Guinea. Cameroons: Johann-Albrechtshöhe; Mundame, 650 ft., *Buesgen*, 163! Lom, 650–1000 ft., *Ledermann*, 6397!

8. **C. Laurentii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 278, *t.* 73, *excl. fig.* 2. Shrub, stellate-pubescent and sparingly lepidote. Leaves scattered, short-petioled, firm, oblanceolate-oblong, acutely acuminate, slightly narrowed from beyond the middle to the lower tenth and then abruptly narrowed to a long pseudo-petiole much longer than the petiole proper, 10–14 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ in. wide; petiole $2\frac{1}{2}$–3 lin. long; stipules ovate, acuminate, $2\frac{1}{2}$ lin. long, stellate-pubescent and sparingly lepidote. Racemes 2–$2\frac{1}{2}$ ft. long, rather laxly paniculately branched; branches 6–15 in. long, subtended by lanceolate leafy bracts $\frac{1}{5}$–$\frac{1}{3}$ in. long; bracts 2-glandular; male flowers in few-flowered glomerules $\frac{1}{3}$–$\frac{1}{2}$ in. apart. Male: Calyx globose, stellate-pubescent and sparingly lepidote, 1 lin. wide, usually 3-lobed. Corolla campanulate; tube hairy within; margin very shortly lobed. Stamens about 18, 5 outer; extra-staminal glands connate in a glabrous lobed ring. Female flowers not seen.—Th. & Hél. Dur. Syll. Fl. Congol. 490.

South Central. Belgian Congo: Lualaba-Kasai Distr.; Batempa, *Laurent!*

9. **C. lasiocarpa,** *Prain in Kew Bulletin.* 1911, 265. Shrub, lepidote and sparingly stellate-pubescent. Leaves scattered, short-petioled, firm, oblong-ovate to oblanceolate-oblong, acutely acuminate, narrowed to an acute base, 6–12 in. long, 2–$4\frac{1}{2}$ in. wide; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. long, lepidote; stipules ovate, acuminate, lepidote and sparingly stellate-pubescent, 3–4 lin. long. Racemes up to 9 in. long, simple or the females sparingly branched; bracts 2-glandular; male flowers in few-flowered glomerules $\frac{1}{5}$–$\frac{1}{3}$ in. apart; females few, solitary towards the ends of the racemes, pedicel lepidote, $\frac{1}{4}$ in. long. Male: Calyx globose, closely lepidote, 1 lin. wide, usually 2-lobed. Corolla wide-campanulate, margin very slightly lobed; tube hairy within. Stamens about 10, 6 outer; extra-staminal glands free, distinct. Female: Calyx oblong, closely lepidote, $\frac{1}{6}$ in. long; lobes 4, narrow-lanceolate, subacute, eglandular. Petals 4, free. Disk deeply lobed. Ovary closely lepidote and setose with long simple stiff hairs; styles 3, each 7-partite or twice 2-partite, stellate-pubescent at the base outside below the division. Capsule (only seen young) densely lepidote and setose.

Lower Guinea. Spanish Guinea: Akonangi, *Tessmann*, 947! 1002! and without precise locality, *Tessmann*, 991!

10. **C. parvifolia,** *Prain in Kew Bulletin*, 1912, 102. Shrub, 14–18 ft. high; twigs glabrous. Leaves scattered, short-petioled, firm, narrowly lanceolate, obtuse or subacute, narrowed to an acute base, 3–4 in. long, $\frac{1}{2}$ in. wide, quite glabrous; petiole $\frac{1}{5}$–$\frac{1}{4}$ in. long, sparingly

stellate-puberulous; stipules ovate-lanceolate, acute, 2 lin. long, stellate-puberulous. Racemes up to 9 in. long, simple; bracts 2-glandular; male flowers in few-flowered glomerules $\frac{1}{3}$–$\frac{1}{2}$ in. apart; female flowers solitary towards the ends of the racemes; pedicel stellate-puberulous, $\frac{1}{3}$ in. long. Male: Calyx globose, stellate-puberulous, 1 lin. wide, 2-lobed. Corolla wide-campanulate, margin distinctly 5-lobed; lobes orbicular; tube hairy within. Stamens about 12, 5 outer; extra-staminal glands free, distinct. Female: Calyx oblong, stellate-puberulous, $\frac{1}{6}$ in. long; lobes 5, ovate-lanceolate, obtuse, eglandular. Petals 5, free. Disk subentire. Ovary densely clothed with simple stiff hairs; styles 3, each twice partite, glabrous throughout.—*C. angustifolia*, Prain in Kew Bulletin, 1912, 103, not of Pax. *Manniophyton angustifolium*, Baill. Bull. Soc. Linn. Par. ii. 954.

Lower Guinea. Gaboon: Ogowe River, *Thollon*, **134**! **361**! **769**!

A very distinct species, growing on rocks in river-beds, which are completely covered when the rivers are in flood.

11. **C. ikelembensis,** *Prain in Kew Bulletin*, 1911, 264. Shrub, stellate-pubescent and lepidote. Leaves scattered, short-petioled, firm, obovate, acute, slightly narrowed from beyond the middle to the suddenly wide cuneate base, margin distantly setose, 6–10 in. long, 2–$3\frac{1}{2}$ in. wide; petiole very stout, 5 lin. long; stipules ovate, acute, $2\frac{1}{2}$ lin. long. Racemes up to 14 in. long, simple or sparingly branched; branches short; bracts 2-glandular; male flowers in few-flowered glomerules 1 in. apart below, $\frac{1}{4}$–$\frac{1}{3}$ in. apart higher up. Male: Calyx globose, densely stellate-pubescent and sparingly lepidote, $1\frac{1}{2}$–2 lin. wide, 3-lobed or occasionally 4-lobed. Corolla wide-campanulate; tube hairy within, hardly exceeding the 5 orbicular truncate or emarginate lobes. Stamens about 18, 5 outer; extra-staminal glands shortly connate in a lobed ring hirsute outside like the interior of the corolla-tube. Female flowers not seen.—*C. Laurentii*, var. *ikelembense*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 278, t. 73, fig. 2; Th. & Hél. Dur. Syll. Fl. Congol. 490.

South Central. Belgian Congo: Equatorial Province; Bombimba on the Ikelemba River, *Laurent*!

12. **C. Poggei,** *Pax in Engl. Jahrb.* xix. 84. Shrub, rusty stellate-pubescent and sparingly setose. Leaves scattered, short-petioled, firm, obovate or oblanceolate-oblong, shortly acutely acuminate, narrowed to an acute or rarely rounded or subcordate base, margin distantly setose, 5–10 in. long, 2–3 in. wide; petiole 4–8 lin. long, sparingly stellate-pubescent and with sometimes a few stiff simple hairs; stipules ovate, acuminate, 3–$3\frac{1}{2}$ lin. long, densely stellate-pubescent and sparingly setose. Racemes 4–7 in. long, simple, stellate-pubescent; male flowers in few-flowered glomerules $\frac{1}{3}$–$\frac{1}{2}$ in. apart; females few, solitary towards the apex of the racemes, pedicel stellate-pubescent, in fruit 7–8 lin. long; bracts stellate-pubescent and 2-glandular. Male: Calyx globose, closely stellate-pubescent, 1 lin. wide, 3-lobed. Corolla wide-campanulate, margin distinctly 5-lobed; tube hairy within. Stamens about

15, 5 outer; extra-staminal glands short, wide, obtuse, faintly connate, glabrous. Female: Calyx oblong, closely stellate-pubescent, $\frac{1}{6}$ in. long; lobes 5, ovate-lanceolate or ovate, subacute, eglandular or occasionally glandular. Petals not seen. Disk depressed-urceolate. Ovary not seen. Capsule densely stellate-pubescent and sparingly setose, $\frac{1}{3}$ in. long. Seeds ovoid, $\frac{1}{4}$ in. long, reddish-brown overlaid with white or pale yellow glistening blotches.—*C. Sapini*, De Wild. Comp. Kasai, 329. *C. Thonneri*, De Wild. Pl. Thonn. Congol. ii. 226, t. 10.

South Central. Belgian Congo: Equatorial Province; Upper Lopori, *Bieler*, **8**! Bangala; Mombongo, Mongala, **1460** ft., *Thonner*, **171** bis! Eastern Province; near Nyangwe, *Dewèvre*, **1072**! Lualaba-Kasai Distr.; Mukenge, *Pogge*, **1326**! Bondo, *Sapin*.

13. **C. strigosa,** *Prain in Kew Bulletin*, 1912, 191. Shrub, everywhere more or less strigose with stiffish spreading hairs. Leaves scattered, short-petioled, thin, obovate or oblanceolate-oblong, rather long-acuminate, narrowed from beyond the middle to a narrow rounded or truncate base, margin sparingly strigose, 7–12 in. long, $2\frac{1}{2}$–4 in. wide, dark green, sparingly strigose on the nerves and veins on both surfaces; petiole 3–5 lin. long, densely strigose with spreading hairs; stipules narrowly oblong-lanceolate, 9–10 lin. long, densely strigose externally. Racemes 6–10 in. long, simple, densely strigose with spreading hairs; male flowers in few-flowered glomerules $\frac{1}{3}$–$\frac{1}{2}$ in. apart; females few, solitary towards the apex of the racemes; pedicel densely strigose, in fruit 3–4 lin. long; bracts densely strigose externally. Male: Calyx globose, closely and shortly pubescent externally, 1 lin. wide; 3-lobed. Corolla campanulate, margin entire or slightly undulate; tube glabrous within. Stamens about 10, 4 outer; extra-staminal glands orbicular, glabrous, contiguous but quite free. Female: Calyx narrow-ovoid, densely strigose externally, $\frac{1}{4}$ in. long; lobes 5, narrow-lanceolate, acute, eglandular. Petals white, orbicular, imbricate, shorter than the calyx-lobes. Disk shallow-urceolate. Ovary strigose. Capsule densely strigose, $\frac{1}{3}$ in. long.

Lower Guinea. Southern Nigeria: Oban, *Talbot*, **658**! **659**!

47. **TANNODIA**, Baill.; Benth. et Hook. f. Gen. Pl. iii. 304.

Flowers diœcious or polyamo-diœcious, dichlamydeous. Male: Calyx ovoid or subglobose, closed in bud, splitting into 2–5 valvate lobes. Petals 4–5, imbricate. Stamens 7–12, 2-seriate; filaments of the outer series usually shorter than the inner, filaments of the inner series usually slightly connate below; anthers dorsified or almost basifixed, cells 2, parallel, opening by longitudinal slits, those of the outer series always introrse, of the inner extrorse or lateral. Disk of 4–5 glands alternate with the petals and outer filaments. Rudimentary ovary 0. Female: Calyx 4–5-fid to -sect; lobes unequal, imbricate. Petals 4–5, imbricate. Disk annular or cup-shaped. Ovary 3-celled, more or less hispid or tomentose; styles 3, slightly united below, at first erect, ultimately

recurved, glabrous, 2-partite. Capsule 3-coccous; cocci 2-valved. Seeds ovoid; testa crustaceous, dull; albumen firmly fleshy; cotyledons broad, flat.—Shrubs or trees. Leaves alternate, petioled, generally 3–5-nerved at the base, midrib thereafter penninerved, margin entire or casually faintly 3-lobed. Flowers small or very small, in straight terminal subspicate racemes, bracteate and bracteolate; pedicels articulate; in both sexes usually 2, less often 3 or more, rarely solitary to a bract.—*Holstia*, Pax in Engl. Jahrb. xliii. 220.

Species 4; three in Tropical Africa, one in the Mascarene Islands.

Tall trees; petals always longer than the sepals; pedicels longer than the calyx; flowers 1–2 to a bract . .	1. *T. Swynnertonii.*
Shrubs; petals always shorter thau the sepals.	
Pedicels longer than the calyx; flowers 1–2 to a bract	2. *T. tenuifolia.*
Pedicels shorter than the calyx; flowers 3 or more to a bract	3. *T. sessiliflora.*

1. **T. Swynnertonii,** *Prain in Journ. Bot.* 1912, 127. A tall tree with a fluted trunk and a hard durable timber; twigs glabrous. Leaves distinctly petioled, firmly membranous, ovate or ovate-lanceolate, somewhat abruptly narrowed below the obtuse apex, base wide-truncate or cuneate, margin somewhat undulate, rarely quite entire, $2\frac{1}{2}$–4 in. long, $1\frac{1}{2}$–$2\frac{3}{4}$ in. wide; nerves 4–5 on each side, the lowest pair quite basal; medium green above, paler beneath, glabrous; petiole glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; stipules caducous, ovate, obtuse, $\frac{1}{8}$ in. long. Flowers in subspicate pedunculed racemes terminating the leafy twigs, male racemes up to 8 in. long, female 3–4 in. long; males usually 2 to a bract, females usually solitary, less often 2 to a bract, the latter developed of the two in female racemes being occasionally a male; male pedicel 2 lin. long, female pedicel up to 5 lin. long; bracts ovate, coriaceous, 1 lin. long; bracteoles oblong, membranous, nearly as long. Male: Calyx globose, closed in bud, splitting into two valvate segments, slightly pubescent outside. Petals 4, orbicular, imbricate, rather larger than the sepals, below pubescent on the inner face with long viscid hairs. Stamens 7–8, 4 outer, surrounded by a ring of large fleshy glands alternate with the petals and the filaments of the outer series; filaments considerably longer than the anthers. Female calyx subglobose, smaller than the male; lobes triangular, pubescent externally. Petals orbicular, 3–4 times larger than the calyx-lobes. Ovary densely tawny-tomentose. Capsule 3-coccous. Seeds large, ovoid, brown; testa dull.—*Croton Swynnertonii*, S. Moore in Journ. Linn. Soc. Bot. xl. 194.

Mozamb. Distr. Gazaland: Chirinda Forest, 3700–4000 ft., *Swynnerton*, 109! 6519!

2. **T. tenuifolia,** *Prain in Journ. Bot.* 1912, 128. A shrub, 7–10 ft. high, wood soft, twigs pubescent. Leaves distinctly petioled, membranous, ovate, shortly and abruptly acuminate, base rounded, margin entire or casually unequally 3-lobed, $2\frac{1}{2}$–3 in. long, $1\frac{1}{4}$–2 in. wide; nerves 3–4 on each side, the lowest pair quite basal, dark green above, paler beneath, sparingly pubescent above, more densely pubescent, sometimes almost

velvety, especially on the nerves beneath; petiole pubescent, ½–1¼ in. long; stipules caducous. Flowers in subspicate racemes, 2–2½ in. long, terminating the leafy twigs; males in pairs or solitary, females solitary; male pedicel 1–1½ lin. long, female pedicel 2½ lin. long; bracts lanceolate, membranous, very small; bracteoles minute. Male: Calyx ovoid, obtuse, closed in bud, splitting into 2–5 valvate segments, pubescent outside with spreading hairs. Petals 5, less often 4, orbicular, shortly clawed, much shorter than the calyx-segments, pubescent on the inner face with long viscid hairs. Stamens 8–12, outer 5, less often 4, surrounded by a ring of glands alternating with the petals and filaments of the outer series; filaments considerably longer than anthers, clothed in the lower half with long viscid hairs. Female calyx ovoid, much larger than the male; lobes divided nearly to the base, subspathulate, 3 larger than the remaining 2, pubescent externally. Petals much shorter than the calyx-lobes. Ovary sparingly setose. Capsule 3-coccous.—*Holstia tenuifolia*, Pax in Engl. Jahrb. xliii. 220.

Mozamb. Distr. German East Africa: Lofia River, 2000 ft., *Goetze*, 442! Portuguese East Africa: Boruma, *Menyharth*, 794! British Central Africa: Nyasaland: Shire Highlands; Ruo, *Scott-Elliot*, 8664!

Var. *glabrata*, Prain in Journ. Bot. 1912, 128. Leaves oblong, acute, base rounded or truncate, 3–4 in. long, 1¼–1½ in. wide, quite glabrous on both surfaces. Male flowers as in the type.

Mozamb. Distr. German East Africa: East Usambara; between Lungusa and Derema, 1500–2000 ft., *Engler*, 444! Portuguese East Africa: Mozambique; Gorongoza, on the M'Kulumazi River, *Vasse*, 440!

The leaves of this variety are exactly like those of *T. sessiliflora*; the flowers are exactly as in the type.

3. **T. sessiliflora,** *Prain in Journ. Bot.* 1912, 128. A shrub, 6 ft. high; twigs glabrescent or glabrous. Leaves distinctly petioled, membranous, oblong, acute or acuminate, base rounded or truncate, margin entire, 3½ in. long, 1¾ in. wide; nerves 4–5 on each side, the lowest pair quite basal, glabrous when mature, dark green; petiole glabrous, 1¼ in. long; stipules caducous. Flowers in spike-like racemes 4–5 in long, terminating the leafy twigs, males 3 or more to each bract, rather densely glomerate; pedicels very short; bracts ovate, concave, minute; bracteoles very minute. Male calyx ovoid, subacute, closed in bud, splitting into 2–3 valvate segments, externally sparingly pubescent. Petals 5, very short, orbicular, not clawed. Stamens 8–10, 5 outer, surrounded by a ring of glands alternate with the petals and filaments of the outer series; filaments shorter than the anthers, glabrous. Female flowers not seen.—*Holstia sessiliflora*, Pax in Engl. Jahrb. xliii. 220.

Mozamb. Distr. German East Africa: Usambara; Buiti, *Holst*, 2377!

48. **AGROSTISTACHYS,** Dalz.; Benth. et Hook. f. Gen. Pl. iii. 302.

Flowers diœcious, dichlamydeous. Male: Calyx globose, closed in bud, splitting into 2–5 membranous valvate lobes. Petals usually 5,

obovate. Stamens 5–20, inserted on a convex glabrous or pubescent receptacle; filaments filiform, free or slightly united below, surrounded or not by a ring of extra-staminal glands; anther-cells pendulous from a thickened connective, the cells nearly free, dehiscing longitudinally. Rudimentary ovary present or 0. Female: Calyx as in the male. Petals as in the male, but very deciduous. Disk annular, thick, with or without minute staminodes. Ovary 3-celled; ovules in each cell solitary; styles 3, spreading, 2-partite. Capsule dry or somewhat fleshy, breaking up into 3 2-valved cocci; endocarp crustaceous. Seeds subglobose; testa crustaceous, shining; albumen thick, fleshy; embryo straight or slightly curved; cotyledons broad, flat.—Trees with glabrous branches. Leaves alternate, petioled or subsessile, large, entire or dentate, peninnerved; stipules often leaving an annular scar. Flowers minute, in lateral cylindric close or open spike-like racemes; males several to a bract, females solitary.

Species 8 or 9, one in our area, one in the Mascarene Islands, the rest South-east Asiatic.

1. **A. africana,** *Müll. Arg. in Flora*, 1864, 534. Small tree, 25 ft. high; young shoots glabrous. Leaves distinctly petioled, firmly membranous, oblong, acute, base wide-cuneate or almost rounded, 7–15 in. long, 3–6 in. wide, rather pale green, dull and glabrous on both surfaces, with 2 basal glands on the upper side at the junction of blade and petiole; petiole glabrous, 1–2 in. long, narrowly winged towards the apex: stipules glabrous, striate, connate in an acuminate sheath 1–1¼ in. long enclosing the next succeeding leaf and falling off as this expands leaving a horizontal scar. Racemes axillary, 2–3 in. long, somewhat spike-like, rhachis sparingly puberulous; bracts striate, subscarious, ovate-oblong, 2-fid, resembling the stipules but smaller, only 2–2½ lin. long and as much apart; pedicels 2–3 lin. long, puberulous, articulate near the base. Male: Calyx closed in bud, glabrous, irregularly valvately lobed; lobes reflexed. Petals 5, white, imbricate. Stamens 20–21; filaments free, glabrous, 4-seriately arranged on a convex pilose receptacle; receptacular glands 0. Female: Calyx and petals as in the males. Disk thick, annular, accompanied by minute staminodes like short male filaments. Ovary densely pilose. Fruit not seen.—DC. Prodr. xv. ii. 725; Hiern in Cat. Afr. Pl. Welw. i. 973; Pax in Bolet. Soc. Brot. x. 160.

Upper Guinea. Fernando Po, at 4000 ft., *Mann*, 582!

Lower Guinea. Island of St. Thomas, *Mann*, 1079! *Welwitsch*, 441! *Quintas*, 23!

49. **CAPERONIA**, St. Hil.; Benth. et Hook. f. Gen. Pl. iii. 304.

Flowers monœcious, rarely dicecious, dichlamydeous. Male: Calyx closed in bud, ovoid or subglobose, splitting into 5 valvate lobes. Petals 5, imbricate, subequal, or with the two lowest distinctly or much smaller than the other 3 or casually obsolete. Disk obsolete. Stamens usually 10; filaments connate below in a column, distinctly 2-seriate

above; free portion of filaments spreading; anthers short, ovoid; cells 2, dehiscing longitudinally, pendulous from tip of glandular connective. Rudimentary ovary cylindric, crowning the apex of the staminal column. Female: Sepals 5–6, rarely 8–10, generally unequal, imbricate, the outer smaller than the inner. Petals 5, subequal, narrower than the larger petals in the male. Disk 0. Ovary sessile, 3-celled; ovules solitary in each cell; styles slightly connate at the base, ovate, deeply laciniate. Capsule 3-coccous; cocci 2-valved, beset externally with flattened or subulate processes mixed with or passing into gland-tipped setæ. Seeds subglobose or oblong-globose; testa very minutely punctate-reticulate, without a caruncle.—Erect annual herbs (the African species), with usually branching stems. Leaves alternate, shortly petioled. Flowers in lax axillary peduncled racemes, each solitary to a bract; the upper males, the lower females.

Species about 12, mostly in tropical South America, a few in Africa.

Leaves palmately nerved at the base, their margins crenate; male petals subequal; female sepals 6 . . . . 1. *C. latifolia.*
Leaves pinnately nerved throughout.
  Leaf-margins crenate; male petals unequal; female sepals 6; seeds globose, pale grey . . . . 2. *C. Buchanani.*
  Leaf-margins serrate.
    Male petals unequal; female sepals usually 6, sometimes 5.
      Seeds globose.
        Seeds deep blue-grey or nearly black . . 3. *C. Stuhlmanni.*
        Seeds tawny or brownish . . . . . 4. *C. palustris.*
      Seeds oblong-globose, pale yellow or tawny . . 5. *C. senegalensis.*
    Male petals usually subequal; female sepals 8–10; seeds oblong-globose, usually pale yellow or tawny, occasionally black . . . . . 6. *C. serrata.*

1. **C. latifolia,** *Pax in Bolet. Soc. Brot.* x. 159. An annual herb; stems simple, rather stout, soft, hispid upwards, 2 ft. high. Leaves short-petioled, ovate, acute, margin crenate, base rounded truncate or slightly cordate, $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{3}{4}$–$2\frac{1}{2}$ in. wide, medium to dark green above, paler beneath, sparingly hispid especially on the nerves and principally beneath, base 5-nerved, midrib giving off 5–8 nerves on each side; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long, hispid; stipules lanceolate, $2\frac{1}{2}$ lin. long, caducous. Racemes $1\frac{1}{2}$–2 in. long; rhachis and pedicels hispid or pubescent; bracts small, linear-subulate. Male sepals 5, triangular, acute, almost glabrous. Petals 5, obovate-oblong, subequal, rather longer than the sepals. Stamens about 10; filaments short. Female sepals 6, unequal, 3 outer lanceolate, much smaller than the 3 inner, obovate-spathulate, acute. Petals 5, oblanceolate, obtuse, shorter than the inner sepals. Ovary closely beset with flattened acute processes. Capsule shortly muricate; accrescent sepals $\frac{1}{3}$–$\frac{1}{4}$ in. long. Seeds not seen.—Pax in Engl. Jahrb. xix. 81.

Upper Guinea. Cameroons: Victoria, *Dusén,* 281 !

Lower Guinea. Island of St. Thomas, *Moller,* 183 !

Also in South America and the West Indies.

Dusén's Cameroon specimen has the leaves rather distinctly punctate above, but does not otherwise differ from Möller's St. Thomas's Island plant. This very distinct species, though first described from African material, appears to be an introduction from America, where it is wide-spread (West Indies, *Hb. Forsyth*: Panama, *Sutton Hayes* **703**; Brazil, *Trail* **743**; Peru, *Tweedie*), and has hitherto been confused now with *C. palustris*, now with *C. castaneæfolia*. It is the only *Caperonia*, besides *C. cordata*, St. Hil., with the leaves palmately nerved at the base.

2. **C. Buchanani,** *Baker in Kew Bulletin*, 1912, 103. An annual herb; stems simple, stout, soft, hispid upwards, 1 ft. high. Leaves short-petioled, upper oblong or oblanceolate-oblong, acute, lower obovate, obtuse, margin crenate, base crenate, upper 1½–2 in. long, ¾–1 in. wide, lower 1–1½ in, long, medium green above, paler beneath, sparingly hispid on the nerves especially beneath; main-nerves 5–9 on each side; petiole ⅙–¼ in. long, hispid; stipules lanceolate, 2½ lin. long, caducous. Racemes 1 in. long or less; rhachis and pedicels hispid or pubescent; bracts lanceolate, small. Male sepals 5, elliptic-oblong, apiculate, glabrous. Petals 5, very unequal, 3 larger, obovate, rather longer than sepals, 2 very small, oblong. Stamens about 10; filaments short. Female sepals 5–6, unequal, all obovate, sparingly toothed on the margin, apiculate, 2–3 outer one-third smaller than the 3 inner. Petals 5, oblanceolate, obtuse, shorter than the inner sepals. Ovary closely beset with flattened acute processes. Capsule muricate, ¼ in. wide; accrescent sepals ⅙ in. long. Seeds pale grey, spherical.

Mozamb. Distr. British Central Africa: Nyasaland; without precise locality, *Buchanan!*

3. **C. Stuhlmanni,** *Pax in Engl. Jahrb.* xix. 81. An annual herb; stems branching, rather stout, soft, hispid throughout, 2–3 ft. high. Leaves short-petioled, lanceolate or oblong-lanceolate or linear, acute, margin sharply serrate, base acute, 2–4½ in. long, ¼–1 in. wide, medium green above, paler beneath, hispid on the nerves especially on the under surface; main-nerves 8–12 on each side, very prominent beneath; petiole ⅒–½ in. long, hispid; stipules ovate-lanceolate, acuminate or subulate, caducous. Racemes 2–2½ in. long; rhachis and pedicels hispid; bracts lanceolate, small. Male sepals 5, ovate, acute, hispid. Petals 5, very unequal, 3 larger spathulate-oblong, longer than the sepals, 2 very small, narrow oblong, all clawed. Stamens about 10; filaments short. Female sepals 5–6, unequal, ovate-lanceolate, acute, hispid, the 3 outer slightly shorter than the 3 inner. Petals 5, casually 6, oblong-lanceolate, rather shorter than the outer sepals. Ovary closely beset with narrow-subulate, gland-tipped processes. Capsule muricate and setose, ¼ in. wide; accrescent sepals ⅒–⅛ in. long. Seeds deep blue-grey or nearly black, spherical.—Pax in Engl. Pfl. Ost-Afr. C. 237.

Mozamb. Distr. German East Africa: Usambara; Bu Makayuni, *Holst*, 3960! Pangani; Blafrika, *Stuhlmann*, **786**! Usinja; Usambiro, *Stuhlmann*, 851! Portuguese East Africa: Quillimane, *Stuhlmann*, **601**.

This species is most nearly allied to *C. palustris*, and is only distinguishable by the colour of its seeds. We have not seen the specimens collected by Stuhlmann at Quillimane.

4. **C. palustris,** *St. Hil. Hist. Pl. Rem.* 245. An annual herb; stems branching, rather stout, soft, hispid upwards, 2–3 ft. high. Leaves short-petioled, lanceolate or oblong-lanceolate or linear, acute, the lowest often obtuse, margin sharply serrate, base cuneate or somewhat rounded, 2–6 in. long, $\frac{1}{4}$–2 in. wide, medium green above, paler beneath, hispid on the nerves especially on the under surface; main-nerves 8–20 on each side, very prominent beneath; petiole $\frac{1}{10}$–$\frac{3}{4}$ in. long, hispid; stipules triangular, acuminate or subulate, caducous. Racemes 2–3 in. long; rhachis and pedicels hispid; bracts lanceolate, small. Male sepals 5, ovate-triangular, acute, glabrous or pubescent. Petals 5, in African specimens always unequal, 3 larger as long as the sepals, the 2 others small or very small, all obovate-oblong, clawed. Stamens about 10; filaments short. Female sepals 6, unequal, obovate-oblong, acute or acuminate, 3 inner considerably larger than the 3 outer, or sometimes 5, unequal, the 2 outer small, the 2 inner large, the other midway in size and position. Petals 5, oblong-lanceolate, clawed, rather shorter than the outer sepals. Ovary closely beset with narrow-subulate gland-tipped processes. Capsule muricate and setose, $\frac{1}{4}$ in. wide; accrescent sepals $\frac{1}{10}$–$\frac{1}{8}$ in. long. Seeds tawny or brownish, spherical.—Müll. Arg. in DC. Prodr. xv. ii. 754; Pax in Engl. Pfl. Ost-Afr. C. 237. *C. castaneæfolia*, Klotzsch in Peters, Reise Mossamb. Bot. 99, not of St. Hil. *C. serrata*, Pax in Engl. Pfl. Ost-Afr. C. 237, not of Presl. *C. fistulosa* and *C. hirtella*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 73.

Upper Guinea. French Guinea: Middle Niger; Cotaga, *Chevalier*, 1158! between Sebi and Mopti, *Chevalier*, 15763! Southern Nigeria: Lagos; Idofu, *Rowland!* Cameroons: near Diangey, 1000 ft., *Ledermann*, 4456! Sideri on the River Benue, 1000 ft., *Ledermann*, 4729! between Garua and Binti, 1000 ft., *Ledermann*, 4810! near Garua, 1000 ft., *Ledermann*, 4980!

North Central. Bagirmi: Tchekna, *Chevalier*, 511!

Mozamb. Distr. German East Africa: Nyika Plateau; between Mtindi and Mkemba, *Volkens*, 37! Portuguese East Africa: Lower Zambesi; Sena, *Peters*, 272! Nhandoa, *Le Testu*, 441! and without precise locality, *Stewart!* Lower Shire; Moramballa Mountain, *Kirk!* Ginumba, *Scott!* British Central Africa: Nyasaland; near Kondowe, *Whyte!* Mount Mlangi, *Last!* Rhodesia: without precise locality, *Allen*, 443!

Also in South America, in Madagascar, and in South Africa.

We follow Müller in identifying this African plant with the South American *C. palustris*, and think it may be only an introduced species. The Bozos obtain from the stems a fibre which is used to make fishing lines.

5. **C. senegalensis,** *Müll. Arg. in Linnæa*, xxxiv. 153. An annual herb; stems branching, rather slender, hispid upwards, $1\frac{1}{2}$–3 ft. high. Leaves short-petioled, narrow-lanceolate or linear, acute, margin sharply and remotely serrate, sometimes subentire, narrowed to the base or cuneate, 2–6 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, pale green, glabrous above, sparingly hispid on the nerves beneath; main-nerves 10–12 on each side, rather prominent beneath; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long; stipules linear, hispid, caducous. Racemes $3\frac{1}{2}$–6 in. long; rhachis and pedicels glandular-hispid; bracts ovate-lanceolate, small. Male sepals 5, ovate-triangular, acute, pubescent. Petals 5,

subspathulate-oblong, clawed, very unequal, 3 larger as long as the sepals, 2 small or very small, sometimes obsolete. Stamens about 10; filaments short. Female sepals 5–6, ovate-triangular, unequal, 3 inner rather larger than the 2-3 outer, all glandular-hispid. Petals 5, obovate, clawed, as long as the larger sepals. Ovary closely beset with narrow subulate gland-tipped processes. Capsule slightly muricate and setose, ¼ in. wide; accrescent sepals $\frac{1}{12}$–$\frac{1}{10}$ in. long. Seeds pale yellow or tawny, oblong-globose.—Müll. Arg. in DC. Prodr. xv. ii. 756; Durand & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 104, and in Reliq. Dewevr. ii. 208; Th. & Hél. Durand, Syll. Fl. Congol. 490. *C. serrata*, Baill. Adansonia, i. 66, not of Presl. *C. Chevalieri*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 73.

Upper Guinea. Senegal: Galam; near Bakel, *Leprieur!* Senegambia; Casamance River, *Perrottet*, 737! French Guinea: Ile Tristao, *Paroisse*, 46! Middle Niger; Nafadie, *Chevalier*, 157! Upper Niger; Samandiny, *Chevalier*, 2633! Upper Soudan, *Lecard*, 210! Sierra Leone: Makela, *Scott-Elliot*, 4053! Scarcies River, *Scott-Elliot*, 4271! Togo: Lome, *Warnecke*, 430! Northern Nigeria: Nupe, *Barter!* Zungeru, *Dalziel*, 65! Lagos, *Rowland!* Cameroons: Garua, 1000 ft., *Ledermann*, 3310! 4542! Rei Buba; 1000 ft., *Ledermann*, 4121!

North Central. Bagirmi: between Mandjafa and Bousso, *Chevalier*, 10442! Lake Ivo district, at Koulfé, *Chevalier*, 8990! Dar Banda: Central Koukounou, *Chevalier*, 6584! 6617!

Lower Guinea. Lower Congo: Boma, *Dewèvre*.

This species is very nearly related to *C. serrata*, Presl, with which it has been identified by Baillon. It may usually be recognised by its generally narrower leaves and its always unequal male petals, but in some gatherings of both species now one, now the other character breaks down. The only differential character which appears to be constant is to be met with in the female calyx, which is 6-lobed in *C. senegalensis*, more than 6-lobed in *C. serrata*.

6. **C. serrata,** *Presl, Epimel. Bot.* 213. An annual herb; stems branching, rather slender, hispid upwards, 1½–3 ft. high. Leaves short-petioled, lanceolate or narrow-lanceolate, acute, margin sharply and often rather closely serrate, narrowed to the base or cuneate, 2–4 in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. wide, pale green, glabrous on both surfaces or with a few hairs on the nerves beneath; main nerves 10–12 on each side, rather prominent beneath; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. long, glabrous; stipules linear, glabrous, caducous. Racemes 2–4 in. long; rhachis and pedicels glabrous or sparingly pubescent; bracts ovate-lanceolate, small. Male sepals 5, ovate-triangular, acute, pubescent. Petals 5, subspathulate-oblong, clawed, nearly equal, as long as the sepals, occasionally 2 distinctly smaller than the others. Stamens 10; filaments short. Female sepals 8–10, ovate-triangular, unequal, 4–5 inner rather larger than the 4–5 outer. Petals 5, oblong-lanceolate, clawed, rather shorter than the inner sepals. Ovary closely beset with flattened eglandular processes. Capsule slightly muricate, ¼ in. wide; accrescent sepals $\frac{1}{10}$–$\frac{1}{8}$ in. long. Seeds usually pale yellow or tawny, sometimes nearly black, oblong-globose.—Müll. Arg. in DC. Prodr. xv. ii. 755, excl. syn. *Lepidocroton serratus*, Presl. *Croton serratus*, Hochst. ex Baill. Adansonia, i. 66. *Lepidococca serrata*, Turcz. in Bull. Soc. Nat. Mosc. xxi. i. 589.

Nile Land. Galabat: near Matamma, *Schweinfurth*, 870! 871! Kordofan: Arashkol Mountain, *Kotschy*, 69! 113! Dinka: Nassar on the River Sobat, *Broun*, 1728! Jur: Abu Gurun's Sereba, *Schweinfurth*, 4256!

50. CHROZOPHORA, Neck.; Benth. et Hook. f. Gen. Pl. iii. 305.

Flowers monœcious, dichlamydeous. Male: Calyx closed in bud, ovoid or globose, splitting into 5 valvate lobes. Petals 5, usually shorter than the calyx-lobes. Disk inconspicuous. Stamens 5–15; filaments connate below in a column, more or less distinctly 1–3-seriate; anthers oblong, erect; cells parallel, opening longitudinally. Rudimentary ovary 0. Female: Calyx 5-lobed; lobes narrow. Petals 5, narrow, usually small, occasionally obsolete. Disk-glands alternate with the petals, short and broad. Ovary 3-celled; ovules in each cell solitary; styles erect, 2-fid, the arms entire, rather stout, sometimes at length spreading. Capsule rather coriaceous, 3-dymous, breaking up into 3 2-valved cocci. Seeds ovoid, without a caruncle; testa smooth or slightly rugose; albumen thick, fleshy; cotyledons broad, flat.—Diffuse or erect herbs, rarely shrubby, harshly or softly stellate-pubescent. Leaves alternate, petioled, often plicate, sometimes bullate. Racemes rather dense, usually short, from the axils of the upper leaves; their upper flowers male, the lower female. Capsules sometimes stellate-pubescent, sometimes lepidote.

Species about 7, extending to the Mediterranean region, throughout the Orient and to India and Indo-China.

- Prostrate herbs with stellate-pubescent but not lepidote capsules; stamens usually more than 10; seeds rough — 1. *C. plicata.*
- Erect or suberect shrubs or undershrubs, with lepidote, but not stellate-pubescent capsules; stamens not more than 10.
  - Seeds rough; capsules muricate; leaves oblong or oblong-lanceolate, longer than broad; scales on ripe capsules rather loose and remote, their margins pectinate . — 2. *C. oblongifolia.*
  - Seeds smooth; capsules not muricate; leaves rhomboid or subhastate, nearly as broad as long; scales on ripe capsules rather close set, their margins undulate or subentire.
    - Fruiting sepals lanceolate, $\frac{1}{8}$–$\frac{1}{6}$ in. long . . . — 3. *C. senegalensis.*
    - Fruiting sepals linear, $\frac{1}{4}$ in. long . . . . — 4. *C. brocchiana.*

1. **C. plicata,** *A. Juss. ex Spreng. Syst. Veg.* iii. 850, *excl. syn. Lam.* A prostrate herb with diffuse much-branched stems, softly white stellate-pubescent. Leaves distinctly petioled, ovate or ovate-rhomboid, obtuse, base somewhat unequally truncate, 2-glandular, margin undulate, plicate and somewhat bullately rugulose, thinly stellate-tomentose above, more densely so beneath, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. wide; petiole $\frac{1}{3}$–1 in. long, densely tomentose; stipules linear, 1 lin. long, deciduous. Racemes short-peduncled, rather dense, often leafy below; lower female pedicels in fruit sometimes $\frac{1}{2}$–$\frac{3}{4}$ in. long. Male calyx globose in bud, densely stellate-pubescent; lobes ovate. Petals pink, lanceolate, shorter than the calyx-lobes. Stamens 12–15, 3-verticillate. Female sepals lanceolate.

Petals very short. Capsule 3-coccous, red-purple, $\frac{1}{3}$ in. wide, densely pubescent with harsh stellate hairs but not lepidote.—A. Rich. Tent. Fl. Abyss. ii. 252, excl. syn.; Baill. Adansonia, i. 67, partly; Boiss. Fl. Orient. iv. 1140, partly; Engl. Hochgebirgsfl. Trop. Afr. 283, partly; Pax in Ann. Istit. Bot. Roma, vi. 183. *C. obliqua*, Schweinf. Pl. Nilot. 10, t. 3; Beitr. Fl. Aethiop. 35; not of A. Juss., nor of Müll. *C. prostrata*, Schweinf. Beitr. Fl. Aethiop. 235, 262; not of Dalz. *C. plicata*, *γ obliqua*, Müll. Arg. in DC. Prodr. xv. ii. 698. *C. plicata*, *γ prostrata*, Müll. Arg. l.c. 747, as to African plant only; Oliv. in Trans. Linn. Soc. xxix. 146; Aschers. & Schweinf. Ill. Fl. Égypte, 138; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 306. *Croton tinctorium*, Forsk. Fl. Ægypt.-Arab. lxxv. 162; not of Linn. *C. plicatum*, Vahl, Symb. i. 78; Willd. Sp. Pl. iv. 538, partly; Geiseler, Crot. Monogr. 70, partly; A. Juss. Tent. Gen. Euphorb. 28, partly. *Lepidocroton serratus*, Presl, Epimel. Bot. 213.

Upper Guinea. Senegal: Dagana, *Leprieur!* Podar, *Mathieu!* Northern Nigeria: Kuka, near Lake Chad, *Vogel*, 32! Cameroons: Garua, sandbanks of the Benue, *Ledermann*, 3239! Kusseri, on the Shari, *Foureau*, 3006!

Nile Land. Nubia: Dongola, *Ehrenberg! Rifaud!* Eritrea: Godofelassi, 6000 ft., *Schweinfurth*, 548. Abyssinia: Goelleb, 4000 ft., *Schimper*, 27! 1694! Jenda, *Steudner*, 533! by the River Tacazze, *Petit! Quartin-Dillon & Petit!* 213! and without precise locality, *d'Hericourt!* Sudan: banks of the Nile; at about 16° N. Lat., *Speke & Grant!* at Getena, *Schweinfurth* 898! Sennar: Abu Sugra, *Schweinfurth!* Wolet Medine, *Kotschy*, 473 in Herb. Delessert partly, Herb. Berlin and Herb. Leiden! Kordofan, *Colston*, 52! 63! Salati, *Broun!* on the Blue Nile, *Muriel*, S/37! Nuer district, *Brownell!*

Mozamb. Distr. Rhodesia: common on sandbanks in rivers, *Allen*, 716!

Also in Egypt.

Var. *obliquifolia*, Prain. Leaves ovate-orbicular, margin repand, often $1\frac{1}{2}$–2 in. long and about as wide; petiole 1–$1\frac{3}{4}$ in. long. Racemes distinctly peduncled; peduncles naked; female pedicels in fruit about $\frac{1}{3}$ in. long; petals yellow. —*C. obliquifolia*, Baill. Étude gén. Euphorb. 322. *C. plicata*, Baill. Adansonia, 67 partly; Schweinf. Pl. Nilot. 11, t. 4, excl. syn.; Klotzsch in Peters, Reise Mossamb. Bot. 576; Schweinf. Beitr. Fl. Aethiop. 36, 262; Boiss. Fl. Orient. iv. 1140, partly; Aschers & Schweinf. Ill. Fl. Égypte, 138; Pax in Engl. Pfl. Ost-Afr. C. 237; Engl. Hochgebirgsfl. Trop. Afr. 283, partly; scarcely of A. Juss. *C. tinctoria*, Klotzsch in Peters, Reise Mossamb. Bot. 99; not of Linn. *C. plicata*, *β genuina*, Müll. Arg. in DC. Prodr. xv. ii. 747, as to African plant only. *Croton plicatum*, Sieb. Avis.; herb. Ægypt. 7, rem. 8; scarcely of Vahl. *C. obliquifolium*, Vis. Pl. Ægypt. Nub. 39, t. 7, fig. 2.

Upper Guinea. Senegal: Dagana, *Leprieur!* Northern Nigeria: Kuka, near Lake Chad, *Vogel*, 3!

Nile Land. Nubia: Dongola, *Ehrenberg!* Daggeh and Sabou, *Kralik!* and without precise locality, *Pfund!* Eritrea: Abai, *Stecker!* Godofelassi, *Rohlfs & Stecker!* Abyssinia: Begemeder; by the River Reb, *Schimper*, 1355! Sudan: Burri, *Schweinfurth*, 832! near Shendy, *Schweinfurth*, 737! North Ipsambul, *Scott-Elliot*, 3418! Sennar: Fazokl, *Ehrenberg!* near Abu Harrah, *Schweinfurth*, 833! 834! Wolet Medine, *Kotschy*, 473 in Herb. Delessert partly, Herb. Kew and Herb. Paris! White Nile, *d'Arnaud!* Kordofan, *Pfund! Colston*, 14!

Mozamb. Distr. Mozambique: Sena, *Peters*, 8! Gonongoza; Sungine, *Vasse*, 403!

Also in Egypt and in Palestine.

As has been pointed out by Schweinfurth and by Müller the two plants here included under *C. plicata*, A. Juss., are distinct in appearance and are easily separated. We follow Müller in considering them varieties of the same species; Schweinfurth, who at first treated them as specifically distinct, has accepted this view. The typical *C. plicata* (*Croton plicatum*, Vahl) appears to be the more usual form in dried up pools and stream beds and on sandbanks in rivers; the variety *obliquifolia* (*Croton obliquifolium*, Vis.) appears to be usually met with as a weed in fields. The species has been also recorded by Pax (Ann. Istit. Bot. Roma, vi. 183) from Ogadon (*Robecchi*, 372) and the River Ganane (*Riva*, 749/632). In the absence of material it is not certain to which of the two varieties these Abyssinian specimens belong. To this species also belongs *Lepidocroton serratus*, Presl, which is described as having 15 stamens, but in the absence of the type (which seems to have disappeared) it is impossible to say definitely which of the two varieties described represents Presl's genus.

2. **C. oblongifolia,** *A. Juss. ex Spreng. Syst. Veg.* iii. 850. A much-branched undershrub, with stems stout and woody below, but sometimes herbaceous and dying after flowering in the first year; stems rather harshly white or tawny stellate-pubescent. Leaves distinctly petioled, ovate-rhomboid or oblong to lanceolate, obtuse, base cuneate, narrowly notched, 2-glandular, margin usually more or less lobed or incised, rarely entire, 1–4 in. long, $\frac{1}{3}$–2 in. wide, thinly and rather harshly stellate-pubescent above, more closely so beneath; petioles $\frac{1}{4}$–$\frac{1}{2}$ in. long, closely and coarsely stellate-pubescent; stipules linear, 1 lin. long, deciduous. Racemes short-peduncled, rather dense; lower female pedicels in fruit $\frac{1}{2}$ in. long or rather longer. Male calyx globose in bud, closely and coarsely stellate-pubescent; lobes ovate-lanceolate. Petals yellowish-white, lanceolate, shorter than the calyx-lobes. Stamens 5–10, 1–2-verticillate. Female sepals lanceolate. Petals linear, as long as the calyx-lobes. Capsule 3-coccous, blue-purple, about $\frac{1}{2}$ in. wide, loosely clothed with floccose flat scales with fringed denticulate margins. Seeds rough.—Decaisne in Ann. Sci. Nat. 2me sér. ii. 242; Baill. Étude gén. Euphorb. 322. *C. obliqua*, Müll. Arg. in DC. Prodr. xv. ii. 749, excl. Wall. Cat. 7716 G; Schweinf. Beitr. Fl. Aethiop. 235, 262; Boiss. Fl. Orient. iv. 1141, excl. syn. Schweinf.; Hook. f. Fl. Brit. Ind. v. 409, Scinde plant only; Aschers. & Schweinf. Ill. Fl. Égypte, 138; Penzig in Atti Congr. Bot. Genova; 1892, 359; Pax in Ann. Istit. Bot. Roma, vi. 183; Cooke, Fl. Bomb. ii. 607; not of A. Juss. *C. tinctoria*, Schweinf. Beitr. Fl. Aethiop. 36; not of A. Juss. *C. obliqua*, var. *angustifolia* and var. *incisa*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 306. *C. tinctoria*, var. *subplicata*, Boiss. Fl. Orient, iv. 1141, partly; Terracc. in Ann. Istit. Bot. Roma, v. 98; not of Müll. Arg. *Croton tinctorium*, Forsk. Fl. Ægypt.-Arab. cxxi.; not of Linn. *C. oblongifolium*, Del. Desc. Egypt. Hist. Nat. ii. (Fl. Égypte) 139, t. 51, fig. 1; A. Juss. Tent. Gen. Euphorb. 28.

Nile Land. Nubia: coast region, *Schweinfurth*, 936! 937! 937 bis! *Bent!* Jebel Garab and Jebel Dyb, *Lusson*, 493! Eritrea: Massowa, *Deflers!* Samhar, *Rensch* (*Hildebrandt*, 738)! Arkiko, *Schweinfurth & Riva*, 142! Anfilah, between Ras Madir and Haressan, *Terracciano;* Edd, *Courbon!* Abyssinia: Bembea, *Schimper*, 1692! Meda, *Schimper*, 1692 bis! Ennecoulou, *Courbon*, 323! Aïruri, *Stecker*, 29!

and without precise locality, *Salt ! Plowden !* Somaliland; Berbera and vicinity, *Boivin*, 1074! *Revoil*, 131! *Drake-Brockman*, 69! 532! 533! 534! 535! coast near Lasgori and hills up to 3000 ft., *Rensch* (*Hildebrandt*, 869)! Tokosha, *Ellenbeck*, 146! Obok, *Faurot !*

Also on the Egyptian coast, in Socotra, on the Arabian coast and in Scinde. Müller records this species as collected by Boivin in the Comoros, but the original field-note accompanying the only gathering of the plant by Boivin gives the locality as Berbera in Somaliland. This species assumes two somewhat distinct forms, (a) with larger leaves, more obtusely lobed, met with everywhere within our area, and (b) with rather smaller acutely lobed leaves, more frequently met with from Suakin southwards. The second form, which includes the two varieties suggested by Schweinfurth, is, however, connected with the first by too many intermediates to admit of its being accorded separate recognition.

3. **C. senegalensis,** *A. Juss. ex Spreng. Syst. Veg.* iii. 850. A much-branched undershrub; stems slender, usually prostrate, woody, glabrous or sparingly adpressed puberulous low down, towards the apex densely hoary-canescent with short close stellate tomentum. Leaves shortly petioled on the twigs, distinctly petioled on the main stem and primary branches, ovate or rhomboid, rarely on the main branches subhastate, obtuse, base cuneate or truncate, margin irregularly repand, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. wide, dark green and usually at length glabrous above, beneath densely coated with short close stellate white tomentum, subcoriaceous; petiole $\frac{1}{5}$–$\frac{1}{3}$ in. long, closely hoary with short tomentum; stipules linear-subulate, deciduous, $1\frac{1}{2}$ lin. long. Racemes very dense, sessile. Male calyx oblong in bud, closely softly and shortly stellate hairy; lobes ovate-lanceolate. Petals pink, lanceolate, as long as the calyx-lobes. Stamens 5–10, 1–2-verticillate. Female sepals linear-lanceolate, in fruit $\frac{1}{8}$–$\frac{1}{6}$ in. long. Petals linear, as long as the calyx-lobes. Capsule 3-coccous, white with a violet tinge, about $\frac{1}{3}$ in. wide, closely clothed with flat adpressed scales with subentire margins. Seeds smooth.—Presl, Epimel. Bot. 213; Baill. Étude gén. Euphorb. 322, partly, and as to Adanson 165 only; Baill. Adansonia, i. 67; Müll. Arg. in DC. Prodr. xv. ii. 750, excl. Kotschy's Nubian plant. *Croton senegalense*, Lam. Encyc. ii. 212 as to citation but excluding the description; Willd. Sp. Pl. iv. 554; Geiseler, Crot. Monogr. 45; A. Juss. Tent. Gen. Euphorb. 28.

Upper Guinea. Mauretania: between Biark and Tin-Amatou, Ksar-el-Barka, Tamra, Guimi, and Foum-Joul, *Chudeau !* Senegambia: Walo and Cayor, *Heudelot*, 419! Walo, *Perrottet*, 738! Dagana, *Leprieur*, 1194! Bakel, *Collin*, 101! between Bakel and Fangalla, *Carrey*, 18! Dakar, *Thiebaut*, 191! Galam, *Herb. Jussieu* (61!) Kaolakh, *Kaichinger*, 48! and without precise locality, *Adanson*, 156A! Upper Senegal: Timbuctoo; Babog, *Chudeau !* marshes of Sienso near San, *Chevalier*, 1051! Bongoumi, *Chevalier*, 687! Dahomey: Alacora Mountains, near Jomba, 1200–2000 ft., *Chevalier*, 24078! Northern Nigeria: Gando; Saie, 560 ft., *Barter*, 3444! Katagum district, *Dalziel*, 205!

North Central. Wadai: Fort Lemy, *Chevalier*, 10362! Bagirmi: Corbol, *Chevalier*, 9271! Makénia, *Chevalier*, 9671! Barambo, *Chevalier*, 9946!

Var. *lanigera*, Prain. Leaves rhomboid, subhastate or hastate, obtuse, base truncate or cordate, margin irregularly repand, 1–2 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. wide, dark

green and thinly hirsute with long hairs above, beneath densely covered with loose woolly tomentum of long hairs, subcoriaceous. Petals pink.—*C. senegalensis*, var. β, Desv. ex Baill. Étude gén. Euphorb. 322. *C. plicata*, Baill. Adansonia, i. 67 partly, not of A. Juss. *C. brocchianæ forma forsan propria*, Schweinf. Pl. Nilot. 10. *C. brocchiana*, var. *Hartmanni*, Müll. Arg. in DC. Prodr. xv. ii. 749 chiefly, not of Schweinf. *Croton lanigerum*, Perr. MSS. in Herb. Paris.

Upper Guinea. Senegambia: Dagana, *Leprieur !* near Richard-Tol, *Lelievre !* Dakar, *Chevalier*, 2630 ! 15787 ! Tomboukana, *Chevalier*, 3464 ! Cape Verde, between Kan and Wochan, *Brunner*, 108 ! Galam, *Herb. Jussieu* (60) ! and without precise locality, *Perrottet*, 42 ! 735 ! *Roger ! Richard !* Northern Nigeria: Borgu; near Fakum, *Barter*, 812 ! Nupe; Jeba, *Barter !*

The variety here recognised passes insensibly on the one hand into *C. senegalensis* proper, on the other into *C. brocchiana*, var. *Hartmanni*. The original description given by Lamarck applies to this variety; the specimen cited by that author belongs, however, to the form here described as typical *C. senegalensis*.

4. **C. brocchiana,** *Vis. Pl. Ægypt. Nub.* 39, *t.* 8, *fig.* 2. A much-branched undershrub or shrub; stems rather stout, erect or suberect, densely stellate-tomentose with rather short spreading (rarely rather close) tomentum. Leaves distinctly petioled, rhomboid or ovate, obtuse, base rounded or less often cuneate, margin undulate and often rather distinctly 3-lobed, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, pale grey or tawny green above and clothed with short rather close persistent pubescence above, beneath shortly softly and patently (rarely closely) white or tawny tomentose, subcoriaceous; petiole $\frac{1}{3}$ in. long, closely or patently hoary with short pubescence; stipules linear-subulate, sometimes hardened and persistent, $1\frac{1}{2}$ lin. long. Racemes very dense, sessile. Male calyx oblong in bud, softly pubescent with spreading stellate hairs, lobes ovate-lanceolate. Petals yellow ? obovate-lanceolate, with incised tips, as long as the calyx-lobes. Stamens 5–10, 1–2-verticillate. Female sepals linear-subulate, $\frac{1}{4}$ in. long. Petals linear, as long as the calyx-lobes. Capsule 3-coccous, white with a violet tinge, about $\frac{1}{3}$ in. wide, closely clothed with flat adpressed scales with subentire margins. Seeds smooth. —Schweinf. Pl. Nilot. 9, t. 5, fig. b.; Müll. Arg. in DC. Prodr. xv. ii. 749; Schweinf. Beitr. Fl. Aethiop. 35, 262. *C. senegalensis*, Baill. Étude gén. Euphorb. 322 partly (Kotschy, 25); Müll. Arg. in DC. Prodr. xv. ii. 750 partly (Kotschy, 25); Schweinf. Beitr. Fl. Aethiop. 262, not of A. Juss.

Upper Guinea. Upper Senegal: Timbuctoo region; Timbuctoo, *Chevalier*, 1302 ! Rezaf, *Chudeau !* Badiagan, *Chudeau !*

Nile Land. Nubia: Nedi, *Brocchi.* Kordofan: Abu Gerad, *Kotschy*, 25 ! near Goghan, *Broun*, 887 ! and without precise locality, *Colston*, 98 ! Darfur, *Purdy*, 39 !

Var. *Hartmanni*, Schweinf. Pl. Nilot, 9, t. 5. Leaves rather larger, base truncate or subcordate, margin usually distinctly 3-lobed, 1–2 in. long, $\frac{3}{4}$–1 in. wide, softly woolly with long spreading stellate hairs on both surfaces; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long.—Müll. Arg. in DC. Prodr. xv. ii. 749 partly. *Croton macrocalyx*, Ehrenb. ex Schweinf. Pl. Nilot. 9.

Upper Guinea. Mauretania: Atar, *Chudeau !* Senegal: Podar, *Mathieu !* Upper Senegal, without precise locality, *Lécard*, 20 ! Northern Nigeria: Bornu, *Oudney !*

Nile Land. Nubia: Dabbeh, *Ehrenberg!* Bayuda, between Dabbeh and Khartoum, *Hartmann!* Matamma; near Ssagadi, *Schweinfurth*, 835! near El Bak, between Berber and Suakin, *Schweinfurth*, 836! 839! without precise locality, *Rifaud!* Kordofan: Bareis on the Darfur frontier, *Pfund*, 492! near Goghan, *Broun!* and without precise locality, *Colston*, 87! *Muriel*, S/106!

This species can only be separated with difficulty from *C. senegalensis*, Lam., the typical form passing insensibly into *C. senegalensis* on the one hand and into its variety *Hartmanni* on the other, while var. *Hartmanni* further passes insensibly into *C. senegalensis*, var. *lanigera*.

51. **MANIHOT**, Adans.; Benth. et Hook. f. Gen. Pl. iii. 306.

Flowers monœcious, apetalous, usually rather large. Male: Calyx often coloured, campanulate, 5-lobed; lobes short or long, imbricate or contorted. Stamens 10, 2-seriate, attached between the lobes or glands of the disk; filaments free, slender; anthers dorsifixed, cells parallel, opening longitudinally. Rudimentary ovary minute or 0. Female: Calyx as in the male. Ovary 3-celled; styles shortly connate below, variously dilated or lobed above; ovules solitary in each cell. Disk entire or lobed or glandular. Capsule 3-coccous; cocci 2-valved. Seeds carunculate, ovoid or oblong; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Shrubs or sometimes trees, rarely herbs, often more or less glaucescent or pruinose. Leaves alternate, usually petioled, palmately lobed, less often entire, sometimes peltate; stipules usually small. Flowers in terminal or subterminal racemes or panicles, with the upper flowers male, and a solitary or few females towards the base; bracts sometimes small, sometimes large, leafy, entire or lacinulate.

Species about 130; all American and mainly Brazilian; those here described more or less widely cultivated economically in the tropics of the Old World.

Fruits without wings or ridges; bracts small; leaves peltate even in fully grown plants; rubber producing. — 1. *M. Glaziovii.*

Fruits with six distinct wings or ridges; leaves not peltate, at least in fully grown plants.

Bracts large and leafy, at first concealing the flowers; grown as a rubber-plant . . . . . — 2. *M. piauhyensis.*

Bracts small, not longer than the pedicels.

Lobes of the leaves more or less lobulate; grown as a rubber-plant . . . . . — 3. *M. dichotoma.*

Lobes of the leaves entire; grown as a food-plant . — 4. *M. utilissima.*

1. **M. Glaziovii,** *Müll. Arg. in Mart. Fl. Bras.* xi. ii. 446. Tree 30–50 ft. high; twigs glabrous; stems yielding rubber. Leaves long-petioled, membranous, peltate, some of the uppermost occasionally entire, the other palmately 3–5- (rarely 7-) lobed, 5–6 in. long, when entire 3 in., when lobed 6–8 in. wide; lobes oblong-ovate or elliptic, shortly acute or acuminate, minutely mucronulate, separated by narrow acute sinuses, their margins entire, the basal pair almost horizontal, central largest lobe about 4 in. long, $1\frac{3}{4}$–2 in. wide, rather deep bluish-green above, paler and often glaucescent or glaucous beneath, glabrous or both sides or sometimes with a tuft of hairs opposite the tip of the

petiole above; petiole glabrous, 4–6 in. long; stipules 2–3 lin. long, pale green, ovate-lanceolate, denticulate. Racemes paniculate, from the forks of the younger twigs, panicles pyramidal; bracts lanceolate, denticulate below, entire higher up, under 2 lin. long; pedicels about $\frac{1}{3}$ in. long; flowers nodding, those at the base of each raceme female, opening some days before the more numerous males higher up. Calyx $\frac{1}{3}$ in. long or rather longer, glabrous outside and within, campanulate, the male 5-fid, the female 5-partite, green blotched with purple at the base. Stamens 10; filaments glabrous, outer longer than inner; anthers with the connective slightly hairy at the tip. Ovary glabrous, subglobose. Disk glabrous. Capsule globose, $\frac{2}{3}$–$\frac{3}{4}$ in. across, wingless, plicate-rugose, grey. Seed flattish, $\frac{1}{2}$ in. long, $\frac{1}{3}$ in. wide, grey marbled with brown.—Trimen in Journ. Bot. 1880, 321. t. 215; Kew Rep. 1880, 17, with plate; Pax in Engl. and Prantl, Pflanzenfam. iii. 5, 79, fig. 48; Kew Bulletin, 1898, 1; De Wild. Miss. É. Laurent, 134, fig. 17–21, and Études Fl. Bas- et Moyen-Congo, i. 278 and ii. 287; Dawe, Miss. Bot. Uganda, 56; Th. & Hél. Durand, Syll. Fl. Congol. 490; Pax in Engl. Pflanzenr. Euphorb.-Adrian. 89, fig. 31. *Manihot sp.*, Pax in Ann. Istit. Bot. Roma, vi. 185.

Native of Brazil, widely cultivated as a rubber-plant in Tropical Africa. The Ceara Rubber or Maniçoba.

The figure in the Kew Report for 1880 is a reproduction, that of the Pflanzenfamilien repeated in the Pflanzenreich is an adaptation of the original drawing made by Fitch for Trimen.

Var. *alienigena*, Prain. Shrub or small tree, 10–12 ft. high; yielding rubber. Leaves long-petioled, membranous, peltate, some of the uppermost entire, the others palmately 3–5-lobed, 3–4 in. long, when entire 1 in., when lobed 4–5 in. wide; lobes wide-spathulate, rounded or subacute with a long terminal mucro, separated by wide rounded sinuses, their margins entire, the basal pair almost horizontal, central largest lobe 2–3 in. long, 1–1$\frac{1}{2}$ in. wide, very glaucous beneath. Calyx white, blotched with purple at the base. Capsule globose, $\frac{1}{2}$–$\frac{2}{3}$ in. across.

Mozamb. Distr. Mozambique: Buzi district, Lusitania estate, cultivated, *Johnson*, 67!

Doubtless also imported from Brazil. Johnson notes that this is "quite distinct from *M. Glaziovii*," with drooping branches, white female flowers with purple marks inside, only growing to about one-fourth the size of *M. Glaziovii*, with smaller trunk, leaves and fruit, and with thinner leaves of a paler green. The wide sinuses, whereby the lobes of the leaves, instead of being in contact or overlapping in their lower third, are separated from each other by interspaces $\frac{1}{4}$–$\frac{1}{3}$ in. across, impart a distinct facies to the foliage. But except as regards its smaller size, var. *alienigena* does not otherwise differ essentially from *M. Glaziovii*. The seeds are said to have been received along with a consignment of seeds of *M. Glaziovii* supplied to the Lusitania estate by Messrs. Vilmorin, Andrieux & Cie.

2. **M. piauhyensis,** *Ule in Notizbl. Königl. Bot. Gart. Berlin*, v. *No.* 41, 2, *and No.* 41*a*, 18, 23, *fig.* 1 *C–H*, *fig.* 2 *C–E*. Shrub, 6–16 ft. high; twigs tawny-tomentose, soon glabrous; stems yielding rubber. Leaves long-petioled, firmly membranous or chartaceous, not peltate, some of the uppermost occasionally 3-lobed, the others palmately 5–7-lobed, 4 in. long, 7–8 in. wide; lobes free almost at the base, obovate-cuneate, obtuse or slightly retuse, very distinctly mucronulate, gradually narrowed from

the middle to the junction with the petiole, margin entire, central largest lobe 4 in. long, 2 in. wide, dark green and glabrous above, paler and rusty-pubescent beneath; petiole reddish, pruinose, 4–4½ in. long; stipules setaceous, tawny-tomentose, deciduous. Racemes elongated, up to 10 in. long, from the forks of the younger twigs; bracts foliaceous, glabrous, ovate, acuminate, over 1 in. long; bracteoles similar, but smaller, about ½ in. long; pedicels of males over 1 in. long, of females 2 in. long or longer, thickened in fruit; flowers ascending, those at the base female, males more numerous and higher up. Calyx 1 in. long or rather less, glabrous outside and within, tubular-cylindric, the male 5-sect nearly to the middle, the female 5-sect rather beyond the middle. Stamens 10; filaments glabrous: anthers glabrous. Ovary puberulous or glabrous, ovoid, 6-keeled. Disk glabrous. Capsule ovoid-globose, distinctly 6-winged, 1½–2 in. long, about as wide. Seed suborbicular, compressed, about ½ in. wide.—Kew Bulletin, 1908, 64; Pax in Engl. Pflanzenr. Euphorb.-Adrian. 34, fig. 11, C–H, fig. 15, C–E. *M. Glaziovii*, var. *piauhy*, Pobég. Ess. Fl. Guin. Fr. 353.

Native of Brazil, rather widely cultivated as a rubber-plant in Tropical Africa. The Piauhy Rubber or Piauhy Maniçoba.

M. Teissonierii, Chev. in Journ. Agric. Trop. vii. 357 (1907), a Brazilian caoutchouc-yielding plant, cultivated in French West Africa, agrees in all other characters with *M. piauhyensis*, but differs in having an indehiscent fruit. On account of this difference the plant has since been treated as the type of a distinct genus *Hotnima*, Chev. in Journ. Agric. Trop. viii. 111 (1908), with a single species, *H. Teissonierii*, Chev. l.c.

3. **M. dichotoma,** *Ule in Notizbl. Königl. Bot. Gart. Berlin*, v. *No.* 41, 2, *and* 41A, 16, 19, *fig.* 1, *A–B*. Tree, 10–40 ft. high, twigs glabrous; stems yielding rubber. Leaves long-petioled, firmly chartaceous or almost coriaceous, not peltate, cordate at the base, some of the uppermost 3-lobed, the others palmately 5-lobed, 6 in. long, 7–8 in. wide: lobes united in their lower fourth, acutely acuminate, mucronulate, sometimes all entire, usually the central and intermediate lyrately lobulate, basal lobes entire and much smaller than the central, 2½–5 in. long, 1–1½ in. wide, sinuses rounded, broad, glabrous, glaucescent on both sides; petiole 3–5 in. long, stout, glabrous; stipules filiform, denticulate, ⅓ in. long. Racemes rather short, 1–1½ in. long, from the forks of the younger twigs; bracts lanceolate, sharply toothed upwards, ⅓ in. long; pedicels ⅓ in. long or less, the females thickened in fruit; flowers ascending, those at the base female, males more numerous and higher up. Calyx greenish-yellow, ¾ in. long or less, glabrous outside, sparingly puberulous and densely papillose near the top within, campanulate, male 5-partite to about the middle, female 5-sect almost to the base. Stamens 10; filaments glabrous; anthers glabrous. Ovary glabrous, oblong-ovoid, 6-winged. Disk glabrous. Capsule oblong, narrowly to distinctly 6-winged, 1½ in. long, 1 in. wide. Seed ovoid, compressed, 1 in. long, ½ in. wide.—Kew Bulletin, 1908, 64; Hemsl. in Hook. Ic. Pl. tt. 2876, 2877; Pax in Engl. Pflanzenr. Euphorb.-Adrian. 83, fig. 11, A–B, fig. 15, F–H. *M. preciosa*, Schindl, MSS. ex Agric. Rep.

Gold Coast, 1908, 24 (*precosa*); Thomps. Rep. For. Gold Coast, 1910, 12 (*precosa*); Kew Bulletin, 1910, 96.

Native of Brazil, rather widely cultivated as a rubber plant in Tropical Africa. The Jequié Rubber or Jequié Maniçoba.

As figured by Hemsley, the leaves in seedlings of this species are peltate as in *M. Glaziovii.*

4. **M. utilissima,** *Pohl, Pl. Bras. Ic. et Descr.* i. 32, *t.* 24. Shrub, 6–10 ft. high, twigs glabrous; root tuberous, 3 ft. long, 6–9 in. thick, weighing 5–25 lbs., bitter and charged with a noxious juice or sweet and harmless. Leaves long-petioled, membranous, the uppermost sometimes entire, ovate, acutely acuminate, rounded at the base, 4 in. long, $1\frac{1}{2}$ in. wide, downwards progressively 3–7-lobed almost to the base, rather broader than long, the largest reaching 10–12 in. in width; lobes linear-lanceolate, acutely acuminate, the central rather the largest, narrowed to the base, and there confluent in a small web $\frac{1}{2}$–$\frac{3}{4}$ in. across, each 3–7 in. long, $\frac{1}{4}$–$1\frac{1}{2}$ in. wide, tawny green above, glaucous beneath, glabrous on both sides or more or less pubescent especially on the main nerves near the base and especially beneath; petiole $2\frac{1}{2}$–10 in. long, glabrous or faintly puberulous near the apex, green or purplish like the main nerves; stipules triangular-lanceolate, acuminate, puberulous, 2–3 lin. long. Racemes lax, few-flowered, from the upper axils; peduncles slender, sometimes clustered, up to 2 in. long; bracts small, linear-lanceolate, entire, deciduous; male pedicels 2–3 lin. long, female pedicels spreading, up to 1 in. long. Calyx dirty yellow, campanulate, glabrous and pruinose outside, puberulous within near the apex, 5-lobed beyond the middle, male 2–$2\frac{1}{2}$ lin. long, female 5 lin. long. Stamens 10; anthers small, with hairy tips. Disk glabrous. Ovary glabrous, narrowly 6-winged. Capsule $\frac{2}{3}$ in. long, wide ellipsoid, rugulose, with 6 undulate almost crenate wings. Seeds ellipsoid, compressed, marbled, $\frac{1}{2}$ in. long.—Bentl. and Trim. Med. Pl. t. 235; Müll. Arg. in DC. Prodr. xv. ii. 1064, and in Mart. Fl. Bras. xi. ii. 457, t. 65; Oliv. in Trans. Linn. Soc. xxix. 148; Ficalho, Pl. Uteis, 251; Pax in Engl. Pfl. Ost-Afr. C. 240; Durand & Schinz, Études Fl. Congo, 244; Hiern in Cat. Afr. Pl. Welw. i. 973; De Wild. Miss. É. Laurent, 140, and Études Fl. Bas- et Moyen-Congo, ii. 287; Dawe, Miss. Bot. Uganda, 56; Stapf in Johnston, Liberia, ii. 649; Th. & Hél. Durand, Syll. Fl. Congol. 490; De Wild. Comp. Kasai, 338; Pax in Engl. Pflanzenr. Euphorb.-Adrian. 67. *M. palmata*, var. *Aipi*, Stapf in Johnston, Liberia, ii. 649, hardly of Müll. Arg. *Jatropha Manihot*, Linn. Sp. Pl. ed. i. 1007. *Janipha Manihot*, H. B. & K. Nov. Gen. et Sp. ii. 108; Bot. Mag. t. 3071.

Native of Brazil, widely cultivated, in many races, throughout Tropical Africa, for the sake of the flour of its tuberous root.

The numerous recognisable races of the Cassava vary in size of plant, from 2–3 ft. up to 9–10 ft. high; in colour of bark, from green or yellowish to violet, brown or chestnut-brown; in tint of foliage from pale green to deep violet; in nature of root, from sweet to bitter, with in each case intermediate conditions and in most instances various combinations of the features mentioned. In addition to those numerous races which differ among themselves by what may be termed relative characters, there are two striking African forms, no counterparts of which have

hitherto been reported from America or elsewhere. These, while agreeing in all essential floral and fruit characters with typical *M. utilissima*, differ from the type and from each other so greatly as regards their foliage that they deserve recognition as distinct varieties. Barter has noted on a specimen of typical *M. utilissima* from Nupe, S. Nigeria (*Barter*, 1497) that he found the plant growing as if wild; adding, however, "no doubt remains of former cultivation."

Var. *hyptiaphylla*, Prain. Leaves long-petioled, membranous, 5–7-lobed almost to the base, distinctly broader than long, the largest reaching 10–12 in. in width; lobes obovate-spathulate, obtuse, the central much the smallest, narrowed to the base and there confluent in a small web $\frac{1}{2}$–$\frac{3}{4}$ in. across, each from $1\frac{1}{2}$–7 in. long, $\frac{1}{4}$–$2\frac{1}{2}$ in. wide; petiole $2\frac{1}{2}$–10 in. long.

Upper Guinea. Dahomey: Savé, *Poisson !* Southern Nigeria; Shokan, *Dudgeon !* Ibadan, *Johnson !*

Var. *schistaphylla*, Prain. Leaves very shortly petioled, compound, 3-foliolate; leaflets long-petioluled, membranous, entire, ovate, acutely acuminate, rounded or shortly cuneate at the base, 4 in. long, $1\frac{1}{2}$ in. wide; petiolules $2\frac{1}{2}$–4 in. long; petiole $\frac{1}{4}$ in. long.

Lower Guinea. Gaboon: Fougamou; Ivea, *Klaine*, 8 !

52. **CEPHALOCROTON**, Hochst.; Benth. et Hook. f. Gen. Pl. iii. 307.

Flowers monœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 3–4 valvate lobes. Stamens 6–8; filaments free, 2-seriate, inflexed in bud with anthers erect, dorsifixed, oblong, dehiscing longitudinally. Rudimentary ovary shortly columnar, entire or lobed. Female: Sepals 5–6, long, pinnatifid, unequal. Ovary 3-celled; styles shortly connate below, free, spreading and multifid above; ovules in each cell solitary. Hypogynous disk annular, subentire. Capsule 3-dymous; cocci 2-valved. Seeds without a strophiole; albumen fleshy; cotyledons broad, flat.—Shrubs, stellate-pubescent. Leaves alternate, distinctly petioled or subsessile, 3–5-nerved at the base, entire or toothed; stipules laciniate, small. Racemes terminal, androgynous; male flowers many, clustered and subcapitate, terminal, female flowers few, pedicelled, at the base of the peduncle.

Species about 8, in Tropical and South Africa.

Leaves distiuctly petioled.	
Female flowers 5–6 at each peduncle-base . . .	1. *C. polygynus.*
Female flowers 1–2, rarely 3, to each peduncle.	
Male calyx glabrous; leaves finely and closely toothed	2. *C. nudus.*
Male calyx pubescent.	
Leaves entire or subentire, softly pubescent . .	3. *C. velutinus.*
Leaves distinctly toothed.	
Leaves crenate, at length almost glabrous, smooth	4. *C. cordofanus.*
Leaves dentate, persistently harshly hairy, scabrous	5. *C. scabridus.*
Leaves sessile or nearly so, entire.	
Male calyx glabrous; leaves rather harsh, when mature nearly glabrous	6. *C. Pueschelii.*
Male calyx hairy; leaves softly pubescent . . .	7. *C. mollis.*

1. **C. polygynus,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Adrian.* 10, *fig.* 3, *D.* Shrub, 5 ft. high; twigs somewhat floccose with

stellate hairs, soon glabrous. Leaves petioled, membranous, ovate, acute, base rounded or slightly cordate, margin crenate-toothed, 1–1¾ in. long, ⅓–1 in. wide, when young stellate-pilose, soon glabrescent and pilose-scabrous only along the nerves; petiole slender, ⅓–⅔ in. long, sparingly stellate-pilose; stipules lanceolate, subentire, uncinate, 1 lin. long. Heads globose, terminal, ⅓ in. across; peduncles ⅙–⅕ in. long, rusty-pubescent; female pedicels 5–6, subumbellate, erect, ⅕ in. long. Male: Calyx tomentose; lobes wide ovate, subacute; rudimentary ovary 2-lobed. Female: Sepals tomentose, pinnatipartite. Ovary tomentose; styles shortly connate at the stellate-hairy base, glabrous and much divided upwards.

Nile Land. Somaliland: Boran; Wai Wai, *Ellenbeck*, 2137.

2. **C. nudus,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Adrian.* 10. Shrub; twigs stellate-pubescent, at length glabrescent. Leaves petioled, ovate, acute, base rounded, margin closely and finely crenate-toothed, ⅔–¾ in. long, ⅕–¼ in. wide, glabrescent above, sparingly stellate-tomentose beneath, somewhat scabridulous; petiole ¼–⅔ in. long; stipules minute, subulate, subentire. Heads globose, terminal, ⅓ in. across; peduncle finely stellate-pubescent, ⅛–⅕ in. long; female pedicels solitary to each peduncle, very short. Male: Calyx glabrous externally; lobes ovate, subacute; rudimentary ovary 2–3-lobed. Female: Sepals densely stellate-pubescent, short, pinnatipartite. Ovary tomentose; styles almost free, glabrous.

Nile Land. British East Africa: Witu, near Malka Korokora, *Thomas*, 105!

3. **C. velutinus,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Adrian.* 10. Shrub, about 3 ft. high; twigs floccose with stellate hairs, at length glabrescent. Leaves petioled, very firm, ovate, acute, base cordate, margin entire or faintly repand-crenulate, ⅔–1 in. long, ⅓–¾ in. wide, densely stellate-velvety on both surfaces; petiole ⅙–⅕ in. long, villous; stipules subulate, incised, 1 lin. long. Heads globose, terminal, ¼–⅓ in. across; peduncle ⅛–⅙ in. long, densely stellate-tomentose; female pedicels 2, ⅛–⅙ in. long. Male: Calyx densely tomentose; lobes triangular-ovate, acute; rudimentary ovary entire or faintly 2-lobed. Female: Sepals pinnately 4-lobed, densely tomentose. Ovary tomentose; styles nearly free, pilose.

Nile Land. British East Africa: Juba Valley; Ferschit, *Ellenbeck*, 2338!

4. **C. cordofanus,** *Hochst. in Flora*, 1841, 370. Small shrub, up to 3–4 ft. high; twigs finely stellate-hairy, sometimes also glandular, glabrescent. Leaves petioled, membranous, ovate-cordate, acute or shortly acuminate, margin crenate, glandular or not, ½–2 in. long, ⅓–1½ in. wide, stellate-tomentose, at length almost glabrous on both sides; petiole ¼–⅔ in. long, stellate-pubescent and sometimes also glandular; stipules linear, slightly incised lobulate, 1½ lin. long. Heads globose, terminal, ⅓ in. across; peduncle stellate-pubescent, up to 1 in. long; female pedicels 1–3, ⅕ in. long, in fruit elongated up to 1¼ in. long. Male: Calyx finely pubescent externally; rudimentary ovary

2–3-fid. Female: Sepals pinnately 4-lobed, lobes again many-lobulate and usually glandular. Ovary tomentose; styles very slightly connate below, many-lobulate, glabrous. Capsule scabridly stellate-pubescent, deeply 3-sulcate, $\frac{2}{3}$ in. wide.—Müll. Arg. in Linnæa, xxxiv. 155, and in DC. Prodr. xv. ii. 762; Baill. Adansonia, v. 148; Pax in Engl. Pfl. Ost-Afr. C 240, and in Engl. Pflanzenr. Euphorb.-Adrian. 8, fig. 3, A–C; *C. cordofanus*, var. *betulinus*, Müll. Arg. ll.cc.; Pax l.c. 9. *Acalypha betulina*, Schweinf. Pl. Nilot. 13 partly; not of Retz.

Nile Land. Nubia: north of Maharrakat and Gedaref, *Schweinfurth*, 845! Matamma, *Schweinfurth*, 846! Sennar: Abuzor, *Broun*, 774! Sudan: Roseires, *Broun*, 498! Malakai, *Broun*, 1690! on the White Nile, *Petherick!* Hellet Idris, *Hartmann!* by the Atbara River, *Steudner*, 845: Mersalamia, *Steudner*, 541! Kordofan: Arashkol Mountain, *Kotschy*, 8! 118! and without precise locality, *Kotschy*, 483!

5. **C. scabridus,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Adrian.* 9. Shrub; twigs verrucose, rigidly stellate. Leaves petioled, rather firm, triangular-ovate, acuminate, base cordate, margin sharply toothed, $1\frac{3}{4}$–2 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, harshly stellate-hirsute; petiole $\frac{1}{4}$–$\frac{2}{3}$ in. long, slender, harshly stellate-hairy; stipules $1\frac{1}{2}$ lin. long, few-lobed. Heads globose, terminal, very small; peduncle short, tawny-pubescent; female pedicels 1–2, $\frac{1}{5}$ in. long. Male: Calyx sparingly pilose. Female: Sepals pinnately lobed. Ovary tomentose; styles shortly connate below, many-lobulate, glabrous.

Nile Land. British East Africa: Ukamba, *Hildebrandt*, 2820!

6. **C. Pueschelii,** *Pax in Engl. Jahrb.* xliii. 84. Shrub, 3–5 ft. high; twigs harshly stellate-pilose. Leaves sessile or nearly so, when young often with a pink or purplish tinge, firmly membranous, ovate or ovate-lanceolate, obtuse or subacute, base rounded, truncate or rarely subcordate, margin entire, 1–$2\frac{1}{4}$ in. long, $\frac{1}{3}$–$1\frac{1}{2}$ in. wide, when young rather densely pilose, at length glabrous except for scattered stellate hairs on the nerves and margin, somewhat harshly scabrous; petiole stellate-hairy, occasionally 2 lin. long; stipules minute, very tomentose. Heads globose, terminal, $\frac{1}{3}$ in. across; peduncles $\frac{2}{3}$–1 in. long, softly pubescent; female pedicels 4–5, softly pubescent, $\frac{1}{4}$–$\frac{1}{3}$ in. long, occasionally 0. Male: Calyx glabrous; lobes ovate-triangular, acute; rudimentary ovary columnar, with a 2-lobed or 2-partite undilated tip. Female: Sepals densely stellate-pubescent, pinnately 4–6-lobed. Ovary finely pubescent; styles connate below in a sparingly pilose column, long, free, glabrous, much laciniate above. Capsule finely stellate-pubescent, deeply 3-sulcate, $\frac{1}{2}$ in. wide.—Engl. Pflanzenr. Euphorb.-Adrian. 11. *C. mollis*, var. *pilosa*, Schinz ex N. E. Br. in Kew Bulletin, 1909. 140.

Lower Guinea. German South-west Africa: Amboland; Okasima, *Schinz*, 2067! between Olukonda and Unkuambi, *Schinz*, 2068! Ondonga, *Rautanen*, 205! 207! Oshando, *Schinz*, 729! Otyitambi, *Luderitz*, 87! Damaraland; Otyisondu, *Pueschel*, 588! Otawi, *Dinter*, 832! Ankas, *Dinter*, 832A; Rietfontein, *Seiner*, 369! Hereroland; Okaukueyo, *Rautanen*, 715!

Mozamb. Distr. Bechuanaland: Olifants Kloof, *Fleck*, 443A! Kokong, *Schultze!* Ngamiland: Kwebe Hills, 3000 ft., *Lugard*, 51! *Mrs. Lugard*, 70!

7. **C. mollis,** *Klotzsch in Peters, Reise Mossamb. Bot.* 99, *t.* 17. Shrub, much-branched from near the base; twigs stellate-velvety. Leaves sessile or nearly so, very firm, oblong-ovate or elliptic, obtuse, base rounded, margin entire, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, pubescent above, stellate-velvety beneath, veins beneath distinct; petiole under 1 lin. long, velvety; stipules linear, minute, spreading.. Heads globose, terminal, $\frac{1}{3}$ in. across; peduncles $\frac{1}{2}$ in. long, velvety; female pedicels 3–4, velvety-pubescent, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Male: Calyx softly pilose; lobes ovate, acute; rudimentary ovary columnar, with dilated lobulate tip. Female: Sepals densely velvety, pinnately 5–6-lobed. Ovary finely pubescent; styles connate below in a tomentose column, free, glabrous, much laciniate above. Capsule finely stellate-pubescent, 3-sulcate, $\frac{1}{2}$ in. wide.—Müll. Arg. in DC. Prodr. xv. ii. 761; Pax in Engl. Pfl. Ost-Afr. C. 240, and in Engl. Pflanzenr. Euphorb.-Adrian. 10; S. Moore in Journ. Linn. Soc. xl. 199.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Sena, *Peters!* Gazaland: Lower Umswirizwi River, 1000 ft., *Swynnerton,* 309! British Central Africa: Nyasaland: Zomba, *Purves,* 119! and without precise locality, *Buchanan,* 958!

53. HASSKARLIA, Baill.; Benth. et Hook. f. Gen. Pl. iii. 308.

Flowers dicœcious, apetalous. Male: Calyx thinly membranous, 3-partite, lobes subvalvate in bud. Stamens 3; filaments very short; anthers erect, 4-celled; cells ovoid-globose, at length free from the base and opening longitudinally from the apex downwards on the inner face. Rudimentary ovary columnar or 0. Female: Calyx minute or 3-partite. Hypogynous disk of 3 petal-like scales, alternate with and nearly as long as the carpels. Ovary fleshy, 3-celled; ovules in each cell solitary; styles flat, dilated, spreading, adpressed to the top of the ovary. Capsule obscurely 3-dymous, breaking up into 3 cocci. Seed smooth, caruncle large; albumen fleshy; cotyledons broad, flat.—Trees, shrubs, or herbs, quite glabrous. Leaves alternate or opposite, short-petioled, shining, penninerved. Flowers lateral; males in catkin-like spikes numerous; females few.

Species 3, endemic. The third species, which has been recently discovered, will be described in the addenda to this volume.

Leaves alternate	1. *H. didymostemon.*
Leaves opposite	2. *H. oppositifolia.*

1. **H. didymostemon,** *Baill. Adansonia,* i. 52. Shrub 8–15 ft. or a medium to tall tree, 40–80 ft. high; twigs glabrous. Leaves alternate, short-petioled, membranous, obovate-oblong, cuspidate, base cuneate, narrowing to the petiole, margin entire, 7–9 in. long, $2\frac{1}{2}$–5 in. wide, bright green, somewhat polished and glabrous on both surfaces; petiole 4–5 lin. long. Male: Calyx globose in bud, under 1 lin. wide, yellowish; flowers clustered in short axillary spikes. Female: Calyx small; flowers racemose or solitary. Capsule 3-lobed, 3–4 lin. wide.—Müll. Arg. in DC. Prodr. xv. ii. 774; Ficalho, Pl. Uteis, 257; Hiern in Cat. Afr. Pl.

Welw. i. 974; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47; Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 51; De Wild. Miss. É. Laurent, i. 131, and Études Fl. Bas- et Moyen-Congo, ii. 284; Stapf in Johnston, Liberia, ii. 649; Rendle in Journ. Linn. Soc. xxxvii. 212; Th. & Hél. Durand, Syll. Fl. Congol. 491. *Gelonium angolense*, Prain in Kew Bulletin, 1911, 233.

Upper Guinea. Senegambia: Fouta Jallon; *Heudelot*, 835! Sierra Leone: Falaba; near Berria, *Scott-Elliot*, 5232! 5430! Scarcies River, *Scott-Elliot*, 4725! 5412! near Kukuna, *Scott-Elliot*, 2425! Samu; near N'tunga, *Scott-Elliot*, 4332! Limba; near Bafodeya, *Scott-Elliot*, 5557! Liberia; Grand Bassa; Fishtown, *Dinklage*, 1710! Monrovia, *Whyte!* Sinoe Basin, *Whyte!* Ivory Coast; Bingerville, Abidgean and Dabou, *Chevalier*, 15321! 16209! 16219! 17214! Brumoukrou, *Chevalier*, 16862! Zaranou, *Chevalier*, 16268! 17651! between Guidako and the Zozro, *Chevalier*, 19054! Togo: Misahöhe, *Baumann*, 509! Southern Nigeria: Brass River, *Barter*, 1848! Cameroons: Batanga, *Dinklage*, 1259! 1268!

Nile Land. Uganda: Central Prov.; Buvuma Island, in Lake Victoria, *Bagshawe*, 661!

Lower Guinea. St. Thomas Island: at 2000 ft., *Mann*, 1058! *Welwitsch*, 358! Spanish Guinea: Nkolentangan, *Tessmann*, B 5! Gaboon: Cristal Mountains, *Trilles*, 35! Libreville, *Klaine*, 2088! French Congo: Mayumba Forests, *Thollon*, 1259! Oubangi River; Modgaka, *Thollon*, 38! Lower Congo: Stanley Pool district, near Leopoldville, *Gillet*; Kisantu, *Gillet*. Angola: Golungo Alto, *Welwitsch*, 359! Cazengo, *Gossweiler!*

South Central. Belgian Congo: Lake Leopold II. district; Ibali, *Laurent*; Mfini, *Laurent*. Equatorial Province: Eala, *Pynaert*, 811, 1786. Bangala district: New Antwerp, *Pynaert*, 10! Eastern Province; Mawambi, Kasanga, *Mildbraed*, 3105! 3115! Irumu, Songola, *Mildbraed*, 2996! Ponthierville, *Dewèvre*, 1132. Kasai district; Kondue, *Laurent*; Ifuta, *Laurent*.

Mozamb. Distr. German East Africa: Bukoba, *Stahlmann*, 972! *Mildbraed*, 44!

2. **H. oppositifolia,** *Pax in Engl. Jahrb.* xliii. 81. Small tree; twigs glabrous; bark greyish-green. Leaves opposite, distichous, short-petioled, firmly membranous, oblong, caudate-acuminate, base cuneate, narrowing to the petiole, margin shortly and distantly toothed, 7 in. long, 2–2¼ in. wide, bright green, somewhat polished and glabrous on both surfaces; petiole 5 lin. long. Male: Calyx globose in bud, yellowish, under 1 lin. wide; flowers clustered in dense cylindric pendulous spikes 2¼–2½ in. long. Female flower and fruit not seen.

Upper Guinea. Liberia: Monrovia, *Dinklage*, 2213! Sinoe Basin, *Whyte!* Southern Nigeria: Oban, *Talbot*, 640!

Lower Guinea. French Congo: N'Djolé, Ogowé, *Thollon*, 714!

Perhaps only a variety of *H. didymostemon*.

4. **ERYTHROCOCCA**, Benth.; Benth. et Hook. f. Gen. Pl. iii. 308.

Flowers dicecious, apetalous. Male: Calyx globose, often apiculate, rarely conical, closed in bud, splitting into 3–4 valvate lobes. Stamens 2–60, usually intermixed with small generally hirsute glands and sometimes surrounded by a ring of similar rather larger free or connate glands; filaments free, longer or shorter than the anthers; anthers

erect, 2-celled; cells subglobose or obovoid, free from the base, opening by longitudinal extrorse slits. Rudimentary ovary 0. Female: Calyx 2- (rarely 3–4-) partite; lobes smaller than in the male. Disk of 2–3 free, discrete or contiguous scales with or without minute or intercalated glands, or shallow-urceolate and usually distinctly 2-lobed, rarely subentire. Ovary glabrous or strigose, 2–3-celled; cells 1-ovuled; stigmas free, sessile, spreading and plumosely fimbriate from the base, very rarely entire, or more or less connate below in a short or very short rarely columnar style, crowned by short or very short smooth (very rarely papillose) and entire (very rarely lobulate) stigmatic lobes. Capsule 2-coccous, didymous, less often 3-coccous or by abortion 1-coccous; cocci subglobose, splitting longitudinally; valves coriaceous, persistent. Seeds nearly spherical, enveloped in a thin complete fleshy usually scarlet aril; testa crustaceous, usually rugosely foveolate-reticulate, rarely almost smooth; albumen fleshy; embryo axile, radicle conical, cotyledons broad, flat.—Shrubs with slender woody branches; buds perulate, the scales usually persistent; bark lenticelled. Leaves alternate, petioled; petioles channelled above, often short; margin crenate or dentate, the teeth glandular; stipules cartilaginous, glabrous, often accrescent and modified into umbonate mammillæ or weak conical thorns, rarely into wide-based pungent spines, sometimes minute, subulate and unaltered. Flowers small, very small or minute, in axillary fascicled or solitary racemes or glomerules; peduncles slender; pedicels capillary, articulate near the base, rarely some distance beyond the bracteoles. Male flowers usually several to a bracteole, rarely solitary; females usually solitary, rarely 2 or more to each bracteole.

Species about 40; two in South Africa, one extending from Abyssinia to Arabia, the others endemic.

*Stigmas laciniate or lobulate; hypogynous scales free and separated by distinct intervals; filaments longer than the anther-cells.
†Stigmas sessile, linear, spreading and plumosely laciniate throughout.
‡Flowers in axillary capitate glomerules; stipules accrescent and more or less modified.
Glomerules of male flowers sessile; ovary glabrous.
Leaves glabrous; stamens usually 8; glands hirsute, the extra-staminal ring complete.
Male pedicels flaccid, flexuous; extra-staminal glands often connate . . 1. *E. Kirkii.*
Male pedicels firm, straight; extra-staminal glands usually free . . . . 2. *E. mitis.*
Leaves more or less pubescent; stamens 9–12; glands glabrous, the extra-staminal ring usually imperfect . . . 3. *E. bongensis.*
Glomerules of male flowers distinctly peduncled; receptacular glands glabrous or sparingly hirsute.
Peduncles and rhachises of glomerules pubescent; leaves firmly membranous.

Ovary glabrous or nearly so; stamens 9–15; glands all inter-staminal . 4. *E. rigidifolia.*
Ovary densely strigose; stamens 12; extra-staminal ring usually complete . . 5. *E. olacifolia.*
Peduncles and rhachises of glomerules glabrous; leaves thinly membranous; ovary (where known) glabrous.
Peduncles $\frac{1}{6}$–$\frac{1}{5}$ in. long; stamens 15 or 18 or 21; extra-staminal ring usually imperfect . . . . . 6. *E. Paxii.*
Peduncles sometimes $\frac{1}{2}$ in. long, rhachis often prolonged and with a smaller second terminal glomerulus; stamens 10–12; extra-staminal ring complete, its glands often somewhat connate . 7. *E. Fischeri.*

‡‡Flowers in axillary racemes.
§Stipules accrescent and more or less modified into mammillæ or thorns or pungent spines.
Male flowers with both inter-staminal glands and an extra-staminal ring; leaves glabrous or nearly so.
Stipular spines small, mammillate or conical, $\frac{1}{10}$ in. long or less; stamens 6–8; ovary glabrous; hypogynous scales flattened; racemes shorter than the leaves.
Male calyx 3-lobed; male peduncles glabrous; receptacular glands hirsute; petiole distinct . . .. 8. *E. abyssinica.*
Male calyx 4- (rarely 5-) lobed; male peduncles pubescent; receptacular glands glabrous; petiole very short 9. *E. usambarica.*
Stipular spines conspicuous, broad-based and pungent, $\frac{1}{8}$–$\frac{1}{6}$ in. long; receptacular glands hirsute.
Racemes much shorter than the leaves.
Calyx partite nearly to the base; male pedicels jointed close to the bracteoles; glands flat, shorter than filaments; stamens 15–18; ovary not seen . . . . 10. *E. zambesiaca.*
Calyx partite only to the middle; male pedicels jointed well above the bracteoles; glands rhomboid, as long as stamens; stamens 6–11; ovary strigose; hypogynous scales flattened . . . . . 11. *E. aculeata.*
Racemes spike-like as long as the leaves; ovary glabrous.
Hypogynous scales flattened; the spaces between them without intercalary scales.
Leaves thinly membranous, margins denticulate; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long; stamens 12 . . 12. *E. subspicata.*

Leaves firmly membranous, margins crenate; petiole $\frac{1}{5}$–$\frac{1}{4}$ in. long; male flowers not seen . . 13. *E. Laurentii.*

Hypogynous scales replaced by subcylindric clavate staminodes with 2-celled empty anthers, surrounded by an extra-staminodial ring of flat hirsute glands; leaves thinly membranous, margins faintly crenate . . . 14. *E. Poggeophyton.*

Male flowers with either inter-staminal glands or an extra-staminal ring, but not with both (unknown in 16, *E. tristis*, and 20, *E. trichogyne*); ovary (where known) densely pubescent.

Pedicels jointed well above bracteoles; hypogynous disk-scales of subcylindric clavate antherless staminodes; leaves more or less pubescent.

Female peduncles several-flowered; stamens 2–5 with an extra-staminal ring of glabrous glands; inter-staminal glands 0 . . . 15. *E. Menyharthii.*

Female peduncles with a solitary flower with jointed pedicel; male flowers unknown . . . . . 16. *E. tristis.*

Pedicels jointed close to the bracteoles; hypogynous disk-scales (where known) flattened; receptacular glands (where known) all inter-staminal, hirsute.

Leaves $\frac{1}{2}$ in. long or less, more or less pubescent; female calyx 2-lobed; stamens 15 . . . . . 17. *E. lasiococca.*

Leaves $1\frac{1}{2}$ in. long or longer.

Leaves nearly glabrous; petiole $\frac{1}{4}$ in. long; stamens 27; female flowers unknown . . . . . 18. *E. ledermanniana.*

Leaves distinctly pubescent on both surfaces.

Petiole $\frac{1}{2}$ in. long; female calyx 2-lobed; stamens 9–12 . . 19. *E. Mildbrædii.*

Petiole $\frac{1}{4}$ in. long or less.

Female calyx 2-lobed; male flower unknown . . . . . 20. *E. trichogyne.*

Female calyx 3–4-lobed; stamens 10 . . . . . 21. *E. hirta.*

§§Stipules unmodified, minute, cartilaginous, glabrous; leaves glabrous; male calyx 4-lobed; stamens 24–30, usually 27; glands all inter-staminal, hirsute; ovary glabrous or with a few apical hairs . . . . 22. *E. pauciflora.*

††Stigmas with a very short style, ovate-lanceolate with lobulate (but hardly plumose) margin; stipules unmodified; leaves glabrous; male calyx 3-lobed; stamens 10–13; glands all inter-staminal,

glabrous; female calyx 2–3-lobed, lobes large ovate; ovary glabrous . . . . . 23. *E. polyandra.*

**Stigmas entire, smooth or rarely papillose; ovary glabrous; hypogynous disk urceolate, lobed or subentire, or if scales free then contiguous under base of ovary; pedicels jointed close to bracteoles; receptacular glands all inter-staminal; stipules unmodified, minute, cartilaginous, glabrous.

Filaments longer than anther-cells; stigmas sessile, linear, entire, smooth, arcuately recurved; hypogynous disk of 2 large lobes contiguous under base of ovary; male buds subspherical, minutely apiculate; stamens 27; glands hirsute; leaves and twigs hispid . . . . . 24. *E. membranacea.*

Filaments (where known) shorter than the anther-cells.

Stigmas (where known) sessile, linear, entire, smooth, spreading; hypogynous disk (where known) of 2 large lobes contiguous under base of ovary; male buds conical-pyramidal from an umbonate base; receptacular glands hirsute.

Petioles and leaves on nerves beneath hispid with spreading hairs; leaves pale green, 8–10 in. long, base rounded; stamens 50–54; female flowers not seen . . . 25. *E. patula.*

Petioles and leaves glabrous even when young; leaves dark green, 3–8 in. long, base cuneate; stamens 24–30 . . . 26. *E. Mannii.*

Stigmas (where known) suborbicular or ovate-lanceolate, suberect or divaricate; hypogynous disk (where known) urceolate; male buds subspherical, minutely apiculate.

Stigmas distinctly papillose, subsessile, suborbicular, nearly erect; hypogynous disk shallow urceolate, in flower subentire, in fruit 5-lobed; stamens 24; glands hirsute; leaves ultimately glabrous . . . 27. *E. africana.*

Stigmas (where known) smooth.

Stigmas subsessile; disk urceolate, 2-lobed.

Stigmas suborbicular, nearly erect; leaves 4–5-nerved.

Leaves persistently hairy on nerves above, softly pubescent beneath; stamens 30; glands hirsute . . 28. *E. Chevalieri.*

Leaves glabrous; stamens 40; glands glabrous . . . . . 29. *E. Molleri.*

Stigmas shortly ovate, divaricate; leaves glabrous, 8–10-nerved; stamens 40; glands hirsute . . . . . 30. *E. rivularis.*

Stigmas (where known) supported by a distinct style; receptacular glands hirsute at apex.

Stigmas (where known) very small, suborbicular, nearly erect, much shorter

than the pronounced columnar style; disk (where known) shallow urceolate, very slightly 2-lobed.

Leaves 4–6 in. long, ultimately glabrous; stamens 30 . . . . . 31. *E. welwitschiana.*

Leaves $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, persistently pubescent; stamens 48–60.

Pubescence adpressed; bracteoles ovate, $\frac{1}{20}$ in. long; stamens 48–54 32. *E. columnaris.*

Pubescence of spreading hispidulous hairs; bracteoles subulate, $\frac{1}{12}$ in. long; stamens 60; female flowers unknown . . . . . 33. *E. Poggei.*

Stigmas (where known) ovate-lanceolate, longer than the short but distinct style, divaricate in flower, recurved in fruit.

Hypogynous disk entire, very eccentric, much developed on one side, nearly obsolete on the other; leaves usually more or less rounded at the base; stamens 30–40; fruit $\frac{1}{4}$ in. across.

Leaves pubescent, especially on the nerves on both sides; capsules slightly depressed between the cocci; seeds shallow foveolate . 34. *E. atrovirens.*

Leaves ultimately glabrous except on nerves beneath; capsules deeply depressed between the cocci; seeds distinctly foveolate . . 35. *E. oleracea.*

Hypogynous disk (where known) distinctly equally 2-lobed

Peduncles and petioles softly adpressed pubescent; leaves cuneate at the base.

Leaves 2–3 in. long; fruit $\frac{1}{4}$ in. across.

Petiole $\frac{1}{4}$ in. long or less; female peduncles about 4-flowered; hypogynous disk shallowly 2-lobed; male flowers unknown . . . . 36. *E. angolensis.*

Petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long; female peduncles 12–16-flowered; hypogynous disk deeply 2-lobed; stamens 34 . . 37. *E. flaccida.*

Leaves 9–10 in. long; stamens 24; female flowers unknown . 38. *E. macrophylla.*

Peduncles and petioles hispid with spreading hairs; leaves more or less rounded at the base; fruit $\frac{1}{3}$ in. across; disk widely 2-lobed.

Leaves tomentose beneath between the hispidly hairy nerves, 4–5 in. long; stamens 24 . . 39. *E. Dewevrei.*

Leaves finely verrucose, but not tomentose between the hispidly hairy nerves, 5–8 in. long; stamens 27	40. *E. hispida.*

1. **E. Kirkii,** *Prain in Ann. Bot.* xxv. 609. Shrub about 6 ft. high; twigs slender, glabrous; bud-scales persistent. Leaves petioled, thinly membranous, ovate or ovate-oblong, obtuse, base cuneate, margin crenate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. wide, dark green, purplish when young, glabrous; petiole glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules accrescent, mammillate, rarely spinulose. Flowers minute, males in sessile glomerules with pubescent rhachis; pedicels glabrous, flexuous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; females on a short rhachis $\frac{1}{5}$–$\frac{1}{4}$ in. long; pedicels one-fourth the length of the males. Male calyx pale green, glabrous, globose in bud; lobes 3, thinly membranous. Stamens usually 8; outer 5–6, the rest central; filaments longer than the anthers; glands minute, hirsute, 5–6, flat, usually connate in an extra-staminal ring; the rest rhomboid, inter-staminal. Female calyx smaller than the male; lobes 3, ciliate. Ovary glabrous, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 discrete scales. Capsule 3-coccous, or 2-coccous, didymous, or 1-coccous; cocci $\frac{1}{4}$ in. across. Seeds with red aril and foveolate reticulate testa.—*E. mitis*, Pax in Engl. Jahrb. xxiii. 524, partly, as to Stuhlmann's Dar-es-Salaam plant; not of Pfl. Ost-Afr. C. 238. *Claoxylon Kirkii*, Müll. Arg. in Flora, 1864, 436, and in DC. Prodr. xv. ii. 776; Pax in Engl. Pfl. Ost-Afr. C. 238; Sim, For. Fl. Port. E. Afr. 105.

Nile Land. British East Africa: Mombasa, *Hildebrandt*, 2039! *Boivin!*

Mozamb. Distr. German East Africa: Usambara; Amboni, *Holst*, 2709! Bagamoyo, *Stuhlmann*, 7233! 7266! *Sacleux*, 1443! Dar-es-Salaam, *Stuhlmann*, 7506! 7555! 7595! 7649! Useramo; Kodenga, *Stuhlmann*, 6369! Kinda, *Stuhlmann*, 6511! Rovuma Bay, *Kirk! Sim.* Zanzibar, *Sacleux*, 629! Portuguese East Africa: near Mozambique, *Stuhlmann*, 397! near Beira, *Schlechter!*

Appears to occur only on or near the coast.

2. **E. mitis**, *Pax in Engl. Pfl. Ost-Afr. C.* 238. Shrub or small tree, 7–20 ft. high; twigs slender, glabrous; bud-scales persistent. Leaves petioled, firmly membranous, ovate-oblong, abruptly and obtusely acuminate, base wide-cuneate, margin crenate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. wide, rather pale green, glabrous; petiole glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules accrescent, mammillate, sometimes spinulose. Flowers minute, males in sessile glomerules with pubescent rhachis; pedicels glabrous, rather stiff, $\frac{1}{4}$–$\frac{1}{3}$ in. long; females on a short rhachis $\frac{1}{6}$–$\frac{1}{5}$ in. long; pedicels one-third the length of the males. Male calyx whitish-green with purplish tip, glabrous, globose in bud; lobes 3, firm. Stamens usually 8; outer 5, the rest central; filaments longer than the anthers; glands minute, hirsute, 5 flattish, usually free, in an extra-staminal ring, the rest rhomboid, inter-staminal. Female calyx smaller than the male; lobes 3, ciliate. Ovary glabrous, 3-celled, less often 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 or 2 discrete scales. Capsule 3-coccous, or

2-coccous, didymous, or 1-coccous; cocci ¼ in. across. Seeds with red aril and foveolate reticulate testa.—Pax in Engl. Jahrb. xxiii. 524, as to Goetze's Morogoro plant only; Prain in Ann. Bot. xxv. 610.

Mozamb. Distr. German East Africa: Usambara; between Magila and Sega, *Volkens*, 72! Morogoro; Khutu Steppe, *Goetze*, 105!

Very nearly allied to *E. Kirkii*, from which it differs chiefly in the rather shorter and stiffer male pedicels, the rather smaller and firmer calyx-lobes and the firmer leaves.

3. **E. bongensis,** *Pax in Engl. Jahrb.* xix. 88. Shrub 2–6 ft. high; twigs thinly pubescent; bud-scales deciduous. Leaves short-petioled, membranous, ovate, acute or rounded at the tip, base cuneate, margin obscurely crenate, 1–1¾ in. long, ¾–1¼ in. wide, green paler beneath, sparingly hairy on the nerves above and below; petiole softly hairy, ⅕–⅓ in. long; stipules accrescent, usually spinulose. Flowers minute, males in sessile glomerules with densely pubescent rhachis; pedicels glabrous, ⅓ in. long. Male calyx green, glabrous, globose in bud; lobes 3, rather firm. Stamens 9–12; outer 6–8, the rest central; filaments longer than the anthers; glands minute, glabrous, all inter-staminal; filaments of the outer series each with a pair of adnate basal glands but with no extra-staminal ring. Female flowers and fruit not seen.—Prain in Ann. Bot. xxv. 610.

Nile Land. Bongo: Gurfala, *Schweinfurth*, **2226** (Herb. Berlin)! 2296 (Herb. Kew)!

South Central. Belgian Congo: Eastern Province, Rutschurru Steppe, *Mildbraed*, 1874!

Mozamb. Distr. German East Africa: Ruanda; Buganza, south of Lake Mohasi, *Mildbraed*, 591!

4. **E. rigidifolia,** *Pax in Engl. Jahrb.* xliii. 320. Shrub 3–10 ft. high; twigs at first softly pubescent, at length glabrous; bud-scales persistent. Leaves short-petioled, firmly membranous, narrow elliptic, acute, base cuneate, margin crenulate, 1¾–3 in. long, ¾–1¼ in. wide, rarely ¾ in. long, ½ in. wide, dark green, glabrous; petiole at first pubescent, soon glabrous or with only a few hairs in lateral lines, ⅕ in. long; stipules accrescent, umbonate or spinulose. Flowers minute, males in short-peduncled glomerules with densely pubescent rhachis; peduncles stout, pubescent, ⅕ in. long; pedicels glabrous, rather stiff, ¼ in. long; females in sessile or casually short peduncled fascicles, pedicels one-third the length of the males. Male calyx green, glabrous, globose in bud; lobes 3, rather firm. Stamens 9–15; outer 6–9, the rest central; filaments longer than the anthers; glands minute, glabrous or occasionally with a few hairs, all inter-staminal; filaments of the outer series each with a pair of adnate basal glands, but with no extra-staminal ring. Female calyx smaller than the male; lobes 3, glabrous. Ovary glabrous or occasionally with a few hairs, 3-celled, less often 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 or 2 discrete scales. Capsule usually 2-coccous, didymous, sometimes 3-coccous; cocci ¼ in. across. Seeds with orange-red aril

and distinctly foveolate-reticulate testa.—Prain in Ann. Bot. xxv 610.

Nile Land. Uganda: Kaihura, on Lake Albert (a stunted form with small leaves), *Scott-Elliot*, 8033! Ankole; marsh to west of Lake Victoria, *Scott-Elliot*, 7449! British East Africa: at Lake Nakuro, 6000 ft., *Scott-Elliot*, 6793! Duruma River, *Kässner*, 301! Nairobi, *Linton*, 159!

South Central. Belgian Congo: northern shore of Lake Albert Edward, *Mildbraed*, 1935!

Mozamb. Distr. German East Africa: Bukoba; Karagwe, 4000–6000 ft., *Stuhlmann*, 1760! *Scott-Elliot*, 8159! Ruanda; Mugarura Island in Lake Kiwa, *Mildbraed*, 1112!

Very nearly allied to *E. bongensis*.

5. **E. olacifolia,** *Prain in Kew Bulletin*, 1911, 89. Shrub; twigs glabrous; bud-scales persistent. Leaves petioled, membranous, ovate-lanceolate, obtuse, base wide-cuneate, margin crenate, 2½–3 in. long, 1–1½ in. wide, dark green, glabrous; petiole sparingly pubescent, ⅓–½ in. long; stipules accrescent, mammillate or spinulose. Flowers minute, males in short-peduncled glomerules with pubescent rhachis; peduncles slender, sparingly pubescent, ⅙ in. long; pedicels glabrous, ⅓ in. long; females in distinctly peduncled glomerules; peduncles nearly glabrous, ¼ in. long; pedicels rather rigid, glabrous, one-fourth the length of the males. Male calyx green, glabrous, globose in bud; lobes 3, thinly membranous. Stamens usually 12; outer 8, the rest central; filaments longer than the anthers; glands minute, glabrous, 5 ovate, subcompressed, free, in an extra-staminal ring, occasionally one or more absent or replaced by a stamen; the rest rhomboid, inter-staminal; filaments of the outer series each with a pair of adnate basal glands. Female calyx smaller than the male; lobes 3, minutely ciliate. Ovary adpressed-strigose, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 discrete linear-ovate scales as long as the ovary. Capsule usually by abortion 2-coccous, didymous, or 1-coccous; cocci sparingly setose, ¼ in. across. Seeds with red aril and minutely foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 611.

Nile Land. Uganda: Toro; Bukarungu, on Lake Ruisamba, 2900 ft., *Bagshawe*, 1191!

Very nearly allied to *E. rigidifolia*, but with thinner leaves, their nerves slightly elevated beneath, a more or less complete extra-staminal ring of glands, a densely strigose ovary and sparingly setose capsule.

6. **E. Paxii,** *Rendle in Journ. Linn. Soc.* xxxvii. 212, *t.* 3. Shrub; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, lanceolate or ovate-lanceolate, subacute, base cuneate, margin crenate, 1–2 in. long, ¼–⅓ in. wide, pale green, often purplish when young, glabrous; petiole glabrous, ¼–⅓ in. long; stipules accrescent, usually umbonate or spinulose. Flowers minute, males in peduncled glomerules with glabrous rhachis; peduncles slender, glabrous, ⅛–⅙ in. long; pedicels glabrous, 1/12–⅛ in. long; females fewer, their pedicels rather shorter than in the males. Male calyx pale green, glabrous,

globose in bud; lobes usually 4, sometimes 3, rather firm. Stamens 15 or 18 or 21; outer 8–10, the rest central; filaments longer than the anthers; glands minute, glabrous or sparingly hirsute, 2–3 outer extra-staminal, never forming a complete ring; the rest rhomboid, inter-staminal; filaments of the outer series each usually with a pair of adnate basal glands. Female calyx smaller than the male; lobes 3, glabrous. Ovary glabrous, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 discrete ovate scales. Capsule usually by abortion 2-coccous, didymous, but often 3-coccous; cocci $\frac{1}{4}$ in. across. Seeds with purplish aril and distinctly foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 611.

Nile Land. Uganda: Ankole; near the River Rufua, *Bagshawe*, **513**!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, **2354**!

Very nearly allied to *E. Fischeri*, differing mainly in the more numerous stamens with an incomplete extra-staminal ring and in the more shortly peduncled male glomerules.

7. **E. Fischeri,** *Pax in Engl. Jahrb.* xix. 88. Shrub; twigs slender, glabrous; bud-scales persistent. Leaves petioled, membranous, oblong-lanceolate, acute, base cuneate, margin crenate, 2–3 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. wide, dark green, often purplish when young, glabrous; petiole glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules accrescent, usually spinulose. Flowers minute, males in peduncled glomerules with glabrous rhachis; peduncles slender, glabrous, up to $\frac{1}{2}$ in. long, usually produced and with a smaller terminal glomerule; pedicels glabrous, up to $\frac{1}{4}$ in. long. Male calyx green, glabrous, globose in bud; lobes 3, rather firm. Stamens 9–12; outer 6–8, the rest central; filaments longer than the anthers; glands minute, sparingly hirsute, 5–6 outer somewhat compressed, more or less connate in an extra-staminal ring; the rest rhomboid, inter-staminal. Female flower and fruit not seen.—Pax in Engl. Pfl. Ost-Afr. C. 238; Prain in Ann. Bot. xxv. 611.

Mozamb. Distr. German East Africa: without precise locality, *Fischer*, **21**!

This, owing to its produced rhachis, forms a link between the species with glomerulate and those with racemose flowers.

8. **E. abyssinica,** *Pax in Engl. Jahrb.* xix. 87. Shrub 10 ft. high; twigs at first pubescent, at length glabrous; bud-scales deciduous. Leaves petioled, finely membranous, oblong, acuminate, base cuneate, margin crenate-serrate, 2–3 in. long, 1–$1\frac{1}{4}$ in. wide, occasionally 4–5 in. long, 2–$2\frac{1}{4}$ in. wide, dark green, often purplish when young, glabrous; petiole glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules accrescent, umbonate or spinulose. Flowers minute, in short-peduncled racemes which are occasionally paniculate; peduncles and rhachis glabrous; pedicels glabrous, male $\frac{1}{8}$ in. long, female as long, solitary or in pairs. Male calyx green, glabrous, globose in bud; lobes 3, rather firm. Stamens usually 8; outer 5, the rest central; filaments longer than the anthers; glands minute, sparingly hirsute; 5 outer rather flat, in an extra-staminal ring; the rest rhomboid inter-staminal. Female calyx smaller than the male, 3-lobed.

Ovary glabrous, 3-celled, rarely 4-celled or 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3, rarely 4 or 2, small discrete scales. Capsule 3-coccous, or sometimes 2-coccous, didymous; cocci nearly $\frac{1}{4}$ in. across. Seeds with dark crimson aril and foveolate reticulate testa.—Schweinf. in Bull. Herb. Boiss. vii. App. ii. 306; Prain in Ann. Bot. xxv. 612. *Mercurialis*? sp., Defl. Voy. Yemen, 203. *Claoxylon Deflersii*, Schweinf. ex Prain, l.c. *Deflersia erythrococca*, Schweinf. ex Penzig in Atti Congr. Bot. Genova, 359; Schweinf. in Abhandl. Akad. Berlin, xxxiii. 663, 667, 708 [Abyssin. Pflanzennam. 17, 21, 62] (name only).

Nile Land. Eritrea: Ghinda, 3300 ft., *Schweinfurth*, **327**! near Acrour, 6300 ft., *Schweinfurth & Riva*, **1037**! Geleb, 5700 ft., *Schweinfurth & Riva*, **1132**! near Felakhit, 3000–3500 ft., *Schweinfurth*, **2239**! Mogod Valley, 4650 ft., *Schweinfurth*, **2059**! Abyssinia: Rora, 6000 ft., *Hildebrandt*, **509**!

Also in Arabia.

9. **E. usambarica,** *Prain in Kew Bulletin*, 1911, 90. Shrub 6–10 ft. high; twigs glabrous; bud-scales deciduous. Leaves short-petioled, firmly membranous, ovate-lanceolate, bluntly acuminate, base wide-cuneate or rounded, margin shallow crenate, $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–1 in. wide, dark green, paler beneath, glabrous; petiole slightly pubescent or glabrous, $\frac{1}{6}$ in. long; stipules accrescent, mammillate or umbonate. Flowers minute, in short-peduncled racemes; peduncles and rhachis pubescent; pedicels puberulous or glabrous, $\frac{1}{12}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, occasionally 5, membranous. Stamens 6–7; outer 5, the rest central; filaments longer than the anthers; glands minute, glabrous; 5 outer 2-lobed in an extra-staminal ring; the rest rhomboid, inter-staminal. Female calyx smaller than the male, 2-lobed. Ovary not seen young; stigmas (marcescent on the capsules) free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 small scales alternating with cocci. Capsule 2-coccous, didymous, or 1-coccous; cocci $\frac{1}{4}$ in. across. Seeds with reddish aril and distinctly foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 613.

Mozamb. Distr. German East Africa: Usambara; Derema, *Scheffler*, **160**! near Amani, 2800–3000 ft., *Engler*, **708**! Handai; Nquelo, 3000 ft., *Heinsen*, **74**!

Very closely allied to *E. abyssinica*.

10. **E. zambesiaca,** *Prain in Kew Bulletin*, 1911, 90. Shrub; twigs sparingly pubescent; bud-scales persistent. Leaves short-petioled, membranous, ovate, obtuse or subacute, base cuneate, margin faintly crenate, $\frac{3}{4}$–1 in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, rather pale green, with a few adpressed white hairs on the nerves beneath, otherwise glabrous; petiole sparingly pubescent, $\frac{1}{6}$ in. long; stipules accrescent, strongly spinescent. Flowers minute, in short-peduncled racemes; peduncles and rhachis adpressed pubescent; pedicels glabrous, males $\frac{1}{5}$ in. long, jointed near the base. Male calyx green, glabrous, globose in bud; lobes 4, rarely 5, occasionally 3, membranous. Stamens 15 or 18; outer 9, the rest central; filaments longer than the anthers; glands minute, all thin, ovate, flattened, with marginal fringe of white hairs; 6 outer extra-staminal,

connate in a lobed cup; the rest inter-staminal. Female flower and fruit not seen.—Prain in Ann. Bot. xxv. 613.

Mozamb. Distr. Nyasaland: Lower Shire; Chiromo, *Scott-Elliot*, 2795!

A very distinct species, in facies not unlike *E. aculeata*, but with smaller leaves, very different receptacular glands, and more numerous stamens.

11. **E. aculeata,** *Benth. in Hook. Niger Fl.* 506. Shrub, 3–8 ft. high; twigs glabrous; bud-scales deciduous. Leaves short-petioled, membranous, ovate or oblong, acuminate, base cuneate, margin faintly crenate, 1½–2 in. long, ¾–1 in. wide, medium green, paler beneath, glabrous; petiole glabrous, ⅙–⅕ in. long; stipules accrescent, very strongly spinescent. Flowers minute, in short-peduncled racemes; peduncles and rhachis pubescent; pedicels glabrous, males ⅕ in. long, jointed high up; females shorter, solitary. Male calyx green, glabrous, globose in bud; lobes 3, rarely 4, rather firm, divided to the middle; tube campanulate. Stamens usually 6, sometimes 7–11; outer 5, the rest central; filaments longer than the anthers; glands relatively large, as long as the stamens, hirsute, all rhomboid; 5 outer free, in an extra-staminal ring; the rest inter-staminal. Female calyx smaller than the male, usually 3-lobed, sometimes 2-lobed. Ovary strigose, 3-celled, less often 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 or 2 short broad discrete scales. Capsule sometimes 3-coccous, less often 2-coccous, didymous, frequently by abortion 1-coccous; cocci sparsely setose, ¼ in. across. Seed with brilliant scarlet aril and distinctly foveolate-reticulate testa.—Müll. Arg. in DC. Prodr. xv. ii. 791; Pax in Engl. Jahrb. xix. 87. *E. aculeata*, var. *acutissima*, N. E. Br. ex Stapf in Journ. Linn. Soc. xxxvii. 114, and in Johnston, Liberia, ii. 649. *E. anomala*, Prain in Ann. Bot. xxv. 614. *Adelia anomala*, Juss. ex Poir. Encyc. Suppl. i. 132; A. Juss. Euphorb. Gen. Tent. 32. *Mercurialis aculeata*, Baill. Adansonia, iii. 173.

Upper Guinea. Senegambia: neighbourhood of Boquet, *Heudelot*, 856! Sierra Leone: without precise locality, *Smeathman! Afzelius! Vogel*, 162! Bagru River, *Mann*, 879! Scarcies; near Wallia, *Scott-Elliot*, 4790! Limba; Makende, *Scott-Elliot*, 5694! Liberia: near Monrovia, *Whyte!* Ivory Coast: Bouroukrou, *Chevalier*, 16579! Agnichy Valley; Capiékrou, *Chevalier*, 17103! Sassandra; Soubre, *Chevalier*, 17990! Southern Nigeria: Western Lagos, *Rowland!* Ibadan, *Schlechter*, 13012! Olokemeji, *Foster*, 285! Oban, *Talbot!* Cameroons: Victoria, *Winkler*, 115! Johann-Albrechtshöhe, *Staudt*, 466!

A very distinct species. The suggested variety *acutissima* hardly differs from the original type. Heudelot notes that this plant is highly reputed as a vermifuge.

12. **E. subspicata,** *Prain in Kew Bulletin*, 1911, 185. Shrub; twigs glabrous; bud-scales deciduous. Leaves petioled, membranous, ovate-oblong, acuminate, base rounded or cuneate, sometimes unequal, margin denticulate, teeth often rather large, and sometimes irregularly lobulate, 4–6 in. long, 1½–2½ in. wide, dark green, glabrous; petiole slender, ⅓–½ in. long, sparsely pubescent; stipules accrescent, very

strongly spinescent. Flowers minute, in peduncled narrow spike-like racemes: peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long, sparingly pubescent; rhachis up to 6 in. long, sparingly pubescent; pedicels glabrous, males $\frac{1}{10}$ in. long, clustered and sometimes towards the base of the raceme on distant minute 6–10-flowered spikelets, females $\frac{1}{12}$ in. long, solitary, very rarely towards the base of the raceme 2 to a bract. Male calyx green, pubescent at the apex, globose in bud; lobes 4, occasionally 5, membranous, divided beyond the middle; tube wide campanulate. Stamens usually 12; outer 6, the rest central; filaments longer than the anthers; glands relatively large, as long as the filaments, hirsute, all narrow oblong; 12 outer united at the base in pairs, but the pairs free, in an extra-staminal ring, the rest inter-staminal. Female calyx smaller than the male, 3-lobed; lobes ciliate. Ovary glabrous, 3- (very rarely 2-) celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3, rarely 2, ovate-oblong discrete scales, twice as long as the calyx-lobes. Capsule usually 3-coccous, sometimes 2-coccous, didymous, occasionally by abortion 1-coccous; cocci $\frac{1}{4}$ in. across. Seed with a red aril lobed at the apex and not quite enveloping the seed, and with a finely foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 615. *E. aculeata*, De Wild. & Durand, Contrib. Fl. Congo, i. 50, and Reliq. Dewevr. 209; Th. & Hél. Durand, Syll. Fl. Congol. 491, partly: not of Benth.

Lower Guinea. French Congo: Oubangi; Krebidje, Fort Sibut, *Chevalier*, 5617!

South Central. Belgian Congo: Equatorial district; Coquilhatville, *Dewèvre*, 692!

A very distinct species.

13. **E. Laurentii,** *Prain in Kew Bulletin*, 1911, 186. Shrub; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, ovate, acutely acuminate, base cuneate, margin faintly crenate, 3 in. long, $1\frac{1}{2}$ in. wide, dark green, glabrous; petiole stout, $\frac{1}{5}$ in. long, glabrous; stipules accrescent, very strongly spinescent. Flowers minute, in short-peduncled narrow spike-like racemes; peduncles $\frac{1}{6}$ in. long and rhachis up to 3 in. long very sparingly pubescent; pedicels glabrous, males not seen, females $\frac{1}{12}$ in. long, solitary, jointed at the base. Male calyx not seen. Female calyx small, 3-lobed; lobes ciliate. Ovary glabrous, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 ovate-oblong discrete scales twice as long as the calyx-lobes. Capsule not seen.—Prain in Ann. Bot. xxv. 615. *E. aculeata*, De Wild. Miss. É. Laurent, 129; Th. & Hél. Durand, Syll. Fl. Congol. 491, partly: not of Benth.

South Central. Belgian Congo: Lie, on the Aruwimi River, *Laurent!*

A very distinct species, which differs very markedly in foliage both from *E. subspicata* and *E. Poggeophyton*, but as regards female flowers agrees with the former.

14. **E. Poggeophyton,** *Prain in Kew Bulletin*, 1911, 187. Shrub; twigs pubescent, at length nearly glabrous; bud-scales deciduous. Leaves short-petioled, membranous, oblong-lanceolate, acute,

base rounded, margin crenate, 3–4 in. long, 1 in. wide, pale green, glabrous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, pubescent; stipules accrescent, very strongly spinescent. Flowers minute, in short-peduncled narrow spike-like racemes; peduncles $\frac{1}{5}$ in. long and rhachis up to 4 in. long, sparingly pubescent; pedicels glabrous, $\frac{1}{10}$ in. long, solitary. Male calyx green, pubescent at the apex, globose in bud; lobes 4, membranous, divided beyond the middle; tube wide campanulate. Stamens 9; outer 5, the rest central; filaments longer than the anthers; glands relatively large, as long as the filaments, hirsute, ovoid-oblong, 10 outer in an extra-staminal ring, the rest inter-staminal. Female calyx smaller than the male, 3-lobed; lobes ciliate. Ovary glabrous, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk replaced by 3 staminodes with stout subcylindric-clavate filaments, each with 2 erect non-polliniferous anther-cells surrounded by an extra-staminodial ring of 5 free or slightly connate glands, hirsute at the tip. Capsule 3-coccous or (by abortion) 2-coccous, didymous or occasionally 1-coccous; cocci $\frac{1}{4}$ in. across. Seed with a red aril and a finely foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 615. *Poggeophyton aculeatum*, Pax in Engl. Jahrb. xix. 89; Durand & Schinz, Études Fl. Congo, 245; Engl. in Sitz. Preuss. Akad. Wiss. xxxviii. (1908) 829; Th. & Hél. Durand, Syll. Fl. Congol. 490, 656.

South Central. Belgian Congo: Lualaba-Kasai district; on the Lulua River, *Pogge*, 1370!

An interesting plant owing to the presence of a double disk in the female flower. The male flowers are borne on the lower part of the female rhachises, but are solitary like the female ones. The hypogynous scales of other species are replaced by staminodes; these staminodes are surrounded by an extra-staminodial ring of disk-glands corresponding to the extra-staminal ring of glands in the male flower. The fact that the female inflorescence is abnormal in having male flowers suggests that the female flower may also be abnormal in having staminodes instead of hypogynous scales, and in having an extra-staminodial ring of receptacular glands of the male type. Except that the leaves are crenate, not denticulate, and that the stamens are 9 in place of 12, this species (apart from the disk) hardly differs from *E. subspicata*.

15. **E. Menyharthii,** *Prain in Ann. Bot.* xxv. 616. Shrub 3–10 ft. high; twigs softly silky; bud-scales persistent. Leaves short-petioled, membranous, ovate or lanceolate, acute or narrow-obtuse, base cuneate or rounded, margin sparingly toothed, $\frac{1}{2}$–2 in. long, $\frac{1}{4}$–1 in. wide, pale green, softly pubescent; petiole pubescent, $\frac{1}{10}$–$\frac{1}{8}$ in. long; stipules accrescent, umbonate or spinulose. Flowers minute, in short-peduncled racemes; peduncles and rhachis silky; males many-flowered, females 2–4-flowered; pedicels silky, males $\frac{1}{4}$ in. long, jointed high up, clustered; females shorter, solitary. Male calyx pale green, silky, conical in bud; lobes 4–5, lanceolate. Stamens 2–5, all central; filaments longer than the anthers; glands minute, glabrous, 4–5, free, all in an extra-staminal ring. Female calyx silky, 2–4-partite. Ovary densely strigose, 3-celled, less often 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 3 or 2 subcylindric clavate scales, longer than the calyx-lobes, with sometimes a few smaller

scales intercalated. Fruit not seen.—*Claoxylon sp.* aff. *C. tristi*, Pax in Baum, Kunene-Samb. Exped. 283. *C. Menyharthi*, Pax in Bull. Herb. Boiss. 2me sér. i. 877. *C. virens*, N. E. Br. in Kew Bulletin, 1909, 140.

Lower Guinea. Angola; Mossamedes; on the Kwito below the confluence with the Longa, *Baum*, 549! German South West Africa; Awas Mountains, *Dinter*, 808!

Mozamb. Distr. German East Africa: Magu Kagehi, on Lake Victoria, *Fischer*, 387! Portuguese East Africa: Boruma, *Menyharth*, 889B! British Central Africa: Ngami Land; Kwebe Hills, 3400 ft., *Mrs. Lugard*, 51! *Lugard*, 53! 94! Bechuanaland; near Messeringa Vley, *Seiner* II, 277!

Very nearly related to *E. tristis*, of which the female flowers alone are known, and only differing from that species in having several-flowered female racemes in place of solitary flowers. The male pedicels in this species are jointed high up as in *E. aculeata*. It is the only species of *Erythrococca* with an extra-staminal ring of glands unaccompanied by inter-staminal ones.

16. **E. tristis,** *Prain in Ann. Bot.* xxv. 616. Shrub 2–7 ft. high; twigs pubescent; bud-scales persistent. Leaves short-petioled, membranous, ovate, acuminate or acute, base rounded, margin rather closely crenate, 1–1¼ in. long, ½–⅔ in. wide, rather pale green, sparingly softly pubescent, especially on the nerves; petiole $\frac{1}{12}$ in. long, pubescent; stipules accrescent, umbonate. Male flowers unknown. Female peduncles softly pubescent, ⅕–⅓ in. long, each with a solitary terminal jointed pedicel, $\frac{1}{10}$–⅛ in. long. Female calyx 2-partite, silky. Ovary densely strigose, 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 subcylindric scales, longer than the calyx-lobes. Capsule by abortion 1-coccous with a rudimentary coccus at its base, setose, ¼ in. across. Seed with a reddish aril and deeply foveolate-reticulate testa.—*Claoxylon triste*, Müll. Arg. in Journ. Bot. 1864, 334; DC. Prodr. xv. ii. 779; Hiern in Cat. Afr. Pl. Welw. i. 975.

Lower Guinea. Angola: Huilla; near Humpata, in rocky places at 5000 ft., *Welwitsch*, 390! *Dekindt*, 104! Morro de Lopello, *Welwitsch*, 391! Monnyino, 6000 ft., *Antunes*, 313! Cazengo, *Pearson*, 2303!

17. **E. lasiococca,** *Prain in Ann. Bot.* xxv. 616. Shrub; twigs virgate, densely grey-pubescent: bud-scales persistent. Leaves short-petioled, membranous, ovate or oblong, acute, base rounded, margin sparingly toothed, ⅓–½ in. long, ⅕–¼ in. wide, medium green, paler beneath, sparingly pubescent above, more densely so beneath; petiole pubescent, ½ in. long; stipules accrescent, usually spinulose. Flowers minute, in short-peduncled racemes; peduncles and rhachis densely pubescent; male pedicels with a few scattered hairs, ⅛ in. long; female pedicels $\frac{1}{12}$ in. long, pubescent. Male calyx green, sparingly pubescent, globose in bud; lobes 3, sometimes 4, membranous. Stamens 15; filaments longer than the anthers; glands minute, hirsute, all inter-staminal. Female calyx pubescent, smaller than the male, 2-lobed. Ovary hirsute, 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 discrete scales. Capsule 2-coccous,

didymous; cocci rather closely strigose, $\frac{1}{4}$ in. across. Seeds with a red aril, and a deeply foveolate-reticulate testa.—*Claoxylon lasiococcum*, Pax in Engl. Jahrb. xix. 87, and in Engl. Pfl. Ost-Afr. C. 238.

Nile Land. Uganda: without precise locality, *Stuhlmann*, **1484**!

Mozamb. Distr. German East Africa: east shore of Lake Tanganyika, *Scott-Elliot*, **8231**!

A very distinct species, readily recognised by its unusually small leaves.

18. **E. ledermanniana,** *Prain in Kew Bulletin*, 1911, 92. Shrub or small tree, 7–18 ft. high; twigs sparingly pubescent; bud-scales persistent. Leaves short-petioled, membranous, ovate, acute, base wide-cuneate, margin sparingly toothed, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$–1 in. wide, rather pale green, glabrous except for some scattered hairs on the nerves, finely verrucose: petiole sparingly hairy, $\frac{1}{4}$ in. long; stipules accrescent, mammillate. Flowers minute, in peduncled racemes; peduncles slender, males $\frac{1}{5}$ in. long, and rhachis sparsely hispidulous; pedicels glabrous, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Male calyx green, glabrous or with a few hairs near the tips, globose in bud; lobes 3, membranous. Stamens 27; outer 10, the rest central; filaments thrice as long as the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female flowers and fruit unknown. —Prain in Ann. Bot. xxv. 617.

Upper Guinea. Cameroons: Esole; on Mount Basso, **6100** ft., *Ledermann*, **2032**! Mfongu; slopes of Muti Mountain, **5600–6300** ft., *Ledermann*, **5877**!

Very closely allied to *E. Mildbrædii*, but with differently shaped leaves, shorter petioles and more numerous stamens with considerably longer filaments.

19. **E. Mildbrædii,** *Prain in Ann. Bot.* xxv. 617. Shrub 5–7 ft. high; twigs sparingly pubescent; bud-scales persistent. Leaves petioled, membranous, lanceolate, obtusely acuminate, base cuneate, margin sparingly toothed, 2–3 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, medium green, paler beneath, sparingly pubescent on both sides, especially on the nerves beneath; petiole pubescent, $\frac{1}{2}$ in. long; stipules accrescent, umbonate or spinulose. Flowers minute, in peduncled racemes; peduncles slender and rhachis sparsely pubescent, males up to $\frac{1}{2}$ in., females $\frac{3}{4}$ in. long; pedicels with a few scattered hairs, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Male calyx green, sparingly hirsute, globose in bud; lobes 3, occasionally 4, membranous. Stamens 9–12; filaments twice as long as the anthers; glands minute, hirsute, all inter-staminal. Female calyx smaller than the male, sparingly pubescent, 2-lobed. Ovary hirsute, 3-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 large fleshy discrete unequally emarginate scales. Capsule 2-coccous, didymous; cocci sparingly strigose, $\frac{1}{4}$ in. across. Seeds with a yellowish (?) aril and a slightly foveolate-reticulate testa.—*Claoxylon Mildbrædi*, Pax in Engl. Jahrb. xliii. 80.

Nile Land. Uganda: Ruwenzori; Kivata, **7000–9000** ft., *Scott-Elliot*, **7637**!

Mozamb. Distr. German East Africa: Ruanda; Kissenge, **7600** ft., *Mildbraed*, **1452**!

A very distinct species.

20. **E. trichogyne,** *Prain in Ann. Bot.* xxv. 617. Shrub 4–5 ft. high; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, oblong-ovate, abruptly acuminate, base cuneate, margin rather closely toothed, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, rather dark green, paler beneath, sparingly hairy, at length glabrous above, softly pubescent especially on the nerves beneath; petiole $\frac{1}{8}$ in. long, sparingly pubescent; stipules accrescent, umbonate or spinulose. Male flowers unknown. Female peduncles slender, $\frac{1}{2}$ in. long, 2–3-flowered, and rhachis softly pubescent; pedicels short, distant, $\frac{1}{8}$ in. long. Female calyx 2-partite. Ovary densely hirsute, 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 free scales. Capsule 2-coccous, didymous; cocci setose, $\frac{1}{4}$ in. across. Seeds with red aril and distinctly foveolate-reticulate testa.—*Claoxylon trichogyne*, Müll. Arg. in Journ. Bot. 1864, 334; DC. Prodr. xv. ii. 778; Hiern in Cat. Afr. Pl. Welw. i. 975.

Lower Guinea. Angola: Golungo Alto; near Sange, *Welwitsch,* 396!

21. **E. hirta,** *Pax in Engl. Jahrb.* xliii. 321. Shrub; twigs softly pubescent; bud-scales persistent. Leaves short-petioled, membranous, ovate or ovate-lanceolate, acuminate, base rounded, rather closely and regularly crenate-toothed, 2–4 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. wide, medium green, paler beneath, sparingly softly pubescent with somewhat spreading hairs especially on the nerves; petiole softly pubescent with spreading hairs, $\frac{1}{5}$–$\frac{1}{4}$ in. long; stipules accrescent, umbonate or spinulose. Flowers minute, in lax peduncled racemes; peduncles slender, males $\frac{1}{3}$–$\frac{1}{2}$ in. long, 2–4-flowered; females $\frac{1}{2}$–$\frac{2}{3}$ in. long, 2–4-flowered, and rhachis softly hirsute with spreading hairs; pedicels silky, sometimes sparingly, males $\frac{1}{5}$ in., females $\frac{1}{8}$ in. long. Male calyx pale green, sparingly silky, globose in bud; lobes 3, membranous. Stamens 10; outer 6, the rest central; filaments twice as long as the anthers; glands minute, hirsute, all inter-staminal. Female calyx pubescent, smaller than the male, 4-partite or occasionally 3-partite. Ovary densely hirsute, 2-celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 broad ovate obtuse or truncate emarginate scales shorter than the calyx. Capsule 1-coccous by abortion; cocci sparingly setose, $\frac{1}{4}$ in. across. Seeds with a coral-red aril and foveolate-reticulate testa.—Prain in Ann. Bot. xxv. 617.

Nile Land. Uganda: Ruwenzori; Butaga Forest, 7000–8000 ft., *Scott-Elliot,* 7998! Entebbe, 4000 ft., *Bagshawe,* 793!

South Central. Belgian Congo: West Ruwenzori, Kalange, 3600 ft., *Mildbraed,* 2486!

Very closely allied to *E. trichogyne,* and only to be distinguished by the more numerous female calyx-lobes.

22. **E. pauciflora,** *Prain in Ann. Bot.* xxv. 618. Shrub 2–3 ft. high; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, oblong, acute or acuminate, base wide-cuneate or rounded, margin obscurely crenate, 2–3 in. long, 1–$1\frac{1}{2}$ in. wide, medium green, paler beneath, when young purplish, almost glabrous; petiole sparingly

hirsute, $\frac{1}{5}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous, few-flowered, usually $\frac{1}{4}$–$\frac{1}{2}$ in. (occasionally 1 in.) long; pedicels glabrous, very short. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens 24–30, usually 27; outer 10, the rest central; filaments longer than the anthers; glands minute, hirsute, rhomboid or linear, all inter-staminal. Female calyx smaller than the male, deeply 2–3-lobed. Ovary glabrous or with a few special hairs, 2- (rarely 3-) celled; stigmas free, linear, patulous, fimbriate-laciniate throughout. Disk of 2 ovate discrete scales. Capsule 2-coccous, didymous; cocci $\frac{1}{4}$ in. across. Seeds with a scarlet aril and faintly foveolate-reticulate testa.—*Claoxylon pauciflorum*, Müll. Arg. in Journ. Bot. 1864, 333; DC. Prodr. xv. ii. 778; Hiern in Cat. Afr. Pl. Welw. i. 975.

Lower Guinea. Loango: near Chinchoxo, *Soyaux*, 29! Angola: Loanda; near Musaque do Sul and above Loanda, *Welwitsch*, 400! near Loanda, *Gossweiler*, 195! Musaque, near the English cemetery, *Gossweiler*, 1519! Malange, *Gossweiler*, 452!

23. **E. polyandra,** *Prain in Ann. Bot.* xxv. 618. Shrub, usually 5–6 ft., occasionally 15–16 ft. high; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, ovate, acute or acuminate, base wide-cuneate or rounded, margin obscurely toothed or subentire, 3–5 in. long, $1\frac{1}{4}$–$2\frac{1}{4}$ in. wide, dark green, or when young dark purple, glabrous; petiole glabrous or with a few hairs, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous, few-flowered, males $\frac{1}{2}$ to 1 in., females up to 2 in. long; pedicels glabrous, $\frac{1}{5}$ in. long. Male calyx purplish, glabrous, globose in bud; lobes 3, membranous. Stamens 10–13; outer 6–9, the rest central; filaments longer than the anthers; glands minute, glabrous, ovoid, all inter-staminal. Female calyx larger than the male, deeply 2-lobed or casually 3-lobed. Ovary glabrous, 2- (rarely 3-) celled; stigmas on a very short style, ovate-lanceolate, divaricate, margins incised-lobulate throughout. Disk of 2 (rarely 3) wide-ovate discrete scales. Capsules usually 2-coccous, didymous, or by abortion 1-coccous; cocci $\frac{1}{4}$ in. across. Seeds with a red aril and deeply foveolate reticulate testa.—*Claoxylon polyandrum*, Pax and K. Hoffm. in Engl. Jahrb. xlv. 237.

Mozamb. Distr. German East Africa: Usambara; Kwai, *Albers*, 36! Amani, *Warnecke*, 219! *Kränzlin*, 2182!

Most closely allied to *E. pauciflorum*, of which it is the eastern representative but with fewer stamens and very different stigmas.

24. **E. membranacea,** *Prain in Ann. Bot.* xxv. 619. Shrub 10 ft. high; twigs softly hispid with tawny spreading hairs; bud-scales persistent. Leaves short-petioled, membranous, oblong-lanceolate or oblong, acuminate, base cuneate or less often rounded, margin deeply and irregularly toothed, 2–6 in. long, $\frac{1}{2}$–2 in. wide, dark green, softly hispid, especially on the midrib beneath, with long tawny spreading

hairs, minutely verrucose; petiole closely and softly hispid, $\frac{1}{5}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, hispidulous, males $\frac{3}{4}$ in., females $\frac{1}{3}$ in. long; pedicels glabrous, males $\frac{1}{4}$–$\frac{1}{3}$ in., females $\frac{1}{8}$ in. long. Male calyx white, glabrous, globose in bud; lobes 3–4, membranous. Stamens 27; outer 9–12, the rest central; filaments longer than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx white, 2-lobed. Ovary glabrous, 2-celled; stigmas free, linear, arcuately reflexed from the base, smooth. Disk of 2 large free equally 2-lobulate scales, their margins contiguous under the base of the ovary. Capsule not seen.—*Claoxylon membranaceum*, Müll. Arg. in Flora, 1864, 437, and in DC. Prodr. xv. ii. 778.

Upper Guinea. Cameroons: Cameroon Mountain, 4000 ft., *Mann*, 1197! Buea, 3300 ft., *Lehmbach*, 212!

A very distinct species.

25. **E. patula,** *Prain in Ann. Bot.* xxv. 619. Shrub or small tree; twigs hispid; bud-scales persistent. Leaves short-petioled, membranous, ovate or narrow elliptic, rather abruptly acuminate, base rounded, margin distinctly but shortly toothed, 8–10 in. long, $2\frac{1}{2}$–3 in. wide, pale green, hispid especially on the nerves on both surfaces or glabrous except for some hispid hairs on the nerves beneath, minutely verrucose; petiole hispid, $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles thin, wiry, glabrous, $1\frac{1}{4}$–2 in. long; pedicels glabrous, male $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Male calyx green, glabrous, conic-pyramidal in bud; lobes 4, membranous. Stamens 50–54; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female flowers unknown.—*Claoxylon patulum*, Prain in Kew Bulletin, 1911, 93.

Upper Guinea. Cameroons: Jabassi, 200–350 ft., *Ledermann*, 1063! 1106!

Owing to the absence of female flowers the precise affinity of this species remains somewhat uncertain. The hispidity which characterises it is shared by two others, *E. membranacea* and *E. hispida*. From the former it is distinguished by its more numerous stamens with filaments shorter than the anthers; from the latter by its more numerous stamens with conic-pyramidal male buds. The last-mentioned character it shares with *E. Mannii*, next which it ought probably to be placed.

26. **E. Mannii,** *Prain in Ann. Bot.* xxv. 620. Shrub 15 ft. high; twigs glabrous; bud-scales persistent. Leaves petioled, membranous, oblong-lanceolate, acuminate, base cuneate, margin irregularly toothed, 3–8 in. long, 1–$2\frac{1}{4}$ in. wide, dark green, paler beneath, glabrous; petiole glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; pedicels glabrous, males $\frac{1}{4}$–$\frac{1}{2}$ in. long, females $\frac{1}{10}$ in. long. Male calyx green, glabrous, conic-pyramidal in bud; lobes 4, membranous. Stamens 24–30; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2-lobed. Ovary glabrous, 2-celled; stigmas free, linear, patulous, smooth. Disk of 2 large free suborbicular entire scales, their

margins contiguous under the base of the ovary. Capsule 2-coccous, didymous, or by abortion 1-coccous; cocci $\frac{1}{4}$ in. across. Seeds with a reddish aril, and distinctly foveolate-reticulate testa.—*Claoxylon Mannii*, Hook. f. in Journ. Linn. Soc. vi. 20; Müll. Arg. in DC. Prodr. xv. ii. 778.

Upper Guinea. Fernando Po: Clarence Peak, 5000 ft., *Mann*, 260! 633!

27. **E. africana,** *Prain in Ann. Bot.* xxv. 620. Shrub; twigs glabrous or adpressed-pubescent; bud-scales persistent. Leaves short-petioled, membranous, ovate, acuminate, base wide-cuneate or rounded, margin faintly crenate, 2–2$\frac{1}{2}$ in. long, 1–1$\frac{1}{2}$ in. wide, medium green, paler beneath, glabrous when mature; petiole glabrous or adpressed-pubescent, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous or adpressed-pubescent, males $\frac{3}{4}$–1 in., females 1$\frac{1}{2}$–2 in. long; pedicels glabrous, males up to $\frac{1}{3}$ in., females $\frac{1}{8}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, or occasionally 3, membranous. Stamens 24; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx deeply 2-lobed. Ovary glabrous, 2- (rarely 3-) celled; stigmas connate at the base, suborbicular, suberect, papillose. Disk shallow-urceolate, in flower subentire, in fruit shortly 5-lobed. Capsule usually 2-coccous, didymous, occasionally 3-coccous; cocci $\frac{1}{4}$ in. across. Seeds with a reddish aril and a finely foveolate-reticulate testa.—*Trewia? africana*, Baill. Adansonia, i. 68. *Claoxylon Barteri*, Hook. f. in Journ. Linn. Soc. vi. 21 (footnote); Stapf in Johnston, Liberia, ii. 649. *C. africanum*, Müll. Arg. in DC. Prodr. xv. ii. 777.

Upper Guinea. Senegambia: Casamance River, *Perrottet*, 748! Sierra Leone: Crawford's Island, *Afzelius!* Bafodeya Hills, *Scott-Elliot*, 5505! 5647! Liberia: Sinöe Basin, *Whyte!* Ivory Coast: between Zaon and Ayame, *Chevalier*, 17805 ter! Zaramou, *Chevalier*, 17631! Cavally Basin, *Chevalier*, 19987! Southern Nigeria: Lagos; Feckie, *Millen*, 163! interior, *Rowland!* Yoruba forests, *Barter*, 3344! Lagos Island; *Barter*, 2223! Eppah, *Barter*, 3285! near Ipatu, *Foster*, 184!

A very distinct species, on account of its distinctly papillose, yet neither fimbriate nor lobulate stigmas.

28. **E. Chevalieri,** *Prain in Ann. Bot.* xxv. 621. Shrub; twigs softly pubescent with spreading hairs; bud-scales persistent. Leaves short-petioled, membranous, ovate-lanceolate, acuminate, base wide-cuneate or rounded, margin denticulate, 2 in. long, $\frac{3}{4}$ in. wide, dark green sparingly pubescent on the nerves above, paler, softly and persistently pubescent beneath; petiole softly pubescent, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, softly pubescent, 1–1$\frac{1}{2}$ in. long; male pedicels glabrous up to $\frac{1}{4}$ in. long; female glabrous or sparingly pubescent, $\frac{1}{12}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, or occasionally 3, membranous. Stamens 30; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx deeply 2-lobed. Ovary glabrous, 2-celled;

stigmas connate at the base, suborbicular, suberect, smooth. Disk shallow urceolate, margin distinctly 2-lobed. Capsule 2-coccous, didymous; cocci $\frac{1}{4}$ in. across. Seeds with a red aril and distinctly foveolate-reticulate testa.—*Claoxylon Chevalieri*, Beille in Bull. Soc. Bot. France lv. Mém. viii. 75.

Upper Guinea. French Guinea: Fouta Jallon; Labé plateau, 3650 ft., *Chevalier*, 12296! Diaguissa, 4000 ft., *Chevalier*, 12643! 12689!

Very closely allied to *E. africana*, but easily recognised by the softly pubescen leaves and peduncles, by the distinctly 2-lobed hypogynous disk and by the smooth, not papillose stigmas.

29. **E. Molleri,** *Prain in Ann. Bot.* xxv. 621. Shrub or small tree; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, lanceolate-oblong or ovate, acuminate, base rounded or wide-cuneate, margin finely denticulate, 4–5 in. long, 1–2$\frac{1}{2}$ in. wide, medium green, when young reddish or greenish-purple, at first with a few white hairs on the nerves beneath, at length glabrous; petiole glabrous, $\frac{1}{3}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous, males $\frac{1}{2}$–$\frac{3}{4}$ in., females 1–2 in. long; pedicels glabrous, males $\frac{1}{6}$ in., females $\frac{1}{4}$ in. long. Male calyx purplish, glabrous, shortly conical in bud; lobes 3, membranous. Stamens 40; outer 10, the rest central; filaments much shorter than the anthers; glands rather few, minute, glabrous or occasionally hirsute, ovoid, all inter-staminal. Female calyx usually 2-lobed, sometimes 3-lobed. Ovary glabrous, 2- (rarely 3-) celled; stigmas connate at the base, suborbicular, suberect, smooth. Disk urceolate, 2-lobed, in fruit crenulate. Capsule usually 2-coccous, didymous; cocci $\frac{1}{4}$ in. across. Seeds with a crimson aril and distinctly foveolate-reticulate testa.—*Claoxylon Molleri*, Pax in Bolet. Soc. Brot. x. 160; Engl. Jahrb. xix. 84. *C. purpurascens*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 75.

Lower Guinea. Island of St. Thomas: St. Nicholas, 3000 ft., *Moller & Quintas*, 130! *Moller*, 136! *Henriques*, 22! 24! St. Thomas Peak, 4650 ft., *Chevalier*, 13652! 13656! 14527! 14582!

A very distinct species.

30. **E. rivularis,** *Prain in Ann. Bot.* xxv. 621. Shrub 15 ft. high; twigs sparingly strigose with spreading brown hairs; bud-scales persistent. Leaves short-petioled, membranous, wide oblong, shortly abruptly acuminate or acute, base wide-cuneate, margin subentire, 4–8 in. long, 2$\frac{1}{2}$–4 in. wide, dark green, paler beneath, minutely verrucose, glabrous; petiole glabrous or with a few spreading brown hairs, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, glabrous, 1–1$\frac{1}{2}$ in. long; pedicels glabrous, males $\frac{1}{4}$–$\frac{1}{3}$ in., females $\frac{1}{6}$ in. long. Male calyx dark green, depressed-globose and faintly 4-angled in bud; lobes 4, membranous. Stamens 40; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2-lobed. Ovary glabrous,

2-celled; stigmas connate at the base, ovate-lanceolate, divaricate, smooth. Disk urceolate, shallowly widely 2-lobed. Capsule and seeds not seen.—*Claoxylon rivulare*, Müll. Arg. in Flora, 1864, 518, and in DC. Prodr. xv. ii. 777. *Chloropatane africana*, Engl. Jahrb. xxvi. 383; Perkins and Gilg in Engl. Pflanzenr. Monim. 24, fig. 4, M–R; C. H. Wright in Dyer, Fl. Trop. Afr. vi. i. 169.

Upper Guinea. Cameroons: Great Batanga, *Dinklage*, 1057! Yaunde, *Zenker*, 494, 798 (fide *Engler*).

Lower Guinea. Spanish Guinea: Mount John, Kongui River, *Mann*, 1785!

A very distinct species. We have not seen the specimens collected by Zenker at Yaunde which bear the numbers quoted by Engler, who, since p. 169 of this volume was printed, has in Herb. Berlin reduced the genus *Chloropatane* to *Claoxylon* as understood by Müller.

31. **E. welwitschiana,** *Prain in Ann. Bot.* xxv. 622. Shrub 4–15 ft. high; twigs glabrous; bud-scales persistent. Leaves short-petioled, membranous, narrow-oblong or elliptic, acuminate, base cuneate, margin remotely and shortly denticulate, 4–6 in. long, 2–3 in. wide, dark green, paler beneath, glabrous above, beneath sparingly adpressed-pubescent on the nerves, soon glabrous, minutely verrucose; petiole sparingly adpressed-pubescent, $\frac{1}{3}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, sparingly adpressed-pubescent, males $\frac{3}{4}$ in., females $1\frac{1}{4}$ in. long; pedicels glabrous, males $\frac{1}{3}$–$\frac{2}{3}$ in., females $\frac{1}{4}$ in. long. Male calyx pale green, glabrous, globose in bud; lobes 4, thinly membranous. Stamens 30; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2–3-lobed. Ovary glabrous, 2- (rarely 3-) celled; stigmas minute, suborbicular, suberect, smooth, at the apex of a thick columnar obovoid style 3–4 times as long as themselves. Disk shallow-urceolate, with 2 minute lobes. Capsule 2-coccous, didymous, crowned by the columnar style; cocci $\frac{1}{4}$ in. across. Seed with a scarlet aril, and slightly foveolate-reticulate testa.—*Claoxylon welwitschianum*, Müll. Arg. in Journ. Bot. 1864, 333, and in DC. Prodr. xv. ii. 776; Hiern in Cat. Afr. Pl. Welw. i. 975. *C. africanum*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 279, as to Sapin's Sankuru specimens only; Comp. de Kasai, Miss. Scient. 330; not of Müll. Arg. *Chloropatane Batesii*, C. H. Wright in Dyer, Fl. Trop. Afr. vi. i. 169, and in Kew Bulletin, 1909, 214. *Autrandra racemosa*, Pierre MSS.

Upper Guinea. Cameroons: Efulen, *Bates*, 409! Bipindi, 500-600 ft. *Zenker*, 1908! 2049! 2610! 2910! 2925! 3773! 3912! 4195! 4237!

Lower Guinea. Spanish Guinea: Bebai, *Tessmann*, 555! Nkolentangan, *Tessmann*, 296! Gaboon: near Libreville, *Autran*, 6442! *Klaine*, 605! 1356! 1425! 1521! 1672! 1976! 2976! Angola: Golungo Alto, on the Zuenza River, *Welwitsch*, 397! *Gossweiler*, 4412! Serra do Alta Queta, *Welwitsch*, 398!

South Central. Belgian Congo: Lualaba-Kasai district; Sankuru, *Sapin!*

A very distinct species. The leaves are stated by Sapin to be used as a vegetable.

32. **E. columnaris,** *Prain in Ann. Bot.* xxv. 622. Shrub 12–15 ft. high; twigs adpressed-pubescent; bud-scales persistent. Leaves short-

petioled, membranous, narrow-ovate, acuminate, base cuneate, margin remotely and shortly toothed, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, dark green, paler beneath, glabrous except on the nerves above, densely pubescent on the nerves, sparingly so elsewhere beneath; petiole pubescent with spreading hairs, $\frac{1}{5}$–$\frac{1}{6}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, pubescent, males $\frac{1}{2}$ in., females 1 in. long; pedicels glabrous, males $\frac{1}{4}$ in., females $\frac{1}{10}$ in. long; bracteoles small, ovate. Male calyx green, glabrous, globose-conic in bud; lobes 4, firmly membranous. Stamens 54; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2-lobed. Ovary glabrous, 2-celled; stigmas minute, suborbicular, suberect, smooth, at the apex of a thick columnar obovoid style 3–4 times as long as themselves. Disk shallow urceolate, shortly widely 2-lobed. Capsule and seed not seen.—*Claoxylon columnare*, Müll. Arg. in Flora, 1864, 437, and in DC. Prodr. xv. ii. 776.

Lower Guinea. Princes Island: *Mann*, 1139!

Very closely allied to *E. welwitschiana*, and with almost identical female flowers, but readily distinguished by the smaller, pubescent leaves. The male flowers of the two differ considerably, those of *E. welwitschiana* being hardly distinguishable from those of *E. oleracea*; those of *E. columnaris* closely approaching those of *E. Poggei*.

33. **E. Poggei,** *Prain in Ann. Bot.* xxv. 623. Shrub; twigs pubescent with soft spreading hairs; bud-scales persistent. Leaves short-petioled, membranous, narrow-ovate, acuminate, margin irregularly and closely crenate-dentate, 2–$2\frac{1}{2}$ in. long, 1 in. wide, dark green, paler beneath, hispidulous on both surfaces especially on the nerves beneath with spreading hairs; petiole hispidulous, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, hispidulous, 1–$1\frac{1}{4}$ in. long; pedicels glabrous, $\frac{1}{4}$ in. long; bracteoles subulate, $\frac{1}{12}$ in. long. Male calyx green, glabrous, globose-conic in bud; lobes 4, membranous. Stamens 60–64; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female flower and fruit not seen.—*Claoxylon Poggei*, Prain in Kew Bulletin, 1911, 93. *C. columnare*, Engl. in Sitz. Preuss. Akad. Wiss. xxxviii. (1908) 829; Th. & Hél. Durand, Syll. Fl. Congol. 656; not of Müll. Arg.

Lower Guinea. Lower Congo: between Dembo and the River Kwango, *Butaye!* Stanley Pool district; near Lazaret, *Vanderyst!*

South Central. Belgian Congo: Lualaba-Kasai district; Mukenge, *Pogge*, 1373!

Owing to the absence of female flowers the affinity of this species remains doubtful, but from the great similarity which the male flowers bear to those of *E. columnaris* it is best placed provisionally near that species, from the male of which it only differs in having a hispidulous in place of an adpressed pubescence and in having longer bracteoles.

34. **E. atrovirens,** *Prain in Ann. Bot.* xxv. 623. Shrub 3–5 ft. high; twigs pubescent; bud-scales persistent. Leaves short-petioled, membranous, oblong or rarely wide-ovate, acuminate, base narrow- to

wide-cuneate, margin shortly denticulate, 3–4 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. wide, medium green, paler beneath, hirsute especially in the nerves on both surfaces; petiole hispidulous, $\frac{1}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, softly hairy, $\frac{3}{4}$–1 in. long; pedicels glabrous, $\frac{1}{6}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens 30–40; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx usually 2-lobed, occasionally 3-lobed. Ovary glabrous, 2- (rarely 3-) celled; stigmas linear-ovate, at first divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk eccentric, shallowly suburceolate, margin entire, much developed on one side, narrow or nearly obsolete on the other. Capsule usually 2-coccous, didymous, occasionally 3-coccous or by abortion 1-coccous; cocci $\frac{1}{4}$ in. across. Seed with a red aril and a slightly foveolate-reticulate testa.—*Claoxylon atrovirens*, Pax in Engl. Jahrb. xix. 85; Durand & Schinz, Études Fl. Congo, 245; Th. & Hél. Durand, Syll. Fl. Congol. 491. *C. inæquilaterum*, Pax in Engl. Jahrb. xliii. 320.

Upper Guinea. Cameroons: Tchape Pass, 4800 ft., *Ledermann*, 2653! Babangi Tungo; Bamessing, 4500 ft., *Ledermann*, 5823!

Nile Land. Uganda: Unyoro; Hoima, 3500 ft., *Bagshawe*, 1512! Entebbe, 3900 ft., *Brown*, 356! Chagwe, 3900 ft., *Dawe*, 215!

South Central. Belgian Congo: Monbuttu; by the Kussumbo River, *Schweinfurth*, 3186! Kwa Muera; Fort Beni on the Semliki, *Mildbraed*, 2246! 2401! Muera, 3300–3600 ft., *Mildbraed*, 2271! 2277! Aruwimi River; Yambuya, *Solheid*, 32!

Mozamb. Distr. German East Africa: Bukoba, *Stuhlmann*, 3923!

A very distinct species.

35. **E. oleracea,** *Prain in Ann. Bot.* xxv. 624. Shrub 3–10 ft. high; twigs sparingly pubescent; bud-scales persistent. Leaves petioled, membranous, ovate or ovate-oblong, acuminate, base rounded, margin shortly denticulate, $2\frac{1}{2}$–6 in. long, $1\frac{1}{2}$–3 in. wide, dark green, paler beneath, minutely verrucose, sparingly pubescent on the nerves beneath; petiole softly adpressed-pubescent, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, sparingly pubescent, males up to 1 in., females $\frac{3}{4}$ in. long; pedicels glabrous, males $\frac{1}{3}$–$\frac{1}{2}$ in., females $\frac{1}{12}$ in. long. Male calyx greenish-white, glabrous, globose in bud; lobes 4, membranous. Stamens 30–40; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2-lobed. Ovary glabrous, 2-celled; stigmas linear-ovate, at first divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk eccentric, shallowly suburceolate, margin entire, much developed on one side, narrow or nearly obsolete on the other. Capsule 2-coccous, didymous, occasionally by abortion 1-coccous; cocci $\frac{1}{4}$ in. across. Seeds with a red aril and a deeply foveolate-reticulate testa.—*Claoxylon africanum*, De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47, and in Reliq. Dewevr.

ii. 209; De Wild. Miss. É. Laurent, i. 130, and in Études Fl. Bas- et Moyen-Congo, ii. 279, mainly, but excluding Sapin's Lualaba-Kasai specimens; Rendle in Journ. Linn. Soc. Bot. xxxvii. 213; Th. & Hél. Durand, Syll. Fl. Congol. 491, mainly, but excluding Sapin's specimens: not *Trewia? africana*, Baill. *C. oleraceum*, Prain in Kew Bulletin, 1911, 94; De Wild. Pl. Thonn. Congol. ii. 227.

Upper Guinea. Cameroons: Tchape Pass, 5000 ft., *Ledermann*, 2845! Tibati, 3000 ft., *Ledermann*, 2433! Yaunde, 2700 ft., *Zenker & Staudt*, 211! *Zenker*, 184! 499! 712!

Nile Land. Uganda: coast of Lake Victoria, 4000 ft., *Bagshawe*, 588!

Lower Guinea. Spanish Guinea: Bebao, *Tessmann*, 555! Lower Congo: Stanley Pool district; Kisantu, *Gillet*, 37! 74! 1419! 1865! Kimuenza, *Gillet*, 2144!

South Central. Belgian Congo: Lukolela, *Dewèvre*, 748! Injolo, *Ledoux & Hugghe*, 22! Lulonga, *Pynaert*, 767! Eala, *Pynaert*, 525! 920! Paku, *Seret!* Bangala district; Bumba, *Laurent!* Abumonbasi, *Thonner*, 200! near Lake Leopold II., *Body*, 92!

Very closely allied to *E. atrovirens* and agreeing with that species as regards the flowers in both sexes, but as a rule readily distinguishable by the shape of the leaf and the nature of the indumentum; the petioles are always longer in *E. oleracea* than in its allies. Throughout the Congo State the leaves of this species appear to be in general use as a vegetable.

36. **E. angolensis,** *Prain in Ann. Bot.* xxv. 625. Shrub, 3–4 ft. high; twigs pubescent; bud-scales persistent. Leaves short-petioled, at first thinly membranous, at length firmer, oblong or ovate, acuminate, base wide-cuneate, margin very shortly denticulate, 2–3 in. long, 1–1¾ in. wide, medium green, paler beneath, pubescent especially on the nerves on both surfaces; petiole softly pubescent, ¼ in. long or less; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, pubescent, females ½ in. long, about 4-flowered; pedicels glabrous, $\frac{1}{12}$ in. long. Male calyx and stamens not seen. Female calyx 2-lobed. Ovary glabrous, 2-celled; stigmas linear-ovate, at first divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk urceolate, very slightly 2-lobed. Capsule 2-coccous, didymous; cocci ¼ in. across, not seen mature. Seeds not seen.—*Claoxylon angolense*, Müll. Arg. in Journ. Bot. 1864, 333; DC. Prodr. xv. ii. 777; Hiern in Cat. Afr. Pl. Welw. i. 975.

Lower Guinea. Angola: Loanda; Pungo Andongo, near Luxillo, *Welwitsch*, 399!

A very distinct species.

37. **E. flaccida,** *Prain in Ann. Bot.* xxv. 625. Shrub or small tree, 15 ft. high; twigs pubescent; bud-scales persistent. Leaves petioled, at first thinly membranous, at length firmer, ovate, acuminate, base wide-cuneate, margin very shortly denticulate, medium green, paler and minutely verrucose beneath, pubescent especially on the nerves on both surfaces; petiole softly pubescent, ⅓–½ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, pubescent, males up to ½ in. long, females

to $1\frac{1}{4}$ in. long, 12–16-flowered; pedicels glabrous, males up to $\frac{1}{3}$ in. long, females to $\frac{1}{12}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens about 34; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx 2-lobed. Ovary glabrous, 2-celled; stigmas linear-ovate, at first divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk urceolate, distinctly 2-lobed. Capsule 2-coccous, didymous; cocci $\frac{1}{4}$ in. across. Seeds with a red aril and a distinctly foveolate-reticulate testa.—*Claoxylon flaccidum*, Pax in Engl. Jahrb. xix. 86; Durand & Schinz, Études Fl. Congo, 245; Th. & Hél. Durand, Syll. Fl. Congol. 491. *C. Schweinfurthii*, Pax in Engl. Jahrb. xix. 86; Durand & Schinz, Études Fl. Congo, 245.

Nile Land. Niamniam: at Nabambisso River, *Schweinfurth*, 3056!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3351 in Herb. Kew! 3355 in Herb. Berlin!

We have found ourselves unable to distinguish the Niamniam plant (*Claoxylon Schweinfurthii*, Pax) from the Monbuttu one (*C. flaccidum*, Pax). The species is moreover very closely allied to *E. angolense*, from which it is only separable by its longer petioles, its female racemes with more numerous flowers and its more distinctly 2-lobed disk.

38. **E. macrophylla,** *Prain in Ann. Bot.* xxv. 625. Shrub; twigs softly adpressed-pubescent; bud-scales persistent. Leaves petioled, membranous, obovate-lanceolate, acuminate, base rather narrow-cuneate, margin slightly undulate and shallowly regularly crenate, 9–10 in. long, $2\frac{3}{4}$–3 in. wide, dark green, paler beneath, at first sparingly pubescent especially on the nerves, at length glabrous above, beneath uniformly softly adpressed-pubescent on the nerves and nervules; petiole sparingly adpressed-pubescent, $\frac{1}{2}$–$\frac{3}{4}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles very slender, silky, $\frac{1}{2}$–$\frac{3}{4}$ in. long; pedicels glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens 24; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female flower and fruit not seen.—*Claoxylon macrophyllum*, Prain in Kew Bulletin, 1911, 95.

South Central. Belgian Congo: Eastern Province; Fort Beni, Kwa Muera, *Mildbraed*, 2197!

A very distinct species, most resembling *E. Dewevrei* and *E. hispida* but readily distinguished from both by the shape of the leaves and the absence of hispid hairs. Till female flowers and fruits are available its precise affinity must, however, remain doubtful.

39. **E. Dewevrei,** *Prain in Ann. Bot.* xxv. 626. Shrub 3–5 ft. high; twigs hispid with yellow hairs; bud-scales persistent. Leaves short-petioled, membranous, ovate, rather abruptly acuminate, base rounded, margin rather closely denticulate or crenate, 4–5 in. long, $1\frac{3}{4}$–2 in. wide, dark green, grey beneath, sparingly hispid on the nerves and finely verrucose above, densely hispid on the nerves and elsewhere

softly and closely tomentose beneath; petiole hispidly hairy, $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules unmodified, hyaline-scarious, minute. Flowers small, in peduncled racemes; peduncles slender, hispid, $\frac{1}{2}$–$1\frac{1}{4}$ in. long; pedicels glabrous, males $\frac{1}{4}$ in. long, females $\frac{1}{6}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens 24; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx deeply 2-lobed. Ovary glabrous, 2-celled; stigmas linear-ovate, at first divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk shallow-urceolate, widely equally 2-lobed. Capsule 2-coccous, didymous; cocci $\frac{1}{3}$ in. across. Seeds not seen ripe.—*Claoxylon Dewevrei*, Pax in Engl. Jahrb. xxxiii. 283; De Wild. & Durand, Reliq. Dewevr. ii. 209, partly; Th. & Hél. Durand, Syll. Fl. Congol. 491; as to Dewèvre 947 only.

Upper Guinea. Cameroons: Babadji, 5200 ft., *Ledermann*, 5988!

South Central. Belgian Congo: Eastern Prov., Nyangwe, *Dewèvre*, 947!

The plant from Babadji, male only, agrees well with that from Nyangwe, female only, on which the species was based, as regards shape and pubescence of leaves, and in these respects differs rather markedly from the closely allied *E. hispida*, from which, as regards the flowers of both sexes and as regards fruit, *E. Dewevrei* is not readily distinguishable. De Wildeman and Durand, l.c., have referred to *E. Dewevrei* a male specimen also collected at Nyangwe (964A). This plant as regards pubescence agrees, however, with *E. hispida*, and not with *E. Dewevrei*; as regards shape and size of leaf, and as regards male flowers it differs considerably from both and may, when the fruit is known, call for separate treatment. In the meantime it may without inconvenience be left where De Wildeman and Durand have placed it, but must be treated as a distinct variety, characterised as follows:—

Var. *inopinata*, Prain in Ann. Bot. xxv. 626. Leaves smaller than in typical *E. Dewevrei*, ovate, acute, base cuneate, margin very faintly toothed, 2 in. long, $\frac{3}{4}$ in. wide, dark green, sparingly hispid on the nerves as in *E. hispida*, and finely verrucose on both surfaces, not tomentose between the nerves beneath. Male calyx as in *E. Dewevrei* and *E. hispida* but rather larger. Stamens 40; outer 10, the rest central; filaments and receptacular glands as in *E. Dewevrei* and *E. hispida*. Female flowers and fruit not seen.—*Claoxylon Dewevrei*, De Wild. & Durand, Reliq. Dewevr. ii. 209, as to Dewèvre 964A only; hardly of Pax.

South Central. Belgian Congo: Eastern Prov.; Nyangwe, *Dewèvre*, 964A!

40. **E. hispida,** *Prain in Ann. Bot.* xxv. 625. Shrub 6–8 ft. high; twigs hispid with yellow hairs; bud-scales persistent. Leaves short-petioled, membranous, oblong, very rarely ovate, acuminate, base rounded or wide-cuneate, margin shortly distantly toothed, usually 5–8 in. long, when ovate only 2–3 in. long, $1\frac{1}{2}$–2 in. wide, medium to dark green, paler beneath, sparingly hispid on the nerves above, more densely hispid on the nerves beneath, finely verrucose on both surfaces; petiole usually hispid, $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules unmodified, hyaline-scarious. Flowers small, in peduncled racemes; peduncles slender, hispid, $\frac{3}{4}$–1 in. long; pedicels glabrous, males $\frac{1}{4}$ in. long, females $\frac{1}{6}$ in. long. Male calyx green, glabrous, globose in bud; lobes 4, membranous. Stamens 27; outer 10, the rest central; filaments much shorter than the anthers; glands minute, hirsute, rhomboid, all inter-staminal. Female calyx deeply 2-lobed. Ovary glabrous, 2-celled; stigmas linear-ovate, at first

divaricate, at length recurved, smooth, at the apex of a distinct cylindric style half as long as themselves. Disk shallow-urceolate, widely and equally 2-lobed. Capsule 2-coccous, didymous; cocci $\frac{1}{3}$ in. across. Seeds with a red aril and a foveolate-reticulate testa.—*Claoxylon hispidum*, Pax in Engl. Jahrb. xix. 85.

Upper Guinea. Cameroons; Buea, 5300 ft., *Preuss*, 888! 908! *Deistel! Lehmbach*, 179! *Reder*, 638! Great Cameroon, 5300 ft., *Mildbraed*, 3459!

A very distinct species of unusually restricted range, readily distinguished from all the others in the genus, except *E. Dewevrei*, by its larger cocci.

55. **CLAOXYLON**, A. Juss.; Benth. et Hook. f. Gen. Pl. iii. 309.

Flowers dicœcious, apetalous. Male: Calyx globose, minutely apiculate and closed in bud, splitting into 3–4 valvate lobes. Stamens (in the African species) 6–12, inserted on a slightly raised receptacle, either mixed with inter-staminal glands only or (in the African species) surrounded by an extra-staminal cup, but without inter-staminal glands; filaments free; anthers erect, obovoid, 2-celled, dehiscing by extrorse longitudinal slits. Rudimentary ovary 0. Female: Calyx 2–3, or (in the African species) 4-partite; segments smaller than in the male. Disk 2-lobed. Ovary hispid or velvety, 2–3-celled (2-celled in the African species); outer solitary; stigmas free, recurved from the base, plumosely laciniate throughout. Capsule (in the African species) 2-coccous; cocci subglobose; splitting loculicidally. Seeds almost spherical, usually arillate; testa crustaceous, foveolate-reticulate or nearly smooth; albumen fleshy; cotyledons broad, flat.—Small trees or shrubs with stoutish twigs. Leaves alternate, usually distinctly petioled, margin crenate or toothed; stipules small, deciduous. Flowers in lateral or axillary, dense or rather lax uniformly floriferous racemes, small or minute; male flowers usually several, female flowers usually solitary to a bract.—*Claoxylon* § *Discoclaoxylon*, Müll. Arg. in Flora, 1864, 437.

Species about 40, widely spread in the tropics of the Old World, represented in Africa by 3 species belonging to the endemic section, *Discoclaoxylon*, Müll. Arg.

Leaves oblanceolate-oblong, base narrow-cuneate; stamens 11–12; extra-staminal cup deep, its margin entire	1. *C. pedicellare.*
Leaves ovate-oblong, base rather wide-cuneate.	
Stamens 11–12; extra-staminal cup shallow, its margin deeply partite	2. *C. occidentale.*
Stamens 6–8; extra-staminal cup deep, its margin crenulate	3. *C. hexandrum.*

1. **C. pedicellare,** *Müll. Arg. in Flora*, 1864, 437. Small tree; twigs green, glabrous, closely and minutely lenticelled. Leaves distinctly petioled, membranous, oblanceolate-oblong, obtuse or acute, base narrow-cuneate, margin very minutely and distantly glandular-toothed, 6–10 in. long, 2–2½ in. wide, medium green, purplish when young, paler beneath, glabrous except for a few scattered adpressed hairs on the nerves beneath, smooth above, minutely verrucose beneath; lateral

nerves 8–9 pairs, ascending, raised beneath; petiole at first sparsely pubescent, soon glabrous, 1½–2½ in. long; stipules very minute. Flowers in axillary spike-like racemes, 6–8 in. long; racemes peduncled; peduncles 1 in. long and rhachis closely adpressed-puberulous; bracteoles ovate-deltoid, each subtending a fascicle of 5–11 flowers; fascicles at first close set, at length ⅛–⅙ in. apart above and ¼–⅓ in. apart below; pedicels puberulous, at length ⅕–¼ in. long. Male calyx whitish-green, puberulous, ovoid in bud; lobes 4, divided nearly to the base. Stamens 11–12, outer 8, the rest central; filaments short, surrounded by a ring of glands completely connate in an entire extra-staminal cup, hirsute on the margin with short white hairs; inter-staminal glands 0. Female flowers and fruit not seen.—Müll. Arg. in DC. Prodr. xv. ii. 779.

Upper Guinea. Fernando Po; *Mann!*

2. **C. occidentale,** *Müll. Arg. in Flora*, 1864, 438. Small tree, 30 ft. high; twigs glabrous, purplish. Leaves distinctly petioled, membranous, ovate-oblong, shortly and obtusely cuspidate, base rather wide-cuneate, margin shortly closely glandular-crenate, 6–12 in. long, 3–5 in. wide, medium green, purple when young and tinged with purple when mature, rather paler beneath, glabrous; lateral nerves 8–9 pairs, ascending, raised beneath; petiole glabrous, 1½–2½ in. long; stipules very minute. Flowers in axillary spike-like racemes, 6–8 in. long; racemes peduncled; peduncles 1 in. long and rhachis glabrous; bracteoles triangular, cuspidate, each subtending a fascicle of 3–5 flowers; fascicles at first close-set, at length ⅒–⅛ in. apart above, ⅙–⅕ in. apart below; pedicels pubescent, 1/12–1/10 in. long. Male calyx purplish-green, densely pubescent, globose in bud; lobes 4, divided nearly to the base. Stamens 11–12, outer 8, the rest central; filaments short, surrounded by a ring of glands partially connate in a very shallow many-lobed extra-staminal cup, the lobes hirsute at the apex with short white hairs; inter-staminal glands 0. Female flowers and fruit not seen.—Müll. Arg. in DC. Prodr. xv. ii. 779.

Lower Guinea. St. Thomas Island: St. Thomas Peak, up to 7000 ft., *Mann*, **1064**! *Welwitsch*, **442**! *Chevalier*, **13666**! *Quintas*, **163**!

3. **C. hexandrum,** *Müll. Arg. in Flora*, 1864, 438. Small tree 10–35 ft. high, twigs glabrous, pale green. Leaves long-petioled, membranous, oblong or oblong-lanceolate, acute or obtuse, base cuneate, margin closely and shortly or occasionally distinctly glandular-toothed, 7–15 in. long, 3–6 in. wide, rather dark green, paler and finely verrucose beneath, petioles (but not the blades) purplish when young, glabrous; lateral nerves 8–12 pairs, rather spreading, raised beneath; petiole glabrous, 1–1½ in. long near the apices of the twigs, 2½–6 in. (occasionally 12 in.) long on the branches below; stipules very minute. Flowers in axillary spike-like racemes, 8–20 in. long; racemes peduncled; peduncles ¼–1½ in. long and rhachis closely and softly adpressed-pubescent; bracteoles ovate, cuspidate, densely pubescent, each subtending a fascicle of 3–7 male flowers or a solitary female flower; fascicles at first close

set, at length $\frac{1}{4}$–$\frac{1}{3}$ in. apart: pedicels densely pubescent, males at length $\frac{1}{6}$–$\frac{1}{5}$ in. long; females $\frac{1}{16}$, in fruit $\frac{1}{10}$ in. long. Male calyx whitish-green; densely pubescent, depressed-globose in bud; lobes 4, divided nearly to the base. Stamens often 6, occasionally 7–8, outer 4, the rest central; filaments short, surrounded by a ring of glands connate in a distinct crenulate extra-staminal cup, the margin hirsute with short white hairs. Female calyx green, densely pubescent; lobes 4, ovate, acute. Ovary densely velvety, 2-celled; stigmas 2, very slightly united at the base, suborbicular, stellately and plumosely fimbriate. Disk of 2 thick fleshy reniform lobes, organically united around the base of the ovary. Capsule 2-coccous, didymous, $\frac{1}{2}$ in. across, tawny velvety; cocci opening loculicidally. Seeds globose, smooth.—Müll. Arg. in DC. Prodr. xv. ii. 780. *C. Preussii*, Pax in Engl. Jahrb. xxviii. 23.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 1352! Cameroons between Victoria and Bimbia, 100 ft., *Preuss*, 1328! Buea, 3300 ft., *Lehmbach*, 184! *Deistel*, 459! *Reder*, 362! 747! Bipindi, *Zenker*, 1992! 2790! 3632! 4095! near Mokundange, *Winkler*, 1117! Bare, 4900 ft., *Ledermann*, 1450! Fernando Po: *Mann*, 186!

South Central. Belgian Congo: Eastern Province, between Beni and Irumu, at Kaponso-Pryo, 3300–3700 ft., *Mildbraed*, 2807! 2819! at Bulika, between Mawambi and Awakubi, *Mildbraed*, 3205!

56. **MICROCOCCA**, Benth.; Benth. et Hook. f. Gen. Pl. iii. 309.

Flowers monœcious or diœcious, apetalous. Male: Calyx globose, minutely apiculate, closed in bud, splitting into 3 (rarely 4) valvate membranous lobes. Stamens usually 2-seriate, occasionally 1-seriate or more than 2-seriate, 3–20, rarely more, attached to a slightly convex receptacle; filaments free, as long as the anthers, mixed or not with inter-staminal glands; cells narrow-obovoid, free from the base, opening by longitudinal extrorse slits. Rudimentary ovary 0. Female: Calyx 3-, less often 4-partite, lobes imbricate. Hypogynous disk of 2–4, usually 3, narrow-linear scales alternate with the carpels and about as long as the calyx. Ovary usually 3-celled, occasionally 2-celled, very rarely 4-celled, cells 1-ovuled; stigmas free, spreading, linear, fimbriate-laciniate throughout. Capsule usually 3-coccous, but sometimes 2-coccous, didymous, occasionally 4-coccous or by abortion monococcous; cocci 2-valved, opening both loculicidally and septicidally and separating from a distinct crustaceous or woody columella. Seeds almost globose; testa crustaceous, distinctly foveolate-reticulate, completely enveloped in a very thin aril; albumen fleshy; cotyledons flat, usually broad, suborbicular, sometimes hardly broader or longer than the stout cylindric short radicle.—Herbs or shrubs, annual or perennial. Leaves alternate or sometimes the lowest opposite, usually distinctly petioled, membranous, usually dentate or serrate, peninnerved. Flowers in axillary filiform interrupted racemes; males minute, short-pedicelled, glomerulate, the glomerules many-flowered in racemes with

male flowers only or with male flowers throughout but terminating in a solitary female flower; or sometimes in 2-sexual racemes, the glomerules mostly or all with a solitary long-pedicelled female flower accompanied by a few male flowers.

Species about 9, extending from Africa through the Mascarene Islands to South-eastern Asia.

Shrubs; stamens 20 or more.
- Leaves long-petioled; stamens not mixed with receptacular glands.
  - Racemes androgynous, with a single terminal female flower; ovary glabrous . . . . . 1. *M. Volkensii.*
  - Racemes 1-sexual, plant dicœcious; ovary setose . 2. *M. Holstii.*
- Leaves short-petioled; stamens mixed with inter-staminal glands; racemes 1-sexual, plant dicœcious; ovary glabrous . . . . . 3. *M. scariosa.*

Annual herbs; stamens few; usually 6, mixed with inter-staminal glands; racemes androgynous, the glomerules often with each a central female flower; ovary strigose . . . . . 4. *M. Mercurialis.*

1. **M. Volkensii,** *Prain in Ann. Bot.* xxv. 631. Shrub 3–6 ft. high; twigs green, sparingly adpressed-pubescent. Leaves long-petioled, membranous, lanceolate, acuminate, base wide-cuneate, margin distinctly glandular-serrate, 2–4 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. wide, medium green, purplish when young, paler beneath, sparingly adpressed-pubescent or glabrous and minutely verrucose on both surfaces; lateral nerves 4–6 pairs, ascending; petiole glabrous or sparingly pubescent, 1–2 in. long; stipules minute. Flowers in axillary monœcious filiform racemes 3 in. long; racemes peduncled and bearing at intervals of $\frac{1}{2}$ in. (below) to $\frac{1}{5}$ in. (towards the apex) minute spikelets of imbricating bracteoles or higher up glomerules of male flowers with a solitary terminal female flower; bracts lanceolate, $\frac{1}{12}$ in. long; male bracteoles 1–2-flowered, minute, ovate, cuspidate; peduncles $1\frac{1}{2}$–2 in. long and rhachis sparingly adpressed-pubescent; pedicels capillary, glabrous, $\frac{1}{12}$ in. long. Male calyx greenish-purple, glabrous, depressed-globose in bud; lobes 3, dividing nearly to the base. Stamens 20; filaments short; inter-staminal glands 0. Female calyx 3-lobed; lobes ovate, acute, much larger than in the males. Ovary dark purple, glabrous, 3-celled; stigmas 3, sessile, linear, plumosely fimbriate from the base. Disk of 3 free narrow ligulate scales alternating with the cells. Capsule purple, 3-coccous; cocci 2-valved. Seeds globose, purplish; testa slightly wrinkled.—*Claoxylon Volkensii*, Pax in Engl. Pfl. Ost-Afr. C. 238, and in Engl. Jahrb. xxiii. 524.

Mozamb. Distr. German East Africa: Kilimanjaro, Marangu, 7000–7500 ft., *Volkens*, 1001! *Engler*, 1766! *Uhlig*, 131!

2. **M. Holstii,** *Prain in Ann. Bot.* xxv. 630. Shrub 4–7 ft. high; twigs green, faintly puberulous or glabrous. Leaves long-petioled, membranous, ovate or elliptic, acuminate, base wide-cuneate, margin slightly glandular-serrate, 6–8 in. long, 2–$2\frac{1}{2}$ in. wide, medium green, purplish when young, paler beneath, minutely verrucose on both surfaces,

glabrous; lateral nerves 10–12 pairs, spreading; petiole glabrous, 2–2¼ in. long; stipules minute. Flowers in axillary dicœcious filiform racemes 6–8 in. long; racemes peduncled and bearing at intervals of ¼–½ in. minute spikelets of imbricating bracteoles; bracts minute; bracteoles very minute, orbicular, males 2–3-flowered, females 1-flowered; peduncles 1½–2 in. long and rhachis glabrous; pedicels capillary, glabrous, ⅕–¼ in. long. Male calyx green, glabrous, globose with a minute apiculus in bud; lobes 3, dividing nearly to the base. Stamens 30; filaments short; inter-staminal glands 0. Female calyx 3-lobed; lobes triangular, obtuse, very short. Ovary sparingly hispid with short hairs, 3-celled; stigmas 3, sessile, linear, plumosely fimbriate from the base. Disk of 3 free short broad scales alternating with the cells. Ripe fruit not seen.—*Claoxylon Holstii*, Pax in Engl. Jahrb. xxxiv. 372.

Mozamb. Distr. German East Africa: East Usambara, near Amani, 2800 ft., *Engler*, 611! near Gonja, *Holst*, 4261!

3. **M. scariosa,** *Prain in Kew Bulletin*, 1912, 192. Shrub 4–7 ft. high; twigs reddish-brown, glabrous. Leaves short-petioled, rather firmly membranous, ovate-oblong, acute or shortly acuminate, base rounded, 2-glandular, margin remotely crenate-toothed or nearly entire, 3–5 in. long, 1¼–2¼ in. wide, rather pale green especially beneath, glabrous on both surfaces; lateral nerves 5–6 pairs, ascending; petiole glabrous, ⅛–⅓ in. long; stipules subulate, 2½ lin. long. Flowers in lateral dicœcious filiform spikes, leaf-opposed or on nodes below the leaves, 2–6 in. long; rhachis green, faintly trigonous, rather rigid, glabrous; bracts rigid, lanceolate, 1–3 lin. apart; bracteoles of male racemes scarious, numerous to each bract, enveloping the pedicels of the numerous flowers which open singly and quickly disarticulate and disappear, bracteoles of female racemes 2 to a bract, subtending solitary flowers; pedicels articulate, of male flowers 1 lin. long, flattened below the joint with their angles minutely ciliolate, of female flowers ultimately 2 lin. long. Male calyx white, glabrous, ovoid-globose in bud; lobes 2–3, dividing half-way or rather lower. Stamens 21–24; filaments rather long, free, glabrous, mixed with as many ovoid receptacular glands, hirsute at the top with long hairs, or glabrous. Female sepals 5, free, ovate, acute, their margins ciliolate, otherwise glabrous. Ovary glabrous, 3-celled; stigmas 3, linear, plumosely fimbriate at the apex only. Disk of 6 free but contiguous short broad scales. Capsule pale straw-colour, 3-coccus; cocci separating septicidally.

Mozamb. Distr. German East Africa: Amboni, near Tanga, *Sacleux*, 1630 (coll. 1897)! Mouyouni, *Sacleux*, 1630 (coll. 1891)!

4. **M. Mercurialis,** *Benth. in Hook. Niger Fl.* 503. Herb, annual; stems simple or branching upwards, sparingly hirsute, sometimes almost woody below, ½–2 ft. high. Leaves long-petioled, alternate except the very lowest, oblong or ovate or ovate-lanceolate, obtuse or subacute, base cuneate or rounded, margin usually bluntly toothed, 1–2 in. long, ½–1 in. wide, medium green, sometimes tinged with purple, dull, nearly glabrous; petiole ½–⅔ in. long. Racemes slender,

axillary, 2–3 in. long; rhachis pubescent. Male: Calyx globose, minutely apiculate and closed in bud, under ½ lin. wide; segments 3, membranous, valvate; pedicels shorter than the calyx. Stamens usually 6, 2-seriate, rarely 3, 1-seriate, occasionally up to 20, several-seriate; receptacular glands narrow-oblong, all inter-staminal. Female: Calyx 3-partite, less often 4-partite; lobes imbricate. Disk of 2–4, usually 3, linear hypogynous staminodiform scales, about as long as the calyx-lobes. Ovary strigose, usually 3-celled, occasionally 2- or 4-celled; styles very short, linear, spreading, fimbriate-laciniate throughout. Capsule strigose, 2 lin. wide, breaking up into 2–4, usually 3, 2-valved cocci. Seeds under 1 lin. long, pale brown or pinkish, completely enveloped in a very thin aril; testa deeply foveolate-reticulate.—Pax in Engl. Pfl. Ost-Afr. C. 238, and in Bull. Soc. Bot. Belg. xxxvii. 105; De Wild. & Durand, Contrib. Fl. Congo, i. 50 and ii. 57, and Reliq. Dewevr. 209; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 306; De Wild. Miss. É. Laurent, i. 129, and Études Fl. Bas- et Moyen-Congo, ii. 279; Th. & Hél. Durand, Syll. Fl. Congol. 492; Prain in Ann. Bot. xxv. 631. *Tragia Mercurialis*, Linn. Sp. Pl. ed. i. 980. *Mercurialis alternifolia*, Lam. Encycl. iv. 120; Baill. Étude gén. Euphorb. 490, and Adansonia, i. 76. *Claoxylon Mercurialis*, Thwaites, Enum. Pl. Zeyl. 271; Müll. Arg. in DC. Prodr. xv. ii. 790; Hook. f. Fl. Brit. Ind. v. 412; Hiern in Cat. Afr. Pl. Welw. i. 976.

Upper Guinea. Senegal: without precise locality, *Perrottet*, 715! French Guinea: Conakry, *Maclaud*, 80! *Dybowski*, 38! *Lecard*, 198! Sierra Leone: near Regent, *Scott-Elliot*, 4117! and without precise locality, *Afzelius*, 419! Liberia: Monrovia and Grand Bassa, at Fishtown, *Dinklage*, 1659! Togo: Lome, *Warnecke*, 187! Misahöhe, *Baumann*, 258! Bismarckburg, *Buettner*, 321! Northern Nigeria: Mount Patteh, *Vogel*, 194! Nupe, *Barter*, 1494! Lokoja, *Dalziel!* Cameroons: Kriegschiffhafen, *Schlechter*, 12394! Batanga, *Dinklage*, 647! 648! *Bates*, 122!

Nile Land. Eritrea: Samhar, near Massowa, *Hildebrandt*, 736! Saati, 470 ft., *Schweinfurth*, 22! *Schweinfurth & Riva*, 487! Abyssinia: without precise locality, *Schimper! Ehrenberg.* Niamniam: Mbomo on the River Lehsi, *Schweinfurth*, 3997! Uganda: Entebbe, 3900 ft., *Brown*, 25!

Lower Guinea. Spanish Guinea: Benito, *Guiral!* Nkolentangan, *Tessmann*, 416! Gaboon: Kringe, *Thollon*, 163! Ogowe, *Thollon*, 419! French Congo: on the Nyoma, *Lecomte*, 109! Brazzaville, *Thollon*, 542! Lower Congo: Boma; Zambi, *Dupuis.* Mayumbe; Bingila, *Dupuis.* Matadi; near Matadi, *Laurent.* Stanley Pool district; near Yumbi, *Laurent*, 421; near Kwamouth, *Bieler;* near Dembo, *Gillet*, *Vanderyst*; Kisantu, *Gillet.* Kwango district; Eiolo, *Laurent.* Angola: Pungo Andongo; near Pedra Cabondo, *Welwitsch*, 395! Golungo Alto; near Sobati, *Welwitsch*, 394!

South Central. Belgian Congo: Lake Leopold II. district; Kutu, *Laurent;* Kiri, *Laurent.* Aruwimi district; near Bena-Kamba, *Dewèvre*, 189; Limbutu, *Laurent.* Uelle district; Paku, *Seret!* Kasai district; Mukenge, *Pogge*, 1332! Eastern Prov.; near Nyangwe, *Dewèvre*, 1093.

Mozamb. Distr. Zanzibar: *Hildebrandt*, 1038! German East Africa: Dar-es-Salaam, *Stuhlmann*, 8526! Madossi, *Stuhlmann*, 8119! Usaramo, *Stuhlmann*, 6380! British Central Africa: Nyasaland; Elephant Marsh, on the Lower Shire, *Scott!*

Also in Tropical Asia and in Madagascar.

57. **ACALYPHA,** Linn. ; Benth. et Hook. f. Gen. Pl. iii. 311.

Flowers monœcious or rarely dicœcious. Petals and disk absent. Male flowers: Calyx thinly membranous, closed in bud, at length valvately 4-partite. Stamens mostly 8 (in the African species), attached to the slightly raised receptacle; filaments free; anther-cells distinct, spreading, oblong or linear, usually flexuous or vermiform. Rudimentary ovary absent. Female flowers: Sepals 3–4, imbricate, small. Ovary 3-celled; styles free (connate for half their length in 2, *A. peduncularis*), laciniate, rarely entire or only bilobed; ovules solitary in each cell. Capsule 3-lobed, usually small and soon dehiscing. Seeds ellipsoid or subglobose, with a crustaceous testa; albumen fleshy; cotyledons broad and flat.—Herbs, shrubs or trees of various habit. Leaves alternate, toothed, 3–7-nerved from the base or penninerved, usually petiolate. Inflorescence various, axillary or terminal or both, bisexual or unisexual, if bisexual then the female flowers below (very rarely above) the males, if unisexual then the male spikes or racemes axillary and the female spike (very rarely a panicle) terminal, or sometimes the flowers dicœcious. Male flowers very small, glomerate in small inconspicuous bracts, arranged in slender catkin-like spikes or racemes. Female flowers solitary or rarely more than 2 within a variously toothed or lobed bract which usually becomes foliaceous in the fruiting stage.

About 300 species, occurring (often as weeds) throughout the warmer regions of both hemispheres; a few in extra-tropical America.

As the male flowers of *Acalypha* are extremely small and do not appear to differ much in the various species, their description in the following has been confined to the bud-stage.

*Male and female flowers on separate inflorescences, very rarely a few males present at the apex of the female axis.
Flowers dicœcious or at least each shoot or stem unisexual.
Leaves sessile or with a petiole not more than 3 lin. long.
Stems numerous, about $1\frac{1}{2}$ ft. long, unbranched, arising from a woody rhizome; leaves oblong or oblong-lanceolate.
Female inflorescence axillary, often reduced to a solitary flower; styles free to the base — 1. *A. fuscescens.*
Female inflorescence terminal, composed of several flowers; styles connate in their lower half . . . . . — 2. *A. peduncularis.*
Stems much-branched; a shrub; leaves obovate or oblanceolate, acuminate . . . — 3. *A. chirindica.*
Leaves with petioles $\frac{1}{2}$–2 in. long.
Leaves accuminate, coarsely serrate; female inflorescence terminal . . . . . — 4. *A. Grantii.*
Leaves obtuse or subacute, crenate; female inflorescence axillary . . . . . — 5. *A. angolensis.*

Flowers monœcious.
Female inflorescence paniculate . . . 6. *A. paniculata.*
Female inflorescence spicate.
Ovary with gland-tipped hairs.
Leaves sessile or subsessile . . . 7. *A. Teusczii.*
Leaves with petioles $\frac{1}{2}$–$\frac{3}{4}$ in. long.
Stems short, arising from a rhizome; bracts of the female flowers coarsely dentate; sepals 3 . . . . 8. *A. benguelensis.*
Shrub or undershrub; bracts of the female flowers lobed nearly to the middle; sepals 4 . . . . 9. *A. senensis.*
Ovary without gland-tipped hairs.
Stems very sticky with numerous gland-tipped hairs . . . . . 10. *A. Allenii.*
Stems not sticky, rarely with a few gland-tipped hairs in the upper part.
Bracts of the female flowers with numerous gland-tipped hairs on the teeth or within (see also 16, *villicaulis*).
Styles bilobed and not laciniate . 11. *A. nigritiana.*
Styles laciniate.
Leaves ovate, caudate-acuminate, closely serrate . . . . 12. *A. ornata.*
Leaves lanceolate or linear-lanceolate, dentate . . . . 13. *A. paucifolia.*
Bracts of the female flowers without gland-tipped hairs (rarely a few present in 16, *villicaulis*).
Leaves linear; ovary glabrous . . 14. *A. angustissima.*
Leaves ovate, ovate-lanceolate or oblong.
Ovary glabrous . . . . 15. *A. welwitschiana.*
Ovary hairy.
Leaves ovate or ovate-lanceolate; petiole $\frac{1}{2}$ in. long or more.
Stems villous with long reflexed hairs; bracts and ovary densely hirsute . 16. *A. villicaulis.*
Stems shortly tomentose or pubescent, or at length nearly glabrous; bracts and ovary pilose with weak spreading hairs.
Petiole $1\frac{1}{2}$–3 in. long; stipules 2–3 lin. long . 17. *A. manniana.*
Petiole about $\frac{1}{2}$ in. long; stipules about $1\frac{1}{2}$ lin. long . . . . 18. *A. nyasica.*
Leaves lanceolate or obovate-lanceolate, subsessile or shortly petiolate.
A much-branched shrub . 3. *A. chirindica.*
Stems simple, very short, arising from a woody rhizome.

Young stems pubescent; female bracts nearly glabrous outside . . 19. *A. polymorpha.*
Young stems densely yellow-tomentose; female bracts adpressed-pilose outside . 20. *A. crotonoides.*

**Male and female flowers on the same inflorescence or in the same leaf-axil.

Leaves provided with usually numerous gold-coloured glands on the lower surface; glands on the ovary (when present) sessile.

Female bracts usually several in each inflorescence, less than $\frac{1}{2}$ in. long.

Female bracts 1-flowered, rather small; ovary pilose . . . . . 21. *A. fruticosa.*
Female bracts 2-flowered, conspicuous; ovary glabrous . . . . . 22. *A. ceraceopunctata.*

Female bracts 1–2 in each inflorescence, about 1 in. long and broad . . . . . 23. *A. pubiflora.*

Leaves without surface glands below; ovary glabrous or hairy and with gland-tipped hairs, but no sessile glands.

Male flowers below the females in each inflorescence.

Leaves and inflorescences crowded on very short lateral branchlets.

Leaves oblong-lanceolate, $\frac{2}{3}$–$\frac{3}{4}$ in. broad; petiole $\frac{2}{3}$ in. long; female flowers 5–12 on each inflorescence . . . . 24. *A. boiviniana.*
Leaves obovate or elliptic-lanceolate, 1–$1\frac{3}{4}$ in. broad; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long; female flowers 2–4 on each inflorescence . . 25. *A. acrogyna.*

Leaves and inflorescences laxly arranged on more or less elongated shoots.

Leaves with a petiole $1\frac{1}{4}$–$2\frac{3}{4}$ in. long; ovary with tubercular-based hairs . . . 26. *A. Engleri.*
Leaves subsessile; ovary not tubercular . 27. *A. Dumetorum.*

Male flowers above the females in each inflorescence.

Female bracts digitately 3–5-(rarely 7-) partite.

Perennial; stems from a woody rhizome . 36. *A. Stuhlmannii.*
Annuals, sometimes woody at the base, no rhizome.

Female bracts 3-partite; a small slender annual . . . . . 28. *A. brachystachya.*
Female bracts 5-(rarely 7-) partite; plant more or less woody . . . . 29. *A. psilostachya.*

Female bracts dentate, fimbriate or laciniate, with numerous teeth.

†Annuals, mostly sparingly branched.

Female flower sessile in each leaf-axil, at the base of but not on the axis bearing the male flowers . . . . 30. *A. hochstetteriana.*
Female flowers arranged on the same axis as the males.

Female bracts fimbriate . . . 31. *A. ciliata.*

Female bracts crenate or dentate.
Female bracts rather small, usually crowded and overlapping in the leaf-axils.
Inflorescences collected towards the ends of the shoots; female bracts with numerous long gland-tipped hairs . . 32. *A. glomerata.*
Inflorescences not collected towards the ends of the shoots; female bracts ciliate, with no or very few gland-tipped hairs . . 33. *A. crenata.*
Female bracts large and foliaceous, very laxly arranged.
Female bracts dentate, more or less reniform when spread out; an erect usually unbranched herb . . . . . 34. *A. indica.*
Female bracts crenate, more or less ovate when spread out, often with a few gland-tipped hairs; a small herb, often much branched from the base 35. *A. segetalis.*
††Perennials; stems herbaceous and arising from a rhizome, or much-branched woody shrubs.
Stems herbaceous, arising from a woody rhizome.
Leaves linear, linear-oblong or oblong, not densely villous.
Male portion of inflorescence long and very slender and usually long-pedunculate; leaves nearly glabrous above . . . . 36. *A. Stuhlmannii.*
Male portion of inflorescence short and nearly sessile; leaves more or less setose-pubescent above . 37. *A. ambigua.*
Leaves ovate, densely whitish villous . 38. *A. eriophylla.*
Shrubs with woody branches.
Ovary tubercular.
Leaves subsessile; inflorescence short; bracts of the female flowers very small, inconspicuous . . . 39. *A. subsessilis.*
Leaves distinctly petiolate; inflorescence elongated; bracts of the female flowers foliaceous, conspicuous . . . . . 40. *A. neptunica.*
Ovary not tubercular.
Leaves cordate at the base; female bracts inserted at the base of the axis supporting the male flowers . 41. *A. Volkensii.*
Leaves rounded, truncate or subcuneate at the base; female bracts inserted about the middle of the axis supporting the male flowers . 42. *A. bipartita.*

1. **A. fuscescens,** *Müll. Arg. in DC. Prodr.* xv. ii. 821. A herb 1–1½ ft. high; rhizome thick, woody; stems numerous, erect or oblique, slightly flexuous, about 1 lin. in diam. 6 in. from the apex, rather densely setose when young, at length nearly glabrous; lower internodes about 1 in. long, gradually shortening upwards to ½ in. long. Leaves oblong-lanceolate, subacute, a little narrowed to the base, 1½–4½ in. long, ⅔–1 in. broad, serrate or slightly crenate-serrate, rigidly chartaceous, rather dark, slightly shining and sparingly setose on the upper, dull brown and shortly pubescent or tomentellous on the lower surface and sparingly setulose on the lateral nerves and veins; lateral nerves 10–12 on each side, ascending and continued to the marginal teeth, not looped or branched, raised on both surfaces, very prominent below; tertiary nerves close and subparallel, a little raised below; petiole 1–2 lin. long, flattened; stipules subulate, 2 lin. long, sparingly setulose. Flowers diœcious, the males not known. Female flowers solitary or in pairs in the axils of the upper leaves, sessile. Bracts several-lobed, lobes alternately long and short, linear-lanceolate, acute, rather densely tawny-pilose outside. Sepals very small. Ovary globose, densely tawny-tomentose outside; styles 3–4, reddish, erect, free to the base, 2 lin. long, linear, coarsely pectinate on the inner face with ascending bristles, shortly pubescent on the outer face. Fruits not known.—Hiern in Cat. Afr. Pl. Welw. i. 976. *A. Dumetorum,* Müll. Arg. in Journ. Bot. 1864, 334, partly, as to Welwitsch, 430. *Ricinocarpus fuscescens,* O. Kuntze, Rev. Gen. Pl. ii. 618.

Lower Guinea. Angola: Pungo Andongo; near Caghuy, *Welwitsch,* 430! and without precise locality, *Gossweiler,* 970!

2. **A. peduncularis,** *Meisn. ex Krauss in Flora,* 1845, 82. Stems simple, arising from a woody rhizome, up to 1 ft. high, pubescent with long stiff and short crisped hairs. Leaves sessile, oblong or ovate-lanceolate, obtuse or subacute, rounded at the base, 1–2 in. long, ½–1 in. broad, coarsely serrate, rather rigidly chartaceous or subcoriaceous, more or less setose on the nerves or sometimes almost glabrous; lateral nerves about 3 on each side, the lowermost pair running parallel with the leaf-margin almost its full length, all distinct on both surfaces, prominent below; tertiary nerves distinct but not prominent; stipules ovate-triangular or oblong-lanceolate, coriaceous, pubescent or nearly glabrous, about 1½ lin. long. Flowers diœcious. Male inflorescence solitary, axillary, pedunculate; female sessile and terminal. Male peduncle ½–3 in. long, pubescent with long stiff spreading hairs and short crisped hairs; flowering portion ½–2½ in. long. Bracts oblong-linear, setosely ciliate. Buds reddish, slightly pilose. Female inflorescence short and almost hidden by the upper overlapping leaves. Bract of the female flower ovate, several-toothed or lobed, often with a few very shortly stalked or nearly sessile glands, pilose. Sepals 4, ciliate. Ovary with gland-tipped hairs; styles 3, connate in their lower half, about ¾ in. long, shortly laciniate, otherwise glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 846; Pax in Engl. Pfl. Ost-Afr. C. 239; Gibbs in Journ. Linn. Soc. xxxvii. 470. *A. villicaulis,* S. Moore in Journ. Linn. Soc. xl. 199,

partly, not of Hochst. *Ricinocarpus peduncularis*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Mozamb. Distr. British Central Africa: **Nyasaland**; plateau of Mount Zomba, 5000–6000 ft., *Whyte!* Rhodesia: **Inyanga, Manika, 6000–7000 ft.**, *Cecil*, 179! 182! between Umtali and Inyanga mountains, *Cecil*, 167! Salisbury, *Cecil*, 68! *Engler*, 3052! *Rogers*, 4003! Gwelo, *Gardner*, 33! Gazaland: Upper Buzi, *Swynnerton*, 383!

Occurs also in Eastern South Africa.

3. **A. chirindica,** *S. Moore in Journ. Linn. Soc.* xl. 199. A much-branched shrub; branches terete, glabrous; young branchlets twiggy, densely pubescent. Leaves rather crowded, subsessile or with a petiole up to 2 lin. long, obovate or oblanceolate, acuminate to a setose apex, narrowed to a subtruncate base, up to $4\frac{1}{2}$ in. long and $1\frac{1}{2}$ in. broad, serrulate, membranous, rather densely pilose (at length less so) on both surfaces; lateral nerves about 5 on each side, distinct on both surfaces; stipules lanceolate, acuminate, about 2 lin. long, slightly pubescent. Flowers dicœcious or submonœcious. Male inflorescences axillary on short lateral branchlets, solitary, slender, 1–$1\frac{1}{2}$ in. long, rarely a very short and more or less abortive female inflorescence terminating each lateral branchlet; axis densely pilose. Male buds pubescent. Female spikes solitary, terminating short lateral branchlets or the main shoot, 1–$2\frac{1}{2}$ in. long. Bracts one-flowered, subreniform in outline, laciniate, 2–3 lin. long (including the teeth), $\frac{1}{2}$ in. broad (when spread out), pilose outside, teeth long-ciliate, nearly glabrous within. Sepals 3, ovate, very small, ciliate. Ovary deeply trilobed, tomentose; styles 3, finely laciniate. Seeds broadly ovoid, minutely and very closely pitted.—*A. psilostachyoides*, Pax in Ann. Istit. Bot. Roma, vi. 183, in small part.

Mozamb. Distr. British Central Africa: Nyasaland; Chikala, *Purves*, 16! plains of Zomba, (specimen malformed) *Whyte*, 85! *Purves*, 118! Shire Highlands, *Buchanan*, 22! 40! 81! 119! 703! *Scott-Elliot*, 8530! Rhodesia: near Chirinda, *Swynnerton*, 380! 381!

In *Buchanan*, 119, and *Purves*, 118, the female inflorescence is paniculate, a condition which appears to be abnormal.

4. **A. Grantii,** *Baker and Hutchinson in Kew Bulletin*, 1911, 230. A shrub about 6 ft. high; branches very shortly pubescent when young, soon becoming quite glabrous and terete. Leaves ovate, somewhat caudate or gradually acuminate, acumen entire, rounded or subcordate at the base, 2–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, rather obtusely and coarsely serrate, subchartaceous, glabrous on both surfaces, digitately 5-nerved at the base, remaining lateral nerves 4–5 on each side, looped near the margin, prominent below; petiole slender, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, with a line of hairs in the groove on the upper side, otherwise glabrous; stipules linear, soon falling off. Flowers dicœcious? males not known. Female spikes terminal, about $\frac{3}{4}$ in. long. Bracts small, acuminate, minutely toothed, teeth gland-tipped, pubescent outside. Sepals 3, ovate, ciliate in the upper part. Ovary pilose in the upper half, not

glandular; styles 3, stout, purple, deeply laciniate, glabrous. Fruits and seeds not seen.

Nile Land. Bongo: Sabbi, *Schweinfurth*, 2201! Uganda: Madi, *Speke & Grant!*

5. **A. angolensis,** *Müll. Arg. in Journ. Bot.* 1864, 335. A shrub 4 ft. high, sparingly branched; branches slightly angular, densely crisped-pubescent or tomentose. Leaves ovate, rounded or subacute at the apex, rounded at the base, 2–4 in. long, $1\frac{1}{2}$–2 in. broad, rather coarsely crenate, less so towards the base, membranous, pubescent on both surfaces especially on the veins below, 5-nerved at the base, remaining lateral nerves 4–5 on each side, slightly raised on both surfaces; petiole $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, densely pubescent; stipules subulate, $1\frac{1}{2}$–2 lin. long, setulose. Flowers diœcious, the males not known. Female spikes axillary, subsessile, about $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. in diam. Bracts 2 lin. long, irregularly and deeply 10–12-toothed, with as many nerves, pilose on both sides, but more densely so on the outer. Sepals 3, ovate, $\frac{1}{4}$ lin. long, whitish-pubescent outside. Ovary trilobed, small, long-pilose in the upper part, glabrous below; styles 3, slightly connate at the base, 4 lin. long, sparingly laciniate with filiform segments. Fruits and seeds not known.—Müll. Arg. in DC. Prodr. xv. ii. 835; Hiern in Cat. Afr. Pl. Welw. i. 977. *Ricinocarpus angolensis*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Lower Guinea. Angola: Pungo Andongo; in thickets at the outskirts of the forest near Catete, *Welwitsch*, 434!

6. **A. paniculata,** *Miq. Fl. Ind. Bat.* i. ii. 406. A sparingly branched herb, 2–5 ft. high; stem slightly angular or subterete, densely pilose with both long and short hairs, about 2 lin. in diam. 1 ft. from the apex. Leaves ovate, subcordate or truncate at the base, rather abruptly and shortly acuminate to an acute apex, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, 1–3 in. broad, coarsely crenate-serrate, membranous, usually rather sparingly setose on both surfaces, especially on the nerves, digitately 5-nerved at the insertion of the petiole, remaining lateral nerves 4–5 on each side, subopposite, branched and gradually fading near the margin; tertiary nerves subparallel, very slender, 1–$1\frac{1}{2}$ lin. apart; petiole rather slender, 1–$3\frac{1}{2}$ in. long, shortly and rather densely crisped-pubescent; stipules subulate, 2–3 lin. long, sparingly pilose outside, with a few stipitate glands here and there along the margin. Flowers monœcious. Male racemes solitary, axillary, $2\frac{1}{2}$–5 in. long; axis terete, densely puberulous; bract subtending each cluster of flowers lanceolate, $\frac{1}{3}$ lin. long, sparingly ciliate; pedicel short, pubescent. Buds very small, 4-lobed, slightly apiculate, glabrous. Female flowers in a terminal oblong panicle 6–8 in. long; branches simple, slender, up to $2\frac{1}{2}$ in. long, like the main axis rather densely crisped-puberulous, a few male flowers at the base of each; bracts 3-flowered, one flower only being developed, ovate, small, ciliate; pedicels $\frac{1}{2}$–1 lin. long, pubescent. Sepals 5, ovate-lanceolate, acute, $\frac{1}{3}$ lin. long, sparingly pubescent outside. Ovary slightly trilobed, closely beset with small wart-like protuberances with

a few stipitate glands interspersed here and there; styles deeply 4–6-partite, the segments linear or filiform, undivided, glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 802; Hook. f. Fl. Brit. Ind. v. 415; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 349; Schweinf. in Höhnel, Disc. Lakes Rudolf & Stephan. Engl. ed. ii. 355; Penzig in Atti Congr. Bot. Genova, 1892, 359; Trimen, Handb. Fl. Ceylon, iv. 57; Pax in Bull. Soc. Bot. Belg. xxxvii. 105, and in Engl. Pfl. Ost-Afr. C. 239; Hiern in Cat. Afr. Pl. Welw. i. 976; Th. Durand & De Wild. Mat. Fl. Congo, ii. 60; De Wild. et Th. Durand, Reliq. Dewevr. 210; De Wild. Miss. É. Laurent, 131, and Études Fl. Bas- et Moyen-Congo, ii. 284; Th. et Hél. Durand, Syll. Fl. Congol. 493. *Ricinocarpus villosus*, var. *racemosus*, O. Kuntze, Rev. Gen. Pl. ii. 616.

Upper Guinea. Gold Coast: Assim, *Cummins*, 20A! Togo: Krakje, *Krause!* Misahohe, *Baumann*, 91! 291! 541! Lagos, *Dawodu*, 212! Cameroons: various localities, *Mann*, 767! 1254! *Schlechter*, 12742! *Buchholz! Zenker*, 313! 578! *Staudt*, 915! *Winkler*, 34B! Fernando Po, *Barter!*

Nile Land. Eritrea: Ginda, *Schweinfurth & Riva*, 2184! *Schweinfurth*, 356; Filfil, *Schweinfurth*, 347. Niamniam, *Schweinfurth*, 2983! Uganda: Sesse Islands, *Stuhlmann*, 1235! Mawokota, *Brown*, 186! British East Africa: Taita; Wara Mountain, *Hildebrandt*, 2460! Maungu Mountain, *Johnston!*

Lower Guinea. Lower Congo: Loango, *Soyaux*, 200! Bingila, *Dupuis*; Lemba, *Cabra*; between Tumba and Kimpesse, *Gillet*; Tumba, *Laurent*; Kisantu, *Gillet*; and without precise locality, *Smith*, 64! 65! 79! Angola: Golungo Alto; near Sange and Bango, *Welwitsch*, 420!

South Central. Belgian Congo: Fort Beni, *Mildbraed*, 2362! Kutu, *Laurent*; Eala, *Pynaert*.

Mozamb. Distr. German East Africa: various localities, *Stuhlmann*, 4591! 8370! *Uhlig*, 690! 1011! *Merker*, 594! *Höhnel*, 21! *Eick*, 162! *Liebusch! Engler*, 347! 392! 438! *Volkens*, 121! *Warnecke*, 417! 436! *Busse*, 2247! *Braun*, 664! 1464! *Kränzlin*, 2145! *Holst*, 479! 2227A! 2289! 3384! 4339! *Meinhof*, 32! *Buchwald*, 61A! Portuguese East Africa: *Testu*, 633! Rhodesia; Melsetter district, *Johnson*, 172!

Occurs also in Tropical Asia.

7. **A. Teusczii,** *Pax in Engl. Jahrb.* xix. 98. Stems arising from a woody rhizome, short, branched from the base, angular, puberulous with crisped hairs, and long-pilose with reflexed weak hairs. Leaves subsessile, ovate or ovate-elliptic, subacute, cordate at the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, somewhat irregularly serrate, thinly coriaceous, pilose on both surfaces; lateral nerves 4–6 on each side, ascending, prominent on both surfaces, especially below; stipules linear-subulate, nearly 2 lin. long, pubescent. Flowers monœcious, male and female on separate inflorescences. Male inflorescence axillary, solitary, pedunculate, up to 3 in. long, the upper half bearing flowers; axis crisped-puberulous and also long-pilose with weak spreading hairs. Buds sparingly pubescent. Female inflorescence terminal, solitary, about $\frac{1}{2}$ in. long. Bracts rather small, reniform, about $1\frac{1}{2}$ lin. long and 3 lin. broad when spread out, obtusely 10–12-toothed, glabrous within, pubescent outside, teeth stipitate-glandular on the margin and on the outside. Sepals 3, elliptic, unequal, one larger than the others and

often bilobed, all ciliate and pilose on the back. Ovary long-pilose in the upper part, hairs intermixed with stipitate glands; styles purple, conspicuous, about $\frac{1}{2}$ in. long, laciniate, glabrous. Seeds smooth.

Lower Guinea. Angola: Malange district, *Teuscz*, 163! 259! *Gossweiler*, 961! 988! Benguella: Mount Elende, *Wellman*, 1303!

8. **A. benguelensis,** *Müll. Arg. in Journ. Bot.* 1864, 335. A perennial herb, 1–1$\frac{1}{2}$ ft. high; stems erect, shortly branched towards the base, angular, reflexed-setose. Leaves ovate or ovate-lanceolate, obtuse or subacute, more or less cordate at the base, 1–3 in. long, $\frac{3}{4}$–1$\frac{1}{4}$ in. broad, crenate, membranous, setose on the nerves and veins on both surfaces, digitately 5-nerved at the base, remaining lateral nerves 4–5 on each side; transverse nerves distant and indistinct; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, setose; stipules linear-subulate, 1$\frac{1}{2}$ lin. long, sparingly setulose. Flower monœcious, male and female on separate inflorescences. Male spikes solitary in the leaf-axils near the middle of the shoot, pedunculate; peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long, rather densely crisped-pubescent; flowering part $\frac{3}{4}$ in. long; bract subtending each cluster of male flowers linear, ciliate. Buds glabrescent. Female spikes terminal, solitary, pedunculate; peduncle 4–5 lin. long, tomentose; flowering part a little over $\frac{1}{2}$ in. long, 4 lin. broad. Bracts unilateral, 10–12-toothed, 2 lin. long, 4 lin. broad when spread out, nearly glabrous within, pilose outside, with numerous stipitate glands on both sides of the teeth. Sepals 3, ovate-lanceolate, subacute, $\frac{3}{4}$ lin. long, ciliate, very sparingly pubescent or nearly glabrous. Ovary trilobed, sparingly pubescent and with numerous long-stipitate glands in the upper half; styles 3, suberect, very slightly connate at the base, almost $\frac{1}{2}$ in. long, laciniate, with opposite filiform segments on the inner face, glabrous.—*A. benguelensis*, vars. *trichogyne* and *adenogyne*, Müll. Arg. l.c., and in DC. Prodr. xv. ii. 844; Hiern in Cat. Afr. Pl. Welw. i. 978. *Ricinocarpus benguelensis*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Lower Guinea. Angola: Huilla; *Dekindt*, 847A! in herbaceous wooded places at Monino near Lopollo, *Welwitsch*, 435! Pungo Andongo: near the River Cuanza and Pungo Andongo, *Welwitsch*, 436!

9. **A. senensis,** *Klotzsch in Peters, Reise Mossamb. Bot.* 96. Stems woody towards the base, angular or deeply sulcate when young, rather densely hirsute or sometimes only tomentellous. Leaves linear-lanceolate or lanceolate, gradually acuminate, cordate at the base, 1$\frac{1}{4}$–7 in. long, $\frac{1}{3}$–1 in. broad, serrate, membranous, more or less hirsute or pubescent on both surfaces, 5-nerved at the base, remaining lateral nerves 10—15 on each side, raised on both surfaces; transverse nerves parallel, rather distant, raised on both surfaces; petiole $\frac{1}{2}$–1$\frac{1}{4}$ in. long, hirsute; stipules subulate-filiform, 2 lin. long, pilose. Flowers monœcious, male and female on separate solitary inflorescences. Male spikes axillary, pedunculate, $\frac{3}{4}$–2$\frac{1}{2}$ in. long; axis puberulous. Buds nearly glabrous. Female spikes terminal, $\frac{3}{4}$–1$\frac{1}{4}$ in. long, nearly $\frac{1}{2}$ in. broad. Bracts suborbicular or reniform, 5 lin. broad (when spread out), 2$\frac{1}{2}$ lin. long, deeply 7–10-toothed, 10-ribbed on the outside, puberulous and

(especially on the teeth) stipitate-glandular on the outside, glabrous within; teeth triangular, mucronate. Sepals 4, lanceolate, slightly unequal, $\frac{3}{4}$ lin. long, subacute, ciliate, pubescent outside, glabrous. Ovary 3–4-celled, rather deeply 3–4-lobed, pubescent and with several long-stipitate glands in the upper half of each lobe; styles 3 or 4, slightly connate at the base, ascending, sparingly laciniate, purple, about $\frac{1}{2}$ in. long. Seeds subglobose, nearly $1\frac{1}{2}$ lin. in diam., not visibly pitted, hilum large and spreading.—Müll. Arg. in DC. Prodr. xv. ii. 845; Pax in Engl. Pfl. Ost-Afr. C. 239. *A. zambesica*, Müll. Arg. in Flora, 1864, 440, and in DC. Prodr. xv. ii. 845; Pax in Engl. Pfl. Ost-Afr. C. 239; Gibbs in Journ. Linn. Soc. xxxvii. 470. *A. villicaulis*, Müll. Arg. in DC. Prodr. l.c., partly, as to Mellor 5; Pax in Baum, Kunene-Samb. Exped. 283; S. Moore in Journ. Linn. Soc. xl. 199, partly; not of Hochst. *A. villicaulis*, var. *minor*, Müll. Arg. in Abhandl. Naturw. Ver. Bremen, vii. 26. *Ricinocarpus senensis* and *zambesicus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2058! Uganda, *Wilson*, 52! between Nandi and Kakamagas, *Whyte!* British East Africa: Kitui, *Hildebrandt*, 2689! and without precise locality, *Hannington!*

Lower Guinea. Angola: by the Kubango River, near Kavanga, *Baum*, 408!

Mozamb. Distr. German East Africa: Useguha, *Scheffler*, 267! Portuguese East Africa: various localities, *Kirk*, 3! *Scott!* *Mrs. E. Cecil*, 8! British Central Africa: Nyasaland; various localities, *Meller*, 5! *Miss Kenyon*, 33! *McClounie*, 41! *Whyte! Whyte & McClounie! Purves*, 44! *Scott-Elliot*, 8599 partly! *Buchanan*, 26! 351! 737! 823! 1384! *Adamson*, 90! Rhodesia; various localities, *Holub*, 819! 820! *Rogers*, 8286! *Sykes*, 197! *Miss Gibbs*, 225! *Engler*, 3071! *Gardner*, 56! Gazaland; near Chirinda; *Swynnerton*, 382! Bechuanaland; near Palapye, *Lugard*, 278!

Var. *chariensis*, Hutchinson. Stems rather thicker and coarser than in the type, densely fulvous-hirsute with reflexed hairs; styles laciniate.—*A. chariensis*, Beille in Bull. Soc. Bot. France, 1908, Mém. viii. 80.

Upper Guinea. Northern Nigeria: Yola; Bornu Road, *Dalziel*, 159! Cameroons: Garua, *Ledermann*, 5123! Kalgey, *Ledermann*, 5185!

North Central. French Congo: between Krebidje and the Kimo River, *Chevalier*, 5495! Dar Banda; Ara, *Chevalier*, 7196. Fort Archambault, *Chevalier*, 8734.

Var. *haplostyla*, Hutchinson. Stems as in the type. Styles undivided or with one or two small segments.—*A. haplostyla*, Pax in Engl. Jahrb. xix. 98; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 284. *A. haplostyla*, var. *longifolia*, De Wild. l.c. i. 277?

South Central. Belgian Congo: Lunda; Lulua River, *Pogge!* Lukafu, *Verdick.*

10. **A. Allenii,** *Hutchinson in Kew Bulletin*, 1911, 229. Stems herbaceous, about 1 ft. long, deeply grooved, very sticky with numerous gland-tipped hairs. Leaves ovate-lanceolate or oblong-lanceolate, mucronate, cordate at the base, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{3}{4}$ in. broad, repand-dentate or denticulate, rather rigidly chartaceous, setose on both surfaces; lateral nerves 6–8 on each side, the lower ascending, the upper arcuate, prominent on both surfaces; tertiary nerves parallel, rather close, prominent below; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, glandular-pubescent; stipules

linear-subulate, $\frac{1}{4}$ in. long, sparingly pilose. Flowers monœcious, male and female on separate inflorescences, rarely a few males produced at the apex of the infructescence. Male racemes axillary, solitary, about $2\frac{1}{2}$ in. long. Axis of the male inflorescence sparingly glandular-pubescent; bracts conspicuous, linear, $1\frac{1}{2}$ lin. long, glandular-pubescent. Female spikes terminal, 2–3 in. long. Bracts $1\frac{1}{2}$ lin. long when in flower, $\frac{1}{2}$ in. long in fruit, several-toothed, shortly acuminate, with numerous stipitate glands on the margin and on the outside, glabrous within. Sepals 3, ovate, glandular-ciliate. Ovary deeply trilobed, pilose, not glandular; styles much laciniate or pectinate, pilose on the back.

Mozamb. Distr. Rhodesia: Gwaai forest, *Allen*, 238! Leshumo Valley, *Holub!* Salisbury, *Rand*, 1385! 1386! South African Gold-fields, *Baines!* Wankie Line, 80 miles north of Bulawayo, on sandstone, *Eyles*, 1130!

11. **A. nigritiana,** *Müll. Arg. in Flora*, 1864, 440. A small shrub; branchlets crisped-puberulous. Leaves ovate, caudate-acuminate, rounded and subentire at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, crenate-serrate, membranous, pubescent on the lower surface, sparingly so on the nerves above, digitately 3–5-nerved at the base, remaining lateral nerves 3–4 on each side, very slightly raised on each surface; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. long, crisped-pubescent; stipules linear-lanceolate, acute, $1\frac{1}{2}$ lin. long, sparingly pubescent on the outside. Flowers monœcious, on separate inflorescences. Male inflorescences lateral, axillary, solitary, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long; axis pubescent. Male buds nearly glabrous. Female inflorescence terminal, about $1\frac{1}{4}$ in. long (seen only in a young state). Bracts obovate-cuneate, caudate-acuminate, about $\frac{2}{3}$ lin. long, about 5-toothed on each side of the acumen, glabrous inside, villous outside, with several stipitate glands on the teeth. Sepals lanceolate, ciliate, nearly enveloping the ovary. Ovary small, pubescent in the upper part, not glandular; styles 3, bilobed to near their middle, not laciniate. Fruits and seeds not seen.—Müll. Arg. in DC. Prodr. xv. ii. 834. *Ricinocarpus nigritanus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Upper Guinea. Southern Nigeria: Lagos; Yoruba forests, *Barter*, 3425!

This species is very closely allied to *A. ornata*, of which it may be only a variety.

12. **A. ornata,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 247. An undershrub; branches more or less sulcate, crisped-pubescent with short hairs and rather densely hirsute with longer reflexed hairs, the latter sometimes absent. Leaves ovate, caudate-acuminate, subcordate, rounded and rarely subcuneate at the base, 2–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, rather coarsely serrate, membranous, sparingly setulose on the upper surface, spreadingly pilose on the nerves and veins beneath, digitately 5-nerved at the base, remaining lateral nerves 4–5 on each side, prominent below; transverse nerves subparallel, about 1 lin. apart; petiole $\frac{1}{2}$–$2\frac{1}{2}$ in. long, sparingly pilose or hirsute; stipules subulate-filiform, 2–3 lin. long, pilose. Flowers monœcious. Male inflorescences axillary, solitary, very slender, $1\frac{1}{2}$–2 in. long; axis sparingly pubescent; bracts subulate, ciliate, $\frac{3}{4}$ lin. long. Buds glabrescent. Female inflorescence terminal, solitary, 2–$3\frac{1}{2}$ in. long. Bracts 1-flowered, ovate-

rhomboid, acutely acuminate, 3 lin. long, 4 lin. broad, about 20-toothed, sparingly pubescent outside; teeth more or less triangular, with stipitate glands at their base on the inner side. Sepals ovate-triangular, sparingly ciliate. Ovary trilobed, rather densely pilose in the upper half; styles 3, laciniate. Seeds ovoid, smooth, about 1 lin. long.—Müll. Arg. in Flora, 1864, 441, incl. vars. *bracteosa* and *pilosa*, and in Linnæa, xxxiv. 19, including preceding vars. and vars. *genuina* and *glandulosa*; Pax in Engl. Pfl. Ost-Afr. C. 239; Hiern in Cat. Afr. Pl. Welw. i. 976 (var. *glandulosa*); Th. Durand & De Wild. Contrib. Fl. Congo, i. 51, and Reliq. Dewevr. 210; Rendle in Journ. Linn. Soc. xxxvii. 213; Th. & Hél. Durand, Syll. Fl. Congol. 493. *A. adenotrichia*, A. Rich. l.c. 248; Müll. Arg. in DC. Prodr. xv. ii. 844. *A. livingstoniana*, Müll. Arg. in Flora, 1864, 440, and in DC. l.c. 833; Pax, l.c. *A. Swynnertonii*, S. Moore in Journ. Linn. Soc. xl. 200. *Ricinocarpus adenotrichus*, O. Kuntze, Rev. Gen. Pl. ii. 617. *R. ornatus*, O. Kuntze, l.c. 618.

Upper Guinea. Lagos: various localities, *Millen*, 20! 113! 135! 176! Southern Nigeria: Oloke Meji, *Foster*, 288! Cameroons: Yakuba, *Ledermann*, 2598!

North Central. Shari district, *Chevalier*, 5588!

Nile Land. Eritrea: various localities, *Beccari*, 128! *Hildebrandt*, 388! *Schweinfurth*, 221, 427, *Schweinfurth & Riva*, 2219! Abyssinia: various localities, *Schimper*, 115! 1414! 1647! *Rohlfs & Stecker! Steudner*, 514! *Petit!* Galabat, *Schweinfurth*, 761! Niamniam: Kalenjo, *Schweinfurth*, 2836! Uganda: Unyoro, *Bagshawe*, 1527! everywhere, *Dawe*, 811! British East Africa: various localities, *Johnston! Hildebrandt*, 2304! *Kässner*, 396! *Scott-Elliot*, 7326!

Lower Guinea. Angola: various localities, *Welwitsch*, 437! 438! 439!

South Central. Belgian Congo: Monbuttu, *Schweinfurth*, 3629! various localities, *Mildbraed*, 2307! *Dewèvre, Descamps, Debeerst*, 13D, *Thonner*, 215.

Mozamb. Distr. Zanzibar, *Stuhlmann*, 709! German East Africa: various localities, *Holst*, 555! 2227! 3553! *Fischer*, 530! *Mildbraed*, 337! *Merker*, 131! 588! 596! *Volkens*, 46! *Warnecke*, 419! *Liebusch! Stuhlmann*, 1611! 6867! 6981! 6988! 7061! 7071! *Engler*, 363! *Jaeger*, 369! *Meller! Kirk!* Portuguese East Africa: islands and shore of Lake Nyasa, *Archdeacon Johnson*, 19! 42! Davira, *Johnson*, 77! foot of Moramballa, *Kirk!* Shiramba, *Kirk!* Kurumadzi River, *Swynnerton*, 796! Chibabava, Lower Buzi River, *Swynnerton*, 799! British Central Africa: Nyasaland; various localities, *Whyte! Buchanan*, 22! 1164! *McClounie*, 159!

Müller distinguished four varieties chiefly on the character of the indumentum and the few or numerous glands on the female bracts. After examining a large series of specimens collected since Müller's work, it is evident that these characters are of little value and that the varieties cannot be maintained.

13. **A. paucifolia,** *Baker & Hutchinson in Kew Bulletin*, 1911, 230. Stems apparently arising from a rhizome, slender, up to 7 in. long, much compressed or grooved, long-setose and pubescent when young, at length glabrous. Leaves lanceolate or linear-lanceolate, subacute at the apex, rounded at the base, 1–2¼ in. long, 2–5 lin. broad, rather shallowly repand-dentate, thinly chartaceous, glabrous on both surfaces except the midrib and lateral nerves which are setose; lateral nerves about 10 on each side, arcuate and looped, distinct but not prominent

below; veins lax; petiole 4–6 lin. long, sometimes setose or crisped puberulous; stipules linear-subulate, 2–3 lin. long, nearly glabrous. Flowers monœcious. Male inflorescence solitary, axillary, pedunculate, $1\frac{1}{2}$–3 in. long; axis sulcate, crisped-pubescent. Buds glabrous. Female spike terminal, 1–$1\frac{1}{2}$ in. long. Bracts small, broadly ovate, caudate-acuminate, about 10-toothed, teeth rather densely stipitate-glandular. Sepals 3, lanceolate, ciliate. Ovary small, sparingly pubescent, not glandular; styles stout, 2–$2\frac{1}{2}$ lin. long, laciniate, otherwise glabrous. Fruits and seeds not seen.

Mozamb. Distr. Portuguese East Africa: near Lake Nyasa, *Johnson*, 457!

14. **A. angustissima,** *Pax in Engl. Jahrb.* xix. 99. Stems short, about 6 in. long, arising from a woody rhizome, compressed or deeply grooved, glabrous, or hairy only towards the base. Leaves sessile, linear, acute, 1–$2\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ lin. broad, entire, coriaceous, glabrous; stipules linear-subulate, $1\frac{1}{2}$–2 lin. long, sparingly pilose. Flowers monœcious, the male and female on separate inflorescences. Male inflorescence axillary, solitary, pedunculate, 1–$1\frac{1}{2}$ in. long; axis angular or grooved, glabrous; bracts linear, nearly 1 lin. long, pilose in the upper part. Male buds very small, nearly glabrous. Female spikes terminal, solitary, sessile, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Bracts subcupular, coriaceous, 2–3 lin. long, with about 20 lobes, glabrous on both sides, lobes subulate, sparingly setulose towards the tips. Sepals 3, lanceolate, ciliate towards the apex. Ovary trilobed, glabrous; styles 3, suberect, about $2\frac{1}{2}$ lin. long, very shortly laciniate. Seeds ellipsoid, $1\frac{1}{2}$ lin. long, smooth.

South Central. Belgian Congo: between Kimbundo and the Coango River, *Pogge*, 113!

15. **A. welwitschiana,** *Müll. Arg. in Journ. Bot.* 1864, 334. A shrub 3–5 ft. high, sparingly branched in the upper part; branches a little over 1 lin. in diam. about 6 in. from the apex, slightly angular, rather densely crisped-pubescent, with a few longer straight hairs intermixed. Leaves ovate-elliptic, rounded or subacute at the apex, rounded or slightly cuneate at the base, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, 1–$2\frac{1}{2}$ in. broad, rather coarsely crenate, subentire towards the base, membranous, setulose-pubescent on both surfaces, 3–5-nerved at the base, remaining lateral nerves 4–5 on each side, slender, slightly raised on both surfaces; petiole $\frac{1}{2}$–2 in. long, rather slender, densely crisped-pubescent; stipules subulate, $1\frac{1}{2}$–2 lin. long, sparingly setulose. Flowers monœcious. Male spikes solitary or in pairs in each leaf-axil, $1\frac{1}{2}$–$3\frac{3}{4}$ in. long, scarcely or very shortly pedunculate; axis tomentose. Buds densely pubescent. Female spike solitary, terminal, scarcely $\frac{1}{2}$ in. long, about $\frac{1}{4}$ in. in diam. Bracts rather small, several toothed, without glands, rather densely pilose. Sepals 3, ovate-lanceolate, sparingly pilose on the outside. Ovary small, slightly trilobed, glabrous; styles long and slender, 2 lin. long, laciniate and sparingly pubescent. Fruits and seeds not known.—Müll. Arg. in DC. Prodr. xv. ii. 834; Hiern in Cat. Afr. Pl. Welw. i. 977. *Ricinocarpus welwitschianus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Lower Guinea. Angola: Pungo Andongo; at the outskirts of the forest near Luxillo, *Welwitsch*, 433!

16. **A. villicaulis,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 248. Stems evidently arising from a woody rhizome, 1½–2 ft. high, woody at the base, angular, hirsute with slightly reflexed hairs. Leaves lanceolate or ovate, subacutely acuminate, cordate at the base, 1½–4½ in. long, ¾–2¾ in. broad, rather coarsely crenate-serrate, membranous, sparingly hirsute above, more densely so below, digitately 5–7-nerved at the base, remaining lateral nerves 5–7 on each side, slightly raised on both surfaces; transverse nerves subparallel, distant; petiole ½–2½ in. long, hirsute, often provided with two fleshy glands at the apex; stipules subulate, 1½ lin. long, setulose. Flowers monœcious, on separate inflorescences. Male inflorescences axillary, solitary, pedunculate, 1½–2½ in. long; axis crisped-pubescent. Male buds slightly pubescent. Female spikes solitary or two or three together, terminating each shoot. Bracts small, several-toothed, densely pubescent, not or very sparingly glandular. Sepals coriaceous, ovate, pilose on the back. Ovary densely pilose; styles 3, laciniate, about ⅓ in. long, glabrous.—Müll. Arg. in DC. Prodr. xv. ii. 845, partly; Oliv. in Trans. Linn. Soc. xxix. 146, t. 98. *A. hirsuta*, Hochst. ex A. Rich. l.c. (name only). *A. zambesica*, var. *brevistyla*, Beille in Bull. Soc. Bot. France, 1908, Mém. viii. 81. *Ricinocarpus villicaulis*, O. Kuntze, Rev. Gen. Pl. ii. 618.

North Central. Shari Region: Golo, near Ndelli, *Chevalier*, 7742!

Nile Land. Gallabat: on the bank of the Gendua, *Schweinfurth*, 860! Abyssinia: Ferrfera, *Schimper*, 737! 781! and without precise locality, *Schimper*, 684! *Quartin Dillon & Petit*, 90! *Steudner*, 570! Upper Nile, *Freeman & Lucas*, 84! Uganda: Elgon District, *Evan-James!* Sibu, Nandi country, *Evan-James!* British East Africa: Ukamba, *Scott-Elliot*, 6441!

Mozamb. Distr. German East Africa: Karagwe, *Speke & Grant*, 379! between Meru and Kilimanjaro, *Volkens*, 1615! Kilimanjaro, *Smith!* Uluguru, *Goetze*, 344! Nyasaland: Namasi, *Cameron*, 1!

17. **A. manniana,** *Müll. Arg. in Flora*, 1864, 441. Stems herbaceous, about 6 ft. high; branches angular and subtomentose when young, at length terete and nearly glabrous. Leaves ovate or ovate-lanceolate, gradually and acutely acuminate, rounded, cordate or truncate at the base, 1½–4 in. long, 1–2½ in. broad, rather coarsely crenate-serrate, membranous, sparingly setose on both surfaces, digitately 5–7-nerved at the base, remaining lateral nerves 5–6 on each side, raised on both surfaces; petiole 1½–3 in. long, slender, densely pubescent; stipules subulate-filiform, 2–3 lin. long, very sparingly setulose. Flowers monœcious. Male spikes axillary, solitary, 2–3 in. long; axis tomentellous. Buds puberulous. Female spikes terminal, solitary, pedunculate; peduncle ½–1¼ in. long, tomentose; flowering part 1½–1¾ in. long, nearly ¾ in. in diam. Female bracts 4 lin. long, nearly ¾ in. broad when spread out, laciniate with about 20 unequal more or less filiform densely ciliate teeth, very sparingly pilose on both sides. Sepals 3, ovate, very small, ciliate. Ovary rather densely pilose, especially in the upper part; styles 3 lin. long, filiform, glabrous,

laciniate, segments filiform. Seeds ellipsoid, smooth, 1 lin. long, ¾ lin. in diam.—Müll. Arg. in DC. Prodr. xv. ii. 834. *Ricinocarpus mannianus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Upper Guinea. Cameroons: Cameroon Mountain, at 3000 ft., *Mann*, 1270! Yaunde, *Zenker*, 546! Buea, *Preuss*, 614!

18. **A. nyasica,** *Hutchinson.* Stems ascending or spreading, woody towards the base, shortly pubescent; branches mostly slender, pubescent. Leaves ovate-lanceolate, obtuse, rounded at the base, ¾–2 in. long, ½–¾ in. broad, somewhat closely crenate-serrate, rigidly membranous, adpressed-pubescent on both surfaces, becoming nearly glabrous above with age, 5-nerved at the base, remaining lateral nerves 6–7 on each side, raised on both surfaces; petiole about ½ in. long, pubescent; stipules subulate, about 1½ lin. long, nearly glabrous. Flowers monœcious. Male spikes axillary, solitary; peduncle up to 1½ in. long, slender, sparingly pubescent. Buds glabrous. Female spikes terminal, solitary, subsessile, 1–2½ in. long, about ⅓ in. in diam. Female bracts subreniform in outline when spread out, 3½ lin. long, 4 lin. broad including the teeth, deeply 16–20-toothed, membranous, nearly glabrous except on the teeth; teeth subulate, 1 lin. long, the middle one much longer, pilose with whitish hairs, not glandular. Sepals 3, ovate, small, very sparingly ciliate. Ovary deeply trilobed, thinly pilose at the top, not glandular; styles filiform, undivided, 1½–2½ lin. long, free to the base, glabrous. Capsule deeply trilobed, slightly pubescent at the top. Seeds ellipsoid, about 1 lin. long, smooth, with a large membranous closely adpressed caruncle.

Mozamb. Distr. Portuguese East Africa: Likoma Islands, in Lake Nyasa, *Johnson!* British Central Africa: Nyasaland; Nymkowa, 6500 ft., *McClounie*, 25! near Nsessi River, *Scott!*

19. **A. polymorpha,** *Müll. Arg. in Journ. Bot.* 1864, 335, *partly.* Stems short, about 6 in. long, arising from a woody rhizome, pubescent. Leaves subsessile, lanceolate-elliptic, obtuse, very slightly narrowed to the base, 1½–2 in. long, ¾ in. broad, serrate, rigidly coriaceous, setulose-pubescent, especially on the midrib and lateral nerves on both surfaces; lateral nerves 7–9 on each side, ascending, prominent on both surfaces; tertiary nerves rather faint, parallel; stipules linear, 3–3½ lin. long, pubescent. Flowers very probably monœcious, the male not seen. Female spikes shortly pedunculate, ¾—1 in. long. Bracts lobed to about the middle, pubescent or nearly glabrous outside, lobes subulate, not glandular. Sepals oblong-lanceolate, ciliate. Ovary pubescent, not glandular; styles very shortly laciniate. Seeds smooth and shining.—*A. polymorpha*, vars. *elliptica*, *sericea*, and *oblongifolia*, Müll. Arg. l.c., and in DC. Prodr. xv. ii. 835; Hiern in Cat. Afr. Pl. Welw. i. 977; De Wild. et Th. Durand in Bull. Herb. Boiss. 2me sér. i. 47; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 284. *Ricinocarpus polymorphus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Lower Guinea. Lower Congo: Kisantu, *Gillet;* Yindu, *Vanderyst.*

Angola: Huilla; near Lopollo, *Welwitsch*, 429! near Mumpulla, *Welwitsch*, 421! between Lopollo and Ferrao da Sola, *Welwitsch*, 428!

20. **A. crotonoides,** *Pax in Engl. Jahrb.* xix. 97. Habit of *A. polymorpha;* stems densely yellow-tomentose. Leaves subsessile, oblanceolate or oblong-oblanceolate, acute, about 1 in. long, nearly ½ in. broad, sharply serrate, rigidly coriaceous, yellow-villous on both surfaces; lateral nerves about 9 on each side, prominent on both surfaces; stipules linear-subulate, ¼ in. long, rather densely pubescent. Flowers monœcious, male and female on separate solitary inflorescences. Male inflorescence axillary, pedunculate, ¾ in. long; axis yellow-tomentose; bracts subspathulate, ciliate. Buds pilose. Female spikes terminal, conic, 1–1¼ in. long, about ½ in. in diam. Bracts ¼ in. long, rather irregularly 12-lobed to about the middle, glabrous inside, adpressed-pilose on the outside, lobes subulate, not glandular. Sepals 3, oblong, ciliate. Ovary deeply trilobed, densely pilose, not glandular; styles 3, laciniate, yellow. Capsule pubescent. Seeds somewhat rounded, truncate at the base, about 1½ lin. in diam., pale brown, smooth.

Lower Guinea. Angola: Huilla, *Antunes*, 115! 886!

South Central. Belgian Congo: Lunda; Kimbundo, *Pogge*, 114!

21. **A. fruticosa,** *Forsk. Fl. Ægypt.-Arab.* 161. A shrub; branches shortly crisped-pubescent when young, soon becoming quite glabrous and clothed with a light brown bark. Leaves ovate, shortly acuminate to a more or less sharply mucronate apex, abruptly cuneate or more rarely somewhat rounded at the base, very variable in size, up to 4 in. long and 3 in. broad, rather coarsely crenate, membranous, clothed with somewhat scattered conspicuous persistent golden-coloured glands on the lower surface, shortly pilose on both sides, at length glabrous or nearly so, digitately 3–5-nerved at the base, remaining lateral nerves 3–5 on each side of the midrib, subopposite, the lower with several branches on their lower side; tertiary nerves conspicuous in the larger and older leaves, parallel, 1–1½ lin. apart; petiole ¼–2 in. long, pubescent; stipules linear-lanceolate, about 2 lin. long, sparingly pubescent. Inflorescence bisexual, axillary, up to ½ in. long, consisting of 2 or 3 foliaceous unilateral bracts, each containing a solitary sessile female flower, and a very short terminal pedunculate male spike; bract subtending each male flower ovate, densely pubescent. Buds subquadrangular, pubescent. Female bract about ¼ in. long, dentate, teeth pilose, several-nerved, very shortly pubescent on the nerves outside, often with a few scattered glands, glabrous within. Sepals 3, ovate-lanceolate, ½ lin. long, pilose on both sides. Ovary slightly trilobed, with numerous golden glands in the depressions between the lobes, pilose; styles 3, free, terete at the base, much branched above, branches simple, filiform. Capsule trilobed, pilose. Seeds ellipsoid, quite smooth. —Müll. Arg. in DC. Prodr. xv. ii. 822; Kurz, For. Fl. ii. 397; Hook. f. Fl. Brit. Ind. v. 415; Pax in Engl. Pfl. Ost-Afr. C. 239, and in Engl. Jahrb. xxviii. 419; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 309;

Penzig in Atti Congr. Bot. Genova, 1892, 359. *A. betulina*, Retz. Obs. v. 30; Vahl, Symb. i. 77; Willd. Sp. Pl. iv. 522; A. Rich. Tent. Fl. Abyss. ii. 249; Schweinf. Beitr. Fl. Aethiop. 33. *Ricinocarpus fruticosus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Nile Land. Eritrea; various localities, *Schweinfurth & Riva*, 349, 350, 6101! 1616; *Hildebrandt*, 686! Abyssinia: various localities, *Schimper*, 398! 1026! 1588! *Ehrenberg! Petit!* Galla Country, *Ellenbeck*, 338! Somaliland: various localities, *Ellenbeck*, 338! 1050! 1099B! 2282; *Robecchi-Brichetti*, 581! 649! *Mrs. Lort-Phillips! Revoil!* Sudan: Bahr el Jebel, *Broun*, 506! Uganda: Unyoro; Kibero, *Bagshawe*, 901! British East Africa: various localities *Battiscombe*, 256! *Hildebrandt*, 2701! 2574! *Kässner*, 297! *Scott-Elliot*, 6113! *Scheffler*, 27!

Mozamb. Distr. Zanzibar, *Hildebrandt*, 702! 1168! German East Africa: various localities, *Volkens*, 57! 181! *Stuhlmann*, 415! 680! 702! 8662! 8679! 8689! *Holst*, 2058! *Heinsen*, 110! *Goetze*, 115! *Braun*, 1677! *Engler*, 331! *Merker*, 571!

South Central. Belgian Congo: outlet of the Semlike River, at Lake Albert Edward, *Mildbraed*, 1936!

Var. *villosa*, Pax MSS. Leaves more or less villous.

Mozamb. Distr. Zanzibar, *Lyne*, 54! German East Africa: Usambara; Maschena, *Holst*, 3569! Dar-es-Salaam district; Usaramo, *Stuhlmann*, 8954.

22. **A. ceraceopunctata,** *Pax in Engl. Jahrb.* xlv. 238. A herb or undershrub 3–4½ ft. high; branchlets subterete, slightly pubescent. Leaves ovate or rhomboid-ovate, shortly and gradually acuminate, cuneate at the base, 2½–3½ in. long, 1–2 in. broad, rather obtusely serrate, membranous, yellowish-green when dry, dotted with numerous yellow glands on the lower surface, otherwise glabrous except the crisped-puberulous midrib; lateral nerves 4–5 on each side, prominent below; tertiary nerves very slender, subparallel; petiole ½–1½ in. long, sparingly crisped-pubescent; stipules subulate, soon falling off. Inflorescence bisexual, axillary, very slender, 1½–3 lin. long, several foliaceous 2-flowered female bracts towards the base, the upper half male and subspicate. Male buds sparingly puberulous. Female bracts foliaceous, 2-flowered, about ¼ in. long when in fruit, ½ in. broad, serrate, sparingly gland-dotted outside, otherwise glabrous. Sepals 3, unequal, the largest sometimes bifid, very sparingly ciliolate at the apex, otherwise glabrous. Ovary ovoid, glabrous; styles stout, much laciniated. Fruits hidden by the enlarged female bracts, deeply trilobed, about ¼ in. in diam., dotted with yellow peltate glands. Seeds 1½ lin. in diam., smooth.

Upper Guinea. Northern Nigeria: Katagum district, *Dalziel*, 209! Yola, *Dalziel*, 151! Cameroons: Buba, *Ledermann*, 4079! Niokodi, *Ledermann*, 4232! near Ngesik, *Ledermann*, 4283!

23. **A. pubiflora,** *Baill. Adansonia*, i. 268. A woody shrub 4–5 ft. high; branches twiggy, glabrous or very nearly so, somewhat angular when young. Leaves obliquely lanceolate, gradually acuminate and slightly mucronate, rounded or slightly cordate at the base, 1½–5 in. long, ¾–1½ in. broad, crenate, membranous, glabrous on both surfaces

except on the nerves when quite young, rather densely glandular below when young, at length sparingly so; lateral nerves 5–7 on each side, looped and branched near the margin, very slightly raised on both surfaces; veins distinct but scarcely raised below; petiole ½–1¼ in. long, subterete, glabrous; stipules deciduous, subulate-lanceolate, 1½ lin. long, glabrous. Inflorescence bisexual, pedunculate, axillary, consisting of one or two large foliaceous bracts towards the base, each containing two sessile female flowers, male portion terminal, subspicate, hardly ¼ in. long. Male buds pubescent. Female bracts broadly ovate, cordate at the base, about 1 in. long and broad when spread out, with several nerves radiating from the midrib, crenate-serrate, glabrous on both sides except for a few scattered golden glands on the outside. Calyx cupular, tridentate, membranous, slightly ciliate. Ovary slightly trilobed, pubescent and rather densely clothed with sessile yellow glands; styles connate at the base, laciniate, about 1½ lin. long. Fruits not seen.—Müll. Arg. in DC. Prodr. xv. ii. 866; Pax in Engl. Pfl. Ost-Afr. C. 239; S. Moore in Journ. Linn. Soc. xl. 200. *Calyptrospatha pubiflora*, Klotzsch in Peters, Reise Mossamb. Bot. 97, t. 18.

Mozamb. Distr. Portuguese East Africa: Inhambane, *Peters!* and without precise locality, *Kirk!* Gazaland: Lower Buzi River, at Boka, *Swynnerton*, **736! 737!**

Occurs also (according to Baillon) in Madagascar.

24. **A. boiviniana,** *Baill. Adansonia*, i. 272. Branchlets villous-pubescent. Leaves crowded, oblong-lanceolate, narrowly acuminate, cuneate at the base, 1½–2⅓ in. long, ⅔–¾ in. broad, serrate, puberulous above, pubescent beneath; petiole ⅔ in. long, pubescent; stipules linear, acute. Inflorescences crowded, slender, bisexual, 4 in. long, 5–12 females in the upper part, the males glomerate in the lower portion. Male buds puberulous. Female bracts small, scarcely longer than the ovary, 1–3-flowered, ovate-lanceolate, acuminate, entire, pubescent. Sepals lanceolate, acuminate. Ovary densely hirsute; styles very short, densely pectinate-laciniate.—Pax in Engl. Pfl. Ost-Afr. C. 239. *Ricinocarpus boivinianus*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Mozamb. Distr. Zanzibar, *Boivin.*

25. **A. acrogyna,** *Pax in Engl. Jahrb.* xliii. 323. A shrub up to 7 ft. high; branches covered with grey bark, glabrescent; lateral flowering branchlets very short, puberulous. Leaves crowded, obovate or elliptic-lanceolate, acutely acuminate, attenuated to and obtuse at the base, 1½–3 in. long, 1–1¾ in. broad, crenate-serrate, thinly chartaceous or membranous, glabrous except on the pubescent lateral nerves below; lateral nerves 5–6 on each side, distinctly looped and branched well within the margin, prominent on both surfaces, with tufts of hairs in their axils below; tertiary nerves very distant, freely anastomosing; petiole ¼–½ in. long, crisped-pubescent; stipules linear-subulate, keeled on the back, subcoriaceous, glabrous, 2 lin. long. Inflorescences bisexual, fasciculate at the ends of short lateral branches, 1½–4 in. long, male flowers numerous in the lower, females 2–4 in the upper part; axis slender, crisped-pubescent. Male buds sparingly puberulous. Female

bracts small, 1-flowered. Sepals 5, ovate-lanceolate, ciliate in the upper part. Ovary conspicuously echinate; styles 3, much laciniate, glabrous. Capsule echinate, about 2½ lin. in diam. Seeds rounded, smooth.—*Claoxylon sp.*, De Wild. & Th. Durand, Reliq. Dewevr. 209.

South Central. Belgian Congo: Fort Beni, *Mildbraed*, **2334! 2341! 2455!** forest of N'Kembo, *Dewèvre*, **441!**

26. **A. Engleri,** *Pax in Engl. Jahrb.* xxxiv. 372. A shrub about 6 ft. high; branches softly hirsute. Leaves elliptic or slightly rhomboid-elliptic, acutely acuminate, more or less cuneate at the base, 3–5½ in. long, 1¼–3¼ in. broad, dentate or subserrate, subentire towards the base, membranous, shortly pilose above, long-pilose with spreading hairs on the nerves beneath, 3-nerved at the base, remaining lateral nerves about 6 on each side, looped near the margin, prominent below; tertiary nerves parallel, about 2 lin. apart; petiole 1¼–2¾ in. long, rather densely pilose; stipules linear-subulate, pilose, 2 lin. long. Inflorescence bisexual, very slender, solitary, axillary towards the ends of the shoots, about 5 in. long, 10–15 female flowers in the upper part, the remaining lower part male; axis pubescent. Male buds sparingly and minutely puberulous. Female bracts 5-partite, rather small, segments linear-lanceolate, pilose outside, not glandular. Sepals 3, linear-lanceolate, acute, ciliate. Ovary densely clothed with tubercular-based hairs; styles 3, stout, much laciniated. Capsule not seen.

Mozamb. Distr. German East Africa: Tanga; between Muhesa and Lungusa, *Engler*, 357!

27. **A. dumetorum,** *Müll. Arg. in Journ. Bot.* 1864, 334, *partly.* An erect sparingly branched undershrub, 2–4 ft. high; branches virgate, leafy towards the apex, puberulous or nearly glabrous; young flowering branchlets whitish-tomentose. Leaves oblong-lanceolate, obtuse, slightly rounded at the base, 1–2½ in. long, ¼–¾ in. broad, finely crenate, rigidly coriaceous, dull on both surfaces, rather densely setulose above, pubescent below especially on the nerves and cross-nerves; lateral nerves 5–7 on each side, ascending and continued to the margin, not or only a little branched, prominent below; tertiary nerves parallel, rather close, raised below; petiole rather stout, 1 lin. long, whitish-tomentose; stipules linear-subulate, subterete, 2–4 lin. long, sparingly pubescent. Inflorescence axillary, solitary, the largest about 2 in. long, bisexual, the lower half consisting of small crowded shortly pedicelled male, the upper of densely arranged sessile female flowers. Male buds 4-lobed, very sparingly and shortly pubescent. Bracts of the female flowers obconic, nearly closed around the flower, about 2 lin. long, rather deeply and irregularly dentate or lobed with about 20 teeth or lobes, nerves distinct on the inside, tomentose outside. Sepals 4, broadly ovate, subacute, ½ lin. long, pilose in the upper half on the outside, glabrous within. Ovary rather deeply trilobed, shortly pubescent; styles 3, free to the base, suberect, laciniate on the inner face. Seeds smooth.—Müll. Arg. in DC. Prodr. xv. ii. 821; Hiern in Cat. Afr. Pl. Welw. i. 976. *Ricinocarpus dumetorum,* O. Kuntze, Rev. Gen. Pl. ii. 617.

Lower Guinea. Angola: Huilla, *Dekindt*, 693! 3090! Mounyino, *Dekindt*, 272! in dense craggy thickets between Nene and Lopollo, and near Mumpulla, *Welwitsch*, 432! outskirts of the forest at Monino, *Welwitsch*, 431! Humpata, *Fritzsche*, 122!

28. **A. brachystachya,** *Hornem. Hort. Hafn.* ii. 909. A flaccid herbaceous annual, 6–12 in. high; stem sulcate, pilose with long and short hairs when young, at length puberulous. Leaves ovate, very shortly and subacutely acuminate, cordate or rounded at the base, ¾–2 in. long, ½–1½ in. broad, shallowly crenate-serrate or serrate, membranous, sparingly pilose on both surfaces, 5–7-nerved at the base, remaining lateral nerves about 3 on each side, raised on both surfaces, more prominent below; transverse nerves very inconspicuous; petiole ½–1¾ in. long, rather slender, pubescent; stipules subulate-lanceolate, ½ lin. long, sparingly ciliate. Inflorescence bisexual, very short, axillary, solitary or geminate, 6–9 female flowers in the lower part, with the male flowers in a terminal short dense cluster; axis rather densely pubescent. Male buds puberulous. Female bracts tripartite; segments linear-oblong, subacute, 1½ lin. long, pubescent on both sides, margins rather sparingly stipitate-glandular. Sepals 3, lanceolate, ciliate, ¼ lin. long. Ovary setose; styles slender, laciniate, otherwise nearly glabrous. Seeds ⅓ lin. long, ovoid, very minutely pitted.—Willd. Enum. Pl. Hort. Berol. 992; Müll. Arg. in DC. Prodr. xv. ii. 870; Hook. f. Fl. Brit. Ind. v. 416; Trim. Fl. Ceyl. iv. 59; Watt, Dict. Econ. Prod. Ind. i. 61; Cooke, Fl. Bomb. ii. 611; Pax in Engl. Pfl. Ost-Afr. C. 239; Hiern in Cat. Afr. Pl. Welw. i. 978; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47, and Reliq. Dewevr. 210; De Wild. Miss. É. Laurent, 131; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 309; Th. & Hél. Durand, Syllog. Fl. Congol. 492. *A. conferta*, Roxb. Flor. Ind. iii. 677. *A. elegantula*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 246. *Ricinocarpus brachystachyus*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Upper Guinea. Cameroons: Batanga, Lobe village, *Bates*, 30! Jaunde, *Zenker & Staudt*, 512! Buea, *Lehmbach*, 190! *Preuss*, 1002! Mungo, *Buchholtz!*

Nile Land. Eritrea: Saati, *Schweinfurth*, 88. Abyssinia: Mezano valley, near Jeladjeranne, *Schimper*, 1708! Uganda: Ruwenzori, common amongst Bananas, *Scott-Elliot*, 7737! Kampala, *Scott-Elliot*, 7314! Entebbe, *Brown*, 326!

Lower Guinea. Lower Congo: Mussumba, *Pogge*, 125! Kisantu, *Gillett*. Angola: Pungo Andongo; in moist places neglected after cultivation, *Welwitsch*, 393!

South Central. Belgian Congo: Fort Beni, on the Semlike River, *Mildbraed*, 2366! Equateur district; Boera, *Dewèvre*. Bangala district; Nouvelle-Anvers, *Hens*.

Mozamb. Distr. German East Africa: Kilimanjaro, *Volkens*, 2312! Bukoba, *Stuhlmann*, 3858! British Central Africa: Nyasaland; Tanganyika Plateau, *Whyte!*

Occurs also in India, Ceylon, and Java.

29. **A. psilostachya,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 246. Suffruticose or herbaceous; stems hirsute or hirsute-tomentose when young. Leaves ovate or rhomboid-ovate, acutely caudate-acuminate, narrowly truncate, rounded or cordate at the base, 2–3½ in. long, 1¼–2 in.

broad, coarsely serrate, membranous, setose on both surfaces, digitately 5–7-nerved at the base, remaining lateral nerves 4–5 on each side, prominent on both surfaces; transverse nerves subparallel, slender; petiole 1–2 in. long, more or less pilose or hirsute; stipules subulate-filiform, 1½–2 lin. long, rather densely pilose. Inflorescence bisexual, axillary, solitary, 1–3 in. long, about 3–4 female flowers towards the base, the remaining portion male, slender. Male buds very minutely pubescent. Female bracts deeply digitately 5-lobed (rarely 7-lobed), including the lobes about 3 lin. long and 5 lin. broad, lobes linear-lanceolate, acute, submembranous, very sparingly ciliolate, setulose at the apex, otherwise nearly glabrous. Sepals 3, ovate, about ¼ lin. long, ciliate. Ovary densely hirsute; styles 3, slender, 3 lin. long, laciniate, rhachis nearly glabrous. Seeds subovoid, minutely mucronate, faintly pitted, 1 lin. long.—Müll. Arg. in DC. Prodr. xv. ii. 865; Pax in Engl. Hochgebirgsfl. Trop. Afr. 283, and in Engl. Pfl. Ost-Afr. C. 239; Oliv. in Trans. Linn. Soc. xxix. 147; Rendle in Journ. Linn. Soc. xxxviii. 278. *A. Johnstoni*, Pax in Engl. Hochgebirgsfl. Trop. Afr. 283, and in Engl. Pfl. Ost-Afr. C. 239. *Ricinocarpus psilostachyus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Nile Land. Abyssinia: between Enjedcap and Shoata, *Schimper*, 560! Gerra-Abuna, *Schimper*, 1548! Uganda: Ruwenzori, 7000 ft., *Wollaston! Scott-Elliot*, 7649! British East Africa: Lanjora, *Johnston!*

Mozamb. Distr. German East Africa: Karagwe, *Speke & Grant!* Kilimanjaro; Marangu, *Volkens*, 699! 762! 765! *Johnston!* Kinga (Livingstone) Range; Mount Kirunde, *Goetze*, 904! Lager, *Uhlig*, 456! Kissenge, *Mildbraed*, 1451! Kondeland; Lungwe, *Stolz*, 76A! British Central Africa: Nyasaland; near Mwata Manga Stream, 4000 ft., *Kirk!* Mount Chiradzulu, *Whyte!* Zomba, 4000–6000 ft., *Whyte! Purves*, 138! Mount Malosa, *Whyte!* Shire Highlands, *Scott-Elliot*, 8503! *Adamson*, 34! *Buchanan*, 746! 974!

South Central. Belgian Congo: Elisabethville, *Rogers*, 10053! Mount Senza, *Kässner*, 2917!

Var. *glandulosa*, Hutchinson. Bracts of the female flowers furnished with numerous stipitate glands.

Nile Land. Uganda: Ruwenzori; Kivata, *Scott-Elliot*, 7649!

Mozamb. Distr. German East Africa: Usambara; Kwai, *Albers*, 114! Kafuro, *Stuhlmann*, 1719! north of Lake Nyasa, *Thomson!* British Central Africa: Nyasaland; Nyika Mountains, *Whyte!* Songue and Karonga, *Whyte!* between Kondowe and Karonga, *Whyte!* Fort Hill, *Whyte!* Milanji, *Mahon!* Masuku Plateau, *Whyte!*

30. **A. hochstetteriana,** *Müll. Arg. in Linnæa*, xxxiv. 39. An annual herb up to 2 ft. high, sparingly branched from the base; stem and branches shallowly sulcate, sparingly puberulous, with a few setose hairs sprinkled here and there. Leaves lanceolate or elliptic, slightly subacutely acuminate, somewhat narrowed to the base, ¾–3 in. long, ⅓–1½ in. broad, crenulate, membranous, sparingly setose on the margin, otherwise glabrescent on both surfaces, rather closely pellucid-dotted, digitately 3–5-nerved at the base, remaining lateral nerves about 3 on each side; petiole ½–1 in. long, very sparingly pubescent; stipules

lanceolate-subulate, ¾ lin. long, rather sparingly ciliate. Flowers monœcious. Male spikes shortly pedunculate, solitary in each leaf-axil together with a solitary sessile female flower; male peduncle nearly 2 lin. long, pubescent; flowering part about 1 lin. long. Male buds glabrous. Sepals 4. Bract of the female flower very small, almost saucer-shaped, subentire, sparingly setose on the margin. Sepals 3, lanceolate, ciliate. Ovary warted; styles short, laciniate. Seeds broadly ovoid, glaucous, sparingly warted, 1½ lin. long.—Müll. Arg. in DC. Prodr. xv. ii. 864. *Mercurialis alternifolia*, Hochst. ex Baill. Étude Gén. Euphorb. 490, sub sect. B, not of Lam. *Ricinocarpus alternifolius*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Nile Land. Cordofan; in spongy muddy places on Arashkol Mountain, *Kotschy*, 156! Ethiopia, *Kotschy*, 26!

31. **A. ciliata,** *Forsk. Fl. Ægypt.-Arab.* 162. An erect sparingly branched annual about 2½ ft. high; stem shortly pubescent with recurved hairs, sulcate. Leaves ovate-elliptic or rhomboid-ovate, caudate-acuminate, rounded or subcuneate at the base, 1½–4½ in. long, ¾–2 in. broad, crenate-serrate, membranous, very slightly scabrous on both surfaces, digitately 5-nerved at the base, remaining lateral nerves 4–5 on each side, slightly raised on both surfaces; tertiary nerves subparallel, rather distant, very slender; petiole 1–3½ in. long, sulcate, usually slightly pubescent when young, at length glabrous; stipules filiform, about 1¼ lin. long, slightly pubescent. Inflorescence bisexual, axillary, solitary or geminate, ¾–1 in. long, about 10 female flowers in the lower part, the upper part male and spicate; axis puberulous. Male buds slightly puberulous. Female bracts suborbicular, 2 lin. long, 3 lin. broad (when spread out), about 20-laciniate-toothed, and as many ribs on the outside, the teeth shortly ciliate, otherwise glabrous. Sepals 3, ovate-lanceolate, very small, membranous, ciliate. Ovary trilobed, small, sparingly pubescent in the upper part; styles 3, slender, laciniate. Seeds ovoid, very minutely pitted, ¾ lin. long.—Vahl, Symb. i. 77, t. 20; Willd. Sp. Pl. iv. 522; Benth. in Hook. Niger Flora, 504; Baill. Adansonia, i. 72; Müll. Arg. in Linnæa, xxxiv. 44, and in DC. Prodr. xv. ii. 873 (incl. vars. *genuina* and *trichophora*, Müll. Arg.); Wight & Arn. in Ann. Nat. Hist. ii. (1839) 111, t. 5; Dalz. & Gibs. Bomb. Fl. 228; Hook. f. Fl. Brit. Ind. v. 417; Pax in Engl. Pfl. Ost-Afr. C. 239; Pax in Baum, Kunene-Samb. Exped. 283; Watt, Dict. Econ. Prod. Ind. i. 62; Cooke, Fl. Bomb. ii. 611; N. E. Br. in Kew Bulletin, 1909, 141. *A. fimbriata*, Schum. & Thonn. Beskr. Guin. Pl. 409; A. Rich. Tent. Fl. Abyss. ii. 245; Baill. Adansonia, i. 272. *A. vahliana*, Müll. Arg. in Linnæa, xxxiv. 43, and in DC. Prodr. xv. ii. 873; Oliv. in Trans. Linn. Soc. xxix. 147, t. 96; Pax in Engl. Pfl. Ost-Afr. C. 239; Hiern in Cat. Afr. Pl. Welw. i. 978; De Wild. & Durand, Contr. Fl. Congo, i. 51, ii. 57, and Reliq. Dewevr. 211; De Wild. Miss. É. Laurent, 131, and Études Fl. Bas- et Moyen-Congo, ii. 284. *Ricinocarpus ciliatus* and *R. vahlianus*, O. Kuntze, Rev. Gen. Pl. ii. 617–8.

Upper Guinea. Senegambia, *Schumacher & Thonning! Roger*, 54!

Heudelot! Leprieur! Togo: near Lome, *Warnecke*, 368! Gold Coast: Aburi, *Brown*, 414! and without precise locality, *Farmar*, 466! Northern Nigeria: Nupe, *Barter*, 1047! Zungeru, *Dalziel*, 100! Yola, *Dalziel*, 153! Mount Patteh, *Vogel*, 181! Lagos, *Dawodu*, 255! *Millen*, 58! *MacGregor*, 255! Cameroons: Rio del Rey, *Johnston!* Duli, *Ledermann*, 4442. Limbameni, *Ledermann*, 4322! Tsero, *Ledermann*, 4806!

North Central. French Congo: Central Shari; Iro district, *Chevalier*, 8878! Fort Archambault, *Chevalier*, 10541!

Nile Land. Eritrea: Ainsaba, *Steudner*, 516! Togodele, *Ehrenberg!* Ethiopia, *Kotschy*, 25! Kordofan, *Kotschy*, 91B! Om Loubi, *Pfund*, 482! Helba, *Cienkowsky*; Gallabat, *Schweinfurth*, 859! Abyssinia: Anzeba River, *Hildebrandt*, 607! Hamedo, *Schimper*, 87! Adowa, *Schimper*, 647! Tacazze River, *Schimper*, 1661! and without precise locality, *Schimper*, 443! Niamniam: Nabambisso, *Schweinfurth*, 3795! Uganda: Busoga, *Brown*, 370!

Lower Guinea. Island of St. Thomas, *Quintas*, 71A! Loango: near Chinchoxo, *Soyaux*, 209! San Salvador, *Büttner*, 269! Lower Congo: *Dewèvre*; Sona-Gongo, *Luja*. Angola: between Kutue and Sobi, *Baum*, 762! Pungo-Andongo, *Welwitsch*, 418! Golungo Alto, *Welwitsch*, 419! German South-West Africa: Otjituo, *Dinter*, 871!

South Central. Belgian Congo: various localities, *Gillet*, *Vanderyst*, *Laurent*.

Mozamb. Distr. German East Africa: near Tabora, *Speke & Grant!* Portuguese East Africa: Sena, *Kirk!* between Lupata and Tete, *Kirk!* Nyasaland: Zomba, *Purves*, 112! *Whyte!* Ngamiland: Kwebe, *Lugard*, 154! 184A! Rhodesia! Salisbury, *Rand*, 1388! Chirinda, *Swynnerton*, 734!

Occurs also in the Cape Verde Islands, Arabia, and India.

32. **A. glomerata,** *Hutchinson in Kew Bulletin*, 1911, 229. A slender erect branched herb; stem often woody towards the base, subterete, sulcate, crisped-pubescent with short hairs and often with numerous gland-tipped hairs intermixed. Leaves ovate-elliptic or rhomboid-elliptic, obtuse or subacute, cuneate at the base, 1–2½ in. long, ¼–1½ in. broad, crenate, membranous, setulose-pubescent on both surfaces, 5-nerved at the base, remaining lateral nerves 3–4 on each side, prominent on both surfaces; tertiary nerves rather lax, more or less parallel, distinct below; petiole as long as or longer than the leaves, pubescent; stipules subulate, small, pilose. Flowers monœcious, arranged as in *A. crenata*, but more crowded and mostly gathered in clusters at the ends of the branches. Female bracts crowded, foliaceous, suborbicular or almost reniform, about 1½ lin. long and 2 lin. broad, 8–10-toothed, teeth triangular, with several long gland-tipped hairs on the inner side of their margin, and sometimes on the outside, with as many nerves as teeth, pubescent outside, nearly glabrous within. Sepals 3, ovate-lanceolate, acute, ciliate. Ovary trilobed, setose-pubescent in the upper two-thirds with gland-tipped hairs intermixed; styles very slender, rather short, divided almost to the base. Seeds ovoid-ellipsoid, minutely pitted, scarcely ¾ lin. long.—*A. crenata*, var. *glandulosa*, Müll. Arg. in Linnæa, xxxiv. 43, and in DC. Prodr. xv. ii. 871. *A. fimbriata*, Baill. Adansonia, i. 272, partly, not of Schumacher or Hochst. (ex Müller).

Nile Land. Bongo: Addai, *Schweinfurth*, 2522! Gir, *Schweinfurth*, 2609!

Uganda: Muka, *Kässner*, 929! Galunka, *Kässner*, 791! and without precise locality, *Stuhlmann*, 1251! 1258!

Mozamb. Distr. Zanzibar, *Hildebrandt*, 1038 partly! *Schlechter!* *Stuhlmann*, 421! 423! German East Africa: Usaramo, *Stuhlmann*, 6599! 7005! 8674! Mrogoro, *Stuhlmann*, 8285! Marangu, *Volkens*, 2316! Dar-es-Salaam, *Stuhlmann*, 7007! 7410! 7415! 7824! 7562! Tanga, *Holst*, 2022! *Volkens*, 166! Amboni, *Holst*, 2746! Portuguese East Africa: Mozambique, *Kuntze!*

33. **A. crenata,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 246. An annual up to 1½ ft. high; stem erect, simple or rarely sparingly branched from the base, rather thick and fleshy, channelled or more or less compressed, rather minutely crisped-pubescent. Leaves ovate or elliptic-ovate, obtuse or subacute, more or less rounded or obtuse at the base, never cuneate, ¾–2 in. long, ½–1¼ in. broad, crenate, membranous, glabrous on both surfaces or slightly pubescent on the midrib and lateral nerves below, 5-nerved from the base, remaining lateral nerves 3-4 on each side, prominent below; tertiary nerves subparallel, lax, distinct on the lower surface; petiole as long as or usually longer than the leaves, sulcate, pubescent; stipules very small, subulate, pubescent. Inflorescence bisexual, several female flowers crowded in the lower part, the males very few and above the females, the axis of each inflorescence terminated by 1–5 globose densely muricate abortive female flowers. Female bracts suborbicular, about 4 lin. in diam. when spread out, with several triangular teeth, conspicuously ciliate, otherwise quite glabrous, nerves as many as the teeth, not conspicuous. Sepals 3, oblong-ovate, ciliate. Ovary pilose with tubercle-based hairs; styles 3, slender, laciniate. Seeds ovoid, ¾ lin. long, minutely and closely pitted. —Müll. Arg. in Linnæa, xxxiv. 42, and in DC. Prodr. xv. ii. 871 (excl. var. *glandulosa*); Pax in Engl. Pfl. Ost-Afr. C. 239; Schweinf. Beitr. Fl. Aethiop. 34. *A. abortiva*, Hochst. ex Baill. Étude Gén. Euphorb. 443. *A. vahliana*, Oliv. in Trans. Linn. Soc. xxix. 147, partly, not of Müll. Arg. *Ricinocarpus crenatus*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Upper Guinea. Nigeria: confluence of the Niger and Benue Rivers, *Barter!* Stirling Hill, *Ansell!* Cameroons: Garua, *Ledermann*, 4953!

Nile Land. Abyssinia: Hamedo, *Schimper*, 192! Gageros, *Schimper*, 137! in fields near Gatta, *Schimper*, 1200! and without precise locality, *Schimper*, 491! Galabat: Matamma, *Schweinfurth*, 858! Kordofan, *Kotschy*, 24! 91A! *Pfund*, 190! 483! Somaliland: Juba Province, *Ellenbeck*, 2314! Uganda: Unyoro, *Speke & Grant*, 545! Busoga, *Brown*, 276!

34. **A. indica,** *Linn. Sp. Pl. ed.* i. 1003. An annual up to 3 ft. high; stem simple or sparingly branched, herbaceous, sometimes woody at the base, shortly crisped-pubescent, sulcate or angular. Leaves rhomboid-ovate, ovate-oblong or ovate-lanceolate, acute or subacute, cuneate or cuneate-truncate at the base, ¾–2½ in. long, ½–1½ in. broad, serrate, membranous, glabrous on both surfaces, except on the midrib and lateral nerves, digitately 5-nerved at the base, remaining lateral nerves about 4 on each side, raised and slightly pubescent on both surfaces; tertiary nerves very distant and subparallel, somewhat indistinct; petiole as long as or usually longer than the leaf-blade

¾–3 in. long, rather sparingly crisped-pubescent; stipules subulate or subulate-filiform, pilose, 1 lin. long. Inflorescence axillary, bisexual, solitary or geminate, ¾–2½ in. long, with 1–7 rather distantly arranged females in the lower part, the males very few and terminal, remote from the female; axis slightly pubescent and terminated by an obovoid pubescent abortive female flower. Female bracts 1–2-flowered, suborbicular, 1½–3 lin. long, 2½–4 lin. broad (when spread out), 10–12-triangular-dentate, sparingly setulose-pubescent on the nerves outside and on the teeth, otherwise glabrous. Sepals 3, ovate-triangular, sparingly ciliate. Ovary deeply trilobed, pilose with tubercle-based hairs; styles short, laciniate. Seeds ovoid, ½–¾ lin. long, very closely and minutely pitted.—Willd. Sp. Pl. iv. 523; Bl. Bijdr. 628; Roxb. Fl. Ind. iii. 675; Wight, Icon. t. 877; Müll. Arg. in DC. Prodr. xv. ii. 868; Hook. f. Fl. Brit. Ind. v. 416; Penzig in Atti Congr. Bot. Genova, 1892, 359; Pax in Engl. Pfl. Ost-Afr. C. 239, and in Baum, Kunene-Samb. Exped. 283; Hiern in Cat. Afr. Pl. Welw. i. 978; Watt, Dict. Econ. Prod. Ind. i. 62; Cooke, Fl. Bomb. ii. 610; Durand & De Wild. Mat. Fl. Congo, ii. 61; De Wild. & Durand, Reliq. Dewevr. 210; N. E. Br. in Kew Bulletin, 1909, 141; Th. & Hél. Durand, Syll. Fl. Congol. 492. *A. spicata*, Forsk. Fl. Ægypt.-Arab. 161. *A. somalium*, Müll. Arg. in Abhandl. naturw. Ver. Bremen, vii. 27. *A. somalensis*, Pax in Engl. Jahrb. xix. 100. *Ricinocarpus indicus*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Nile Land. Eritrea: Bogos, *Steudner*, 532! Dalac and Eilet, *Ehrenberg!* Somaliland: Maid, *Hildebrandt*, 1455! 1518! between Dagage and Gobeli, *Ellenbeck*, 1011! between Maju and Aroris, *Ellenbeck*, 1074A! Guelidi, *Revoil!* and without precise locality, *Drake-Brockman*, 393! 394! *Miss E. Cole!* Sudan, *Broun*, 1740! British East Africa: Kibwezi River, *Kässner*, 685!

Lower Guinea. Angola: Loanda; slopes of Praia de Bispo, *Welwitsch*, 417! Bumbo; at the base of Serra da Xella, in neglected fields after cultivation, *Welwitsch*, 427! between Umpupe and Palmfontein, *Baum*, 26! Amboland: Oshundo, *Schinz*, 731!

South Central. Belgian Congo: Kasai; Lusambo, *Laurent*.

Mozamb. Distr. German East Africa: between the Njaraso and Matron Lakes, *Merker*, 374! Usambara; Kwai, *Eick*, 151! Mashena, *Holst*, 8785! Ngamiland: Kwebe Hills, *Mrs. Lugard*, 184!

Occurs also, mostly as a weed, in Madagascar, Arabia, India, Ceylon, and the Philippines.

Var. *bailloniana*, Hutchinson. Female bracts large and pubescent between the nerves, ½ in. long and over ¾ in. broad when spread out.—*A. bailloniana*, Müll. Arg. in Linnæa, xxxiv. 44, and in DC. Prodr. xv. ii. 869; Pax in Engl. Pfl. Ost-Afr. C. 239.

Mozamb. Distr. Zanzibar, *Hildebrandt*, 1195! *Last! Stuhlmann*, 561! *Schmidt*, 40! *Boivin*. German East Africa: Pangani, *Stuhlmann*, 346!

35. **A. segetalis,** *Müll. Arg. in Journ. Bot.* 1864, 336. A small spreading annual, 6–12 in. high, branched from the base; stem and branches more or less deeply channelled. Leaves ovate, obtuse or subacute, more or less rounded at the base, ½–1½ in. long, ⅓–1 in. broad, crenate, membranous, shortly ciliate, very sparingly setulose on the midrib and lateral nerves, 5-nerved at the base, 3 of the nerves suberect, remaining ones about 3 on each side, slightly raised on both

surfaces; petiole $\frac{1}{3}$–$1\frac{1}{2}$ in. long, slender, crisped-puberulous; stipules subulate, caducous. Inflorescences bisexual, usually solitary in each leaf-axil, very short, about $\frac{3}{4}$ in. long; 2–4 distantly arranged females in the lower part, the males very few and terminal, remote from the female, with a terminal abortive female as in *A. indica*. Female bracts 2-flowered, foliaceous, ovate, acuminate, subcordate at the base, 5–6 lin. long, about 8 lin. broad when spread out, crenate, about 10-nerved, sparingly setulose on the nerves and margin, sometimes with a few gland-tipped hairs intermixed. Sepals 3, ovate, $\frac{1}{3}$ lin. long, sparingly ciliate. Ovary rather deeply trilobed, sparingly clothed with tubercle-based hairs; styles 3, rather short, laciniate, otherwise glabrous. Seeds ovoid, $\frac{3}{4}$ lin. long, minutely and closely pitted.—Müll. Arg. in DC. Prodr. xv. ii. 877; Hiern in Cat. Afr. Pl. Welw. i. 979. *A. sessilis*, vars. *brevibracteata* and *exserta*, Müll. Arg. in Flora, 1864, 465, not of Poir. *A. gemina*, vars. *brevibracteata* and *exserta*, Müll. Arg. in DC. Prodr. xv. ii. 866. *A. sessilis*, De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 47; De Wild. Miss. É. Laurent, 131, and Études Fl. Bas- et Moyen-Congo, ii. 284; not of Poir. *Ricinocarpus segetalis*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Upper Guinea. Togo: Misahohe, *Baumann*, **227**! Dahomey, *Testu*, **95**! Lagos, *Millen*, **37**! *Rowland!* Northern Nigeria: Nupe, *Barter*, **1490**! **1495**! Lokoja, *Dalziel*, **163**! Cameroons: Batanga, common in cassava fields and on the roadsides, *Bates*, **40**! Yaunde, *Zenker & Staudt*, **511**! Akwa, *Dinklage*, **150**! Kribi, *Ledermann*, **499**! Kinada, *Ledermann*, **4684**! Garua, on the Benue, *Ledermann*, **4859**! Dume, *Ledermann*, **4272**!

Lower Guinea. French Congo: Brazzaville, *Thollon*, **420**! Lower Congo: *Burton!* San Salvador, *Büttner*, **270**! Angola: Golungo Alto; in fields and by the River Cuango, near Sange, *Welwitsch*, **389**! **440**! near Camilungo, *Welwitsch*, **416**! Ambaca; near Ambaca, *Welwitsch*, **416B**! Malange district, *Gossweiler*, **998**! Huilla; Mounyino, *Dekindt*, **286**! **287**! and without precise locality, *Antunes*, **230A**! German South-West Africa: Tusfelsbach, *Dinter*, **115**! Okahandja, *Dinter*, **451**! Windhoek, *Dinter*, **328**!

Mozamb. Distr. Ngamiland: Kwebe Hills, *Mrs. Lugard*, **137**! Rhodesia: Victoria Falls, *Rogers*, **5386A**!

Occurs also in Eastern South Africa.

36. **A. Stuhlmanni,** *Pax in Engl. Jahrb.* xix. 99. Stems arising from a woody many-headed rhizome, slender, pubescent or nearly glabrous. Leaves subsessile, variable in shape and size, oblong or linear-oblong, obtuse or subacute, mostly rounded or very obtuse at the base, 1–4 in. long, $\frac{1}{2}$–1 in. broad, crenate-serrate, rigidly subchartaceous, at first thinly pubescent on both surfaces, at length becoming glabrous or nearly so; lateral nerves 3–5 on each side, ascending, prominent below; stipules subulate, about $1\frac{1}{2}$ lin. long. Flowers normally monœcious. Inflorescence axillary, bisexual or rarely subunisexual, up to $2\frac{1}{2}$ in. long, 1 to few females at the base, the remainder consisting of a slender male spike, sometimes the short lateral shoots towards the apex of each stem entirely (?) female; male portion of each inflorescence very slender, pedunculate; axis very shortly pubescent. Buds sparingly puberulous. Female bracts deeply laciniate, about 2 lin. long; segments about 10,

linear or subulate, very acute, the middle one longer than the rest, long-pilose or almost villous, not glandular. Sepals 3, linear-lanceolate, about $\frac{1}{2}$ lin. long, ciliate towards the apex. Ovary tomentose, not glandular; styles free, multilaciniate, about 2 lin. long, pubescent on the back. Seeds ovoid-ellipsoid, $1\frac{1}{3}$ lin. long, glabrous.

Nile Land. Uganda: Elgon district, *Evan-James!* Kavironda, *Scott-Elliot*, 7028! Namasi, *Cameron*, 11!

Mozamb. Distr. German East Africa: Karagwe, 4000–5000 ft., *Scott-Elliot*, 8160! Ukome, Lake Victoria, *Stuhlmann*, 885! Usumbara, *Keil*, 156! British Central Africa: Nyasaland; Mount Malosa and Mount Zomba, *Whyte!* Shire Highlands, *Whyte! Scott-Elliot*, 8465! 8466! and without precise locality, *Buchanan*, 321! 826! 1365!

37. **A. ambigua,** *Pax in Engl. Jahrb.* xix. 96. A herb 5–9 in. high; rhizome thick and woody, many-headed; stem tufted, erect, sparingly branched, subtomentose when young. Leaves linear, acute, slightly narrowed to the base, 1–$2\frac{1}{2}$ in. long, 2–3 lin. broad, coriaceous, serrulate, setose on both surfaces; lateral nerves ascending, 5–6 on each side, very prominent on the lower surface; tertiary nerves subparallel, distinct below; petiole short, scarcely 1 lin. long, setose-pubescent; stipules subulate, $1\frac{1}{2}$ lin. long, pubescent. Flowers monœcious. Inflorescence bisexual, axillary, up to $1\frac{1}{4}$ in. long; female flower sessile and solitary or geminate at the base, the remainder male. Male buds shortly pubescent. Female bracts similar to those of *A. angustissima*, Pax, but adpressed-pilose on the outer side. Sepals 4, lanceolate, acute, ciliate. Ovary setulose-pubescent; styles laciniate. Seeds ellipsoid, about $1\frac{1}{2}$ lin. long, smooth.—*A. polymorpha*, vars. *depauperata* and *angustifolia*, Müll. Arg. in Journ. Bot. 1864, 335, and in DC. Prodr. xv. ii. 836; Hiern in Cat. Afr. Pl. Welw. i. 978. *A. dumetorum*, Pax in Baum, Kunene-Samb. Exped. 283, not of Müll. Arg.

Lower Guinea. Angola: Huilla; *Dekindt*, 835! about Lopollo, *Welwitsch*, 424! between Mumpulla and Humpata, *Welwitsch*, 422; between Mumpulla and Nene, *Welwitsch*, 423! Benguella; Mount Elende, *Wellman*, 1172! 1271! Malange, *Teuscz*, 405! Goudkopje, on the River Chitanda, *Baum*, 171!

38. **A. eriophylla,** *Hutchinson in Kew Bulletin*, 1911, 185. Stems arising from a woody rhizome, erect, simple, up to 8 in. high, deeply channelled or sulcate, villous with weak spreading whitish hairs. Leaves crowded towards the apex of each shoot, more or less overlapping, subsessile, ovate or ovate-elliptic, shortly caudate-acuminate, rounded or (in a young state) slightly cuneate at the base, $\frac{1}{2}$–1 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, rather sharply serrate or almost dentate, chartaceous, densely villous with long white hairs on both surfaces; lateral nerves prominent on both surfaces but nearly hidden by the indumentum; stipules conspicuous, trilobed or tripartite, $2\frac{1}{2}$–4 lin. long, subcoriaceous, glabrous inside, pilose outside, segments linear-lanceolate, subacute or obtuse. Inflorescence bisexual, in the axils of fallen leaves; female flower solitary, inserted on and at the base of the axis bearing the male flowers. Male portion pedunculate, about 1 in. long; peduncle

¾–1½ in. long, pilose. Bract subtending each cluster of male flowers oblong-linear, 1½ lin. long, ciliate. Male buds red, very sparingly pubescent at the apex. Female bract almost hidden within the stipule, irregularly lobed to about the middle, sparingly pilose outside, glabrous within; lobes subulate, pilose, with no gland-tipped hairs. Sepals 3, oblong-lanceolate, ciliate. Ovary densely hirsute with whitish hairs, not glandular; styles slender, 2 lin. long, shortly laciniate. Capsule and seeds not seen.—*A. peduncularis*, var., Pax in Baum, Kunene-Samb. Exped. 283, not of Meisn.

Lower Guinea. Angola: by the River Kubango, above Massaca, *Baum*, 270A!

A very remarkable species, at once distinguished amongst the African species by the large trilobed stipules, which almost enclose the female flower at the base of each male axis.

39. **A. subsessilis,** *Hutchinson in Kew Bulletin*, 1911, 231. A shrub; branches subterete, bark slightly roughened, glabrous or nearly so; young branchlets puberulous. Leaves subsessile, oblanceolate or obovate, very obtusely acuminate, the acumen often emarginate, cuneate at the base, 1½–3½ in. long, ¾–2 in. broad, chartaceous, obtusely serrate, glabrous on both surfaces; lateral nerves 6–7 on each side, looped and branched within the margin, very prominent below; tertiary nerves lax, subparallel, conspicuous below; stipules linear-lanceolate, strongly keeled on the back, scale-like, slightly pubescent or glabrous, 2½ lin. long. Inflorescence bisexual, 1 in. long, one or two females at the base of each, the males numerous in the upper part; axis densely pubescent. Male buds slightly pubescent or almost glabrous. Female bracts very small and inconspicuous. Sepals 3, ciliate. Ovary setose-pubescent; styles laciniate. Capsule and seeds not seen.—*Mallotus brevipes*, Pax ex Engl. Pfl. Ost-Afr. A. 18, name only, not *Acalypha brevipes*, Müll. Arg.

Mozamb. Distr. German East Africa: Usambara; Masheua, *Holst*, 3568! Tanga, *Volkens*, 185! Bagamoyo, *Sacleux*, 1444! Mount Ngorou, *Sacleux*, 980, partly!

Var. *mollis*, Hutchinson, l.c. Branches and under surface of the leaves softly and rather densely pubescent.

Nile Land. British East Africa: Mazeras, *Powell*, 3, partly!

Mozamb. Distr. Zanzibar, *Kirk!* German East Africa: Bagamoyo, *Sacleux*, 1445! Mandera, *Sacleux*, 980, partly!

40. **A. neptunica,** *Müll. Arg. in Abhandl. Naturw. Ver. Bremen*, vii. 26. A shrub about 3½ ft. high; branches woody, subterete, clothed with reddish-brown bark, puberulous when young, at length glabrous. Leaves oblanceolate-elliptic, obovate or subrhomboid, shortly caudate-acuminate, more or less narrowed to the base, 2–6 in. long, 1–3½ in. broad, obtusely serrate, submembranous or almost chartaceous, rather closely pellucid-dotted, slightly scabrous above, glabrous below except for a few very short hairs on the midrib and lateral nerves; lateral nerves 5–6 on each side, looped near the margin, prominent on both surfaces especially below; transverse nerves rather faint, distant, often branched; stipules triangular-lanceolate, acute, brown and subscarious, 1½–2½ lin.

long, persistent, minutely and sparingly puberulous when young, at length glabrous; petiole up to 3 in. long, very sparingly setulose or glabrous. Inflorescence bisexual, axillary, solitary, 1–1½ in. long, two or three females towards the base, the upper part males and spicate; axis tomentellous. Male buds puberulous. Female bracts reniform, about 1½ lin. long, and 3 lin. broad when spread out, margin dentate, very sparingly pubescent outside. Sepals 3, ovate, acute, broad at the base, ½ lin. long, ciliate. Ovary densely covered with coarse bristle-tipped tubercles; styles 3, connate at the base, finely laciniate. Seeds not seen.—Pax in Engl. Pfl. Ost-Afr. C. 239. *A. mildbrædiana*, var. *glabrescens*, Pax in Engl. Jahrb. xliii. 323.

Nile Land: British East Africa: Uganda; Kavirondo, *Scott-Elliot*, 7093!

Mozamb. Distr. Zanzibar: Kidoti, *Hildebrandt*, 1146! German East Africa: Usambara; Gombelo, *Holst*, 2160!

South Central. Belgian Congo: forest north-west of Fort Beni, *Mildbraed*, 2254! 2273! 2337! 2372!

Var. *pubescens*, Hutchinson. Young branchlets velvety-pubescent; leaves softly pilose on the lower surface.—*A. mildbrædiana*, var. *pubescens*, Pax, l.c. 324.

South Central. Belgian Congo: forest north-west of Fort Beni, *Mildbraed*, 2253! 2335!

41. **A. Volkensii,** *Pax in Engl. Pfl. Ost-Afr. C.* 239. A shrub up to 5 ft. high; branches finely sulcate, often long pilose or pubescent. Leaves ovate, shortly and more or less gradually and subacutely acuminate, cordate at the base, 1½–3 in. long, ¾–1¾ in. broad, crenate-serrate, membranous, pubescent especially on the nerves and veins below, 5-nerved from the base, remaining lateral nerves 6–7 on each side, branched near the margin, prominent on both surfaces; tertiary nerves rather lax, subparallel, prominent below; petiole 1–1¾ in. long; stipules linear-filiform, sparingly pilose, 2 lin. long. Inflorescence axillary, bisexual; female bract solitary, sessile in the leaf-axil at the base of the male raceme, the latter 2–3½ in. long, very slender; axis pubescent. Male buds glabrous. Female bracts foliaceous, very broadly ovate, more or less cordate at the base, doubly serrate, nearly glabrous, about ½ in. long. Sepals 3, ovate, ciliate. Ovary hirsute, especially in the upper half; styles 3, slender, deeply laciniate and very sparingly pilose.—*A. psilostachyoides*, Pax in Ann. Istit. Bot. Roma, vi. 183, for the most part.

Nile Land. Abyssinia, *Roth!* Somaliland: Galla Highlands, *Ellenbeck*, 1262! Ualema, *Riva*, 1529! and without precise locality, *Riva*, 1386! Uganda: Kavironda, *Whyte!* British East Africa: N'di, Taita Hills, *Hildebrandt*, 2518! Mount Boura, *Sacleux*, 1315! Sani, *Kässner*, 765! Mtoni River, *Kässner*, 624!

Mozamb. Distr. German East Africa: Usambara, *Buchwald*, 532! 575! 610! 628! Mbalu, *Engler*, 1481! Sakare, *Engler*, 959! Amani, *Engler*, 764! *Kranzlin*, 2121! Lake Eugili, *Uhlig*, 724! Kilimanjaro, *Volkens*, 419! *Johnston*, 109! Moschi, *Merker*, 597! Kwai, *Albers*, 281! Lutindi, *Holst*, 3382! *Luibusch!*

42. **A. bipartita,** *Müll. Arg. in Flora*, 1864, 538. A climbing shrub; branches subquadrangular, tomentellous when young, puberulous when older and clothed with light-brown bark; internodes ¾–1¼ in. long. Leaves ovate, gradually and subacutely acuminate, slightly rounded or

subtriangular at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, serrate, membranous, rather sparingly setulose above, densely pubescent with spreading hairs on the nerves and veins below, digitately 15-nerved at the insertion of the petiole, remaining lateral nerves about 4 on each side, looped and anastomosing before reaching the margin, raised on both surfaces; transverse nerves subparallel, about 1 lin. apart; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long, densely pubescent; stipules subulate, 2 lin. long, pubescent. Inflorescence bisexual, axillary, solitary, pedunculate; peduncle about 1 in. long, with a female 2-flowered bract placed slightly above the middle, upper part male and spicate, 1–$1\frac{1}{2}$ in. long. Buds of the male flowers slightly pubescent. Bract enclosing the female flowers foliaceous, about 3 lin. long and broad, pubescent outside, rather sparingly so within, margin rather deeply crenate-dentate, without glands. Sepals 3, ovate, $\frac{1}{3}$ lin. long, ciliate and pubescent on the back, setose at the apex. Ovary pubescent, slightly trilobed; styles 3, suberect, $\frac{3}{4}$ lin. long, laciniate and distinctly pubescent.—Müll. Arg. in DC. Prodr. xv. ii. 860; Oliv. in Trans. Linn. Soc. xxix. 146, t. 97; Pax in Engl. Pfl. Ost-Afr. C. 239. *Ricinocarpus bipartitus*, O. Kuntze, Rev. Gen. Pl. ii. 617.

Nile Land. Uganda: Entebbe, *Mahon! Fyffe*, **129**! Busoga, *Brown*, **77**! Kavirondo, *Scott-Elliot*, **7095**, partly! **7097**! 7 days' march from Mumias, *Whyte!* Usogo villages, *Whyte!* Kome Island, in Lake Victoria, *Conrads*, **31**! between Issenge and Mpororo, *Mildbraed*, **338**! Muanza, *Stuhlmann*, **4618**! and without precise locality, *Stuhlmann*, **1309**!

Mozamb. Distr. German East Africa: Karagwe, *Speke & Grant*, **161**! Kilimanjaro; Moschi, *Merker*, **595**!

According to Capt. Grant the branches of this plant are used for basket-making in Unyoro.

Imperfectly known species.

43. **A. sidæfolia,** *A. Rich. Tent. Fl. Abyss.* ii. 249. Stem woody, branched; branches terete, tomentose. Leaves ovate-lanceolate, very acute, cordate at the base, $\frac{3}{4}$ in. long, about $\frac{1}{3}$ in. broad, serrate, hirsute above, villous-tomentose below; petiole about $\frac{1}{4}$ in. long; stipules acute, hirsute. Male spikes axillary, dense-flowered, hirsute, longer than the leaves. Female spikes ovoid, compactly and densely flowered. Bracts 1-flowered, broadly reniform, 9–11-lobed, lobes triangular, 1–2-laciniate at the base. Ovary silky-tomentose; styles long, shortly pectinately laciniate.—*Ricinocarpus sidifolius*, O. Kuntze, Rev. Gen. Pl. ii. 618.

Nile Land. Abyssinia: Shireh province, *Quartin-Dillon.*

44. **A. Dewevrei,** *Pax in Engl. Jahrb.* xxviii. 24. A shrub; young branches pubescent. Leaves ovate, acuminate, obtuse at the base, about 6 in. long and $3\frac{1}{2}$ in. broad, denticulate, thinly membranous, 3-nerved, pubescent on the nerves, ciliate; petiole $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, pubescent; stipules acuminate from a broad base, $2\frac{1}{2}$ lin. long, 1 lin. broad. Inflorescence bisexual, axillary, 2–3 in. long, with a few female towards the base, the upper part male. Female bracts reniform, $1\frac{1}{2}$ lin. long, slightly dentate, nearly glabrous. Sepals 3–4. Styles laciniate.—De Wild. & Durand, Reliq. Dewevr. 210.

Lower Guinea. Lower Congo; Lukolela, *Dewèvre*, 820.

Known to me only from the description; probably closely allied to *A. bipartita* and *A. Volkensii*.

58. **MAREYA,** Baill.; Benth. et Hook. f. Gen. Pl. iii. 312.

Flowers monœcious or diœcious, apetalous. Male: Calyx closed in bud, globose, splitting into 3–4 valvate segments. Stamens 10–20; filaments free, filiform, flexuous in bud, inserted on a convex glandular receptacle; anthers 2-celled; cells distinct, oblong, shortly stipitate, in bud pendulous, at length flexuous-divaricate, dehiscing from the apex. Rudimentary ovary 0. Female: Sepals 4–6, broad, imbricate. Disk flattened, lobed. Ovary pubescent, 3- (rarely 4-) celled; cells 1-ovuled; styles distinct or shortly connate below, recurved, papillose-plumose. Capsule more or less 3-dymous, pubescent, usually breaking up into 2-valved cocci; rarely fruit indehiscent. Seeds subglobose, smooth; albumen fleshy; cotyledons broad, flat.—Trees or shrubs. Leaves alternate, petioled, usually rather large, entire or slightly toothed, penninerved. Racemes or spikes axillary or lateral or clustered towards the ends of the twigs, usually exceeding the leaves. Flowers glomerulate along the rhachis; glomerules sometimes with only male flowers, sometimes with 2 or more males accompanied by a solitary female, sometimes replaced by solitary female flowers.

Five endemic species.

Flowers distinctly pedicelled, monœcious; petiole $\frac{1}{4}$ in. long or less; leaves thin; capsule breaking up into 2-valved cocci . . . . . 1. *M. brevipes.*
Flowers sessile or subsessile; petioles $\frac{1}{2}$ in. long or longer.
  Monœcious; leaves rather firm; capsule breaking up into 2-valved cocci.
    Flowers green; spikes slender, flexuous; leaves nearly or quite glabrous beneath . . . . . 2. *M. micrantha.*
    Flowers white; spikes stiff, rigid; leaves usually with spreading hairs on the nerves beneath . . . 3. *M. spicata.*
  Diœcious.
    Leaves thin, lateral nerves few; capsule breaking up into 2-valved cocci . . . . . 4. *M. acuminata.*
    Leaves rather firm, lateral nerves numerous; fruit indehiscent . . . . . 5. *M. longifolia.*

1. **M. brevipes,** *Pax in Engl. Jahrb.* xxviii. 24. Shrub, monœcious; twigs glabrous. Leaves very shortly petioled, membranous, obovate-lanceolate or narrow-obovate, shortly and acutely acuminate, narrow from beyond the middle to the narrow-truncate or occasionally acute base, shortly distantly toothed throughout, 6–15 in. long, 2–4 in. wide, rather dark green, glabrous on both surfaces; petiole glabrous, 1–2 (rarely 3) lin. long; stipules lanceolate, puberulous, deciduous. Spikes numerous, slender, flexuous, usually about as long as the leaves, occasionally shorter; rhachis glabrous. Male flowers in few-flowered

clusters, usually only 2, with pedicels twice as long as the calyx, with a central female with pedicel 3–4 times as long as the calyx in each glomerule; bracts and bracteoles minute. Buds globose, under $\frac{1}{2}$ lin. wide; calyx-segments green, obtuse. Stamens longer than the calyx-lobes. Female calyx-lobes acute. Ovary puberulous; styles shortly connate at the base. Capsule globose, 3-dymous, $\frac{1}{8}$ in. across.

Upper Guinea. Cameroons: Bipinde, *Zenker*, **1794**!

Nile Land. Uganda: Southern Buddu, 4800 ft., *Dawe*, **970**!

Lower Guinea. Spanish Guinea: Bebao Campo, *Tessmann*, **723**!

South Central. Belgian Congo: Eastern Prov.; Mawambi, Mokoko, *Mildbraed*, **2942**! Awakubi, Abarangu, *Mildbraed*, **3119**!

2. **M. micrantha,** *Müll. Arg. in DC. Prodr.* xv. ii. 792, *excl. var. leonensis*. Shrub, monœcious, 10–12 ft., or occasionally a small tree 20–25 ft. high; twigs puberulous. Leaves petioled, moderately firm, ovate or ovate-oblong, rarely obovate-lanceolate, shortly acuminate, slightly toothed upwards, entire and narrowed from about the middle to the cuneate base, 4–7 in. long, $1\frac{1}{2}$–3 in. wide, quite glabrous above, glabrous beneath or sometimes faintly puberulous on the midrib near the base; petiole sparingly puberulous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; stipules short, triangular, puberulous, deciduous. Spikes numerous, slender, flexuous, usually considerably longer than the leaves; rhachis very finely puberulous. Male flowers in sessile clusters; bracts ovate, minute. Buds globose, under $\frac{1}{2}$ lin. wide; calyx-segments green, obtuse. Stamens longer than the calyx-lobes. Female flowers in the lower nodes, usually solitary, sometimes accompanied by 2 or more males. Capsule somewhat depressed; cocci 3, semiorbicular, pale brown, 2 lin. wide.—Benth. in Hook. Ic. Pl. t. 1281. *Acalypha micrantha*, Benth. in Hook. Niger Fl. 505.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, **45**! Cameroons: Johann-Albrechtshöhe, *Staudt*, **494**! **760**! near Victoria, *Preuss*, **1376**! *Winkler*, **604**! Babong, **830** ft., *Ledermann*, **1150**! Semukina, **2000–2300** ft., *Ledermann*, **1202**! Babanga, *Dinklage*, **1405**! Bipinde, *Zenker*, **2082**! **4202**! Fernando Po: Goderich Bay, *Vogel*, **210**! *Mann*, **209**! **235**! **435**!

Lower Guinea. Spanish Guinea: Bebao, *Tessmann*, **829**! Gaboon; *Klaine*, **85**! **553**!

3. **M. spicata,** *Baill. Adansonia*, i. 74. Tree, monœcious, reaching 50 ft. in height; twigs pubescent. Leaves petioled, moderately firm, obovate-lanceolate, shortly and rather obtusely acuminate, slightly to coarsely toothed upwards, entire and narrowed from beyond the middle to the narrowly cuneate base, 4–8 in. long, $1\frac{1}{2}$–3 in. wide, glabrous or with only the midrib slightly pubescent above, often with rather stiff spreading hairs on the nerves beneath; petiole finely pubescent, $\frac{1}{2}$–1 in. long; stipules short, triangular, pubescent, deciduous. Spikes numerous, rather stiff, about as long as the leaves; rhachis densely pubescent. Male flowers fragrant, in sessile clusters; bracts ovate, minute. Buds globose, $\frac{3}{4}$ lin. wide; calyx-segments white, very obtuse. Stamens as

long as the calyx-lobes. Female flowers in the lower nodes, usually solitary, sometimes accompanied by 2 or more males. Capsule depressed; cocci 3, subglobose, purplish-brown, 4 lin. wide.—Benth. in Hook. Ic. Pl. sub t. 1281. *M. micrantha*, Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 51, and Reliq. Dewevr. ii. 213; Th. & Hél. Durand, Syll. Fl. Congol. 494, partly, excl. the Lusambo specimens. *M. micrantha*, var. *leonensis*, Müll. Arg. in DC. Prodr. xv. ii. 792. *M. micrantha*, var. *nitida*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 82. *Acalypha leonensis*, Benth. in Hook. Niger Fl. 504.

Upper Guinea. Senegambia, *Heudelot*, **752**! French Guinea: Konakry, *Chevalier*, **12165**! *Maclaud*, **170**! *Dybowski!* Fouta Jalon; between Ymbo and Kouria, *Caille* (*Chevalier*, **14791**)! Kouria; near Bowali, *Caille* (*Chevalier*, **14936**)! Sierra Leone: various localities, common, *Scott-Elliot*, **4158**! **4697**! **5055**! *Afzelius! Don! Barter! Vogel*, **137**! *Winwood-Reade! Smythe!* Liberia: Grand Bassa, *Dinklage*, **1848**! **1901**! near Kakatown, *Whyte!* Gold Coast: Koforidua, *Johnson*, **447**! Cameroons: Victoria, **500** ft., *Preuss*, **1319**! Fernando Po: Goderich Bay, *Daniell!*

South Central. Congo State: Aruwimi district; Okanga, *Dewèvre*, **1098**! Lokandu, *Dewèvre*, **1121A**! **1122**! Eastern Prov.; Rewa, *Dewèvre*, **1140A**! and without precise locality, *Dewèvre*, **1030**!

4. **M. acuminata,** *Prain in Kew Bulletin*, 1912, 103. Shrub or small tree; twigs glabrous. Leaves petioled, thin, obovate-lanceolate, abruptly and acutely acuminate, entire, narrowed from beyond the middle to the cuneate base, 5–7 in. long, 1½–2 in. wide, glabrous on both surfaces, dark green; petiole glabrous, ½ in. long; stipules small, deciduous. Spikes numerous, slightly flexuous, rather longer than the leaves; rhachis angular, glabrous; bracts ovate, minute. Male flowers not seen. Female flowers throughout the spikes, solitary; styles quite free to the base. Capsule subglobose, 3-sulcate; cocci 3, 2 lin. wide, brown.

Lower Guinea. Gaboon: Libreville, *Klaine*, **2483**!

5. **M. longifolia,** *Pax in Engl. Jahrb.* xxxiii. 283. Shrub, dicœcious, 4–9 ft. high; twigs pubescent. Leaves petioled, firm, obovate or obovate-lanceolate or oblanceolate, cuspidate or acuminate, gradually narrowed from beyond the middle to the narrow-cuneate base, distinctly regularly toothed, 6–12 in. long, 1½–4 in. broad, finely puberulous on the midrib, otherwise glabrous above, minutely puberulous beneath, especially on the prominent midrib and 12–20 pairs of lateral nerves; petiole rather variable, ½–2½ in. long, finely puberulous, pulvinate at the base and apex; stipules lanceolate, adpressed-pilose, 2 lin. long, deciduous. Spikes from nodes on the old wood or females axillary, males several, females solitary, 3–4 in. long; rhachis puberulous, shorter than the leaves. Male flowers in sessile clusters; bracts ovate, acute, puberulous. Buds globose, under 1 lin. wide; calyx-segments 3–4, green, triangular. Stamens 2-seriate, inner slightly longer than the calyx-lobes. Female flowers solitary; calyx 4–5-partite. Disk urceolate, distinctly 6–8-lobed. Ovary thinly

pubescent, subglobose, slightly sulcate or smooth, thick-walled, 2-celled, less often 3-celled; ovules solitary; styles 2 or 3, connate below, recurved and free above, finely papillose, simple. Fruit indehiscent, depressed-globose, ½ in. wide, 5 lin. high; pericarp glandular-lenticelled externally.

Upper Guinea. Cameroons: Bipinde, 260–1350 ft., *Zenker*, 1795! 1850! 2382! 2549! 3636! 4228!

Very distinct from the other species on account of the much larger indehiscent fruit.

59. **LEPIDOTURUS,** Baill.; Benth. et Hook. f. Gen. Pl. iii. 316.

Flowers diœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 4, less often 3 or 5, valvate lobes. Stamens 8; filaments slightly connate at the base; anthers oblong, erect, dorsifixed; cells contiguous, parallel, dehiscing longitudinally. Rudimentary ovary 0. Female: Calyx 3–5-sect; lobes unequal. Disk 0 or of 3–4 glands. Ovary 3-celled; cells 1-ovuled; styles at first connate, ultimately free from the base, simple or 2-partite. Capsule 3-dymous, breaking up into 3 2-valved cocci. Seeds strophiolate; albumen fleshy; cotyledons broad, flat.—Shrubs. Leaves alternate, membranous, petioled, glabrous, entire or crenate, 3–5-nerved from the base. Male spikes on the old wood, sessile; bracts large, concave, persistent, subtending solitary sessile flowers or several pedicellate ones. Female spikes few-flowered.

Species 3, one from Madagascar and the two following.

Leaves rounded at the base; spikes at length rather lax	1. *L. laxiflorus.*
Leaves slightly cordate at the base; spikes dense	2. *L. occidentalis.*

1. **L. laxiflorus,** *Benth. in Hook. Ic. Pl. t.* 1297. Shrub or small tree, 15–20 ft. high; twigs rather stout, puberulous. Leaves petioled, membranous, oblong, caudate-acuminate, base rounded, margin shortly and closely crenate, 3-nerved, rarely 5-nerved from the base, 3–5 in. long, 1¼–2 in. wide, bright green, somewhat shining, glabrous above, nerves beneath with long spreading hispidulous hairs; petiole puberulous, 1–1½ in. long; stipules setaceous, puberulous, 3 lin. long; stipels glabrous, 1 lin. long. Male spikes numerous from below the leaves, when young dense, at length lax, 2–3 in. long; bracts ovate, brown, scarious, slightly pubescent near the margin outside, ⅙ in. wide. Male: Calyx subglobose, ½ lin. wide, sparingly pubescent; pedicel short. Female: Ovary pubescent; styles long, slender, simple, pubescent outside. Capsule globose, sparingly puberulous or pubescent, 3-dymous. Seeds smooth, globose.—Pax in Engl. Pfl. Ost-Afr. C. 238. *Macaranga Thonneri*, De Wild. Pl. Thonner. Congol. ii. 227, t. 4.

Upper Guinea. Southern Nigeria: interior of Western Lagos, *Rowland!* Yoruba forests, *Barter*, 3342! *Millson*, 42! 135! Benin, *Unwin*, 39! Cameroons: various localities, 2300–4850 ft., *Preuss*, 868! *Diestel*, 560! *Reder*, 393! 430! *Lehmbach*, 48A! *Zenker*, 187! *Ledermann*, 1902! 2445! 2475! 2489! 2806! 2972!

Nile Land. Niamniam: Nabambisso River, *Schweinfurth*, 2956! Linduku (Unduku) River, *Schweinfurth*, 3072! Kulanjo, *Schweinfurth*, 2843! British East Africa: Mombasa, *Sacleux*, 2316!

South Central. Belgian Congo: Ubangi; Yakoma, 1460 ft., *Thonner*, 252! Gugo, near Yakoma, 1600 ft., *Thonner*, 221. Eastern Province; Fort Beni, Kwa Muera, *Mildbraed*, 2272! 2375!

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Holtz*, 925! *Schulze*, 1! Konerawe, 700 ft., *Stuhlmann*, 6194! Kidonge, *Stuhlmann*, 635! Portuguese East Africa: between Mbussonie and Caberiera, *Rodrigues de Cavalho!* Pungwe Valley, *Vasse*, 317! Gazaland: Boka, Lower Buzi, *Swynnerton*, 1784!

2. **L. occidentalis,** *Müll. Arg. in Journ. Bot.* 1864, 332. Shrub, 10–15 ft. high; twigs slender, glabrous. Leaves petioled, membranous, oblong, caudate-acuminate, base very slightly cordate, margin slightly and distantly crenate, 3–5-nerved from the base, 3–5 in. long, $1\frac{1}{4}$–2 in. wide, bright green, somewhat shining, glabrous on both surfaces; petiole glabrous, $\frac{1}{4}$–$\frac{3}{4}$ in. long; stipules setaceous, glabrous, 1 lin. long; stipels very minute. Male spikes dense, sessile, $\frac{3}{4}$ in. long; bracts orbicular, yellowish red, scarious, orbicular, slightly pubescent near the margin outside, $\frac{1}{8}$ in. wide. Male: Calyx subglobose, $\frac{1}{2}$ lin. wide, glabrous; pedicel short. Female: Ovary glabrous; styles long, slender, simple, quite glabrous. Capsule globose, glabrous, 3-dymous. Seeds globose, smooth.—DC. Prodr. xv. ii. 898; Hiern in Cat. Afr. Pl. Welw. i. 980.

Lower Guinea. Angola: Pungo Andongo; *Welwitsch*, 407! 408!

60. **ALCHORNEA,** Sw.; Benth. et Hook. f. Gen. Pl. iii. 314.

Flowers apetalous, usually diœcious, rarely monœcious. Disk usually 0. Male: Calyx globose, closed in bud, splitting into 4, rarely 3–2, valvate lobes. Stamens 8 or fewer; filaments free or slightly connate; anthers 2-celled, dorsifixed; cells opening longitudinally, parallel or slightly diverging, often partially free at the base. Rudimentary ovary 0. Female: Calyx-lobes 3–6, usually 4, imbricate. Ovary 2- or 3-celled, rarely casually 4-celled; ovules solitary; styles distinct, usually linear, simple or rarely 2-fid. Capsule splitting into 2–3, rarely 4, 2-valved cocci; endocarp crustaceous. Seeds subglobose, estrophiolate; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Shrubs or trees, usually sparingly pubescent. Leaves alternate, entire or toothed, stipellate or not at the base, sometimes glandular below near the junction with the distinct petiole. Spikes usually axillary or lateral; male flowers small, clustered on the slender simple or branched rhachis; female flowers solitary to a bract, in simple spikes or racemes; bracts in both sexes very small.

Species about 30, widely spread in the tropics of both hemispheres.

Ovary 2-celled; inflorescences always lateral; leaves ovate, ¶¶ palminerved, base cordate, without stipels; diœcious 1. *A. cordata.*
Ovary 3–4-celled; leaves p nninerved.
Leaves without stipels; base usually n rrow: flowers diœcious.

Leaves 6–12 in. long, nerves 12 or more on each side; male inflorescences all lateral; capsule smooth . 2. *A. floribunda.*
Leaves 2½–6 in. long, nerves 10 or fewer on each side; male as well as female inflorescences terminal.
Capsule smooth; petioles finely puberulous or glabrous, ¼ in. long or less . . . . 3. *A. glabrata.*
Capsule verrucose; petioles hispidly hairy, ⅓–½ in. long . . . . . 4. *A. hirtella.*
Leaves with a pair of stipels at the cordate or subcordate base; flowers monœcious; inflorescences both terminal and axillary.
Leaves firm; capsule smooth . . . . . 5. *A. Engleri.*
Leaves membranous; capsule verrucose . . . 6. *A. yambuyaensis.*

1. **A. cordata,** *Benth. in Hook. Niger Fl.* 507. Shrub 3–12 ft. high or a small tree; twigs pubescent. Leaves long-petioled, moderately firm, cordate-ovate, acute, crenate or entire, 4–10 in. long, 3–6 in. wide, glabrous when mature, 5-nerved from the base, with 4 basal glands in the angles of the nerves; petiole 2–4 (occasionally 5–6) in. long. Male spikes copiously paniculate; panicles axillary; buds globose, ½ lin. wide. Female flowers in long lax spikes; calyx 4-lobed. Capsule 2-celled, ⅓ in. wide.—Hiern in Cat. Afr. Pl. Welw. i. 979; Stapf in Johnston, Liberia, ii. 650: not *A. cordata*, Müll. Arg. *A. cordifolia*, Müll. Arg. in Linnæa, xxxiv. 170, and in DC. Prodr. xv. ii. 908; Ficalho, Pl. Uteis, 257; Pax in Bolet. Soc. Brot. x. 160, in Bull. Soc. Bot. Belg. xxxvii. 105, and in Engl. Pfl. Ost-Afr. C. 238; Rendle in Journ. Linn. Soc. xxxvii. 213; De Wild. & Durand in Contrib. Fl. Congo, ii. 57, Reliq. Dewevr. ii. 211, and in Bull. Herb. Boiss. 2me sér. i. 48; De Wild. Miss. É. Laurent, i. 129, Études Fl. Bas- et Moyen-Congo, i. 276, ii. 280, and Comp. Kasai, 330; Th. & Hél. Durand, Syll. Fl. Congol. 494. *Schousbœa cordifolia*, Schum. & Thonn. Beskr. Guin. Pl. 449.

Upper Guinea. Senegal: various localities, *Roger! Perrottet*, 729, 730, 731! *Heudelot*, 23! *Leprieur! Farmar*, 100! Gambia: Banks of the Gambia, *Heudelot*, 345! French Guinea: Fouta Jallon, *Miguel*, 15! Kouria, *Caille* (*Chevalier*), 14663! Konakry, *Maclaud*, 181! without precise locality, *Paroisse*, 34! Sierra Leone: various localities, *Johnston*, 87! *Kirk! Mrs. Hunter! Afzelius*, 418! *Don! Vogel*, 141! *Daniell! Garrett*, 24! *Scott-Elliot*, 3844! 4179! Liberia: Grand Bassa, *Dinklage*, 2097! Sinoe Basin, *Whyte!* Gold Coast; Aburi, *Brown*, 937! Ashanti, *Cummins*, 179! Togo: near Sokode, 1000–1300 ft., *Kersting*, 50! 343! 405! 729! Kirikiri, 1000 ft., *Kersting*, 58! Misahohe, *Baumann*, 399! Atakpame, *Doering*, 282! Dahomey: Dogba, *Le Testu*, 204! 205! *Poisson*, 113! Southern Nigeria: various localities, *Moloney! Foster*, 153! *Millen*, 162! *Lamborn*, 14! *Dawodu*, 13! *Dennett*, 69! *Vogel! Mann! Talbot*, 682! 1319! Northern Nigeria: Kontagora, *Dalziel*, 88! Katagum, *Dalziel*, 405! Gurara River, *Elliot*, 217! Cameroons: various localities, *Deistel*, 67! 125! *Zenker & Staudt*, 86! *Zenker*, 1091! 1309! *Buchholz*, 74! *Preuss*, 551! *Dinklage*, 1170! 1456! *Bates*, 69! *Staudt*, 500! 551! *Ledermann*, 337! 2048. *Winkler*, 31B! 1017! 1037! Fernando Po, *Vogel*, 73! *Barter! Mann*, 81!

North Central. Western Soudan: near the Banamiane, *Chevalier*, 151! Moussaüe, *Chevalier*, 456!

Kile Land. Niamniam: Nabambisso River, *Schweinfurth*, 29 3031!

3049! Uganda: various localities, *Stuhlmann*, 1312! *Fyfe*, 119! *Scott-Elliot*, 7367! 7408! 8037! *Ussher*, 11! *Bagshawe*, 66!

Lower Guinea. Princes Island: *Newton*, 1! *Welwitsch*, 378! St. Thomas Island: *Welwitsch*, 377! *Moller*, 161! 175! *Henriques*, 32! Spanish Guinea: Benito, *Guiral!* Fang district, *Tessmann*, 116! Nkolentangan, 1500 ft., *Tessmann*, 167! Gaboon: various localities, *Griffon du Bellay*, 241! 351! *Klaine*, 1088! 1345! *Leroy*, 60! *Thollon*, 341! 4008! *Büttner*, 263! 264! 265! Libreville, *Jolly*, 171! *Lecomte*, A24! Lower Congo: various localities, *Cabra*, *Smith! Cabra & Michel*, *Dupuis*, *Gillet*, *Butaye* (*Gillet*, 3481), *Pynaert*, 54, 254, *Soyaux*, 92! *Duparquet*, 104! Angola: Golungo Alto, *Welwitsch*, 359 (Herb. Berlin)! 378! 379! Cazengo, *Gossweiler*, 653!

South Central. Belgian Congo: near Lake Leopold II., *Body*. Equatorial district; Ikenge, *Laurent*. Bangala district; Umangi, *Laurent*; Lie, *Laurent*. Lualaba-Kasai district; Kasongo-Batetela, *Sapin!* Mushenge, *Lescrauwaet*, 389; Mukenge, *Pogge*, 1369! Lulua, *Pogge*, 1380! 1389!

Mozamb. Distr. German East Africa: Kwidjivi Island in Lake Kivu, 5000–6000 ft., *Mildbraed*, 1182! Karagwe; Ihangiro, *Stuhlmann*, 914! Bukoba, *Stuhlmann*, 960! 1036! 3681! 3789! *Stüpner*, 11! British Central Africa: Nyasaland; Mandala, *Scott-Elliot*, 8542!

2. **A. floribunda,** *Müll. Arg. in Journ. Bot.* 1864, 336, *excl. var* β. Shrub or small tree, 6–25 ft. high; twigs glabrous. Leaves short-petioled, moderately firm, oblanceolate-oblong, acute, entire or crenate, narrowed from beyond the middle to the narrow rounded base, 6–12 in. long, $2\frac{1}{4}$–$4\frac{1}{2}$ in. wide, glabrous, penninerved, with usually 2 pairs of glands at or near the base on the lower side; petiole $\frac{1}{4}$ in. long or less; stipules subulate. Male spikes copiously panicled; panicles lateral; buds globose, $\frac{1}{2}$ lin. wide. Female flowers in simple or panicled terminal long lax spikes. Capsule 3-celled, smooth, $\frac{1}{3}$ in. across; styles simple, linear-subulate, over $\frac{1}{2}$ in. long.—Flora, 1864, 435; DC. Prodr. xv. ii. 905, excl. var. β; De Wild. & Durand, Contrib. Fl. Congo, i. 50, and in Bull. Herb. Boiss. 2me sér. i. 837; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 280; Th. & Hél. Durand, Syll. Fl. Congol. 494, mainly.

Upper Guinea. Southern Nigeria: Benin, *Dennett*, 6! Oban, *Talbot!* Cameroons: Buea, 3200–3300 ft., *Reder*, 643! *Preuss*, 907! *Lehmbach*, 7! 202! Efulen, *Bates*, 211! Yaunde, 2700 ft., *Zenker & Staudt*, 137! *Zenker*, 508! 534! Bipindi, *Zenker*, 2241! 2916! 3760! Fernando Po: *Mann*, 306!

Lower Guinea. Gaboon: near Libreville, *Klaine*, 1701! 2200! French Congo: Mayumba forests, *Thollon*, 1262! Nkomi, *Lecomte!* Lower Congo: Banana, *Cabra*; Boma; Mayumbe, Upper Chiloango, *Cabra & Michel*; near Kisantu, *Gillet*, 3799; Sele, *Butaye*. Spanish Guinea: Mount John, on the River Kongui, *Mann*, 1801! Nkolentangan, *Tessmann*, 227!

South Central. Belgian Congo: Equatorial Province; Upper Lopori, *Bieler*; Eala, *Pynaert*, 1426; Equator, *Pynaert*, 332. Bangala; Mongala, near Mobeka, *Laurent*. Aruwimi; near Yambuya, *Laurent*. Welle; Bomokandi, near Nala, *Seret*, 884. Eastern Prov.; Fort Beni, Kwa Muera, *Mildbraed*, 2179! 2191! Kaponso Poyo, 3300–3700 ft., *Mildbraed*, 2800!

3. **A. glabrata,** *Prain in Kew Bulletin*, 1910, 342. Shrub or tree, sometimes 40 ft. high; twigs pubescent or puberulous. Leaves short-

petioled, moderately firm, oblong or oblanceolate-oblong, acute, entire or crenate, much narrowed to the narrow-truncate or cuneate base, 4–6 in. long, 1–2½ in. wide, glabrous, penninerved, with 1–2 pairs of glands at or near the base on the lower side; petiole ¼ in. long or less; stipules subulate. Male spikes copiously panicled; panicles terminal; buds globose, ½ lin. wide. Female flowers in simple terminal lax spikes. Capsule 3-celled, smooth, finely pubescent, ⅓ in. across; styles simple, linear-subulate, ½ in. long.—*A. floribunda*, var. *glabrata*, Müll. Arg. in Journ. Bot. 1864, 336, and in DC. Prodr. xv. ii. 905; Hiern in Cat. Afr. Pl. Welw. i. 979.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 4087!

Nile Land. Uganda: Entebbe, *Bagshawe*, 713!

Lower Guinea. French Congo: Mayumba forests, *Thollon*, 1110! 1285! River Alima, *Thollon*, 946! 947! Angola: Pungo Andongo, *Welwitsch*, 352!

South Central. Belgian Congo: Niamniam; Yuru River, *Schweinfurth*, 3275!

Mozamb. Distr. German East Africa: Amani, *Zimmermann*, 93! 151! 880! Usambara, 4000 ft., *Buchwald*, 247! 249! Lutindi, *Liebusch!* Nquelo, 3300 ft., *Scheffler*, 51! Urundi; Kiriba, 7000–8000 ft., *Scott-Elliot*, 8278! 8307! Rugege Forest, 6300 ft., *Mildbraed*, 914! Kwidjivi Island in Lake Kivu, 5300 ft., *Mildbraed*, 1207!

Also in Natal.

4. **A. hirtella,** *Benth. in Hook. Niger Fl.* 507. Small shrub; twigs pilose. Leaves short-petioled, moderately firm, oblong or oblanceolate-oblong, shortly and bluntly acuminate, entire or crenate, narrowed to a rounded base, 2½–5 in. long, 1–2¼ in. wide, usually hispid on the midrib beneath, penninerved, with a pair of glands at the base on the lower side; petiole hispid, ⅓–½ in. long; stipules subulate. Male spikes copiously or sparingly panicled, rarely simple, terminal; buds globose, ½ lin. wide; rhachis pubescent. Female flowers in simple terminal lax spikes. Capsule 3-celled, muricately tubercled, pubescent, ⅓ in. across; styles simple, linear-subulate.—Müll. Arg. in DC. Prodr. xv. ii. 904; Pax in Engl. Jahrb. xxviii. 23; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 280; Stapf in Johnston, Liberia, ii. 649; Th. & Hél. Durand, Syll. Fl. Congol. 494. *A. floribunda*, De Wild. & Durand, Pl. Thonner. Congol. i. 20; Th. & Hél. Durand, Syll. Fl. Congol. 494, partly; not of Müll. Arg. *A. comoensis*, Beille in Bull. Soc. Bot. France, lvii. Mém. viii. 124.

Upper Guinea. Senegambia: Rio Nunez, *Heudelot*, 746! French Soudan Bamancoro, *Chevalier*, 499! French Guinea: Kouria, *Chevalier*, 14707! Conakry, *Maclaud*, 55! *Dybowski*, 47! and without precise locality, *Farmar*, 206! Sierra Leone: River Pungas, *Afzelius!* Scarcies River, *Scott-Elliot*, 4230! 4629! 4714! and without precise locality, *Smeathmann!* Liberia: Grand Bassa, *Vogel*, 35! *Dinklage*, 1723! 1814! 2017! Ivory Coast: River Comöe; between Alepe and Malamalasso, *Chevalier*, 17507!

South Central. Gaboon: Bonando, *Duparquet!* near Libreville, *Klaine*, 634! 1230! Belgian Congo: Bangala; Mongala, Ngali, 1500 ft. *Thonner*, 14! Aruwimi; Isangi, *Laurent*; and without precise locality, *Dewèvre!*

5. **A. Engleri,** *Pax in Engl. Jahrb.* xliii. 80. Shrub, monœcious, 3 ft. high; twigs pubescent. Leaves petioled, moderately firm, oblong, caudate-acuminate, serrate-dentate, base cordate, 3–4 in. long, 1½–2 in. wide, hirsute on the nerves beneath, penninerved, usually with a pair of glands at the base on the lower side and with 2 filiform stipels at the apex of the petiole; petiole ¾–1 in. long; stipules subulate. Spikes simple or sparingly branched, terminal and in the upper axils; male buds globose, 1 lin. wide, glomerate, females solitary, subsessile. Stamens 8–9 round a 3-fid rudimentary ovary. Ovary 3–4-celled, glabrous. Capsule smooth; styles simple, linear, over ½ in. long, gradually thickened downwards.

Mozamb. Distr. German East Africa: Dar-es-Salaam; Pugu Mountains, *Engler*, 3957!

6. **A. yambuyaensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 280. Shrub, monœcious, 10 ft. high; twigs pubescent. Leaves petioled, membranous, oblong or elliptic-ovate, caudate-acuminate, coarsely crenate, base cordate or rounded, 3–6 in. long, 1¼–2¾ in. wide, sparingly hirsute on the nerves above, densely pubescent on the nerves beneath, when old almost glabrous, penninerved, sometimes with a pair of glands at the base on the lower side and with two filiform stipules at the apex of the petiole; petiole ¾–2 in. long; stipules subulate. Spikes simple, terminal and axillary, the terminal 2-sexual or female, the lateral male; male buds globose, 1 lin. wide, glomerate; females solitary, subsessile. Stamens 8; rudimentary ovary 0. Ovary 3–4-celled, pubescent and ridged. Capsule 3–4-coccous, irregularly warted at the apex; styles simple, linear-subulate, puberulous, ⅓–½ in. long.—Th. & Hél. Durand, Syll. Fl. Congol. 494. *A. verrucosa*, Pax in Engl. Jahrb. xliii. 321.

South Central. Belgian Congo: Aruwimi district; Patalungo, near Yambuya, on the Aruwimi, *Solheid*, 55, 80, 100! *Mildbraed*, 3289! Eastern Prov.; Kasanga, Mawambi, on the River Ituri, *Mildbraed*, 3108! Kwa Muera, Fort Beni, *Mildbraed*, 2271!

61. NEOBOUTONIA, Müll. Arg.; Benth. et Hook. f. Gen. Pl. iii. 317.

Flowers diœcious, apetalous. Disk of 5 scales, sometimes very minute. Male: Calyx membranous, globose and closed in bud, splitting into 2 valvate lobes. Stamens 15–30; filaments short or very short, free; anthers oblong, basifixed; cells 2, parallel, opening longitudinally; connective tipped with 1–3 minute waxy deciduous glands. Rudimentary ovary 0. Female: Calyx 5-fid or 5-partite; lobes imbricate. Ovary 3-celled; ovules solitary in each cell; styles recurved, 2-fid. Capsule 3-coccous; cocci 2-valved. Seeds ovoid or subglobose, caruncu-late; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Shrubs or trees, more or less clothed with tufts of stellate hairs mixed sometimes with longer simple hairs. Leaves long-petioled, cordate-orbicular, 5–7-nerved from the base, glandular-lepidote and stellate-pubescent beneath. Male flowers in copious terminal panicles of spike-like racemes,

clustered; bracts minute. Female flowers in less copious panicles, solitary.

Species 8, all endemic.

Flowers large for the genus (males 2½ lin. wide when open, female calyx 5 lin. long, 8 lin. wide); male flowers pedicelled; female calyx-segments lanceolate, longer than the tube; pubescence of leaves confined to nerves, veins and reticulations . . . . 1. *N. macrocalyx.*

Flowers small (males only 1–1½ lin. wide when open, female calyx where known only 2 lin. long, 3 lin. wide).

Pubescence or scurf of leaves confined to nerves, veins and reticulations; female calyx-segments where known triangular, shorter than the tube; male flowers pedicelled.

Leaves with long white hairs as well as stellate-pubescence and scurf on main nerves; male calyx hirsute.

Twigs and male panicles softly hirsute with long simple hairs . . . . . 2. *N. diaguissensis.*

Twigs and male panicles scurfy stellate-pubescent only . . . . . 3. *N. Mannii.*

Leaves sparsely scurfy on nerves and veins, without any long simple hairs; male calyx glabrous . 4. *N. glabrescens.*

Pubescence or scurf on leaves continuous and felted over the whole under surface; female calyx-segments where known lanceolate, longer than the tube.

Leaves thinly membranous; male flowers pedicelled.

Leaves above softly hirsute on the nerves with long white hairs; beneath softly, loosely velvety; male calyx hirsute . . . 5. *N. velutina.*

Leaves above sparsely scurfy on the nerves; beneath closely firmly adpressed-scurfy; male calyx glabrous.

Filaments slender, longer than the anthers; extra-staminal glands ovate, obtuse, distinct 6. *N. africana.*

Filaments broad, not exceeding the anthers; extra-staminal glands lanceolate, acute, very minute . . . . . 7. *N. canescens.*

Leaves firmly membranous; male flowers subsessile; male calyx sparingly hirsute or glabrous 8. *N. Melleri.*

1. **N. macrocalyx,** *Pax in Engl. Jahrb.* xxx. 339. Tree, 50–65 ft. high; twigs stellate-scabrous. Leaves distinctly petioled, orbicular-cordate, acute or obtuse, entire or somewhat undulate or crenate, 8 in. long, as much across, green, hoary-stellate beneath on nerves, veins and reticulations only, with a few scattered flat glands above, sparsely stellate-scurfy on nerves and reticulations; stipules lanceolate, 5 lin. long. Male flowers pedicelled, copiously panicled, large for the genus, in bud globose, 2½ lin. wide when open. Calyx densely stellate-pubescent. Stamens about 30; filaments longer than the anthers; connective with a single terminal gland; extra-staminal scales oblong, truncate or

emarginate. Female flowers in simple or sparingly branched racemes, large, 5 lin. long, 8 lin. wide. Sepals lanceolate, accrescent, stellate-velvety, connate below in a short tube. Styles rather broad, 2-fid. Capsule 3-coccous, 6 lin. long, as much across. Seeds ovoid, pale brown; hilum large, prolonged halfway down on the inner side.

Nile Land. Uganda: a day's march from Nandi, *Whyte!* British East Africa: Escarpment, 7000–9000 ft., *Battiscombe*, 59! Aberdare Mountains, 8000 ft., *Heller!* Mount Kenia, Elephant Camp, *Heller!* and without precise locality, *Elliott*, 22! 146! *Powell*, 150! *Hutchins!*

Mozamb. Distr. German East Africa: Wilhelmstal; West Usambara, Waruni, 4700–5000 ft., *Engler!* 1083! Ruanda; Rugege Forest, 6400 ft., at Rukurera, Nizahindi, and Nirussisi, *Mildbraed*, 1026! 1038! 1039! South of Karissimbi, 8500 ft., *Mildbraed*, 1564! Uhehe; near Mufindi, 6200 ft., *Goetze*, 758!

2. **N. diaguissensis,** *Beille in Bull. Soc. Bot. France*, lvii. *Mém.* viii. 125. Small tree; twigs stellate-pubescent and softly velvety with long white hairs. Leaves distinctly petioled, orbicular-cordate, acute or obtuse, somewhat undulate, crenate, 5–6 in. long, as much across, green, pubescent on nerves, veins and reticulations only, beneath with stellate tufts mixed with long subsimple hairs, above with long simple bulbous-based hairs only; petioles closely velvety; stipules minute, ovate-lanceolate. Male flowers shortly pedicelled, copiously panicled, in bud ovate, apiculate, 1½ lin. wide when open; rhachis and panicle-branches velvety. Calyx sparingly hirsute at the apex. Stamens 15–20; filaments about as long as the anthers; connective with a single gland, occasionally with 2–3 apical glands; extra-staminal scales ovate. Female flowers and fruit unknown.

Upper Guinea. French Guinea: high plateau of Diaguissa, *Chevalier*, 12691!

3. **N. Mannii,** *Benth. in Hook. Ic. Pl. sub t.* 1298. Small tree, 20–35 ft. high; twigs stellate-scurfy, tufts mixed with a few long white hairs. Leaves distinctly petioled, orbicular-cordate, acute or obtuse, entire, 4–8 in. long, as much across, green, pubescent on nerves and veins only, beneath densely scurfy and softly pubescent with long hairs especially on main and secondary nerves, above sparsely scurfy and sparingly beset with long simple hairs on main nerves; petiole softly and sparingly hirsute; stipules minute, ovate-lanceolate. Male flowers pedicelled, copiously panicled, in bud globose, 1 lin. wide when open; rhachis and panicle-branches sparingly scurfy. Calyx sparingly hirsute at the apex. Stamens 15–20; filaments longer than the anthers; connective usually with a single (sometimes with 2–3) terminal glands; extra-staminal scales ovate. Female flowers in copiously branched racemes, small, 2 lin. long, 3 lin. wide. Sepals wide triangular, finely pubescent, connate below in a tube longer than the lobes. Styles narrow, with 2 linear lobes. Fruit unknown.—Benth. et Hook. f. Gen. Pl. iii. 317. *Conceveiba africana*, Müll. Arg. in Flora, 1864, 530.

Upper Guinea. Cameroons: Bargkon, *Conrau*, 149! Buea, 3300 ft., *Lembach*, 203! *Deistel*, 643! *Reder*, 562!

Lower Guinea. Princes Island, *Mann*, 1127!

4. **N. glabrescens,** *Prain in Kew Bulletin*, 1911, 265. Shrub, 12–15 ft. high; twigs stellate-scurfy. Leaves distinctly petioled, orbicular-cordate, acute, entire, 4–8 in. long, as much across, green, stellate-scurfy on nerves and veins only; petiole finely scurfy; stipules minute, ovate-lanceolate. Male flowers pedicelled, copiously panicled, in bud globose, 1 lin. wide when open; rhachis and panicle branches sparingly scurfy. Calyx glabrous. Stamens 15–20; filaments longer than the anthers; connective usually with a single (sometimes with 2–3) terminal glands. Female flowers in copiously branched racemes, small, 2 lin. long, 3 lin. wide. Sepals triangular, pubescent, connate below in a tube longer than the lobes. Styles narrow, with 2 linear lobes. Fruit unknown.

Upper Guinea. Cameroons: Victoria; Bimbia, *Preuss*, 1288! Kribi; Bipinde, 1300–1600 ft., *Zenker*, 1527! 3202A! 4246! Yaunde; Epfasa, 2700 ft., *Zenker*, 1430!

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessmann*, 133! Akonangi, *Tessmann*, 982!

5. **N. velutina,** *Prain in Kew Bulletin*, 1911, 266. Tree, 50–80 ft. high; twigs sparingly stellate-scurfy. Leaves distinctly petioled, orbicular-cordate, acute, entire, 4–8 in. long, as much across, green, above softly hirsute on the nerves with rather long white hairs simple from a bulbous base or springing from the centre of a stellate tuft, beneath uniformly continuously velvety with a loose soft stellate tomentum; petiole finely scurfy; stipules linear, rather rigid. Male flowers pedicelled, copiously panicled, in bud globose, 1½ lin. wide when open; rhachis and panicle-branches closely scurfy. Calyx finely pubescent at the apex. Stamens 20–25; filaments as long as the anthers; connective usually with 3 (sometimes with a single) apical glands; extrastaminal scales oblong, truncate or emarginate. Female flowers in copiously branched racemes, small, 2 lin. long, 3 lin. wide. Sepals linear-lanceolate, pubescent, connate below in a very short tube. Ovary densely velvety with stellate hairs; styles narrow, with 2 linear lobes. Capsule 3-coccous, densely velvety, 3 lin. long, as much across. Seeds not seen ripe.

Upper Guinea. Cameroons: Bamenda, 5500 ft., *Ledermann*, 1924! Ntem, 3200 ft., *Ledermann*, 2049! Labane, 3500 ft., *Ledermann*, 2242! Yakuba, 4400 ft., *Ledermann*, 5484! Tukurua, 4200 ft., *Ledermann*, 5567! Babadju, 5200 ft., *Ledermann*, 5987!

6. **N. africana,** *Müll. Arg. in Journ. Bot.* 1864, 336. Shrub or small tree, 15–20 ft. high; twigs grey stellate-scurfy. Leaves distinctly petioled, orbicular-cordate, acute, entire, 4–10 in. long, as much across, green, sparingly stellate-scurfy on main nerves above, beneath closely uniformly clothed with a fine felted tomentum intermixed with small flat glands; petiole finely and closely scurfy; stipules not seen. Male flowers pedicelled, copiously panicled, in bud globose, 1 lin. wide when open; rhachis and panicle branches scurfy. Calyx glabrous. Stamens about 20; filaments longer than the anthers, slender; connective usually

with 3 (sometimes with a solitary) apical gland; extra-staminal scales ovate. Female flowers in copiously branched racemes, small, 2 lin. long, 3 lin. wide. Sepals linear-lanceolate, pubescent, connate below in a very short tube. Ovary with tufts of stellate hairs; styles narrow with 2 linear lobes. Capsule 3-coccous, dark greenish-brown, pubescent, 4 lin. long, as much across. Seeds subglobose; hilum prolonged down on the inner side.—DC. Prodr. xv. ii. 892; Benth. in Hook. Ic. Pl. sub tt. 1298, 1299 as to citation but excluding the description and figures; Hiern in Cat. Afr. Pl. Welw. i. 980.

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 359! 3596! Cazengo, *Gossweiler*, 4376! 4376A! 4746!

South Central. Belgian Congo: Elizabethville, *Rogers*, 10261!

7. **N. canescens,** *Pax in Engl. Jahrb.* xix. 91, *partly, and as to Schweinfurth's specimens only.* Tree, 25–40 ft. high; twigs rusty stellate-scurfy. Leaves distinctly petioled, orbicular-cordate, acute, entire, 4–8 in. long, as much across, green, sparingly stellate-scurfy on main nerves above, beneath closely and uniformly clothed with fine felted tomentum intermixed with small flat glands; petiole finely and closely scurfy; stipules linear. Male flowers pedicelled, copiously panicled, in bud globose, 1 lin. wide when open; rhachis and panicle branches scurfy. Calyx glabrous. Stamens about 20; filaments short and thick, hardly longer than the anthers; connective usually with 3 (occasionally with a solitary) apical glands; extra-staminal scales very minute, lanceolate. Female flowers in copiously branched racemes, small, 2 lin. long, 3 lin. wide. Sepals linear-lanceolate, pubescent, connate below in a very short tube. Ovary with tufts of stellate hairs; styles narrow, with 2 linear lobes. Capsule 3-coccous, stellate brown-scurfy with a few longer white hairs intermixed, 3 lin. long, as much across. Seeds subglobose, dark brown; hilum prolonged downwards on the inner side.—*N. africana*, Benth. in Hook. Ic. Pl. t. 1298, 1299, as to description and figures; not of Müll. Arg. *N. Chevalieri*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 77.

Nile Land. Niamniam: Nabambisso River, *Schweinfurth*, iii. 145!

Lower Guinea. French Congo: Upper Ubangi; Boma, near Kaga Do, in the Upper Ombella Valley, *Chevalier*, 5958!

South Central. Belgian Congo: Eastern Prov.; Mawambi, *Mildbraed*, 3098! Fort Beni, Kwa Muera, *Mildbraed*, 2196!

8. **N. Melleri,** *Prain in Kew Bulletin*, 1911, 266. Tree, 30–40 ft. high; twigs grey- or rusty-stellate scurfy. Leaves distinctly petioled, orbicular-cordate, acute or obtuse, entire, 4–8 in. long, as much across, very firm, green, sparingly hirsute and stellate-scurfy on nerves and reticulations above, beneath closely and uniformly clothed with a fine felted tomentum intermixed with small flat glands; petiole sparingly scurfy; stipules linear. Male flowers sessile or subsessile, copiously panicled, in bud globose, 1½ lin. wide when open; rhachis and panicle-branches scurfy. Calyx usually sparingly hirsute towards the apex. Stamens 25–30; filaments slender, considerably longer than the

anthers; connective usually with 3 (rarely with a solitary) apical glands; extra-staminal scales oblong, truncate or emarginate. Female flowers in branched racemes, branches not very copious, small, 2 lin. long, 3 lin. wide. Sepals linear-lanceolate, pubescent, connate below in a short tube. Ovary rather closely strigose; styles narrow, with 2 linear lobes. Capsule 3-coccous, dark brown, pubescent, 4 lin. long, as much across. Seeds subglobose, hilum prolonged downwards on inner side.—Prain ex S. Moore in Journ. Linn. Soc. xl. 201. *N. canescens*, Pax in Engl. Jahrb. xix. 91, mainly, but excl. Schweinfurth's specimens; Pax in Engl. Pfl. Ost-Afr. C. 238; Dawe, Rep. Bot. Uganda, 56. *Mallotus Melleri*, Müll. Arg. in Flora, 1864, 468; DC. Prodr. xv. ii. 959; Dawe, Rep. Bot. Uganda, 56.

Nile Land. Uganda: Toro; on the Nsongi River, 4000 ft., *Dawe*, 841! on the B gera, 4000 ft., *Bagshawe*, 1130! Ankole, 5000 ft., *Dawe*, 445! 475!

South Central. Belgian Congo: Eastern Prov.; Ruwenzori, 4000 ft., *Mildbraed*, 2477! 2744!

Mozamb. Distr. German East Africa: Bukoba, *Stuhlmann*, 1097! 1150! 1565! 1582! 3321! 3745! Kabotschi, *Fischer*, 527! Portuguese East Africa: Gazaland; Mount Maruma, 3500 ft., *Swynnerton*, 686! Kurumadzi, 2000 ft., *Swynnerton*, 1124! British Central Africa: Nyasaland; Zomba, *Whyte!* 91! Manganja Hills, *Meller!* Shire Highlands, *Buchanan*, 12! 21! 344! 1498!

62. **NECEPSIA**, Prain in Kew Bulletin, 1910, 343.

Flowers monœcious, apetalous. Male: Calyx ovoid-globose with 4 valvate ascending segments. Stamens numerous, free, inserted on a globose receptacle, mixed with oblong densely pubescent glands; anthers introrse, longitudinally attached to a rather widened connective which is produced slightly beyond the anthers. Rudimentary ovary 0. Female: Sepals 5, imbricate. Disk thick, flat, with a slightly crenulate margin, glabrous below and on the edge, densely setose on the free portion above. Ovary 3-celled, densely setose, cells 1-ovuled; styles 3, bifid, very stout, somewhat reflexed, very slightly connate at the base, hairy externally, papillose on the face.—Tree. Leaves alternate, distinctly petioled, minutely and remotely toothed. Flowers in axillary androgynous or 1-sexual spikes; males many fascicled with a single central female, or males many fascicled without a central female, or solitary females subtended by several bracts; bracts rigid, subscarious.

A single endemic species.

1. **N. Afzelii,** *Prain in Kew Bulletin*, 1910, 343. A tree; twigs at first finely tawny-puberulous, soon becoming glabrous. Leaves shortly petioled, oblong-ovate or ovate, acutely acuminate, tip mucronulate, minutely and remotely toothed, base wide-cuneate, 2-glandular beneath, 4–10 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ in. wide, glabrous on both surfaces, firmly chartaceous; main nerves 7–8 on each side, arching; transverse veinlets nearly parallel; all prominent beneath, midrib and main nerves also prominent above; petiole $\frac{1}{3}$–1 in. long, glabrous, channelled above; stipules lanceolate, rigid, subscarious, persistent, 3 lin. long. Spikes

solitary, axillary, 4–10 in. long; rhachis angular, rigid, tawny-puberulous; bracts clustered, strongly imbricate, ovate, acute, rigid, striate, subscarious, pubescent, 1–2 lin. long, with male flowers in each axil and a central female, or with only male flowers, or with only a solitary female flower. Male flowers: Calyx in bud ovoid, subacute; segments 4, valvate, puberulous externally; pedicels puberulous, 1 lin. long. Petals 0. Stamens about 30, arising from a subglobose receptacle, free, with small oblong densely pubescent glands interspersed among the free filaments; anthers introrse, 2-celled; cells ovate, separated by a somewhat widened connective slightly produced beyond them. Female flowers: Sepals 5, imbricate, triangular or ovate, acute, puberulous. Ovary 3-celled, densely tawny-setose, seated on a thick flat disk; styles very slightly connate at the base, somewhat recurved, 2-fid, pubescent outside and at the base inside, stigmatic and fimbriate-papillose on the inner face above; cells 1-ovuled.

Upper Guinea. Sierra Leone; without precise locality, *Afzelius*, 29! Cameroons: Bipinde, *Zenker*, 3040!

63. **CROTONOGYNOPSIS,** Pax in Engl. Jahrb. xxvi. 328.

Flowers diœcious, apetalous. Male: Calyx ovate-conic and closed in bud, splitting into 5 (less often 4) valvate ovate acute lobes. Petals 0. Stamens 12–15; filaments long, free; anthers ovate-oblong, slightly apiculate, 2-celled, dehiscing longitudinally; receptacle with ovate-oblong glands outside and among the stamens. Rudimentary ovary 0. Female: Calyx 5- (rarely 4-) lobed; lobes triangular, acute. Disk cupular, with 4–5 marginal protuberances alternating with the calyx-segments. Ovary 3-celled, cells 1-ovuled; styles 3, free, lacerate at the tips.—A shrub or tree, with stout branches. Leaves alternate, firmly membranous, sessile. Male flowers in racemes fascicled on swellings on the branches, subtended by concave bracts. Female flowers in axillary racemes.

A single endemic species.

1. **C. usambarica,** *Pax in Engl. Jahrb.* xxvi. 328. A shrub or small tree 12–30 ft. high; bark yellowish. Leaves sessile, spathulate-lanceolate, acuminate, base auriculate-subcordate, margin faintly toothed, 12–14 in. long, 3 in. wide beyond the middle, narrowed to ½ in. above the slightly widened base, penninerved, firmly membranous, dull green above, paler beneath, glabrous on both surfaces; stipules 0. Flowers dirty white. Male racemes 1½–2 in. long, fascicled on old wood; rhachis pubescent; pedicels pubescent, jointed a little above the base, 1½–2½ lin. long; bracts small, ovate, acute, pubescent. Calyx usually 5- (rarely 4-) partite, glabrous, hyaline. Stamens 12–15; filaments slender, glabrous. Disk-glands oblong, uniformly distributed over the disk. Female racemes axillary, solitary, pendulous, 2½–3 in. long; rhachis, pedicels and bracts as in the males. Calyx usually 5- (rarely 4-) partite; segments triangular, acute, herbaceous, pubescent externally. Disk

shallow cupular, with 4–5 protuberances on the margin, alternating with the calyx-segments. Ovary 3-celled, glabrous; styles cylindric, glabrous, with laciniate tips. Fruit not seen.

Upper Guinea. Cameroons; Buea, *Deistel*, 218!

Mozamb. Distr. German East Africa: Usambara; Derema, 2700–3200 ft., *Heinsen*, 8! *Scheffler*, 166!

64. **ARGOMUELLERA**, Pax in Engl. Jahrb. xix. 90.

Flowers monœcious, apetalous. Male: Calyx globose, splitting into 3–4 valvate reflexed segments. Stamens numerous, free, inserted on a hemispherical receptacle, mixed with oblong glabrous or hirsute receptacular glands; anthers small, introrse, 2-celled, longitudinally attached to a narrow connective. Rudimentary ovary 0. Female: Sepals 5, rarely 6, rather distinctly 2-seriate, imbricate. Disk 0. Ovary 3-celled, densely tomentose; ovules solitary in each cell; styles 3, continuous with the carpels, undivided, rather stout, slightly connate below, somewhat reflexed above, tomentose without, stigmatic but not papillose on the face. Capsule breaking up into 3 2-valved cocci; valves thinly woody. Seeds globose, without a caruncle; albumen fleshy; cotyledons broad, flat.—Shrubs or trees. Leaves alternate. Flowers in axillary usually androgynous spike-like racemes; males rather numerous, fascicled, each fascicle usually with a single central female, occasionally all the fascicles except the terminal (very rarely all the fascicles including the terminal) with only male flowers.—*Pycnocoma*, sect. *Wetriaria*, Müll. Arg. in DC. Prodr. xv. ii. 952.

Species about 8; two endemic, the others Mascarene.

Leaves pubescent on the nerves beneath, shortly petioled, base acute	1. *A. macrophylla.*
Leaves glabrous, sessile, base rounded	2. *A. sessilifolia.*

1. **A. macrophylla,** *Pax in Engl. Jahrb.* xix. 90. Shrub 6–12 ft. high, with tawny- or rusty-pubescent branchlets. Leaves very shortly petioled, thinly to firmly chartaceous, oblanceolate-oblong, 8–16 in. long, 2–5 in. wide, acuminate, sharply serrate especially towards the apex, much narrowed to the entire very acute base, glabrous above, hirsute with spreading hairs on the nerves beneath; petiole rusty- or tawny-pubescent, $\frac{1}{6}$ in. long; stipules pubescent, narrow-lanceolate, $\frac{1}{4}$ in. long. Racemes several from the upper axils, 2–8 in. long; rhachis slender, pubescent with spreading hairs; bracts spreading, ovate, acute, pubescent; flowers glomerulate, each cluster usually with several males and a single central female, sometimes with only a female in the terminal glomerule, occasionally with all the glomerules of male flowers only. Male sepals 3 or 4, reflexed, ovate-lanceolate, $\frac{1}{5}$ in. long. Stamens numerous, exserted, mixed with glabrous or sparingly hirsute interstaminal glands. Female sepals 5 or 6, rather distinctly 2-seriate, the inner the smaller, narrow-ovate, acute, imbricate. Ovary 3-celled, densely tawny-pubescent; styles recurved, stigmatic on the inner face

above, connate in their lower third. Capsule subglobose, somewhat 3-sulcate, breaking up into 3 2-valved cocci, densely pubescent, $\frac{1}{3}$ in. across. Seeds globose, brown, $\frac{1}{5}$ in. across.—Durand & Schinz, Études Fl. Congo, 246; Th. & Hél. Durand, Syll. Fl. Congol. 495; S. Moore in Journ. Linn. Soc. xl. 201. *Pycnocoma Sapini*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 285, and Comp. Kasai, 331. *P. hirsuta*, Prain in Kew Bulletin, 1909, 51. *P. parviflora*, Pax in Engl. Jahrb. xliii. 81.

Upper Guinea. Ivory Coast: Zaranou; Indenie, *Chevalier*, 17634! between Mbosso and Zaranou, *Chevalier*, 17600!

Nile Land. Uganda: Mabira Forest, 3900 ft., *Dawe*, 202! *Ussher*, 69! forest near Mfanga, *Bagshawe*, 1165! Unyoro; Badonga Forest, *Bagshawe!* and without precise locality, *Stuhlmann*, 1313!

Lower Guinea. Spanish Guinea: Bebai, *Tessmann*, 563! 624! 924! French Congo: Ogowe, *Leroy!* Lower Congo: without precise locality, *Smith!* Angola: Benguella; Caugullo, *Gossweiler*, 3806!

South Central. Belgian Congo: Eastern Prov.; Fort Beni, Kwa Muera, *Mildbraed*, 2251! Irumu, Angalla, 3600 ft., *Mildbraed*, 2854! forest west of Issongo-Semliki, 2900 ft., *Stuhlmann*, 2692! Semliki, Karimi, *Mildbraed*, 1988! Kasai; Lulua, *Pogge*, 1376! 1393! Saukuru, *Sapin!* between Lubua and Bena-Mahima, *Sapin!*

Mozamb. Distr. German East Africa: Itara, *Mildbraed*, 144! Rhodesia: Chirinda Forest, 3700–4000 ft., *Swynnerton*, 114!

Var. *Laurentii*, Prain. Leaves slightly undulate, not toothed.—*Pycnocoma Laurentii*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 285.

South Central. Belgian Congo: Kasai; Bumbaye, *Laurent!*

This variety has, in the only specimen seen, a solitary terminal female flower. In the form of typical *A. macrophylla* described as *Pycnocoma hirsuta*, Prain, this is also the case; in the form described as *P. parviflora*, Pax, all the flowers in all the glomerules are male.

2. **A. sessilifolia,** *Prain in Kew Bulletin*, 1912, 191. Shrub or small tree, with tawny-pubescent branchlets. Leaves sessile, chartaceous, oblanceolate-oblong, 14–15 in. long, 3–$3\frac{1}{2}$ in. wide, bluntly acuminate with mucronulate tips, narrowed from the upper fourth to the narrowly rounded base, margin very minutely and remotely denticulate in the upper half, glabrous on both surfaces; stipules tawny-pubescent, lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Racemes several from the upper axils, 6–9 in. long; rhachis slender, pubescent; bracts spreading, ovate, acute; flowers glomerulate, each cluster with several males and a single central female. Male flowers: Sepals 4, or 3, erect, ovate-lanceolate, $\frac{1}{8}$ in. long. Stamens numerous; receptacle with numerous inter-staminal glands hirsute at the apex interspersed among the filaments. Female flowers: Sepals 6, less often 5, distinctly 2-seriate, the inner the smaller, narrow-ovate, acute. Ovary 3-celled, pubescent; styles recurved, stigmatic on the inner faces above, connate in their lower fourth. Capsule subglobose, somewhat 3-sulcate, breaking up into 3 2-valved cocci; pubescent externally, $\frac{1}{3}$ in. across. Seeds globose, grey mottled with brown, $\frac{1}{6}$ in. across.

Lower Guinea. French Congo: Ogowe River, *Thollon*, 741!

65. **MALLOTUS,** Lour.; Benth. et Hook. f. Gen. Pl. iii. 319.

Flowers diœcious, rarely monœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 3–5 valvate lobes. Stamens usually numerous, rarely definite, inserted on a slightly elevated receptacle; filaments free, occasionally accompanied by inter-staminal glands; anthers dorsifixed low down, 2-celled, cells opening longitudinally, sometimes slightly separated by a widened connective. Rudimentary ovary 0 or rarely minute. Female: Calyx shortly or deeply imbricately or valvately 3–5-lobed or subspathaceous. Disk usually 0. Ovary usually 3-celled, rarely 2- or 4-celled; ovules solitary in each cell; styles free or connate at the base, undivided, recurved, papillose or fimbriate on the inner face. Capsule globose or 3-dymous, rarely 2-dymous, dividing into 2-valved cocci. Seeds ovoid or globose; testa crustaceous, sometimes spuriously arillate; albumen fleshy; cotyledons broad, flat.—Trees or shrubs. Leaves alternate or opposite, petioled, rather broad, entire, toothed or lobed, sometimes peltate, usually with basal glands on the upper side. Spikes simple or paniculate; male flowers numerous, small, fasciculate; females fewer, solitary. Capsule pubescent, glandular or echinate.

Species over 80, throughout the tropics of the Old World, but in Africa sparingly represented.

Leaves not gland-dotted; stipules rigid; fruit bristly . 1. *M. subulatus.*
Leaves gland-dotted beneath; stipules flexible; fruit smooth . . . . . 2. *M. oppositifolius.*

1. **M. subulatus,** *Müll. Arg. in Linnæa,* xxxiv. 192. Shrub, 6–15 ft. high; twigs subscabridly stellate-pubescent. Leaves petioled, opposite, membranous, oblong or rarely ovate, acute, base widely rounded, rarely subcordate, margin entire, 4–7 in. long, 3–4 in. wide, bright green, glabrous on both surfaces, not glandular beneath, 3-nerved from the base; petiole $\frac{1}{2}$–$2\frac{1}{4}$ in. long, stellate-pubescent; stipules subulate, rigid, 3–4 lin. long. Racemes axillary, stellate-pubescent, 1–2 in. long; male flowers glomerate; pedicels shorter than the buds; females solitary; pedicels as long as the flowers. Male: Calyx obovoid, 3–4-partite; lobes valvate, densely stellate without. Stamens 40–50; filaments free. Rudimentary ovary sometimes present. Female sepals usually 3, densely stellate-pubescent, recurved. Ovary 3-celled, globose, rugose; stigmas densely papillose on the inner face. Capsule 3-coccous, 6–8 lin. wide; cocci 2-valved, covered with firm rather wide-based slightly hooked bristles. Seeds globose, $2\frac{1}{2}$ lin. across.—DC. Prodr. xv. ii. 970; Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 50; De Wild. & Durand, Reliq. Dewevr. ii. 211; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 280; Th. & Hél. Durand, Syll. Fl. Congol. 495. *M. Buettneri,* Pax in Engl. Jahrb. xix. 89.

Upper Guinea. Ivory Coast: Aboisso, *Chevalier,* 17825! Gold Coast: Axim, *Chipp,* 50! Southern Nigeria: Benin, *Unwin,* 38! Bonny, *Monteiro!* Calabar, *Williams,* 32! Oban, *Talbot,* 621! 623! 655! Cross River, *Johnston!*

and at Abonando, *Rudatis*, 107! Cameroons: Mungo, *Buchholz!* near Bonjongo, *Winkler*, 34A! Victoria, *Winkler*, 435! 440! 446! 621! *Deistel*, 167! *Dusén*, 285! Bimbia, *Preuss*, 1283! Bigundi, *Schlechter*, 12402! Northern Cameroons, *Conrau*, 223! Fernando Po: *Vogel*, 191! *Mann*, 260!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Büttner*, 272! Libreville, *Trilles*, 108! *Klaine*, 11! 333! 364! 371! 439! 534! 2286! 2717! 2730! 2783! 2861! and without precise locality, *Griffon du Bellay! Jardin*, 142. French Congo: Upper Ubangi; between Krebedje and Poste de la Mpoku, *Chevalier*, 6068! Lower Congo: Stanley Pool district; Lukolela, *Pynaert*, 170, *Dewèvre*, 545.

South Central. Belgian Congo: Equatorial Prov.; near Eala, *Laurent*. Ubangi River; without precise locality, *Laurent*. Eastern Prov.; Maniema, near Kasongo, *Dewèvre*, 927, 1073, 1543.

2. **M. oppositifolius,** *Müll. Arg. in Linnæa*, xxxiv. 194. Shrub, 6–12 ft. high; twigs stellate-pubescent, purplish-brown, soon glabrous. Leaves petioled, opposite, firmly membranous, ovate or ovate-oblong, acute or acuminate, base cordate or obtuse, margin somewhat sinuately toothed, 6–7 in. long, 3½–4 in. wide, rather deep green above, paler rusty-stellate on the nerves and glandular beneath, 3-nerved from the base; petiole 1¼–3 in. long, pubescent; stipules linear, 1–2 lin. long. Racemes axillary, rhachis tawny- or rusty-pubescent, male 4–5 in., female 2½–3 in. long; male flowers glomerate; pedicels longer than the flowers; females solitary; pedicels as long as the buds. Male: Calyx globose, 4- (rarely 5-) partite; lobes valvate, ovate-lanceolate, hirsute without, recurved. Stamens 20–50; filaments free, purple. Female: Sepals 4 or 5, glandular-granulate, recurved. Ovary 3-celled, globose, glandular; stigmas plumose. Capsule 3-coccous, 3–5 lin. wide; cocci 2-valved. Seeds globose, 1½ lin. across.—DC. Prodr. xv. ii. 976, mainly; Hiern in Cat. Afr. Pl. Welw. i. 980; De Wild. Miss. É. Laurent, i. 130, Études Fl. Bas- et Moyen-Congo, i. 276 and ii. 279, and Comp. Kasai, 330; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 48, Pl. Thonner. Congol. i. 21, ii. 227, and Reliq. Dewevr. ii. 211; Pax in Engl. Pfl. Ost-Afr. C. 238, in Bull. Soc. Bot. Belg. xxxvii. 105, and in De Wild. & Durand, Contrib. Fl. Congo, i. 50; Th. & Hél. Durand, Syll. Fl. Congol. 495. *M. Chevalieri*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 76. *Croton oppositifolius*, Geiseler, Monogr. Croton. 23. *Acalypha? dentata*, Schumach. & Thonn. Beskr. Guin. Pl. 410. *Claoxylon cordifolium*, Benth. in Hook. Niger Fl. 506. *Rottlera dentata*, Baill. Adansonia, i. 69, partly.

Upper Guinea. Sierra Leone: between Farana and Falaba, 500 ft., *Scott-Elliot*, 4461! Ivory Coast: between Alepe and Malamalasso, *Chevalier*, 17512! between Davo and Boutoubie, *Chevalier*, 16334! Togo: without precise locality, *Baumann*, 570! Southern Nigeria: Cape Coast Castle, *Brass! Vogel*, 75! Abo (Ibu), *Vogel*, 11! 31! 36! 48! Cameroons: various localities, 1000-2800 ft., *Ledermann*, 2114! 3768! 3772! 4181! 4236! 4420! 4678! 4772! *Schlechter*, 12766! *Winkler*, 558!

Nile Land. Bongo: Baiko, *Schweinfurth*, 2752! Niamniam: Nabambisso River, *Schweinfurth*, 2961! Uganda: Entebbe, *Bagshawe*, 765! Unyoro, *Dawe*, 1034!

Lower Guinea. Gaboon: Ogowe, *Thollon*, 278! French Congo: Kassa, *Chevalier*, 5089! Upper Ubangi; Kaga Ilonon, *Chevalier*, 5570! Krebedje,

Chevalier, 5582! Bangui, *Chevalier*, 11022! Lower Congo: Banana, *Cabra*; Boma; Mayumbe, near Shinganga, *Dewèvre*; Bingila, *Dupius*. Stanley Pool district; near Leopoldville, *Gillet*, 2864, *Vanderyst*; near Lukolela, *Laurent*; Kisantu, *Gillet*; Kwango; *Rensch*, 556!

South Central. Belgian Congo: Niamniam; Diagbe River, *Schweinfurth*, 3237! Monbuttu; Munza, *Schweinfurth*, 3247! 3489! Equatorial Province; Eala, *Laurent*, 49, 1287, *Pynaert*, 475, 921; Bokakata, *Dewèvre*. Bangala; Umangi, near Lie, *Laurent*; near Bumba, *Pynaert*, 24; Upoto, 1300–1500 ft., *Thonner!* Ubangi; Lower Ubangi, *Laurent*; Gugo, near Yakoma, 1600 ft., *Thonner*, 223, 240. Aruwimi; near Lokandu, *Dewèvre*, 658, 787; near Yambuya, *Solheid*, *Mildbraed*, 3281! Malema, *Laurent*. Eastern Province; Fort Beni, *Mildbraed*, 2319! 2402! Maniema, near Nyangwe, *Dewèvre*, 1104; Ruwenzori; Lumengo, 4000 ft., *Mildbraed*, 2730! Kasai; Luebo, *Lescrauwaet*; Lulua, *Pogge*, 1336! 1381! Lualaba, *Pogge*, 1382!

Mozamb. Distr. Zanzibar: Kidoli, *Hildebrandt*, 1144! *Stuhlmann*, 433! German East Africa: Usambara; Kerermatonto, 2000 ft., *Engler*, 3344! Gonga Mountain, 3000 ft., *Engler*, 3371! Portuguese East Africa: Mozambique, *Le Testu*, 604! British Central Africa: Nyasaland, *Buchanan*, 82!

Var. *pubescens*, Pax in Engl. Jahrb. xxiii. 525. Leaves thinly membranous, margin entire or remotely toothed, 3–6 in. long, $1\frac{1}{2}$–3 in. wide, pale green with grey pubescence of simple hairs intermixed with a sparse grey stellate pubesence on the nerves beneath. Racemes with grey pubescent rhachis and pedicels. Filaments yellowish-white.—*M. oppositifolius*, Müll. Arg. in DC. Prodr. xv. ii. 976 partly.

Upper Guinea. Ivory Coast: Bouroukrou, *Chevalier*, 16510! 16635! 16654! 16876! Nzi district, at Coffiecro, *Chevalier*, 20117! Togo: Aguna, *Kersting*, 290! Lome, *Warnecke*, 51! 319! Sokode, 1000–1300 ft., *Kersting*, 114! 386! Northern Nigeria: Nupe, *Barter*, 1702! 1742! Southern Nigeria: Abeokuta, *Barter*, 3381! Lagos, *Moloney!*

Lower Guinea. Angola: Ajuda, *Newton*, 18!

Mozamb. Distr. Zanzibar: *Hildebrandt*, 1144! *Last! Lyne*, 25! *Sacleux*, 397! German East Africa: Ruguberg, *Holtz*, 1040!

Var. *glabrata*, Müll. Arg. in Linnæa, xxxiv. 194. Leaves thinly membranous, margin entire or remotely toothed, 3–6 in. long, $1\frac{1}{2}$–3 in. wide, pale green and glabrous except for a few scattered grey stellate hairs on the main nerves beneath. —*M. oppositifolius*, Müll. Arg. ll. cc. partly; Hiern in Cat. Afr. Pl. Welw. i. 980.

Upper Guinea. Gold Coast: without precise locality, *Farmar*, 436! 442! 526! 564! Togo: Volta district; Rousu River, *Krause!* Alatu, *Baumann*, 327! Aguna, *Kersting*, 290A! Southern Nigeria: Yoruba, *Vogel*, 32! *Barter*, 3368! Abeokuta, *Irving*, 153! between Ibadan and Abéokutá, *Schlechter*, 13025! Lagos, *Dawodu*, 75! 299! Oban, *Talbot*, 697! Calabar, *Thomas*, 1169! Cameroons: Barombi, *Preuss*, 480! Yaunde, 2700 ft., *Zenker*, 1399! Makaka, 1300–1700 ft., *Ledermann*, 1188! Bare, 2800 ft., *Ledermann*, 1253! Lagdo, 1000 ft., *Ledermann*, 4374! Johann-Albrechtshöhe, *Staudt*, 597! Limbareni, *Buchholz!*

Lower Guinea. Gaboon: Ogowe River, *Meisager!* French Congo: Londima, *Thollon*, 1260! Cabinda: Chinchosho, *Soyaux*, 155! Angola: Golungo Alto; near Lango, *Welwitsch*, 342! Cazengo; Granja de S. Luiz, *Gossweiler*, 4653! 4700! 4709!

Also in Madagascar.

Var. *integrifolia*, Müll. Arg. in Linnæa, xxxiv. 195. Leaves firmly membranous, margin entire or rarely faintly toothed, 2–5 in. long, $\frac{3}{4}$–2 in. wide, pale green,

almost or quite glabrous beneath.—DC. Prodr. xv. ii. 977. *Rottlera dentata*, Baill. Adansonia, i. 69, partly.

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Kirk*, 141 ! *Schulze! Holst*, 892 ! *Engler*, 2180 ! Vikindo, *Stuhlmann*, 6106 ! 6130 ! Tambani, *Stuhlmann*, 6150 !

Also in Madagascar.

The status of the four varieties here recognised is somewhat unequal. It is possible that Beille is justified in treating *M. Chevalieri*, which is certainly identical with *Claoxylon cordifolium*, Benth., as a species distinct from the other three varieties. On the other hand the difference between Pax's variety *pubescens* and Müller's variety *glabrata* is one of degree only, not of kind; while they may be kept varietally apart, they are clearly conspecific. Even if these two be treated as undeserving of separate recognition the form distinguished by Müller as var. *integrifolia* must still be considered a distinct variety of the species to which the thinner-leaved forms "*pubescens*" and "*glabrata*" belong. It is not clear whether Gieseler intended to include in his *Croton oppositifolius* both *Claoxylon cordifolium*, the purple-stamened plant, and the forms with yellow stamens; if he meant his description to apply only to one of the two it is not clear which of them he had in view.

66. **CLEIDION**, Blume; Benth. et Hook. f. Gen. Pl. iii. 320.

Flowers monœcious or diœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 3–4 valvate lobes. Stamens numerous, crowded on a convex or conical receptacle; filaments free; anthers dorsifixed; connective sometimes apiculate; cells transversely didymous. Rudimentary ovary 0. Female: Sepals usually 3–5 (rarely 5), imbricate. Ovary 2–3-celled; styles long, slender, deeply 2-fid; ovules solitary in each cell. Disk 0. Capsule 2–3-coccous; cocci 2-valved. Seeds subglobose; testa coriaceous; albumen fleshy; cotyledons broad, flat.—Trees or shrubs. Leaves alternate, petioled, glabrous, usually toothed, penninerved. Male flowers in lax axillary racemes, solitary or clustered. Female flowers long-peduncled, solitary or geminate, axillary. Capsule smooth.

Species about 15, throughout the tropics of both hemispheres.

Leaves shortly petioled, obovate-oblong, much narrowed to the base; male racemes simple	1. *C. gabonicum.*
Leaves long-petioled, ovate or oblong, base rounded; male racemes branching	2. *C. Preussii.*

1. **C. gabonicum,** *Baill. Adansonia*, xi. 129. A diœcious shrub (*Griffon du Bellay*) or tree about 50 ft. high (*Johnson*); young branches sparingly pubescent. Leaves shortly petioled, alternate, obovate-oblong, acuminate, 4–7 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. wide, much narrowed to the base, slightly crenately toothed, membranous, dark green, glabrous on both surfaces, with 4–5 pairs of ascending secondary nerves, looping to make a scalloped intra-marginal vein continuous with a pair of basal nerves; midrib, veins and reticulations prominent beneath; petioles softly pubescent, $\frac{1}{5}$–$\frac{1}{2}$ in. long; stipules ovate, acute, somewhat pubescent outside, $\frac{1}{6}$ in. long. Male spikes rather lax, slender, 4–10 in. long, axillary;

rhachis very sparingly puberulous or glabrous; flowers in clusters of 3–6; bracts minute, acute; clusters 1–3 lin. apart. Calyx white, globose, glabrous, 1 lin. in diam.; segments 3, triangular, acute. Stamens many; filaments slender, glabrous, inserted on a conical receptacle; anther-cells with 2 superposed locelli. Disk 0. Female flowers racemose, solitary; pedicels finally $\frac{1}{2}$ in. long. Ovary subglobose, 2–3-celled, somewhat villous; styles $\frac{1}{3}$–$\frac{1}{2}$ in. long. Capsule subglobose, $\frac{1}{2}$ in. across, 3-coccous or 2-coccous. Seeds subglobose, glabrous.

Upper Guinea. Gold Coast: Akim, on the Dansu River, *Johnson*, 437! Western Ashanti; Tappa, *Chipp*, 101! Coomassie, *Chipp*, 141!
Lower Guinea. Gaboon; Pyrat, *Griffon du Bellay*, 2!

2. **C. Preussii,** *Baker in Kew Bulletin*, 1910, 343. A climbing shrub 15–20 ft. high, with slender green glabrous branches. Leaves long-petioled, alternate, ovate or oblong, acuminate, 3–5 in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. wide, rounded at the base, crenulate, membranous, pale green, glabrous on both surfaces, 3-nerved at the base, midrib with about 3 pairs of ascending secondary nerves looping to make an intra-marginal nerve continuous with the lateral basal nerves; midrib, veins and reticulations distinct beneath; petioles glabrous, 2 lin. long; stipules very minute. Male racemes axillary, shortly peduncled, lax, including the peduncles 3–6 in. long, with short spreading or deflexed branchlets $\frac{1}{6}$–$\frac{1}{3}$ in. apart, usually 4–6-flowered, but sometimes towards the apex only 1-flowered; bracts minute, acute; pedicels filiform, longer than the globose glabrous buds. Calyx green; lobes 3–5, oblong, acute, glabrous. Stamens numerous; filaments glabrous, very short, inserted on a conical receptacle; anther-cells with 2 locelli. Disk 0. Female flowers and fruit unknown.—*Cleidion sp.*, Benth. in Benth. et Hook. f. Gen. Pl. iii. 320. *C. Mannii*, Baker in Kew Bulletin, 1910, 58. *Mallotus Preussii*, Pax in Engl. Jahrb. xxiii. 525.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 615! Cameroons: Barombi, *Preuss*, 420! Cameroon River, *Mann*, 2202!

67. DISCOGLYPREMNA, Prain in Kew Bulletin, 1911, 317.

Flowers diœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 5 valvate lobes. Stamens about 7; filaments long, free, mixed with numerous hirsute receptacular glands; anthers dorsifixed near the apex, cells distinct, each unequally didymous and 2-locellate, pendent from a prominent conical connective. Rudimentary ovary 0. Female: Calyx 5-partite; lobes valvate, at length reflexed. Ovary 3-celled; styles distinct, entire, fimbriate within, recurved-spreading; ovules solitary in each cell. Disk very prominent, of 6–8 stout scales hirsute at the tips. Capsule tridymous, breaking up into 2-valved cocci. Seeds ovoid, nestling in a fleshy aril; testa hard, thick; tegmen distinct; albumen fleshy; cotyledons broad, flat.—Tree. Leaves alternate, petioled, 3-nerved and minutely 2-glandular above at the base. Spikes in both sexes forming considerable terminal panicles. Flowers

minute; males clustered, females solitary along the rhachis; pedicels in both sexes articulate; bracts minute.

Species 1, endemic.

1. **D. caloneura,** *Prain in Kew Bulletin*, 1911, 317. Tree, 50–70 ft. high; twigs glabrous. Leaves petioled, firm, oblong or rounded-oblong, usually shortly caudate-acuminate, base cuneate or almost rounded, entire or faintly toothed, 3–4 in. long, 2–2¼ in. wide, glabrous or with a few hairs on the main nerves beneath, 3-nerved from the base; petiole 1¾–2 in. long. Panicles 6–8 in. long, 3–4 in. wide. Male: Calyx valvately 5-partite, less often 3–4-partite, in bud globose, ½ lin. wide. Stamens 7–8; filaments far exserted, slender, glabrous; receptacular glands all inter-staminal, very variable in thickness, hirsute at the apex, about twice as many as the filaments; anthers dorsifixed near the apex; connective conical; cells distinct, each unequally 2-locellate, with the smaller locellus on the inner side. Female: Calyx valvately 5-sect; lobes reflexed. Ovary 3-celled, hirsute; styles free, undivided, fimbriate on the inner face, recurved-spreading; ovules in each cell solitary. Disk of 6–8 large ovate obtuse thick scales, hirsute at the margin and on upper side. Capsule 3-coccous, sparingly hairy; cocci 2-valved. Seeds ovoid, completely enveloped in a thick pulpy aril; testa very hard and thick, black, somewhat polished, foveolate; tegmen grey, distinct; albumen fleshy; cotyledons suborbicular, slightly cordate at the base.—*Alchornea caloneura*, Pax in Engl. Jahrb. xliii. 81.

Upper Guinea. Ivory Coast: Potou Lagoon; Anyama, *Chevalier*, 20019! Gold Coast: Ancobra River, *Johnson*, 919! Esubompang, *Chipp*, 100! Southern Nigeria: 70 miles east of Lagos, *Lamborn*, 123! Cameroons: Bipinde, *Zenker*, 2113! 2643! 3322!

Lower Guinea. Spanish Guinea: Nkolentangan, *Tessmann*, 97! Bebao, *Tessmann*, 702!

68. **MACARANGA**, Thouars; Benth. et Hook. f. Gen. Pl. iii. 320.

Flowers diœcious, rarely monœcious, apetalous. Male: Calyx globose, closed in bud, splitting into 3–4 valvate lobes. Stamens sometimes few (1–3), often numerous (10–30); filaments short, free, very rarely united or as if branched; anthers short, terminal, usually 4-celled, 4-valved, sometimes 3-celled, 3-valved, rarely 2-celled. Rudimentary ovary 0. Female: Calyx truncate or shortly toothed, ultimately wide-cupular or obliquely spathaceous. Ovary 2-3- (rarely 4–6-) celled; styles short, stout, entire, free or slightly united at the base; rarely long, slender or united in a globose mass; ovules in each cell solitary. Disk 0. Capsule breaking up into 2-valved cocci or occasionally, when 1-chambered, almost indehiscent. Seeds globose; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Trees or shrubs. Leaves alternate, petioled, simple or lobed, base often palminerved and sometimes peltate, sometimes penninerved. Spikes or racemes axillary or lateral or sometimes forming a terminal panicle; male flowers small,

clustered; female flowers solitary; bracts distinct or minute, entire or lobed or fimbriate.

Species about 100, spread throughout the tropics of the Eastern hemisphere.

Leaves more or less distinctly lobed.
Lobes large, separated by narrow sinuses.
Stipules converted into deep flask-shaped sacs 1. *M. saccifera.*
Stipules not saccate.
Lobes of leaves with short acute tips.
Basal sinus of leaf narrow . . . 2. *M. Schweinfurthii.*
Basal sinus of leaf open . . . 3. *M. rosea.*
Lobes of leaves with long caudate-acuminate tips.
Leaves glabrous on both sides when mature . . . . . 4. *M. heterophylla.*
Leaves pubescent on the nerves on both sides . . . . . 5. *M. dibeelensis.*
Lobes small, separated by wide shallow sinuses.
Leaves when mature glabrous on both sides 6. *M. occidentalis.*
Leaves persistently pubescent on nerves and veins beneath.
Stipules narrow, lanceolate . . . 7. *M. angolensis.*
Stipules wide, ovate . . . . 8. *M. magnistipulosa.*
Leaves not lobed.
Leaves palmately 5–7-nerved from the often slightly peltate base.
Leaves membranous, denticulate, acuminate, peltate . . . . . 9. *M. ruwenzorica.*
Leaves subcoriaceous, entire, acute, only slightly and not always peltate . . 10. *M. kilimandscharica.*
Leaves 3-nerved from the base, or penninerved.
Leaf-margins more or less sinuate or toothed.
Leaves shallowly repand; bracts large, orbicular, entire . . . . 11. *M. Staudtii.*
Leaves distinctly toothed.
Bracts toothed or lobed.
Stipules more or less persistent, 1 in. long or longer; bracts obtuse.
Bracts deeply laciniate; segments linear . . . . . 12. *M. Beillei.*
Bracts crenate; segments obtuse . 13. *M. Paxii.*
Stipules caducous, $\frac{1}{2}$ in. long or less; bracts acute, serrate.
Leaves with long white hairs on the nerves beneath . . . 14. *M. togoensis.*
Leaves without long white hairs.
Leaves on nerves beneath and young twigs rusty-pubescent 15. *M. monandra.*
Leaves and young twigs quite glabrous . . . . 16. *M. Zenkeri.*
Bracts entire, small; stipules caducous, under $\frac{1}{4}$ in. long . . . . 17. *M. Dawei.*
Leaf margins always entire.

Bracts large and conspicuous.
Leaves elliptic-ovate, acuminate, base rounded or subcordate.
Leaves pubescent on the nerves beneath.
Petiole 3–6 in. long.
Bracts entire; young twigs glabrous . . . 18. *M. pierreana.*
Bracts incised; young twigs pubescent . . . 19. *M. Poggei.*
Petiole under 2 in. long; twigs pubescent . . . . . 20. *M. Gilletii.*
Leaves and young twigs glabrous . 21 *M. Laurentii.*
Leaves oblong or lanceolate, acute, base cuneate.
Leaf-bases minutely 2-lobed at junction with petiole . . 22. *M. Barteri.*
Leaf-bases not at all lobed.
Flowers in panicles . . . 23. *M. Rowlandii.*
Flowers in spikes . . . 24. *M. lancifolia.*
Bracts small or very small or obsolete.
Petiole 2 in. long or longer.
Leaves ovate or oblong, base unequally cuneate or sometimes rounded; stamens 15 . . 25. *M. mellifera.*
Leaves triangular-ovate, base wide-truncate; stamens 2–3 . . 26. *M. gabunica.*
Petiole under 2 in. long.
Leaves oblong or elliptic-oblong.
Leaves long-acuminate, pubescent or puberulous on the nerves beneath.
Stipules persistent; bracts under flowers larger than the basal . . . 27. *M. klaineana.*
Stipules caducous; bracts under flowers smaller than the basal, almost obsolete . . . 28. *M. Pynærti.*
Leaves shortly acuminate or acute.
Leaves more or less pubescent on both surfaces . . 29. *M. spinosa.*
Leaves glabrous . . . 30. *M. inopinata.*
Leaves oblanceolate-oblong, obtuse or shortly abruptly acuminate 31. *M. Heudelotii.*

1. **M. saccifera,** *Pax in Engl. Jahrb.* xix. 93, *t.* 1. A shrub or tree; branches armed with spines, densely tawny-pubescent. Leaves long-petioled, rounded-ovate, deeply 3-lobed, lobes obovate-oblong or triangular, acute, margin repand or toothed, base narrowly deep-cordate, 8–10 in. long, nearly as wide, subcoriaceous, gland-dotted beneath, with a pair of marginal glandular processes at the junction with the petiole; petiole 6 in. long; stipules converted into large coriaceous acute flask-

shaped sacs. Male flowers in axillary panicles; bracts ovate, acute, subtending several flowers; buds globose. Female flowers unknown.—De Wild. Miss. É. Laurent, 130, tt. 39–41; De Wild. & Durand, Contrib. Fl. Congo, ii. 57; Reliq. Dewevr. ii. 212; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 283, and Comp. Kasai, 330; Durand & Schinz, Études Fl. Congo, 246; Th. & Hél. Durand, Syll. Fl. Congol. 496.

Lower Guinea. Gaboon: Libreville, *Klaine*, 3080! Lower Congo: Cataract district; between Matadi and Leopoldville, *Laurent!*

South Central. Belgian Congo: Madibi, on the River Kwilu, *Sapin;* Equatorial district; near Eala, *Pynaert*, 717, 1047, *Laurent*, 1133, Bokakata, *Dewèvre;* Bangala district; near Bumba, *Seret*, 35; Mjolo, *Laurent*, 258; *Seret;* Aruwimi; Patalongo (Yambuya) *Laurent*. Kasai; Kondue, *Laurent;* Batempe, *Laurent;* between Lusambo and the Lomami, *Laurent;* Mukenge, *Pogge*, 1335! 1363!

2. **M. Schweinfurthii,** *Pax in Engl. Jahrb.* xix. 92. A shrub or tree, sometimes very lofty, reaching 150 ft. in height (*Chevalier*); trunk and branches armed with spines, branches glabrous. Leaves long-petioled, ovate, shallowly 3-lobed, lobes oblong or triangular, acute, margin irregularly toothed, base narrowly deep-cordate, 6–18 in. long, nearly as wide, membranous, becoming firmer with age, gland-dotted beneath, with a pair of glandular processes at the junction with the petiole; petiole 8–16 in. long; stipules large, ovate, acute, $1\frac{1}{4}$ in. long. Male flowers in lateral panicles fascicled in the axils of fallen leaves; bracts concave, thick, entire, subtending many flowers. Stamens 2–5 (usually 3). Female flowers in short lateral racemes; pedicels short, stout. Sepals ovate, obtuse. Ovary glabrous, 2–3-celled; stigmas spreading. Capsule usually 2-coccous; cocci $\frac{1}{2}$ in. across.—Durand & Schinz, Études Fl. Congo, 246; Th. & Hél. Durand, Syll. Fl. Congol. 496. *M. Lecomtei*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 78. *M. calophylla*, Pax in Engl. Jahrb. xliii. 221.

Upper Guinea. Cameroons: Tibati, *Ledermann*, 2425! Songalong, *Ledermann*, 2108!

North Central. Darbanda: Boro Valley, *Chevalier*, 7057!

Nile Land. Uganda: very common, *Scott-Elliot*, 7351! *Bagshawe*, 776! 1232!

Lower Guinea. French Congo: Brazzaville, *Chevalier*, 4207!

South Central. Belgian Congo: Ituri district; Fort Beni on the Semliki, *Mildbraed*, 2214! Niamniam; by the River Diagbe, *Schweinfurth*, 3315! by the River Yuru, *Schweinfurth*, 3336! Monbuttu; Munza, *Schweinfurth*, 3500!

3. **M. rosea,** *Pax in Engl. Jahrb.* xxvi. 328. A tree; branches stout, sometimes armed with spines, glabrous. Leaves long-petioled, ovate, shallowly 3-lobed, lobes oblong or triangular, acute, margin obscurely toothed, base wide-cordate, 6–12 in. long, nearly as wide, membranous, becoming firmer with age, gland-dotted beneath, with a pair of glandular processes at the junction with the petiole; petiole 4–10 in. long; stipules large, ovate, acute, 1 in. long. Male flowers in lateral panicles fascicled in the axils of fallen leaves; bracts small, concave, subtending many flowers. Stamens 2. Female flowers unknown.

De Wild. Études Fl. Bas- et Moyen-Congo, ii. 283; Th. & Hél. Durand, Syll. Fl. Congol. 496. *M. angolensis*, Hiern in Cat. Afr. Pl. Welw. i. 981, second section, not of Müll. Arg.

Upper Guinea. Southern Nigeria: Oban, *Talbot,* 112! 1377! 1431! Cameroons; Bipinde, *Zenker*, 1315! 2178! 2178A! 2821!

Lower Guinea. Angola: Bamba, *Monteiro!* Ambriz, *Welwitsch*, 451!

South Central. Belgian Congo: Equatorial district, Eala, *Pynaert*, 1491; Ikenge, *Huyghe;* Lualaba-Kasai district; Mukenge, *Pogge*, 1391!

4. **M. heterophylla,** *Müll. Arg. in DC. Prodr.* xv. ii. 993. A shrub or tree reaching 20 ft. in height; branches armed with spines, at first rusty-pubescent. Leaves long-petioled, rounded-ovate, deeply 5-lobed, less often 3-lobed, lobes oblong, long-acuminate, margin sinuately toothed, base wide-cordate, 12 in. long, nearly as wide, firmly membranous, glabrous on both sides when mature, gland-dotted beneath, with a pair of marginal glands at the junction with the petiole; petiole 8 in. long; stipules large, triangular, firm, $1\frac{1}{4}$ in. long, persistent. Male flowers in axillary panicles; bracts triangular, keeled, subtending several flowers; bracteoles ovate-triangular, laciniate. Stamens 3; filaments united at the base. Female flowers in axillary racemes; bracts as in the males, subtending 2–3 flowers. Sepals 4, ovate-triangular. Capsule 2-celled. Seed ovoid.—Hiern in Cat. Afr. Pl. Welw. i. 981. *M. Schweinfurthii*, Cummins in Kew Bulletin, 1898, 79; not of Pax. *M. quinquelobata*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 78. *Mappa heterophylla*, Müll. Arg. in Journ. Bot. 1864, 336. *Tanarius heterophyllus*, O. Kuntze, Rev. Gen. Pl. ii. 620.

Upper Guinea. Senegambia: between Diangon and Sindialone, *Chevalier*, 15770! French Guinea: Fouta-Jalon, near the Konkouré River, *Chevalier*, 14751! between La Santa and Timba, *Chevalier*, 12596! Kouria, *Chevalier*, 15003! Sierra Leone: forests of Sugarloaf Mountain, *Don! Barter! Welwitsch*, 464! route to Lester Peak, *Scott-Elliot*, 3835! Scarcies River, near Buya-Buya, *Scott-Elliot*, 4767! Ivory Coast: Bingerville district; Abidjean and Dabou, *Chevalier*, 15250! Agneiby Valley, Voguié, *Chevalier*, 17136! Gold Coast: Ashanti, *Cummins*, 132!

5. **M. dibeelensis,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 281. A small tree; branches often armed with spines, at first densely pubescent. Leaves long-petioled, rounded-ovate, 3-lobed, lobes acuminate, margin irregularly toothed, base cordate, 5–13 in. long, nearly as wide, subcoriaceous, pubescent on both sides, especially on the nerves, gland-dotted beneath, with a pair of marginal glandular recesses at the junction with the petiole; petiole 3–8 in. long; stipules lanceolate, acute, nearly 1 in. long, caducous. Male flowers in axillary panicles; bracts ovate or obovate, toothed at the tip, subtending many flowers. Female flowers unknown.—Th. & Hél. Durand, Syll. Fl. Congol. 495.

South Central. Belgian Congo: Kasai; Dibele, *Laurent, Flamigni,* 189; Equatorial district; below Bolumbo, *Laurent.*

6. **M. occidentalis,** *Müll. Arg. in DC. Prodr.* xv. ii. 994. A tree 30–50 ft. high; branches stout, brown-pubescent. Leaves long-petioled,

orbicular, obscurely 3-lobed, cuspidate, margin subentire, base cordate, 6–12 in. long, nearly as wide, subcoriaceous, glabrous, white-pruinose and gland-dotted beneath; petiole 6–8 in. long; stipules triangular, tomentose. Male flowers in dense lateral panicles, axillary or from the axils of fallen leaves; bracts large, orbicular, laciniate, subtending several flowers. Stamens 2–5. Female flowers in laxer panicles. Calyx tomentose, shortly lobed. Ovary glandular; stigmas densely papillose.—*M. Preussii,* Pax in Engl. Jahrb. xix. 92. *Mappa occidentalis,* Müll. Arg. in Flora, 1864, 467.

Upper Guinea. Cameroons: Ambas Bay; Victoria Mountain, 2500 ft., *Mann,* 771 ! Cameroon Mountain, 2000-3000 ft., *Mann,* 1189 ! 2155 ! Buena, 2700–3300 ft., *Preuss,* 601 ! *Deistel,* 152 ! 287 ! *Lehmbach,* 216 ! Soppo, 2300–3200 ft., *Preuss !* Fernando Po: at 4000 ft., *Mann,* 303 !

7. **M. angolensis,** *Müll. Arg. in DC. Prodr.* xv. ii. 994. A subscandent shrub or a short-stemmed tree with long spreading branches; branches often armed with spines, densely pubescent. Leaves long-petioled, orbicular-ovate, usually slightly 3-lobed, acute, base shallow-cordate, margin with thickened teeth, 4–7 in. long, nearly as wide, subcoriaceous, glabrous except on the main-nerves above, persistently and closely pubescent on the nerves and veins and gland-dotted beneath; petiole pubescent, 3–5 in. long; stipules lanceolate, acute, pubescent. Male flowers in lax lateral panicles, axillary or from the axils of fallen leaves; bracts ovate, abruptly acute, entire, subtending many flowers. Stamens 2–3. Female flowers in rather dense panicles. Calyx cupular. Ovary pubescent. Capsule usually 2-celled. Seeds small, orbicular.—Ficalho, Pl. Uteis, 257; Hiern in Cat. Afr. Pl. Welw. i. 981; De Wild. Études Fl. Bas- et Moyen-Congo, i. 277, ii. 281; Th. & Hél. Durand, Syll. Fl. Congol. 495. *M. mildbrædiana,* Pax in Engl. Jahrb. xliii. 322. *Mappa angolensis,* Müll. Arg. in Journ. Bot. 1864, 337. *Tanarius angolensis,* O. Kuntze, Rev. Gen. Pl. ii. 620.

Lower Guinea. Lower Congo: Kisantu, *Gillet,* 166. Angola: Golungo Alto; Serra de Alto Queta and ascent from Sango, *Welwitsch,* 449 ! 450 ! Cazengo; near Monte Bello, *Gossweiler,* 664 ! Granja de S. Luiz, *Gossweiler,* 4809 !

South Central. Belgian Congo: between Tumba and Kimpese, *Gillet;* Ituri district; Fort Beni, on the Semliki, Kwa Muera, *Mildbraed,* 2278A ! 2376 !

Var. *mollis,* Prain. Leaves more distinctly cordate at the base.—*M. mollis,* Pax in Engl. Jahrb. xix. 93; Durand & Schinz, Études Fl. Congo, 246; Th. & Hel. Durand, Syll. Fl. Congol. 496. *M. Guignardi,* Beille in Bull. Soc. Bot. France, lv. Mém. viii. 77.

Lower Guinea. French Congo: Brazzaville, *Chevalier,* 4048 ! 4153 ! 4183 ! Gaboon: near Libreville, *Klaine* (specimens much less pubescent) !

South Central. Belgian Congo: Lualaba-Kasai district; Mukenge, *Pogge,* 1352 !

8. **M. magnistipulosa,** *Pax in Engl. Jahrb.* xliii. 222. A shrub, perhaps sometimes scandent; branches glabrous. Leaves long-petioled, orbicular-ovate, shallowly 3-lobed, acute, base deep-cordate, margin sparingly toothed, 8 in. long, nearly as wide, coriaceous, glabrous above, persistently but sparingly pubescent beneath, not gland-dotted, with a pair of small glandular processes at the junction with the petiole; petiole

5–6 in. long; stipules large, obliquely ovate, obtuse, over 1 in. long. Male flowers in lax axillary panicles; bracts ovate, toothed, subtending several flowers. Stamens 3. Female flowers unknown.

Lower Guinea. Spanish Guinea: Anang, 1500 ft., *Tessmann*, 249!

9. **M. ruwenzorica,** *Pax in Engl. Jahrb.* xliii. 322. A tree; branches at first pubescent, soon glabrous. Leaves long-petioled, rather broadly peltate, triangular, caudate-acuminate, base truncate or slightly retuse, margin denticulate, 5–10 in. long, nearly as wide, thinly membranous, glabrous above, sparingly hairy on the nerves and gland-dotted beneath; petiole 4–6 in. long; stipules lanceolate, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers and fruit unknown.

Nile Land. British East Africa: Kenia, *Hutchins!*

South Central. Belgian Congo: Ituri district; Ruwenzori, Butaga-Tal, 6000–7000 ft., *Mildbraed*, 2701!

Described by Dr. Pax from imperfect material because of its being the first African *Macaranga* with peltate leaves. This is not exactly the case; the leaves of Volkens 1271, included by Pax in *M. kilimandscharica*, are slightly peltate; the leaves of Engler 648, from Nguelo, East Usambara, are nearly as peltate as those of Mildbraed 2701 and are similar in consistence, but are less markedly denticulate and less distinctly acuminate, while the stipules are larger. Dawe 602, from Ruwenzori at 6000–7000 ft., has equally peltate leaves, but with a less acuminate apex, entire margins and firmer consistence then in Mildbraed 2701. Two specimens from German East Africa, named "Mkumba" and numbered 294 and 326 in Berlin Herb., appear closely related to Engler 648, but those of 326 are firmer and not peltate, those of 294 are less markedly peltate and less markedly denticulate. Still another specimen, with very widely peltate leaves, is Lyne 101 from the Ngazi forest, Pemba. Unfortunately all the specimens here alluded to—which may represent three (if not four) distinct but allied species—agree with *M. ruwenzorica* in having neither flowers nor fruit.

10. **M. kilimandscharica,** *Pax in Engl. Pfl. Ost-Afr. C.* 238. A tree; young branches pubescent. Leaves long-petioled, often narrowly but distinctly peltate, wide-ovate, acute, base rounded or slightly cordate, margin entire, 4–6 in. long, nearly as wide, subcoriaceous, glabrous; petiole 3–4 in. long; stipules lanceolate, deciduous. Male flowers in short lateral panicles; bracts ovate, acute, entire, subtending several flowers. Stamens 2. Female flowers in short axillary panicles; bracts as in the males. Calyx-lobes ovate. Ovary glabrous, 2-celled; stigmas recurved. Capsule globose, densely lepidote, $\frac{1}{4}$ in. in diam.—Pax in Engl. Jahrb. xxiii. 526; xxx. 339.

Nile Land. Uganda: Toro; Ruwenzori, 7000–8600 ft., *Scott-Elliot*, 7816! British East Africa: Kenia and Aberdare range, 7000–8000 ft., *Battiscombe*, 76! Kericho, *Elliott*, 187!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 6000 ft., *Volkens*, 1080! 1271! 1271A! Amani, 3000 ft., *Warnecke*, 366! British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 14! 387!

Schweinfurth, 3337, from Yuru, Niamniam, is nearly allied to, if not a form of, this species. The leaves are rather narrower for their length and are borne on long slender shoots armed with numerous spines.

11. **M. Staudtii,** *Pax in Engl. Jahrb.* xxiii. 526.— A tree or shrub; branches stout, glabrous. Leaves long-petioled, wide-oblong, acute, narrowed gradually to the small rounded base, margin shallowly repand, 6–7 in. long, 4–5 in. wide, subcoriaceous, glabrous above, slightly pubescent and gland-dotted beneath, with a pair of marginal glandular processes at the junction with the petiole; petiole 2–3 in. long; stipules caducous. Male flowers in axillary panicles; bracts large, suborbicular, entire; buds small, globose, tomentose. Female flowers unknown.

Upper Guinea. Cameroons: Yaunde, *Zenker & Staudt*, 324!

Lower Guinea. Gaboon: Libreville, *Klaine*, 692!

Though very different in shape of leaf, the natural position of this species is in the vicinity of *M. rosea* and *M. Schweinfurthii*.

12. **M. Beillei,** *Prain in Kew Bulletin*, 1910, 239. A shrub or small tree; branches glabrous. Leaves long-petioled, ovate, acuminate, base rounded or faintly subcordate, margin slightly toothed, 4–6 in. long, 3–4 in. wide, membranous, glabrous or nearly so; petiole 3–4 in. long; stipules lanceolate, 1 in. long, persisting. Male flowers in rather lax lateral panicles; bracts ovate, deeply laciniate, subtending several flowers; buds globose, minute, puberulous. Stamens 2. Female flowers unknown.

Upper Guinea. Ivory Coast: Bingerville district; between Abidjean and Dabou, *Chevalier*, 15551!

Lower Guinea. French Congo: Kitobi, *Lecomte*, A 89!

13. **M. Paxii,** *Prain in Kew Bulletin*, 1910, 127. A shrub or small tree; branches sparingly armed with spines, glabrous. Leaves long-petioled, ovate, long-acuminate, base rounded, margin deeply and distantly toothed, 4–8 in. long, 3–4 in. wide, membranous, pubescent on the nerves when young especially beneath, ultimately glabrous except for a few long white hairs on the nerves beneath; petiole 3–4 in. long; stipules ovate, acute, with ciliate margins, over 1 in. long. Male flowers in rather lax lateral panicles; bracts suborbicular, obtuse, deep crenate, subtending several flowers; buds globose, minute, puberulous. Stamens 2, occasionally 1. Female flowers unknown.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 610! Cameroons: Yaunde, *Zenker & Staudt*, 106! *Zenker*, 648!

14. **M. togoensis,** *Pax in Engl. Jahrb.* xliii. 221. A tree or shrub, sometimes subscandent; branches armed with spines, at first white-pubescent, at length glabrous. Leaves long-petioled, ovate-oblong, shortly acuminate; base truncate, margin irregularly and undulately or erosely toothed, 5–7 in. long, nearly as wide, firmly membranous, dull, nearly glabrous above, with more persistent rather long white hairs on the nerves and gland-dotted beneath; petiole 3–7 in. long; stipules lanceolate, under $\frac{1}{2}$ in. long, caducous. Male flowers in short axillary fascicled racemes or panicles; bracts subconcave, orbicular, laciniate, subtending numerous flowers. Stamens 2, exserted. Female flowers in rather lax lateral panicles. Capsule pisiform, clothed with

yellowish glands.—*M. huræfolia*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 80.

Upper Guinea. Sierra Leone: Scarcies; near Sasseni, *Scott-Elliot*, 4530! Ivory Coast: Bingerville district; between Abidjean and Dabou, *Chevalier*, 15319! 15449! 15590! Basin of the Middle Sassandra; Guideko, *Chevalier*, 16401! Altié, between Montezo and Alepé, *Chevalier*, 17432! Togo, *Doering*, 291!

15. **M. monandra,** *Müll. Arg. in Journ. Bot.* 1864, 337. A shrub or tree reaching 25 ft. in height; branches brown-pubescent. Leaves long-petioled, suborbicular or wide-oblong, acute, base rounded or widely deltoid, margin rather deeply repand, 4–5 in. long, nearly as wide, firmly membranous, dull, glabrous above, finely rusty-puberulous on the nerves and gland-dotted beneath; petiole 3–6 in. long; stipules lanceolate, under $\frac{1}{2}$ in. long, caducous. Male flowers in small dense lateral panicles; bracts large, ovate, acute, toothed, subtending several flowers. Stamen 1 (*Müller*). Female flowers in lateral corymbose racemes or panicles. Calyx small, lobed. Ovary densely glandular. Stigma sessile. Capsule globose, densely lepidote; pedicels very long.—Hiern in Cat. Afr. Pl. Welw. i. 982; Pax in Bull. Soc. Bot. Belg. xxxvii. 105; Durand & Schinz, Études Fl. Congo, 246; Rendle in Journ. Linn. Soc. xxxvii. 213; Dawe, Rep. Bot. Uganda, 56; Th. & Hél. Durand, Syll. Fl. Congol. 496. *Tanarius monandrus*, O. Kuntze, Rev. Gen. Pl. ii. 620.

Lower Guinea. Lower Congo, *Laurent*, 45. Angola: Golungo Alto, *Welwitsch*, 446! Cazengo; Monte Bello, *Gossweiler*, 742!

Nile Land. Uganda: Sesse Island, *Dawe*, 49! Musozi, *Bagshawe*, 4!

16. **M. Zenkeri,** *Pax in Engl. Jahrb.* xxiii. 526. A tree; branches glabrous. Leaves long-petioled, oblong, acute, base cuneate or deltoid, margin deeply and distantly repand, 4–7 in. long, 3–5 in. wide, membranous, glabrous on both surfaces; petiole 3–6 in. long; stipules lanceolate, under $\frac{1}{2}$ in. long, caducous. Male flowers in small lateral panicles; bracts large, ovate, acute, toothed, subtending several flowers; buds globose, minute, pubescent. Stamens 2. Female flowers in lateral corymbose racemes or panicles. Calyx minute, obscurely lobed. Capsule globose; pedicels very long.—Pax in De Wild. & Durand, Contrib. Fl. Congo, i. 50; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 48; Contrib. Fl. Congo, ii. 57; Reliq. Dewevr. ii. 212; De Wild. Études Fl. Bas- et Moyen-Congo, i. 277, ii. 284; Th. & Hél. Durand, Syll. Fl. Congol. 497.

Upper Guinea. Southern Nigeria: Old Calabar, *Holland*, 99! Cameroons: Yaunde, *Zenker & Staudt*, 514! Bipinde, *Zenker*, 962! 1751! 1858! 2558! 2817! Efulen, *Bates*, 262! Abonando, *Rudatis*, 12!

Lower Guinea. Gaboon: Libreville, *Klaine*, 81! 116! 269! 588! 858! *Thollon*, 140! Lower Congo: Stanley Pool district; near Sanda, *Oddon;* Kisantu, *Gillet*, 249; and without precise locality, *Gillet*, 1834.

South Central. Belgian Congo: Equatorial district; Eala, *Laurent;* Welle district; Bomokandi, near Nala, *Seret;* Eastern Province; Ponthierville, near Lokandu, *Dewèvre*, 1134; Katanga district; near Tanganyika, *collector unknown.*

17. **M. Dawei,** *Prain in Kew Bulletin*, 1911, 232. A small tree; branches puberulous. Leaves short-petioled, lanceolate or oblong-lanceolate, acute, base wide-cuneate or rounded, margin shortly but distinctly and irregularly toothed or occasionally subentire, 2½–4 in. long, ⅔–1 in. wide, chartaceous, glabrous, glandular-lepidote beneath; petiole ¼–⅓ in. long, puberulous; stipules lanceolate, ¼ in. long or less, rusty-puberulous, caducous. Male flowers in small lateral spikes ¼–½ in. long; bracts small, ovate, acute, entire, subtending several flowers; buds globose, minute, pubescent. Stamens 5–12; filaments united irregularly below, free above. Female flowers unknown.

Nile Land. Uganda: by the Mubuka River, on the lower slopes of Ruwenzori, *Dawe*, 595!

A very distinct species; in all other respects a *Macaranga*, but with stamens resembling those of a *Homonoia*.

18. **M. pierreana,** *Prain in Kew Bulletin*, 1912, 105. A shrub or tree; branches quite glabrous. Leaves long-petioled, ovate, shortly acuminate, base rounded, margin entire, 6 in. long, 4 in. wide, glabrous except on the nerves, gland-dotted beneath; petiole 5–6 in. long; stipules caducous. Male flowers in small ovate strobiliform heads terminating the branches of a long lax axillary panicle; bracts obovate, subacute, entire, subtending several flowers; buds globose. Female flowers in large axillary panicles. Capsule globose, 1-coccous; pedicels long.

Lower Guinea. Gaboon: Sierra del Crystal, *Klaine!* near Libreville, *Klaine*, 1151!

19. **M. Poggei,** *Pax in Engl. Jahrb.* xix. 94. A tree or shrub; branches at first fulvous-pubescent. Leaves long-petioled, ovate, shortly acuminate, base rounded or subtruncate, margin entire, 4–6 in. long, 2–3 in. wide, glabrous except on the nerves beneath, gland–dotted beneath; petiole 3–4 in. long; stipules caducous. Male flowers in short axillary panicles; bracts ovate-oblong, acuminate, incised-toothed, subtending several flowers; buds globose. Female flowers in axillary corymbose simple or sparingly branched racemes; bracts as in the males. Calyx minute, lobed. Capsule globose or subdidymous; pedicels very long.—Durand & Schinz, Études Fl. Congo, 246; Th. & Hél. Durand, Syll. Fl. Congol. 496.

South Central. Belgian Congo: Mukenge, *Pogge*, 1387!

Var. *Chevalieri*, Prain. Leaf-base subcordate.—*M. Chevalieri*, Beille in **Bull.** Soc. Bot. France, lvii. Mém. viii. 125.

Lower Guinea. French Congo: Brazzaville, *Chevalier*, 11100!

20. **M. Gilletii,** *De Wild. Etudes Fl. Bas- et Moyen-Congo*, i. 276, *t.* 73. A tree or perhaps a shrub; branches armed with spines, at first pubescent, at length glabrous. Leaves petioled, elliptic-ovate, rather long-acuminate, base rounded or faintly subcordate, margin entire, 3–4½ in. long, nearly as wide, glabrous except on the nerves on both surfaces; petiole ⅓–1¾ in. long; stipules lanceolate, caducous. Male flowers in rather lax fascicled axillary panicles; bracts concave, wide-

ovate, subtending several flowers. Female flowers unknown.—Th. & Hél. Durand, Syll. Fl. Congol. 496.

Lower Guinea. Belgian Congo: Stanley Pool district; Kisantu, *Gillet*, 1840.

Evidently very closely allied to, if not a form of, *M. Poggei*.

21. **M. Laurentii,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 282. A small tree; branches glabrous. Leaves petioled, elliptic-obovate, somewhat acuminate, base rounded, margin entire, 3–5½ in. long, glabrous, shining above, dull and gland-dotted beneath; petiole ¾–1½ in. long; stipules triangular, acute, caducous. Male flowers in small lateral panicles; bracts large, ovate, acute, irregularly toothed, finely pubescent and glandular. Female flowers unknown.—Th. & Hél. Durand, Syll. Fl. Congol. 496.

South Central. Belgian Congo: Equatorial district; Eala, *Laurent*, 1304; *Pynaert*, 1278.

22. **M. Barteri,** *Müll. Arg. in Flora*, 1864, 535. A small tree; branches glabrous. Leaves long-petioled, oblong, acute, narrowed to two very minute lobes at the base, margin entire, 5–6 in. long, 2–3 in. wide, firmly membranous, glabrous on both sides; petiole 2½–4 in. long; stipules caducous. Male flowers in small peduncled axillary panicles; bracts large, ovate, acute, subtending numerous flowers. Stamens 2. Female flowers in axillary corymbose racemes; bracts as in the males. Calyx very small, lobed. Capsule irregularly ovoid or globose; pedicels very long.—DC. Prodr. xv. ii. 1015. *M. Heudelotii*, var. *nitida*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 79.

Upper Guinea. Sierra Leone: Limba, *Scott-Elliot*, 5668! Ivory Coast: Bingerville district; Abidjean and Dabou, *Chevalier*, 15161! 15274! 15414! 16197 bis! Zaranou, *Chevalier*, 16297 bis! Bouroukrou, *Chevalier*, 16830! and without precise locality, *Jolly*, 137! Gold Coast: Aburi Hills, *Johnson*, 296! Akwapim Hills, *Johnson*, 748! Togo: *Baumann*, 162! Southern Nigeria: Lagos, *Millen*, 28! 125! Onitsa, *Barter*, 1654! Cross River Expedition, *Johnston!*

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessmann*, 9!

23. **M. Rowlandii,** *Prain in Kew Bulletin*, 1910, 127. A small tree; branches glabrous. Leaves petioled, oblanceolate-oblong, abruptly and shortly acuminate, base cuneate, margin entire, 3–4 in. long, 1½–1¾ in. wide, glabrous and dull above, paler, glabrous and sparingly gland-dotted beneath; petiole ¾–1½ in. long; stipules lanceolate, caducous. Male flowers in small narrow lateral panicles; bracts ovate, cuspidate, shortly toothed, finely pubescent, subtending several flowers. Stamens 2. Female flowers unknown.

Upper Guinea. Gold Coast, *Farmar*, 454! Western Lagos, *Rowland!*

24. **M. lancifolia,** *Pax in Engl. Jahrb.* xliii. 322. A medium-sized tree; branches glabrous. Leaves petioled, lanceolate or oblong-lanceolate, acute, base cuneate, margin entire, 4–5 in. long, 1¼–1½ in. wide, coriaceous, rather shining and glabrous above, paler, glabrous and closely gland-dotted beneath; petiole 1¼–1½ in. long, with a pair of

apical glands; stipules small, rigid, recurved. Male flowers in axillary peduncled spikes; bracts closely imbricating, strongly keeled, entire, rather thick, subtending several flowers. Female flowers unknown.

South Central. Belgian Congo: Ituri district; between Mawambi and Awakubi, *Mildbraed*, 3118!

25. **M. mellifera,** *Prain in Journ. Linn. Soc.* xl. 201. A tree of medium size with wide branching crown; twigs rather stout, sparingly puberulous, soon becoming glabrous. Leaves long-petioled, ovate or oblong, sharply acuminate, base widely and abruptly cuneate or rounded, margin entire, 4–4½ in. long, 2¼–3 in. wide, subcoriaceous, glabrous above, copiously gland-dotted beneath and glabrous except on the lower third to one-half of the 3 basal nerves, which are densely hirsute with spreading hairs; petiole 2 in. long; stipules rather wide-lanceolate, caducous, puberulous. Male flowers in axillary panicles towards the end of the branches, honey-scented; bracts small, ovate, acute, entire, subtending several flowers. Stamens 15; filaments inserted on a long narrow receptacle, so that the androecium simulates a central column. Female flowers in axillary racemes; bracts as in the males; pedicels solitary or in few-flowered clusters. Ovary 1-celled by abortion, crowned by a single stout style-arm spreading at the base, erect at the tip, and with the rudimentary style-arm adnate to the opposite side of the coccus lower down, densely lepidote. Fruit unknown.

Mozamb. Distr. British Central Africa: Nyasaland; *Buchanan*, 1483! Rhodesia; Chirinda outskirts, 3700–4000 ft., *Swynnerton*, 5! 2120!

26. **M. gabunica,** *Prain in Kew Bulletin*, 1912, 104. A climbing shrub with long, spreading or pendulous branches at first sparingly rusty-puberulous, soon glabrous, unarmed. Leaves long-petioled, triangular-ovate, abruptly long-acuminate, base wide-truncate, margin entire, 4–4½ in. long, 3½–4 in. wide, coriaceous, pale green and glabrous above, slightly rusty-puberulous on the nerves only and gland-dotted beneath; petiole 2–2½ in. long; stipules caducous. Male flowers in small axillary panicles; their branches very short; bracts small, densely rusty-puberulous, subtending several flowers; stamens 2–3. Female flowers in small axillary panicles; bracts as in the males. Calyx urceolate, margin very slightly undulate. Capsule 1-coccous, 1-seeded, subglobose, densely rusty-puberulous, 2-valved, tipped by the remains of the slightly eccentric style, ⅓ in. in diam.

Lower Guinea. Gaboon: near Libreville, *Klaine*, 642! 643! 1152! 1153! French Congo: Niounerou, *Lecomte*, C 9!

27. **M. klaineana,** *Pierre ex Prain in Kew Bulletin*, 1912, 104. A climbing shrub; branches sparingly armed with minute spines, rusty-puberulous. Leaves petioled, ovate or elliptic, very long-acuminate with acute tips, base rounded, margin entire, 1¾–3 in. long, glabrous above, sparingly rusty-puberulous on the nerves and gland-dotted beneath; petiole rusty-puberulous, ⅓–1 in. long; stipules linear, rusty-puberulous, persistent, ⅕–¼ in. long. Male flowers in axillary

panicles; bracts at the base of the branches small, those subtending clusters of flowers rather larger, ovate, entire; stamens 2–3. Female flowers in axillary panicles with branches shorter than the males; bracts as in the males, but the floral subtending solitary flowers. Ovary 1-celled, incurved; style lateral, ascending, incurved, echinate below. Capsule 1-coccous, 1-seeded, subglobose, bearing the more or less persistent lateral style, $\frac{1}{5}$ in. in diam.

Lower Guinea. Gaboon: Libreville, *Klaine*, 239! 347! 1118! 6436!

28. **M. Pynærti,** *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 283. A shrub or tree; branches armed with spines, at first pubescent with spreading hairs, at length glabrous. Leaves petioled, elliptic-ovate, rather long-acuminate with rounded apiculate tip, base rounded or slightly subcordate, margin entire, over 2 in. long, glabrous above, slightly pubescent on the nerves and gland-dotted beneath; petiole pubescent, $\frac{1}{2}$–$1\frac{1}{2}$ in. long; stipules caducous. Male flowers in axillary panicles; bracts at the base of the branches small, these subtending clusters of flowers very minute. Female flowers unknown.—Th. & Hél. Durand, Syll. Fl. Congol. 496.

South Central. Belgian Congo: Equatorial district; Eala, *Pynaert.*

29. **M. spinosa,** *Müll. Arg. in Flora*, 1864, 466. A shrub or tree, reaching 40 ft. in height; branches long, spreading or pendulous, armed with spines, sparsely pubescent. Leaves long-petioled, oblong, acute, base rounded or slightly cordate, margin entire, 4–5 in. long, 2–$2\frac{1}{2}$ in. wide, subcoriaceous, slightly pubescent on both surfaces, copiously gland-dotted beneath; petiole 1–$1\frac{3}{4}$ in. long; stipules linear-lanceolate. Male flowers in small axillary panicles; bracts minute, ovate, subtending several flowers; stamens 2–3. Female flowers in small axillary panicles; bracts as in males. Calyx urceolate, truncate. Stigmas densely papillose.—DC. Prodr. xv. ii. 1013; Hiern in Cat. Afr. Pl. Welw. i. 982. *M. ledermanniana*, Pax in Engl. Jahrb. xliii. 222. *Tanarius spinosus*, O. Kuntze, Rev. Gen. Pl. ii. 620.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 1407! Nkolebunde, 650 ft., *Ledermann*, 807! Fernando Po, *Mann*, 1160!

Lower Guinea. French Congo: Kitobi, *Lecomte*, B 13! Spanish Guinea: Fang district, *Tessmann*, 5, partly! Angola: Golungo Alto, *Welwitsch*, 447! 448! Cazengo; near Monte Bello, *Gossweiler*, 690!

30. **M. inopinata,** *Prain.* A tree; branches rusty-pubescent. Leaves petioled, elliptic-ovate, somewhat acuminate, base truncate, margin entire, $2\frac{1}{2}$–4 in. long, $1\frac{3}{4}$–$2\frac{3}{4}$ in. wide, glabrous and somewhat shining above, glabrous, dull and closely gland-dotted beneath; petiole $1\frac{1}{2}$–2 in. long; stipules large, ovate-lanceolate, rusty-pubescent on both sides, $\frac{1}{2}$ in. long. Male flowers in large lateral panicles 4–5 in. long, their branches up to 2 in. long, rhachis and branches glabrous; bracts rather small, ovate or spathulate, obtuse, entire, finely pubescent. Stamens 3. Female flowers and fruit unknown.

Mozamb. Distr. German East Africa: Western Usambara, Kumba, *Holst*, 3739!

31. **M. Heudelotii,** *Baill. Adansonia,* i. 69. A small to medium tree, reaching 40 ft. in height; branches armed with spines, pubescent. Leaves petioled, oblanceolate-oblong, obtuse or minutely mucronate, base rather narrow, rounded, margin entire, 3–5 in. long, ½–2 in. wide, coriaceous, glabrous or slightly pubescent on the nerves beneath; petiole rusty-pubescent, ¼–¾ in. long; stipules caducous. Male flowers in axillary spikes; bracts ovate-triangular, acute; buds minute, obconic. Stamens 3–5, exserted. Female flowers in axillary panicles. Calyx membranous, 4–5-toothed. Ovary globose, densely lepidote; style thick, pilose; apex conic, retrorsely incurved. Capsule pisiform, lepidote. Seed globose.—Müll. Arg. in DC. Prodr. xv. ii. 1015. *M. apicifera,* Beille in Bull. Soc. Bot. France, lv. Mém. viii. 79,

Upper Guinea. Senegambia: Cape Verd peninsula, *Leprieur!* Kombo, *Heudelot,* 106! Rio Nunez, *Heudelot,* 784! Dagana, *Perrottet,* 725! 753! *Leprieur!* French Guinea: Kindia, *Chevalier,* 13028! 13157! 13208 bis! Kouria, *Chevalier,* 14854! Medinani, on the Upper Niger, *Chevalier,* 513! Sierra Leone, *Scott-Elliot,* 4390! 4517! 4743! 4958! 5258! 5275! Ivory Coast: Lower Cavally, between Prolo and Blieron, *Chevalier,* 19885! Southern Nigeria: Lagos; Eppah, *Barter,* 3271! near Lagos, *Moloney!*

69. RICINUS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 321.

Flowers monœcious, apetalous. Male: Calyx membranous, globose in bud, splitting into 3–5 valvate lobes. Stamens very numerous, up to a thousand, clustered, central; filaments several times divided; anthers 2-celled; cells distinct, subglobose, divaricate, separately attached to the connective; dehiscence longitudinal. Rudimentary ovary 0. Female: Calyx very caducous, usually spathaceously split. Ovary 3-celled; styles short or somewhat elongated, 2-fid or occasionally entire, spreading, somewhat plumose; ovules solitary in each cell. Disk 0. Capsule 3-dymous, breaking up into 3 2-valved cocci. Seeds ovoid; testa crustaceous; albumen fleshy; cotyledons broad, flat.—A tall annual herb or a tree-like shrub, glabrous, often glaucous. Leaves alternate, large, peltate, palmately 7- or more-lobed; lobes serrate. Racemes more or less paniculate towards the ends of the branches; flowers rather large, the upper males, clustered; the lower females, shortly pedicelled. Capsule smooth or echinate.

A single species, perhaps originally African, now widely cultivated throughout the Tropics.

1. **R. communis,** *Linn. Sp. Pl. ed.* i. 1007. Herbaceous or shrubby, evergreen; twigs glaucous. Leaves alternate, long-petioled, orbicular-peltate, 6 in. to 2 ft. across, deeply palmately lobed; lobes 7 or more, from ovate or oblong to ovate-lanceolate or linear, acute or acuminate, margin sharply glandular-toothed, glabrous and glaucous on both surfaces, green or reddish: petiole 4–12 in. long; stipules large, ovate, connate in an acute bud-sheathing deciduous calyptra ½–¾ in. long, quickly deciduous. Flowers in large pyramidal pseudo-terminal erect panicles, males below, females higher up. Male: Calyx

6 lin. wide; anthers yellow. Female: Calyx 4–5 lin. wide; styles usually brightly coloured. Capsule subglobose, ellipsoid or oblong, smooth or prickly, 7–12 lin. long, 7–10 lin. wide. Seed ovoid-flattened, 7–8 lin. long, 3–5 lin. wide; testa finely mottled; raphe faintly raised; caruncle conspicuous.—Bot. Mag. t. 2209; Müll. Arg. in DC. Prodr. xv. ii. 1017; Bentl. & Trimen, Med. Pl. iv. t. 237; Engl. Hochgebirgsfl. Trop. Afr. 284; Pax in Engl. Pfl. Ost-Afr. C, 240; Durand & Schinz, Études Fl. Congo, 247; Hiern in Cat. Afr. Pl. Welw. i. 983; De Wild. Études Fl. Katanga, 80, Miss. É. Laurent 133, and Not. Pl. Util. Congo, i. 588, 616; Th. & Hél. Durand, Syll. Fl. Congol. 499; De Wild. Comp. de Kasai, Miss. Scient. 331.

Distributed everywhere throughout Tropical Africa, where it is probably a native. It ascends in Abyssinia to 8000 ft. and on Kilimanjaro where, according to Volkens, it is undoubtedly wild, to 6000ft. It now occurs as a cultivated plant in many races. The leading African forms are as follows:—

Var. *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 1019. Fruit subglobose, about 7 lin. wide, densely beset with prickles 3 lin. long; seed 5 lin. long.—*R. communis*, Linn. Sp. Pl. ed. i. 1007, mainly.

Universally distributed throughout Tropical Africa.

Var. *africana*, Müll. Arg. in DC. Prodr. xv. ii. 1019. Fruit subglobose, about 7 lin. wide, sparingly beset with prickles $1\frac{1}{2}$ lin. long; seed 5 lin. long.—*R. africanus*, Willd. Sp. Pl. iv. 565, mainly; Terracc. in Ann. Istit. Bot. Roma, v. 99.

Nile Land. Eritrea: Amfilah, *Terracciano*. Abyssinia: Ankober, *Roth*, 92! Hawash and Maki Rivers, *Wellby!* Somaliland: without precise locality, *Mrs. E. Lort-Phillips!* Sudan: Khartoum, *Kotschy*, 250! 332! Kordofan: *Kotschy*, 243!

This form is characteristic of the Mediterranean littoral and the regions immediately adjacent.

Var. *megalosperma*, Müll. Arg. in DC. Prodr. xv. ii. 1017. Fruit ovoid-globose, narrowed to the apex, 10–12 lin. long, 9–10 lin. wide, rather densely beset with prickles 3 lin. long; seed 7–8 lin. long.—*R. megalospermus*, Del. Cent. Pl. Afr. Caill. 89. *R. macrocarpus*, Hort. ex Steud. Nomencl. ed. 2, ii. 459.

General in Southern Tropical Africa from Mossamedes in Lower Guinea, through Rhodesia to Mozambique.

Var. *benguelensis*, Müll. Arg. in Journ. Bot. 1864, 337. Fruit ellipsoid, rounded at the apex, 8 lin. long, 7 lin. wide, sparingly beset with prickles $1\frac{1}{2}$ lin. long.—DC. Prodr. xv. ii. 1019.

Upper Guinea. Northern Nigeria: Nupe; Jeba, *Barter!*

Lower Guinea. Spanish Guinea: Bebai, *Tessmann*, 463! Benguella; Mossamedes, *Welwitsch*, 307.

70. CHÆTOCARPUS, Thwaites; Benth. et Hook. f. Gen. Pl. iii. 323.

Flowers diœcious, apetalous. Male: Sepals 4–8, strongly imbricate. Stamens 5–20; filaments connate below in a column, free above; anthers oblong, dorsifixed; cells 2, parallel, dehiscing longitudinally. Rudimentary ovary at the apex of the staminal column, entire or 3-fid. Disk small. Female: Calyx as in the male. Ovary 3-celled; ovules in each cell solitary; styles distinct, erect and somewhat incurved, 2-partite, the arms papillose-fimbriate within. Disk distinct, 4–10-lobed or entire. Capsule

globose-setose or tubercled or both, breaking up into 3 2-valved cocci. Seed ovoid or subglobose; testa crustaceous, black, polished; albumen fleshy; cotyledons broad, flat.—Shrubs, glabrous or puberulous. Leaves alternate, stipulate, short-petioled, entire, coriaceous. Flowers small, axillary, densely fascicled.—*Neochevaliera*, Beille in Comptes Rendus Acad. Sc. Paris, cxlv. 1294.

Species about 6; two in India and Malaya, three in South America, and the following.

1. **C. africanus,** *Pax in Engl. Jahrb.* xix. 113. Shrub 6–10 ft. high; twigs pubescent. Leaves very short-petioled, coriaceous, oblong-lanceolate, acuminate, base wide-cuneate or occasionally rounded, margin entire, 3–6 in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. wide, polished, at first sparingly hairy, soon glabrous above, dark green; beneath paler, dull, sparsely hairy but soon glabrous except on the raised midrib and nerves; petiole hispidly hairy, 2 lin. long; stipules linear, caducous. Male flowers glomerulate, female solitary. Male: Sepals 4, imbricate, 2-seriate, unequal. Stamens 6; free part of filaments pubescent,subdistichously disposed on a pubescent column, which is surrounded at the base by an extra-staminal ring of 6 unequal receptacular glands. Rudimentary ovary terminating the column, obovate, entire, pilose. Female: Sepals 7–8, 2-seriate, outer 3 or 2 pubescent, smaller than the 5 glabrous, much imbricate inner. Disk of 5 triangular laciniate lobes. Ovary densely hispid, 3-celled, cells 1-ovuled; styles 3, tawny-tomentose, branched. Capsule subglobose, 4 lin. wide, closely tubercled and setose. Seeds black, truncate; testa shining; caruncle distinct, subglobose.—Durand & Schinz, Études Fl. Congo, 246; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 48, and Reliq. Dewevr. ii. 212; De Wild. Miss. É. Laurent, 141, and Études Fl. Bas- et Moyen-Congo, ii. 288; Th. & Hél. Durand, Syll. Fl. Congol. 497; De Wild. Comp. de Kasai, Miss. Scient. 341. *Neochevaliera brazzavillensis*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 54.

Lower Guinea. French Congo: Brazzaville, *Brazza! Chevalier*, 4128! 4141! 4149! 11141! 11142! 11207! *Dybowski!* between Nigona and Ngantchou, *Chevalier*, 5022! Lower Congo: Stanley Pool district; Bolobo, *Laurent;* Kinchassa, *Schlechter*, 12546! 15554! 12802! Leopoldville, *Dewèvre;* Kisantu, *Gillet, Laurent;* Kimuenza, *Pynaert*, 115; Sanda, *Vermuelen* (*Gillet*, 3411); Dembo, *Vanderyst*. Kwango district; Dima, *Laurent*.

South Central. Belgian Congo: Lake Leopold II. district; Mfini, *Laurent*. Lualaba-Kasai district; by the Kasai River, *Laurent;* Kamba, *Laurent;* Kapinga. *Laurent;* Butala, *Laurent;* Mangba, *Laurent;* Mukenge, *Pogge*, 1384, 1388; on the Sankuru, *Sapin!* Katanga district; Mussamba, *Pogge*, 112.

71. GELONIUM, Roxb.; Benth. et Hook. f. Gen. Pl. iii. 324.

Flowers diœcious, rarely monœcious, apetalous. Male: Sepals 5, imbricate. Stamens 10–60, crowded on a convex receptacle; filaments free, filiform; anthers oblong, 2-celled, dehiscing longitudinally. Rudimentary ovary 0. Female: Sepals 5 or 3, imbricate. Disk membranous at the

edge, sometimes distinctly lobed, sometimes with marginal very small staminodes. Ovary usually 3-celled, sometimes 2-celled; ovules solitary in each cell; styles short, flat, spreading, suborbicular, entire, emarginate, 2-lobed or lacerate. Fruit subglobose, faintly 3-keeled; endocarp thinly crustaceous or firmly coriaceous, indehiscent or finally breaking up into 2-valved *cocci*. Seeds ovoid, with a crustaceous foveolate reticulate testa, usually arillate; albumen fleshy; cotyledons broad, flat.—Trees or shrubs. Leaves alternate, shortly petioled, usually entire; stipules connate, deciduous, leaving an annular scar. Flowers small, in glomerate leaf-opposed sessile or shortly peduncled cymules.

Species about 20; two in Tropical Africa, the others South African, Mascarene and South-east Asiatic.

Sepals glandular *on the back*; leaves distinctly wide-reticulate, sparingly vesicular-punctate; monœcious .	1. *G. zanzibarense.*
Sepals not glandular on the back; leaves distinctly closely reticulate and vesicular-punctate; diœcious .	2. *G. procerum.*

1. **G. zanzibarense,** *Müll. Arg. in DC. Prodr.* xv. ii. 1130. Shrub, 6 ft. high, monœcious; everywhere glabrous. Leaves short-petioled, subcoriaceous, obovate-oblong, shortly cuspidate, base cuneate, margin entire, 2–4 in. long, $\frac{3}{4}$–2 in. wide, shining above; nerves 4–6 pairs looping very distinctly some distance from the margin, sparingly vesicular-punctate within the wide reticulations; petiole 2–3 lin. long. Flowers numerous, in subsessile fasciculate cymes opposite the petioles. Buds globose. Sepals in both sexes 5, subequal, each with a distinct gland on the back above the middle. Male: Stamens 6-12. Female: Ovary 3-celled, glabrous; styles broad, flat, suborbicular, subentire, spreading, and closely applied to the carpels. Fruit globose, $\frac{1}{5}$ in. across, at length separating into 2-valved cocci; endocarp thinly crustaceous. Seeds ovoid; testa crustaceous, widely foveolate-reticulate; aril pulpy. — *Suregada zanzibariensis,* Baill. Adansonia, i. 254.

Nile Land. British East Africa: Mombasa, *Wakefield!* Kilimanjaro Expedition, 40–60 miles inland, *Johnston!*

Mozamb. Distr. Zanzibar, *Boivin! Kirk,* 63! *Hildebrandt,* 1119! German East Africa: Usambara; near Bote on the Umba River, *Kässner,* 98! Derema, *Scheffler,* 157! Amboni, *Holst,* 2715!

Also in Madagascar.

2. **G. procerum,** *Prain in Kew Bulletin,* 1911, 233. Tree; twigs slightly angular, glabrous; bark fissured; "wood coarse but clean and white" (*Elliot*). Leaves short-petioled, subcoriaceous, ovate, subacute or obtuse, base cuneate, margin entire, $1\frac{1}{4}$–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–$2\frac{1}{4}$ in. wide, glabrous on both surfaces, shining above; nerves 4–6 pairs, with a very close distinct reticulation, each mesh enclosing a vesicular swelling distinct on both surfaces but especially beneath; petiole 2–$2\frac{1}{2}$ lin. long. Flowers diœcious, in subsessile fasciculate few-flowered cymes opposite the petioles. Buds globose. Male: Sepals 5–6, glandular, usually unequal, the third and fourth always exceeding

and often much larger than the outer and the two inner; the innermost (sixth) often very small, sometimes obsolete. Stamens 20. Female: Sepals 5, not glandular on the back, subequal. Ovary 3-celled, glabrous; styles 2-fid, lobes lanceolate. Fruit shallowly 3-sulcate, $\frac{1}{3}$ in. wide, separating into 2-valved cocci; endocarp thinly crustaceous. Seeds subglobose; testa crustaceous not at all foveolate. —Prain ex S. Moore in Journ. Linn. Soc. xl. 201. *G. lithoxylon*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Gelon. 22.

Nile Land. British East Africa: Ukamba; South of Nairobi, *Elliot*, 178!

Mozamb. Distr. German East Africa: Amani, *Warnecke*, 380! Rhodesia: Gazaland; Chirinda Forest, 3700--4000 ft., *Swynnerton*, 104! Chimanimani Mountains, 7000 ft., *Swynnerton*, 1115!

72. PLUKENETIA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 327.

Flowers monœcious, apetalous. Disk 0. Male: Calyx subglobose in bud, splitting into 4 valvate segments. Stamens 8–40, inserted on a prominent receptacle; filaments short, free, mixed with inter-staminal glands; anthers small, cells globose or didymous, parallel. Rudimentary ovary 0. Female: Sepals imbricate. Ovary normally 4-celled; ovules solitary; styles connate in a stout short or distinct column continuous with the carpels, surmounted by 4 cruciformly spreading short ovate stigmas. Capsule fleshy or dry, subglobose or depressed, splitting into 4 winged or appendaged cocci. Seeds compressed, with a narrow marginal wing, or globose and sometimes 3-ribbed on one side; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Shrubs, or herbs with woody bases, usually scandent. Leaves alternate, petioled, 3–5-nerved from the base, margin crenate or dentate. Racemes axillary or leaf-opposed, rarely terminal; flowers pedicelled, males many, often subfascicled, usually small; females few, solitary, subbasal or basal.

Species about 12, in the warmer regions of both hemispheres, but chiefly in America.

Shrub; stems scandent, 10–20 ft. high; leaves large, ovate, 3-nerved, long-petioled; stamens about 40 . 1. *P. conophora.*

Herbs with a woody base; stems 1–2 ft. high or long; leaves smaller, short-petioled.

Leaves lanceolate or triangular-oblong, 5-nerved and more or less distinctly 2-lobed at the base; racemes lateral; stems erect or scandent.

Stamens about 8; leaves finely dentate, sometimes deeply sagittate at the base; stems scandent . 2. *P. hastata.*

Stamens about 12; leaves rather coarsely toothed, not sagittate; stems erect . . . . 3. *P. africana.*

Leaves ovate, without basal lobes, 3-nerved at the base; racemes terminal; stems prostrate . . . 4. *P. procumbens.*

1. **P. conophora,** *Müll Arg. in Flora*, 1864, 530. Shrub; stems climbing, 10–20 ft. long, glabrous. Leaves long-petioled, rather firmly

membranous, ovate or ovate-oblong, rather abruptly acuminate, base rounded or wide cuneate, margin crenate-dentate, often very minutely so, 4 in. long, $1\frac{3}{4}$–2 in. wide, 3-nerved from the base; secondary nerves 3–4 on each side, glabrous; petiole $1\frac{1}{4}$–2 in. long, glabrous; stipules minute. Racemes axillary, subpaniculate; peduncles $\frac{1}{4}$ in. long and rhachis puberulous; male flowers in bracteolate clusters of 3–5 at the apices of secondary puberulous branches $\frac{1}{12}$–$\frac{1}{8}$ in. long; pedicels slender, glabrous, $\frac{1}{4}$ in. long, jointed at the base; female flowers at the apices of a single or of two subopposite puberulous subbasal secondary branches; female pedicels glabrous, very short, jointed at the bracteoles. Male: Calyx subglobose, glabrous, valvately 4-lobed. Stamens about 40; anthers subglobose; filaments with minute inter-staminal glands. Female: Calyx puberulous, 4-lobed. Disk 0. Ovary at first pilose, soon glabrescent, 4-celled, stoutly 4-winged; style stout, cylindric, slightly widened upwards with 4 shortly ovate, cruciformly spreading, finely fimbriate stigmas. Capsule thickly coriaceous, 3 in. across, with 4 thickly coriaceous radially spreading wide-ovate wings $\frac{1}{2}$ in. long $\frac{1}{3}$ in. deep projecting from each valve and 4 raised commissural ridges midway between the wings, opening at the apex to expose the seed. Seed subglobose, 1 in. long, almost as wide; testa thin, brown, subcrustaceous; albumen firmly fleshy, pale yellow.—DC. Prodr. xv. ii. 769. *Tetracarpidium Staudtii*, Pax in Engl. Jahrb. xxvi. 329.

Upper Guinea. Sierra Leone: without precise locality, *Scott-Elliot*, 4118! Southern Nigeria: Oban, *Talbot*, 1371! 1384! Modakeke, *Foster*, 205! Akwa, *Thomas*, 171! Cameroons: various localities, *Mann*, 2202! *Winkler*, 1431! *Volkens*, 9! *Mannsfeld*, 42! *Staudt*, 558! 783! 802! *Ledermann*, 296! 1145! 1183! 1184! 1207! 1250! 6138! *Buchholz*, 102! *Zenker*, 1583! 2234! 2551! 3273! 3311! 3394! Fernando Po: Clarence Peak, *Buchholz!*

Lower Guinea. Spanish Guinea: Sierra de Crystal, *Mann*, 1739! Gaboon: without precise locality, *Klaine*, 2284!

South Central. Belgian Congo: Eastern Province; Fort Beni, *Mildbraed*, 2292!

Perhaps polygamo-diœcious; sometimes the female flowers may be absent from an individual raceme or even from an entire specimen; whether individual plants may be wholly male has not been noted. Usually as soon as the female flowers have been fertilised the portion of the inflorescence which has male flowers falls away. Klaine's specimens from the Gaboon have the pedicels puberulous like the rhachis. Scott-Elliot states that the fruit (? seed, which yields a commercial oil) is edible. Perhaps Dr. Pax is justified in thinking that this should be considered the type of a distinct genus.

2. **P. hastata,** *Müll. Arg. in Flora*, 1864, 469. Herb; stems several from a woody base, slender, twining, puberulous. Leaves short-petioled, firmly membranous, lanceolate to linear-lanceolate, acute, base shallowly or deeply hastate or sagittate, margin finely dentate, $1\frac{1}{2}$–3 in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. wide, sparingly hirsute on the nerves and elsewhere scabridulous on both surfaces; petiole slender, $\frac{1}{8}$–$\frac{1}{3}$ in. long, pubescent or scabridulous; stipules lanceolate, small. Racemes simple, spike-like, lateral or leaf-opposed, 1–2 in. long; male flowers many, female solitary, subbasal; bracts linear-lanceolate, males several-flowered; pedicels

jointed above the base. Male: Calyx subglobose, glabrous, valvately 4-lobed; lobes lanceolate. Stamens about 8; filaments very short, with minute inter-staminal glands; anthers subglobose, cells adnate to the connective throughout. Female: Calyx pubescent, 4-lobed; lobes ovate-acute, imbricate. Disk 0. Ovary densely strigose, 4-celled and shortly 4-winged; style very short, with four shortly ovate cruciformly spreading smooth, slightly sulcate stigmas. Capsule 4-coccous; *cocci* 2-valved, horned, cruciformly explanate, each $\frac{1}{3}$–$\frac{1}{2}$ in. from the inner angle to the apex of the horn, $\frac{1}{4}$ in. wide. Seed suborbicular, subcompressed; testa somewhat rugose, expanded in a narrow firm irregular wing all round.—DC. Prodr. xv. ii. 772; Pax in Engl. Pfl. Ost-Afr. C, 240. *Pseudotragia scandens*, Pax in Bull. Herb. Boiss. 2me sér. viii. 636.

Lower Guinea. German South-West Africa: Amboland; Oohama, *Schinz*, 894! Damaraland; Okanakasewa, *Dinter*, 666! Otjitus, *Dinter*, 859!

Mozamb. Distr. Portuguese East Africa: Lower Zambesi, between Shupanga and Sena, *Kirk!*

Very closely allied to *P. africana*, Sonder, and perhaps only a variety of that species, but readily distinguished by the more minutely dentate leaves, the larger fruits and the rather fewer stamens.

3. **P. africana,** *Sonder in Linnæa*, xxiii. 110. Herb; stems many from a woody base, slender, erect, at first pubescent. Leaves short-petioled, firmly membranous, often purplish when young, narrowly triangular-oblong, acute or shortly acuminate, base shortly laterally lobed, wide cuneate, rounded, truncate or shallow-cordate, margin strongly dentate especially towards the base, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, glabrous above, sparingly hirsute on the purplish nerves beneath; petiole slender, $\frac{1}{8}$–$\frac{1}{4}$ in. long, pubescent; stipules linear, small. Racemes simple, spike-like, lateral or leaf-opposed, 1–$1\frac{1}{2}$ in. long; male flowers rather few, females solitary, subbasal; bracts ovate-lanceolate, males several-flowered; pedicels jointed above the base. Male: Calyx subglobose, sparingly pubescent, valvately 4-lobed; lobes lanceolate. Stamens about 12; filaments short, with minute inter-staminal glands; anthers subglobose, cells adnate to connective throughout. Female: Calyx pubescent, 4-lobed, lobes ovate-lanceolate, imbricate. Disk 0. Ovary densely strigose; style very short, with 4 shortly ovate cruciformly spreading finely papillose stigmas. Capsule 4-coccous; cocci 2-valved, horned, cruciformly explanate, each $\frac{1}{4}$ in. from the inner angle to the apex of the horn, $\frac{1}{5}$ in. wide. Seed suborbicular, subcompressed; testa somewhat rugose, expanded in a narrow firm irregular wing all round.—Müll. Arg. in DC. Prodr. xv. ii. 773. *Sajorium africanum*, Baill. Étude Gén. Euphorb. 483. *Pseudotragia Schinzii*, Pax in Bull. Herb. Boiss, 2me sér. viii. 635.

Lower Guinea. German South-West Africa: Hereroland, Otjiheveta, *Schinz*, 895!

Also in South Africa.

4. **P. procumbens,** *Prain in Kew Bulletin*, 1912, 240. Herb; stems many from a woody base, rather stout, complanate, prostrate,

diffusely branched, closely and persistently rusty-scabridulous. Leaves subsessile, firmly membranous, purplish, wide-ovate, acute, base rounded, margin rather closely and acutely serrate except at the entire base, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, $\frac{2}{3}$–$1\frac{1}{4}$ in. wide, shortly hispidulous on the nerves on both surfaces, otherwise glabrous, very dark-green and white-punctate above, paler not punctate beneath; petiole rusty-scabridulous, $\frac{1}{12}$–$\frac{1}{10}$ in. long; stipules linear, minute. Racemes simple, spike-like, terminal, 1–2 in. long; male flowers rather few, females solitary, subbasal; bracts narrow-lanceolate; pedicels in both sexes solitary, jointed above the base. Male: Calyx oblong, glabrous, valvately 4-lobed; lobes lanceolate. Stamens about 12; filaments very short; anthers subglobose, cells adnate to the connective throughout. Female: Calyx glabrous, 4-lobed, lobes ovate, acute, imbricate. Disk 0. Ovary densely strigose; styles about as long as the ovary, with 4 oblong cruciformly spreading finely papillose stigmas. Capsule (only seen young) 4-coccous; cocci horned. Seed not seen.

Lower Guinea. Angola: Benguella; Ganguella, on the Cubango River at Princeza Amelia, 5000 ft., *Gossweiler*, 2540!

73. **DALECHAMPIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 330.

Flowers monœcious, apetalous. Disk 0. Male: Calyx globose, closed in bud, splitting into 4–6 valvate lobes. Stamens usually 20–30; filaments connate below in a column, inserted on the convex receptacle; anthers narrow-oblong, 2-celled; anther-cells opening longitudinally. Rudimentary ovary 0. Female: Sepals 5–12, in flower denticulate; in fruit accrescent, indurated, pinnatifid. Ovary usually 3-celled, casually 4-celled; ovules solitary in each cell; styles connate in a stout rather thickened column, often hollow upwards; stigma terminal, entire or faintly lobed. Capsule breaking up into 3 (less often 4) 2-valved cocci; valves thinly woody. Seeds globose or subglobose, without a caruncle; albumen fleshy; cotyledons broad, flat.—Herbs or shrubs with usually twining stems. Leaves alternate, petioled in the African species, palmately nerved from the base, entire or deeply 3-lobed. Flowers in dense axillary peduncled heads, subtended by a pair of large similar or slightly dissimilar leafy entire or lobed membranous usually coloured bracts. Male flowers central and terminal in the heads subtended by smaller bracts and sometimes mixed with fleshy processes representing sterile flowers; female flowers lateral and basal also with an involucel of smaller bracts.

Species about 60, in all warm regions but mostly in Tropical America.

Leaves and ripe capsules nearly or quite glabrous.

Leaves membranous, all simple or with simple and 3-lobed leaves on the same stem, when lobed the lobes oblong-lanceolate or oblong, acuminate; stipules long linear-subulate	1. *D. ipomœæfolia.*
Leaves firm, always deeply 3-lobed, lobes wide-oblong, obtuse or minutely cuspidate; stipules ovate-triangular, slightly oblique	2. *D. Hildebrandtii.*

Leaves more or less pubescent; capsules setose or hairy.
Leaves entire; capsules setose . . . . 3. *D. Chevalieri.*
Leaves deeply 3-partite; capsules hairy . . . 4. *D. scandens.*

1. **D. ipomœæfolia,** *Benth. in Hook. Niger Fl.* 500. A slender twiner; stems pubescent upwards. Leaves distinctly petioled, triangular-ovate, acuminate, base usually shallow-cordate, occasionally deep-cordate, margin slightly toothed, usually not lobed, occasionally shortly 3-fid, rarely deeply 3-sect or 3-partite with lobes oblong-lanceolate or oblong, 3–4 in. long, $1\frac{3}{4}$–$2\frac{1}{4}$ in. broad, thinly membranous, 5-nerved from the base, glabrous on both surfaces or thinly pubescent on the nerves beneath; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, glabrous or finely pubescent; stipules linear, $\frac{1}{3}$ in. long, entire. Heads axillary, long-peduncled; involucral bracts ovate, acute, entire, green or yellowish, $\frac{3}{4}$–1 in. long and nearly as broad. Stylar column clavate. Cocci black, glabrous. Seed spherical, grey, mottled.—Müll. Arg. in DC. Prodr. xv. ii. 1248; De Wild. and Durand in Bull. Herb. Boiss. 2me sér. i. 48; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 286; Th. & Hél. Durand, Syll. Fl. Congol. 499. *Tragia Buettneri,* Pax in Engl. Jahrb. xix. 103.

Upper Guinea. Liberia: Monrovia and Grand Bassa, *Dinklage,* 1763! Ivory Coast: Bouroukrou, *Chevalier,* 16783! 16928! Zaranou; Indenia, *Chevalier,* 17637! Gold Coast: Ashanti; near Sutah, *Cummins,* 48! Southern Nigeria: Lower Niger, *Vogel,* 9! Lagos, *Lamborn,* 275! Cameroons: Batanga, *Bates,* 168! *Dinklage,* 1142! 1199! Ebea, *Dinklage,* 188! Kribi, *Dinklage,* 627! Lom, 650–1000 ft., *Ledermann,* 6405!

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessmann,* 318! 418! Gaboon: Sibange, *Dinklage,* 529! *Buettner,* 286! French Congo: Brazzaville, *Thollon,* 417! 421 partly! Lower Congo: Mayumbe; Upper Chiloango, *Cabra & Michel,* Leopoldville, *Schlechter,* 12538! Kisantu, *Gillet, Vanderyst!*

South Central. Belgian Congo: Lukolela, *Dewèvre,* 652! Lake Leopold II. district; Ibali, *Laurent.* Equatorial district; Eala, *Laurent.* Eastern Province; Mawambi, Kasanga, *Mildbraed,* 3109!

2. **D. Hildebrandtii,** *Pax in Engl. Jahrb.* xix. 107. A slender twiner; stems glabrous. Leaves distinctly petioled, deeply 3-partite, base deep cordate, lobes oblong, rounded or short cuspidate, their margin entire, $2\frac{1}{2}$ in. long, 3 in. broad, firmly membranous, 5-nerved from the base, glabrous on both surfaces; petiole 1–$1\frac{3}{4}$ in. long, glabrous; stipules ovate-triangular, slightly oblique, $\frac{1}{5}$ in. long, entire. Heads axillary, long-peduncled; involucral bracts ovate, slightly cordate, deeply and acutely 3-lobed, margin elsewhere serrate, green or yellowish, $\frac{3}{4}$–1 in. long, $\frac{3}{4}$–1 in. broad. Stylar column cylindric, truncate. Cocci brown, with a few scattered hairs or glabrous. Seed spherical, dark brown.—Pax in Engl. Pfl. Ost-Afr. C. 240.

Nile Land. British East Africa: Seyidieh; Mombasa, *Hildebrandt,* 1980! Takaungu, *Thomas,* 47!

Mozamb. Distr. Zanzibar, *Hildebrandt,* 1354! 1980! *Stuhlmann,* 439! *Sacleux,* 1077! French Island, *Kirk,* 17! German East Africa: Mandera, *Sacleux* 952! Dar-es-Salaam, *Engler,* 2080!

A very distinct plant, apparently littoral or sublittoral; most nearly allied to *D. scandens,* Linn., var. *cordofana,* Müll. Arg.

3. **D. Chevalieri,** *Beille in Bull. Soc. Bot. France,* lvii. *Mém.* viii. 127. A slender twiner; stems rather closely pubescent. Leaves distinctly petioled, ovate-triangular, apex rather abruptly apiculate, base cordate or subentire, margin finely denticulate, not lobed, 3–4½ in. long, 1½–2¼ in. broad, firmly membranous, 5–7-nerved from the base, pubescent on the nerves on both surfaces; petiole 1–1½ in. long, pubescent; stipules triangular, finely glandular-toothed, ⅓ in. long, pubescent on both surfaces. Heads axillary, long-peduncled; involucral bracts pale yellow, white-veined, ovate, acute, dissimilar, one with a cordate base and an entire apex, one with a rounded base and a 3-fid apex, their margins finely glandular-toothed, 1½–2 in. long, 1–1½ in. wide; peduncles 3 in. long, with a pair of bracts like the stipules below the middle. Stylar column cylindric, truncate. Cocci rather closely beset with short stiff setæ. Seed spherical, not yet ripe.

Upper Guinea. Cameroons: Lom, 670–1000 ft., *Ledermann,* 6488!

North Central. Dar Banda: Tomi Valley, *Chevalier,* 5381!

4. **D. scandens,** *Linn. Sp. Pl. ed.* i. 1054. A slender twiner; stems pubescent. Leaves distinctly petioled, deeply 3–5-partite, base deep cordate, lobes acute or shortly acuminate, rarely obtuse, their margins entire or toothed or the outer sometimes shortly lobed near the base, 1½–5 in. long, 1–5 in. broad, membranous, 5–7-nerved from the base, pubescent on both surfaces; petiole 1–3 in. long, pubescent; stipules ovate-lanceolate, ⅕ in. long. Heads axillary, long-peduncled; involucral bracts ovate, slightly cordate, deeply and acutely 3-lobed, margin elsewhere serrate, green or yellow, ⅓–¾ in. long, ⅓–¾ in. broad. Stylar column cylindric, truncate. Cocci brown, rather closely beset with more or less adpressed hairs. Seed spherical, grey with brown blotches.—Linn. Mant. Alt. 496; Müll. Arg. in DC. Prodr. xv. ii. 1244.

Var. *parvifolia,* Müll. Arg. in DC. Prodr. xv. ii. 1245. Leaves with rather narrow-oblong, acute or acuminate lobes, 1½–3 in. long, 1–2½ in. broad; outer involucral bracts rather firm, usually greenish, ⅓–½ in. long and broad. —*D. parvifolia,* Lam. Encycl. ii. 258. *D. senegalensis,* A. Juss. ex Webb in Hook. Niger Fl. 174; Schmidt, Fl. Cap. Verd. 305. *D. scandens,* Hiern in Cat. Afr. Pl. Welw. i. 985; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 48, and in Études Fl. Bas- et Moyen-Congo, i. 278, and ii. 286; Th. & Hel. Durand, Syll. Fl. Congol. 499, hardly of Linn.

Upper Guinea. Senegal: Dakar, *Adanson! Thiebaut,* 149! *Robert!* Dagana, *Leprieur! Perrottet,* 740! Richard-Tol, *Lelievre!*

North Central. Kanem: Ngouri; Mondo, *Chevalier,* 10211!

Lower Guinea. Lower Congo: Stanley Pool; between Leopoldville and Mombasi, *Gillet,* 2577. Angola: Loanda, *Welwitsch,* 383! *Gossweiler,* 212! 339! Sibongo, *Welwitsch,* 385! Ambriz, *Welwitsch,* 387! Mossamedes, *Pearson,* 2838!

Also in the Cape Verde Islands.

Var. *cordofana,* Müll. Arg. in DC. Prodr. xv. ii. 1245. Leaves with usually rather wide-oblong, acute or occasionally obtuse lobes, 2–5 in. long, 2½–5 in. broad; outer involucral bracts membranous, yellowish or yellow, ½–¾ in. long and broad.—Pax in Engl. Pfl. Ost-Afr. C, 240, in Ann. Istit. Bot. Roma, vi. 184, and in Bull.

Soc. Bot. Belg. xxxvii. 106; Th. & Hél. Durand, Syll. Fl. Congol. 499. *D. tripartita*, R. Br. in Salt, Abyss. App. 65. *D. cordofana*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 244. *D. capensis*, Terracc. in Istit. Bot. Roma, v. 99, not of Spreng.

Nile Land. Eritrea: Hababb, 3000 ft., *Hildebrandt*, 619! Terha Valley; Saati, *Schweinfurth & Riva*, 273! Hamfila Bay, at Haressan, *Terracciano*; Keren, 4500 ft., *Steudner*, 548! *Beccari*, 210! Abyssinia: Tacazze Valley, 3000–4500 ft., *Schimper*, A 42! 1615! near Adegana and Modat, 3000–4500 ft., *Schimper*, B 85! 1776! Dehli-Dikeno, 4000 ft., *Schimper*, 394! Airuri, *Rohlfs & Stecker*, 30! Galla country; Karro Gudda, 1000–1300 ft., *Ellenbeck*, 2161! Harrar; Ever Valley, *Ellenbeck*, 988! and without precise locality, *Salt! Schimper*, 498! Somaliland: near Dolo, on the River Daua, *Riva*, 1133! 1253! Web Ruspoli, *Riva*, 1138! Web Schabeli, *Keller*, 223! Guelidi on the Ouebi River, *Revoil!* Fullah Valley, *Ellenbeck*, 229! 239! Doka and Ganale, *Ellenbeck*, 2259! and without precise locality, *Mrs. Lort-Phillips!* Sudan: Jebel Malakhib, *Broun*, 30! Kordofan: Arashkol Mountain, *Kotschy*, 36! 84! *Steudner*, 527! Mulbes, *Pfund*, 480! between El Obeid and Mulbes, *Pfund*, 385! Dinka: Mongalla on the Bahr el Jebel, *Broun*, 1630! British East Africa: Ndi Mountain, *Scott-Elliot*, 6231! near Changamwe, *Kässner*, 275! Voi, 1300 ft., *Braun*, 1553! *Engler*, 1953! Mombasa; Rabai Hills, *Taylor!*

Lower Guinea. Gaboon: near Zala, *Soyaux!* Cabinda: Chinchoxo, *Soyaux*, 211! Lower Congo: Boma, *Cabra*. Angola: Ambriz, *Monteiro!* Loanda, *Welwitsch*, 384! Mossamedes, *Welwitsch*, 386! Cazengo, *Welwitsch*, 388!

South Central. Belgian Congo: Mogandjo, on the Aruwimi River, *Laurent*; Katanga; Tanganyika, *Descamps*.

Mozamb. Distr. German East Africa: West Usambara; Gonja, *Engler*, 1546! Mombo, *Braun*, 1907! Tanga: Sigi Valley, *Zimmermann*, 60! Amboni, *Holst*, 2793! Mubesu, *Busse*, 2610! on the Pangani River, *Volkens*, 555! Dum Steppe, 2500 ft., *Volkens*, 2208! Lake Chala Volcano, 3900 ft., *Volkens*, 1784! Bagamoyo: Mandera, *Sacleux*, 785! Ukami; between Morogoro and Mzinga, *Kränzlin*, 2998! Usagara Mountains, *Kirk!* Mpapua, 1300 ft., *Kränzlin*, 2954! Saadani, *Kränzlin*, 2970! Usaramo; Kisserawe, 750 ft., *Stuhlmann*, 6221! and without precise locality, *Fischer*, 242! Portuguese East Africa: Boruma, *Menyharth*, 1072! Shamo, *Kirk!* Lower Shire, *Meller!*

Also in Arabia.

What may be a form of *D. scandens*, but with prostrate and not twining stems, and smaller, less deeply partite leaves with rounded lobes, is reported from Renkwood Station on the White Nile (*Broun*, 1566). The flowers are not distinguishable from those of var. *cordofana*.

D. scandens, Linn., is widely spread in America and is there even more variable than in Africa. The typical form is described by Müller as having the stylar column pubescent low down; in our African specimens the stylar column is always quite glabrous. In their extreme states the two African varieties are readily distinguishable; they are, however, connected by intermediate conditions.

74. **PYCNOCOMA**, Benth.; Benth. et Hook. f. Gen. Pl. iii. 326.

Flowers monœcious, apetalous. Male: Calyx ovoid in bud, splitting into 3, less often 4, valvate segments. Stamens very many, inserted on a raised receptacle with glandular lobes; filaments very long, free, filiform, often flexuous at first; anthers very small, 2-celled; cells parallel, dehiscing longitudinally. Rudimentary ovary 0. Female: Sepals usually 5, less often 4, rarely 6, imbricate. Disk 0. Ovary 3-celled;

ovules in each cell solitary; cells each with two dorsal protuberances; styles 3, usually considerably connate in a column below; stigmas terminal, capitate or subcapitate, very slightly dilated. Capsule 3-dymous, rarely indehiscent, usually breaking up into three 2-valved cocci, each valve with a horn or wing on the back. Seeds without a caruncle, globose; albumen fleshy; cotyledons broad, flat.—Stemless or short-stemmed shrubs, rarely small trees. Leaves large or very large, usually in terminal clusters, much narrowed to the base and sessile or shortly petioled, penninerved. Flowers in axillary racemes from the upper axils; pedicels 1–3 to a bract, usually very long; racemes rarely spike-like, with short-pedicelled flowers; flowers male except the terminal which is female.

Species 11, all endemic.

Bracts concave, ovate, acending.
- Racemes dense, spike-like; male pedicels shorter than the calyx; fruit where known indehiscent.
  - Female sepals like male bracts; styles free almost to the base . . . . . 1. *P. dentata.*
  - Female sepals unlike male bracts; styles united in their lower half . . . . . 2. *P. littoralis.*
- Racemes open, lax; male pedicels slender, much longer than the bracts; fruit 3-coccous, cocci 2-valved.
  - Bracts obtuse, densely adpressed-silky without.
    - Rhachis of racemes bracteate and floriferous to the base; leaves trapeziform, faintly to distinctly 3-lobed . . . . . 3. *P. Thonneri.*
    - Rhachis of racemes with a distinct naked peduncle; leaves oblanceolate-oblong.
      - Rhachis and peduncle rather densely pubescent.
        - Racemes 6 in. long or longer; horns of fruit falcate, much longer than deep 4. *P. cornuta.*
        - Racemes 4 in. long or less . . . 5. *P. brachystachya.*
      - Rhachis and peduncle glabrescent or glabrous; racemes 6 in. long or longer; horns of fruit triangular not longer than deep 6. *P. macrophylla.*
  - Bracts acute, loosely patently villous without . 7. *P. Chevalieri.*

Bracts flat, spreading or reflexed.
- Bracts trapezoid-spathulate, margins ciliate, but elsewhere glabrous, even without; leaves oblanceolate-oblong . . . . . 8. *P. Thollonii.*

Bracts lanceolate, pubescent without.
- Styles united for more than half their extent.
  - Leaves oblanceolate, narrowed from far beyond the middle to the base or to a short petiole 9. *P. angustifolia.*
  - Leaves ovate-oblong, contracted from the middle only to a distinct or long petiole . 10. *P. minor.*
- Styles united for less than half their length; leaves oblanceolate-oblong . . . . 11. *P. macrantha.*

1. **P. dentata,** *Hiern in Cat. Afr. Pl. Welw.* i. 983. Shrub or small tree, 10–15 ft. high; branches slender, virgate, woody. Leaves

clustered towards the ends of the twigs, very shortly petioled, coriaceous, oblanceolate-oblong, acute or obtuse, narrowed from the middle to the acute base, margin shortly toothed in the upper half, 3–7 in. long, ¾–2 in. wide, glabrous on both surfaces; petiole ⅛–¼ in. long. Racemes spike-like, floriferous almost to the base, from the axils of the upper leaves; rhachis puberulous; bracts ovate, obtuse, concave, densely silky externally; pedicels shorter than the calyx, pubescent. Male: Sepals 3, ovate-triangular, ⅙ in. long, yellowish-white. Stamens numerous; filaments slender, ¼ in. long. Female: Sepals 5–6, indistinguishable from the bracts under the male flowers, ovate, obtuse, densely silky externally, glabrous and purple within, ⅕ in. long. Ovary 3-celled, densely villous, each cell with two short dorsal ridges; styles 3, puberulous, free almost to the base. Capsule not seen.

Lower Guinea. Angola: Ambriz; between Ambriz and Quizembo, *Welwitsch*, 476! Socolla Nudui, *Gossweiler*, 1623! Loanda; Umbella, near Funda, *Gossweiler*, 4910!

2. **P. littoralis,** *Pax in Engl. Jahrb.* xix. 100. Shrub 10 ft. high, or sometimes a tree; branches slender, woody. Leaves both clustered at the ends of the twigs and scattered or subverticillate lower down, shortly petioled, thinly coriaceous, obovate-oblong, obtuse or subacute, narrowed from beyond the middle to the acute base, margin shortly crenulate except in the lower fourth, 4–6 in. long, 1½–3 in. wide, glabrous on both surfaces; petiole ¼–⅓ in. long. Racemes spike-like, floriferous almost to the base, from the axils of the upper leaves; rhachis densely pubescent; bracts ovate, obtuse, concave, densely adpressed-silky externally; pedicels very short, pubescent. Male: Sepals 3, ovate-triangular, under ⅙ in. long. Stamens numerous; filaments slender, ⅓ in. long. Female: Sepals 5, silky externally, ovate, obtuse, not reflexed, ⅙ in. long. Ovary 3-celled, densely velvety, each cell with two short dorsal ridges; styles 3, densely pubescent, short, connate in their lower half. Capsule distinctly 6-winged, thick-walled, woody, apparently indehiscent, ¾ in. across. Seeds spherical, ¼ in. across.—Pax in Engl. Pfl. Ost-Afr. C. 239.

Nile Land. British East Africa: coast between Mombasa and Lamu, *Whyte!*

Mozamb. Distr. German East Africa: Tanga; Kwamarimba-Ngomeni, *Braun*, 1800! Bagamoyo, *Hildebrandt*, 1300! *Stuhlmann*, 18! *Sacleux*, 1492!

Braun's specimens are said to be from a considerable tree.

3. **P. Thonneri,** *Pax in De Wild. & Durand, Contrib. Fl. Congo*, 51. Shrub, 2–3 ft. high; branches rather slender, woody. Leaves clustered at the ends of the twigs, long-petioled, thinly coriaceous, rhomboid, trapeziform or ovate, acute or subacute, abruptly narrowed in the lower third to an acute base which passes into a winged petiole, margin undulate, sometimes slightly (rarely very distinctly) 3-lobed and minutely and obscurely toothed, 8–12 in. long, 4–6 in. wide, glabrous on both surfaces and minutely puncticulate beneath; petiole below the wing ¼–4 in. long. Racemes floriferous almost to the base, from the axils of the upper leaves; rhachis densely pubescent; bracts ovate,

obtuse, concave, densely adpressed-silky externally; pedicels slender, thinly puberulous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, 1–3 to a bract. Male: Sepals usually 4, oblong-lanceolate, acute, reflexed in flower, glabrous except at the tip externally, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, $\frac{1}{3}$ in. long. Female: Sepals usually 4, ovate, acute, rather densely pubescent externally, reflexed in flower, $\frac{1}{6}$ in. long. Ovary 3-celled, pubescent, each cell with two short triangular horns; styles 3, sparingly hirsute, connate in their lower half. Capsule 3-coccous, 3-dymous, $\frac{3}{4}$ in. across; cocci 2-valved, closely and finely pubescent externally, each valve with a projecting triangular subacute horn-like wing, 4 lin. long, 5–6 lin. deep. Seeds globose, brown, $\frac{1}{3}$ in. across.—De Wild. & Durand, Pl. Thonner. Congol. 21, t. 12; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 286; Th. & Hél. Durand, Syll. Fl. Congol. 498. *P. trilobata*, De Wild. Miss. É. Laurent, 132, t. 38, and in Comp. de Kasai, Miss. Scient. 331; Th. & Hél. Durand, Syll. Fl. Congol. 498. *P. longipes*, Pax in Engl. Jahrb. xliii. 324.

South Central. Belgian Congo: Equatorial Prov.; Ikelemba, Efukwa-Kombe, *Laurent!* Bangala; Mongalla, Ngali, *Thonner*, 95! *Duchesne*, 22! Likimi, *Malchair*, 82! Yambuya, on the River Aruwimi, *Laurent*, 1045! 1046! *Mildbraed*, 3293! *Solheid*, 63! Kasai; Bolongula on the River Sankuru, *Laurent!* Illongonga, *Sapin*, Z 61! Belo: Lolema, *Jespersen*, 9!

4. **P. cornuta,** *Müll. Arg. in Flora*, 1864, 483. Shrub, 2–6 ft. high; branches slender, woody. Leaves clustered at the ends of the twigs, sessile, rather firmly chartaceous, oblanceolate-oblong, acute or acuminate, narrowed from the upper third to the very acute base, margin often denticulate in the upper third, 12–18 in. long, 3–4 in. wide, glabrous and sparingly raised-puncticulate on both surfaces. Racemes peduncled, from the axils of the upper leaves; rhachis usually rather loosely pubescent; bracts ovate, obtuse, concave, loosely grey-silky externally; pedicels sparingly pubescent, slender, $\frac{1}{2}$–$\frac{3}{4}$ in. long, 1–3 to a bract. Male: Sepals 3, ovate-triangular, acute, pubescent externally especially towards the tip, reflexed in flower, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, $\frac{1}{2}$ in.long. Female: Sepals 5, oblong-lanceolate, acute, loosely silky externally especially in the upper half, reflexed in flower, $\frac{1}{5}$ in. long. Ovary 3-celled, densely velvety, each cell with two long falcate dorsal horns; styles 3, rather densely hirsute, connate in their lower third. Capsule 3-coccous, 3-dymous, $\frac{3}{4}$ in. across; cocci 2-valved, closely finely velvety externally, each valve with a projecting falcate horn-like wing, 3-4 lin. long, 2 lin. deep. Seeds globose, brown, $\frac{1}{3}$ in. across.—DC. Prodr. xv. ii. 951.

Upper Guinea. Gold Coast: without precise locality, *Farmar*, 424! Southern Nigeria: Lagos; Abeokuta, *Barter*, 3385! Cameroons: Johann-Albrechtshöhe, *Buesgen*, 49! near Majuka, *Buesgen*, 405! Kube, *Buesgen*, 535! Batanga, *Dinklage*, 996! Bodje, *Ledermann*, 295!

Very closely allied to *P. macrophylla*, Benth., but with usually more densely pubescent rhachis, and apparently always raised-puncticulate leaves; the dorsal horns on the ovary are twice as long in this species as they are in *P. macrophylla*.

5. **P. brachystachya,** *Pax in Engl. Jahrb.* xliii. 82. A shrub, 2–3 ft. high; branches stout, soft. Leaves clustered at the ends of the twigs, sessile, thinly to firmly chartaceous, oblanceolate-oblong, acute or acuminate, narrowed from the upper third to the very acute base, margin entire, 12-20 in. long, 3½–4½ in. wide, glabrous on both surfaces. Racemes shortly peduncled, from the axils of the upper leaves; rhachis densely pubescent; bracts ovate, obtuse, concave, densely pubescent; pedicels pubescent, slender, ½ in. long, 1–3 to a bract. Male: Sepals 3, ovate-triangular, acute, densely pubescent externally, reflexed in flower, ⅙ in. long. Stamens numerous; filaments slender, ½ in. long. Female: Sepals 5, oblong-lanceolate, acute, densely pubescent externally, ⅕ in. long. Ovary 3-celled, pubescent, each cell with two short triangular dorsal horns; styles 3, densely pubescent, connate in their lower third. Fruit not seen.

Upper Guinea. Southern Nigeria: Lagos; Abeokuta, at Obumo Rock, *Millen*, 149! Cameroons: Victoria, *Winkler*, 367.

We have not seen the original specimen, collected by Dr. Winkler, on which this species is based. The specimens collected by Millen agree as regards foliage with *P. macrophylla*, but as regards pubescence with *P. cornuta*, of which *P. brachystachya* may be only a form. The racemes are much shorter than in either *P. macrophylla* or *P. cornuta*.

6. **P. macrophylla,** *Benth. in Hook. Niger Fl.* 508. Shrub, 8 ft. high; branches stout, soft. Leaves clustered at the ends of the twigs, sessile, thinly to firmly chartaceous, oblanceolate-oblong, acute or acuminate, narrowed from the upper third to the very acute base and there sometimes abruptly contracted into a winged pseudo-petiole 3–4 in. long, margin entire, 12-20 in. long, 3½–4½ in. wide, glabrous on both surfaces. Racemes peduncled, from the axils of the upper leaves; rhachis thinly pubescent; bracts ovate, obtuse, concave, densely adpressed grey-silky externally; pedicels glabrous or sparingly pubescent, very slender, ¾–1 in. long, 1–3 to a bract. Male: Sepals 3, ovate-triangular, acute, glabrous except at the acute bearded tips externally, reflexed in flower, ⅙ in. long. Stamens numerous; filaments slender, ½ in. long. Female: Sepals 5, oblong-lanceolate, acute, adpressed-silky externally especially in the upper half, reflexed in flower, ⅕ in. long. Ovary 3-celled, densely adpressed-silky, each cell with two short triangular dorsal horns; styles 3, sparingly hirsute, connate in their lower third. Capsule 3-coccous, 3-dymous, ¾ in. across; cocci 2-valved, closely finely velvety externally, each valve with a projecting obtusely triangular horn-like wing 2 lin. long and deep. Seeds globose, brown, ⅓ in. across.—Müll. Arg. in DC. Prodr. xv. ii. 951; De Wild. Études Fl. Bas- et Moyen-Congo, i. 278; Th. & Hél. Durand, Syll. Fl. Congol. 497. *P. Zenkeri*, Pax in Engl. Jahrb. xxvi. 329.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 699! Cameroons: Lom, 600–1000 ft., *Ledermann*, 6439! Bodje, *Ledermann*, 295! Ossidinge; Abonando, 300 ft., *Rudatis*, 96! Bipinde, *Zenker*, 1251! Batanga, *Dinklage*, 1371! Fernando Po: *Vogel*, 18!

South Central. Belgian Congo: Kwango; Dyuma Valley! *Gentil! Gillet*, 2843! Eastern Prov.; near Stanley Falls, *Dewèvre*, 1168!

7. **P. Chevalieri,** *Beille in Bull. Soc. Bot. France,* lv. *Mém.* viii. 81. Shrub, 7–10 ft. high; branches slender, woody. Leaves clustered towards the ends of the twigs, distinctly petioled, firmly chartaceous, obovate-lanceolate, acute, narrowed from the middle to the acute base which passes into a winged petiole, margin entire, 10-12 in. long, $3\frac{1}{2}$–4 in. wide, glabrous on both surfaces, very finely and closely puncticulate beneath; petiole below the wing $\frac{1}{4}$–$\frac{1}{2}$ in. long. Racemes peduncled, from the axils of the upper leaves; rhachis rather closely pubescent; bracts ovate, acute, concave, loosely silky-pubescent externally; pedicels slender, pubescent, $\frac{1}{3}$ in. long, 1–3 to a bract. Male: Sepals usually 4, ovate-lanceolate, acute, pubescent externally, reflexed in flower, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, $\frac{1}{4}$ in. long. Female: Sepals usually 5, ovate-lanceolate, white-pubescent externally, reflexed in flower, $\frac{1}{6}$ in. long. Ovary 3-celled, velvety-pubescent; each cell with two short triangular dorsal horns; styles 3, pubescent, connate only in their lower fifth. Capsule 3-coccous, 3-dymous, $\frac{1}{2}$ in. across; cocci 2-valved, closely velvety externally, each valve with a projecting short triangular acute horn, 1–$1\frac{1}{2}$ lin. long, 1 lin. deep. Seed globose, brown, $\frac{1}{4}$ in. across.

Lower Guinea. French Congo: near the Kemo River, *Thollon,* 673! Fort Possel, *Chevalier,* 5308! 5367! 10553! Upper Ubangi; Boma, *Chevalier,* 5915! Upper Shari; Ngaoura, near Mbelli, *Chevalier,* 7335! Mpokou, *Chevalier,* 10595! Bangui, *Chevalier,* 10848!

This species in general facies most closely resembles *P. minor,* Müll. Arg., but is readily distinguished by the very different bracts.

8. **P. Thollonii,** *Prain in Kew Bulletin,* 1912, 193. Shrub; branches slender, woody. Leaves clustered at the ends of the twigs, sessile, thinly coriaceous, obovate-lanceolate, acute or acuminate, narrowed from beyond the middle to the narrow rounded base, margin faintly undulate, 12–15 in. long, 4 in. wide, glabrous on both surfaces. Racemes peduncled, from the axils of the upper leaves; rhachis very finely puberulous; bracts trapezoid-spathulate, flat, reflexed, glabrous everywhere except on the shortly ciliate margins; pedicels slender, puberulous, $\frac{1}{2}$ in. long, 1–3 to a bract. Male: Sepals 3, ovate-triangular, acute, very sparingly puberulous or quite glabrous externally, reflexed in flower, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, $\frac{1}{2}$ in. long. Female: Sepals 5, ovate-lanceolate, acute, glabrescent or glabrous externally, reflexed in flower, $\frac{1}{6}$ in. long. Ovary 3-celled, pubescent, each cell with two dorsal horns; styles 3, sparingly hirsute, connate in their lower fifth. Capsule not seen.

Lower Guinea. French Congo: Ogowe River, *Thollon,* 842!

As regards foliage this is hardly distinguishable from *P. macrophylla,* Benth., but the bracts are altogether different in the two plants.

9. **P. angustifolia,** *Prain in Kew Bulletin,* 1908, 439. Shrub; branches rather slender, woody. Leaves clustered towards the ends of the twigs, subsessile or very shortly petioled, thinly to firmly chartaceous, narrowly oblanceolate or obovate-lanceolate, acute or

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acutely acuminate, narrowed from the upper fifth or fourth to the acute base and then sometimes contracted into a winged pseudopetiole $\frac{1}{3}$–$\frac{3}{4}$ in. long, margin entire or oftener in the upper half distinctly, shortly rather sharply toothed, 8–16 in. long, $1\frac{1}{4}$–3 in. wide, glabrous on both surfaces; petiole below the wing $\frac{1}{10}$–$\frac{1}{4}$ in. long. Racemes peduncled, from the axils of the upper leaves; rhachis very thinly puberulous or nearly glabrous; bracts lanceolate, flat, acute, reflexed, grey-puberulous outside; pedicels slender, puberulous, $\frac{1}{2}$ in. long, 1–3 to a bract. Male sepals 4, less often 3, narrowly ovate, acute, glabrescent, reflexed in flower, $\frac{1}{6}$ in. long. Female sepals 5, narrowly oblong-lanceolate, acute, sparingly pubescent externally, reflexed in flower, $\frac{1}{6}$ in. long. Ovary 3-celled, closely adpressed pubescent, each cell with two short triangular dorsal horns; styles 3, sparingly pubescent, connate in a stout column for three-fourths to four-fifths of their length. Capsule (only seen young) closely velvety, with six short triangular projecting horns.

Upper Guinea. Liberia: Grand Bassa; near Soarhidorf, *Dinklage*, **1602**! neighbourhood of Kaka Town, *Whyte!* Begwai, *Bunting!* Ivory Coast: between the Sassandra and the Cavally, *Chevalier*, **19269**!

10. **P. minor,** *Müll. Arg. in Flora*, 1864, 483. Shrub, 1–3 ft. high; branches slender, woody. Leaves clustered towards the ends of the twigs, distinctly petioled, thinly chartaceous, oblanceolate-oblong, acuminate, narrowed from the middle to the acute base which passes into a winged petiole, margin entire or rarely coarsely toothed in the upper half, 8–15 in. long, 2–4 in. wide, glabrous on both surfaces; petiole below the wing $\frac{1}{4}$–$2\frac{1}{2}$ in. long. Racemes peduncled, from the axils of the upper leaves; rhachis very finely puberulous; bracts lanceolate, acute, flat and reflexed; pedicels slender, puberulous, $\frac{1}{2}$ in. long, 1–3 to a bract. Male sepals 3, less often 4, ovate-triangular, acute, sparingly puberulous externally, more closely so at the tips, reflexed in flower, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, $\frac{1}{4}$ in. long. Female sepals 5, linear-lanceolate, acute, sparingly puberulous externally, reflexed in flower, $\frac{1}{6}$ in. long. Ovary 3-celled, pubescent; each cell with two short triangular dorsal horns; styles 3, sparingly hirsute, connate in their lower three-fourths. Capsule 3-coccous, 3-dymous, sometimes one or less often two cocci abortive, $\frac{3}{4}$ in. across; cocci 2-valved, closely and finely velvety externally, each valve with a projecting short triangular obtuse horn-like wing, $1\frac{1}{2}$–2 lin. long, $1\frac{1}{2}$ lin. deep. Seed globose, brown, $\frac{1}{3}$ in. across.—DC. Prodr. xv. ii. 951. *P. petiolaris*, Pierre MSS.

Lower Guinea. Spanish Guinea: Muni River, *Mann*, **1841**! Gaboon: Libreville, *Griffon du Bellay*, **46**! **78**! *Klaine*, **68**! **240**! **460**! **596**!

11. **P. macrantha,** *Pax in Engl. Pfl. Ost-Afr. C.* 239. Shrub or small tree 3–18 ft. high; branches slender, woody. Leaves clustered at the ends of the twigs and scattered lower down, shortly petioled, thinly coriaceous, oblanceolate-oblong, acute or acuminate, narrowed from beyond the middle to the acute base which is often contracted into a

narrowly winged pseudopetiole, margin entire, 8-15 in. long, $2\frac{1}{2}$-4 in. wide, glabrous on both surfaces; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. long. Racemes peduncled, from the axils of the upper leaves; rhachis rather loosely pubescent; bracts ovate, acute, flat or nearly so and reflexed, densely pubescent on both surfaces; pedicels rather densely pubescent, slender, $\frac{3}{4}$–1 in. long, 1–3 to a bract. Male sepals 3, ovate-triangular, acute, densely pubescent externally, reflexed in flower, $\frac{1}{6}$ in. long. Stamens numerous; filaments slender, over $\frac{1}{2}$ in. long. Female sepals 5, ovate-lanceolate, acute, densely pubescent on both surfaces, reflexed in flower, $\frac{1}{4}$ in. long. Ovary 3-celled, densely pubescent, each cell with two rather long narrow triangular dorsal horns; styles 3, densely hirsute, connate in their lower fourth. Capsule not seen.—Pax in Engl. Jahrb. xxiii. 527.

Mozamb. Distr. German East Africa: Usambara; Gonja, 3400 ft., *Holst*, 4237! Amani, 3000–3500 ft., *Warnecke*, 477! *Engler*, 476! 846! 3427A! *Braun*, 1036! Derema, 2700 ft., *Scheffler*, 97! Nquelo, 3500 ft., *Heinsen*, 65!

75. **NEOPYCNOCOMA**, Pax in Engl. Jahrb. xliii. 222.

Flowers monœcious, apetalous. Male: Calyx globose, splitting into 2–3 valvate segments. Stamens numerous, free, inserted on a hemispherical receptacle, mixed with oblong pilose glands; anthers small, introrse, 2-celled; cells longitudinally attached to a narrow connective. Rudimentary ovary distinct. Female: Sepals 5, distinctly 2-seriate, the inner the smaller, imbricate. Disk 0. Ovary 3-celled, densely tomentose; ovules solitary in each cell; styles 3, undivided, rather stout, somewhat reflexed, slightly connate at the base, pubescent without, stigmatic but not papillose on the inner face above.—Shrub. Leaves alternate, shortly petioled, entire or slightly toothed towards the apex. Flowers in androgynous spike-like racemes; males many, fascicled; female solitary, terminal; bracts herbaceous.

A single endemic species.

1. **N. lancifolia,** *Pax in Engl. Jahrb.* xliii. 223. A shrub (or tree). Leaves short-petioled, lanceolate, $7\frac{1}{2}$–8 in. long, 2–$2\frac{1}{4}$ in. broad, acuminate, gradually narrowed to the base, penninerved, margin faintly denticulate, coriaceous, quite glabrous; petiole 2–6 lin. long; stipules 0. Spikes peduncled, about 4 in. long, in the axils of the upper leaves, sparingly pubescent; bracts small, triangular. Male flowers glomerulate in the axils of the bracts. Male sepals orbicular, acute, pubescent externally, 1 lin. long. Filaments 15–20, rather longer than sepals. Rudimentary ovary rather shorter than the filaments. Female sepals 5–6, triangular, acute, pubescent. Ovary densely tawny-pubescent, globose, without wings; styles 1 lin. long.

Lower Guinea. Spanish Guinea; Nkolentangan, Mabungo, 1500 ft., *Tessmann*, 359!

The characters of this species are, with the single exception of the presence of a rudimentary ovary in the male flower, those of *Argomuellera macrophylla*, Pax. The rudimentary ovary has a solitary distinct chamber with a well-developed

ovule. It is, therefore, a matter for further investigation as to whether the conditions present do not indicate an abnormal condition of *A. macrophylla*, Pax, showing pistillody, rather than the existence of a distinct genus.

75A. **KLAINEANTHUS,** Pierre ex Prain in Kew Bulletin, 1912, 105.

Flowers dicœcious, apetalous. Male: Sepals 4–5, imbricate, connate below in a campanulate tube as long as the lobes. Stamens 8 or 10, 2-seriate; filaments of the outer series rather shorter than those of the inner, surrounded by a ring of 4–5 fleshy ovate glands opposite the sepals and alternate with the outer stamens; anthers basifixed, smooth, 2-celled, dehiscence longitudinal, introrse. Rudimentary ovary 2–3-lobed, as long as the stamens of the inner series. Female: Sepals 5, rarely 4, imbricate, almost free to the base. Disk cupular with often an incomplete or complete ring of 5 or 4 staminodes inserted at the base of the disk within. Ovary 3-celled, glabrous; styles 3, glabrous, 2-partite to their lower fourth, each arm obtusely 2-lobed at the tip. Fruit capsular, 3-coccous; cocci crepitant, separating septicidally and also opening loculicidally leaving a long trigonous persistent woody columella; epicarp thinly fleshy; endocarp thickly woody. Seeds large, flattened ovoid, carunculate; embryo rather large; cotyledons broad, ovate-cordate, flat.—A tree; leaves alternate; petioles pulvinate at the base and apex; flowers in ample terminal and axillary panicles; males glomerulate, females subsolitary to a bract; pedicels in both sexes slender, short, articulate.

A single endemic species.

1. **K. Gaboniæ,** *Pierre ex Prain in Kew Bulletin,* 1912, 106. A tree 30–60 ft. high, twigs reddish and pubescent when young, at length grey and glabrous. Leaves distinctly petioled, oblong or obovate, bluntly acuminate, margin entire, base wide- to narrow-cuneate, 4–8 in. long, 1½–3½ in. wide, firm, dark green and dull above, paler and somewhat polished beneath, glabrous on both surfaces; secondary nerves 8–12 pairs, raised beneath, looping within the margin; petiole slightly pulvinate at the base, distinctly pulvinate and geniculate at the apex, 1½–2 in. long. Panicles axillary and terminal, males as long as the females, rather shorter than the leaves; male flowers glomerate, females subsolitary; pedicels in both sexes shorter than the calyx, distinctly articulate. Male: Calyx 5- or 4-lobed, companulate below; lobes oblong, obtuse, pubescent and ciliate, strongly imbricate. Stamens 8 or 10, 2-seriate; filaments of outer series shortest, surrounded by a ring of 4 or 5 extra-staminal glands alternate with the outer stamens and opposite the calyx-lobes; anthers basifixed, erect, introrse, dehiscence longitudinal. Rudimentary ovary 3-gonous, as long as the inner stamens, 3- (rarely 2-) lobed at the apex. Female: Calyx 5- (less often 4-) partite almost to the base, otherwise as in the males. Disk cupular, denticulate and 4–5-lobed. Staminodes often present in a complete or incomplete series, hypogynous. Ovary 3-celled, glabrous; styles 3, deeply 2-partite, the arms again minutely and bluntly 2-fid. Capsule 3-celled, ¾ in. across;

cocci 2-valved, crepitant in dehiscence. Seed large, ovoid, clothed with a yellow fleshy aril, 5 lin. long, 4 lin. wide, 2½ lin. thick; testa brown, shining; albumen 2-partite; cotyledons flat, broad, leafy, 3-nerved from the base, 4 lin. long, 3 lin. wide.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1754! 1853! 3790! 4204!

Lower Guinea. Gaboon; Libreville, *Klaine*, 277! 1352! 1941! 2015! 2461! 2474! 2510! 3200! Sibange, *Klaine*, 2576!

76. **TRAGIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 329.

Flowers monœcious, rarely dicœcious or polygamous, apetalous. Male: Calyx globose in bud, splitting into 3 (very rarely 4–5) valvate lobes. Disk 0 or obscure. Stamens normally 3, casually 1–2 or 4–5; filaments free; anthers ovoid or oblong, dorsifixed or nearly basifixed; cells 2, parallel, dehiscing longitudinally introrsely in all but one African species. Rudimentary ovary minute or obsolete. Female: Calyx-segments usually either 3 or 6, imbricate, when 6 2-seriate, very rarely 4-5, more or less accrescent in fruit in all but one African species, pinnately or palmately lobulate, very rarely entire or subentire. Ovary 3-celled; ovules in each cell solitary; styles 3, connate below in a slender column, very rarely connate throughout in a stout hollow column; stigmas never partite. Capsule breaking up into 3 2-valved cocci; cocci subglobose, rarely slightly angled dorsally. Seeds globose, not strophiolate; testa crustaceous; albumen fleshy; cotyledons broad, flat.—Herbs, very rarely shrubby; stems usually long, slender and twining, rarely shorter and erect, or suberect and rambling upwards, usually more or less copiously beset with stinging bristles on the stems, leaves and female calyx. Leaves alternate, stipulate, usually distinctly petioled and very generally cordate at the base. Racemes lateral leaf-opposed or terminal or both, with almost always a distinct naked peduncle, with many male flowers above and 1–2 (less often 3) basal female flowers; in dicœcious species with many male flowers and with comparatively few female flowers respectively. Bracts persistent, the females usually similar to the males but larger, sometimes dissimilar. Pedicels slender, articulate and 2-bracteolate, usually shorter than their bracts; males generally solitary to their bracts or solitary for the most part but geminate below, less often in 3-flowered glomerules or cymules; females in the Tropical African species always solitary to their bracts.

Species over 100, spread throughout the warmer regions of both hemispheres

Basal female pedicel filiform, as long as the male part of the inflorescence; anthers extrorse; female calyx-segments hardly accrescent in fruit . . 1. *T. volubilis.*

Basal female pedicel or pedicels short or very short; anthers introrse; female calyx-segments usually distinctly accrescent in fruit.

Racemes 1-sexual; plants dicœcious; female calyx, where known, 6-partite, 2-seriate.

Male flowers solitary to their bracts or only

casually geminate low down; leaves sessile or very shortly petioled, lanceolate; stems erect.	
Leaves densely pilose on both surfaces; male racemes 4 in. long or under . . .	32. *T. Schweinfurthii.*
Leaves shortly setose on the nerves only; male racemes 6 in. long or longer . . .	33. *T. akwapimensis.*
Male flowers in 3-flowered glomerules or cymules.	
Leaves sessile or very shortly petioled; stems erect or suberect.	
Leaves ovate, shallow-cordate; hairs on stem retrorse	14. *T. Descampsii.*
Leaves lanceolate, subhastate-auriculate; hairs on stem ascending . . .	23. *T. lukafuensis.*
Leaves distinctly to long petioled, cordate; stems long, slender, twining.	
Leaves softly puberulous on nerves and petioles; male sepals puberulous . .	18. *T. mitis.*
Leaves harshly retrorsely hispid on nerves and petioles; male flowers glabrous, twice as large as in *T. mitis*. . . .	19. *T. bongolana.*
Racemes androgynous or, if casually 1-sexual, the plants polygamous.	
*Female calyx 6-partite, segments usually more or less distinctly 2-seriate.	
†Female calyx-segments entire or subentire.	
Male flowers mostly in 3-flowered glomerules or cymules; racemes 6 in. long or longer; bracts lanceolate, similar in both sexes; female calyx-segments little accrescent, not narrowed to a claw; stems short, erect, tufted	2. *T. fasciculata.*
Male flowers solitary to their bracts; racemes under 1 in. long; male bracts spathulate, female larger, 3-lobed; female calyx-segments distinctly accrescent, unguiculate; stems long, slender, twining.	
Narrow claw of female calyx-segments not exceeding the terminal laminula.	
Leaves pubescent; laminula of calyx-segments wide, suborbicular, obtuse	4. *T. spathulata.*
Leaves glabrous; laminula of calyx-segments narrow, oblong, subacute	3. *T. polygonoides.*
Narrow claw of female calyx-segments twice as long as the terminal laminula; laminula either always entire or alternately entire and 1-toothed at its base	5. *T. laminularis*.
††Female calyx-segments distinctly lobulate on each side.	
Styles united throughout their length in a hollow column; stems slender, twining.	
Style-column narrowly funnel-shaped; female bracts subreniform with a closely sharply toothed margin . .	9. *T. natalensis.*
Style-column widely pyriform or subglobose, at first as large as the ovary;	

female bracts oblanceolate-oblong, sparingly toothed but not lobed . . 10. *T. anomala.*

Styles usually more or less connate below in a slender column but free at least in their upper fourth to their upper half.

Female calyx-segments ending in a persistently membranous laminula much broader than the lateral lobules; stems slender, twining.

Lateral lobules of female calyx-segments 4–6 on each side.

Lateral lobules of female calyx-segments bristly with white stinging hairs . . . . . 8. *T. tenuifolia.*

Lateral lobules of female calyx-segments setose but not bristly . 6. *T. Chevalieri.*

Lateral lobules of female calyx-segments usually 3 on each side . . . 7. *T. Zenkeri.*

Female calyx-segments with the terminal laminula like the lateral lobules.

Capsule $\frac{3}{4}$ in. across, its walls coriaceous; leaves cordate, distinctly petioled; stems suberect . . . . 24. *T. physocarpa.*

Capsule $\frac{1}{3}$ in. across or less, its valves crustaceous or woody.

Male flowers mostly in 3-flowered glomerules or cymules; stems erect; leaves sessile or shortly petioled.

Leaves linear-lanceolate, base cuneate or rounded; pedicels longer than their bracts . 31. *T. shirensis.*

Leaves ovate-lanceolate, base cordate; pedicels shorter than their bracts . . . . . 15. *T. Rhodesiæ.*

Male flowers solitary to their bracts or only casually geminate low down.

Leaves narrow-cuneate at the base.

Female calyx-segments 5–7-lobulate on each side, their rhachis oblong, broad; leaves 3-partite; stems erect . 13. *T. tripartita.*

Female calyx-segments 4-lobulate on each side, their rhachis linear, narrow.

Stems ascending or rambling; leaves oblong, variously partite and lobulate . 11. *T. cannabina.*

Stems erect, straight; leaves linear-lanceolate, entire or subentire . . . 12. *T. Hildebrandtii.*

Leaves cordate, less often truncate or rounded at the base, never cuneate.

‡Leaves never lobed or partite.
Leaves rounded, truncate or very shallow-cordate at the base; stems erect or suberect.
Leaves densely bristly with stinging hairs; racemes terminal, up to 3 in. long — 28. *T. ukambensis.*
Leaves without, or with very few stinging hairs; racemes not exceeding 1 in. in length.
Racemes terminal and lateral; leaves ovate, always distinctly petioled . . . — 29. *T. impedita.*
Racemes all lateral; leaves lanceolate to ovate-lanceolate, often subsessile . . — 30. *T. angolensis.*
Leaves distinctly cordate at base; stems, except in *T. arabica*, var. *parvifolia*, long, slender, twining.
Pedicels in both sexes distinctly longer than their bracts; female calyx-segments 2–3-lobulate on each side, little accrescent . . . — 27. *T. Preussii.*
Pedicels not longer than their bracts in either sex.
Female calyx-segments 3–4-lobulate on each side.
Bracts wide-ovate, glabrous; leaves triangular - ovate, hardly bristly . — 25. *T. glabrescens.*
Bracts narrow-lanceolate or subulate; leaves ovate, armed with numerous pungent stinging hairs.
Leaves narrow-cordate, pubescent and bristly . — 20. *T. brevipes.*
Leaves wide-cordate, bristly only . — 21. *T. Benthamii.*
Female calyx-segments 5–7-lobulate on each side.
Leaves ovate-lanceolate, copiously

bristly, bristies accompanied or not by a soft pubescence; bracts subulate.
Leaves acuminate, 2 in. long or longer . . **16.** *T. cordifolia.*
Leaves acute, under 1 in. long; stems sometimes (var. *parvifolia*) erect . . **17.** *T. arabica.*
Leaves ovate-oblong, hardly bristly; bracts wide-ovate **26.** *T. insuavis.*

‡‡Leaves more or less distinctly 3-lobed and subhastate-auriculate.
Basal lobes semiorbicular, sometimes obscure, their margin serrate like the central lobe; stems long, slender, twining . . **22.** *T. Okanyua.*
Basal lobes oblong, subhorizontal, more coarsely toothed than the central lobe; stems erect; female calyx-segments often fewer than six . . **34.** *T. dioica.*

Female calyx 3-partite, or, if segments more than 3, the these 1-seriate (see **34, *dioica*).
Leaves sessile or subsessile; stems erect.
Racemes 6 in. long or longer; male flowers in 3-flowered cymules; leaves lanceolate, rounded at the base . . . . **35.** *T. Wildemanii.*
Racemes 1 in. long; male flowers solitary to their bracts.
Leaves ovate, truncate or cuneate at the base **36.** *T. Gardneri.*
Leaves linear- to ovate-lanceolate, subhastate-auriculate at the base . . **41.** *T. subsessilis.*
Leaves distinctly petioled, more or less cordate at the base.
Stems erect or suberect.
Male flowers solitary to their bracts; cocci subglobose.
Leaves ovate-triangular, deep-cordate at the base . . . . . **37.** *T. Dinteri.*
Leaves distinctly 3-lobed, subhastate-auriculate at the base; female calyx-segments usually more than three . **34.** *T. dioica.*
Male flowers glomerulate; cocci bluntly angled on the back; leaves ovate-lanceolate, shallow- to deep-cordate at the base, hirsute . . . . . **44.** *T. senegalensis.*

Stems long, slender, twining; male flowers solitary to their bracts.
†Male bracts ovate-lanceolate or lanceolate, their margins glabrous or ciliate but not glandular; female bracts like the male bracts but somewhat larger.
Leaves ovate-lanceolate or lanceolate, almost glabrous; lobules of female calyx-segments very short.
Leaves shallow-cordate at the base; bracts with finely ciliolate margins; filaments erect . . **43.** *T. angustifolia.*
Leaves deep-cordate and minutely to distinctly subhastate-auriculate at the base; bracts with glabrous or very sparingly ciliolate margins; filaments incurved . . . **42.** *T. kirkiana.*
Leaves ovate or ovate-oblong, deep-cordate at the base.
Lobules of female calyx-segments exceeding in length the width of the rhachis; leaves sparingly bristly. **39.** *T. Scheffleri.*
Lobules of female calyx-segments not longer than the width of the rhachis; leaves very bristly . **38.** *T. furialis.*
††Male bracts trangular-ovate, with margin ciliate and finely glandular; female bracts with finely toothed margin; leaves from triangular-ovate to lanceolate and from obscurely lobed to subhastate-auriculate at the base; sometimes almost glabrous, sometimes densely pubescent and bristly; connective glandular . . . . **40.** *T. adenanthera.*

1. **T. volubilis,** *Linn. Sp. Pl. ed.* i. 980. Stems long, slender, twining, armed with stinging hairs. Leaves distinctly to long petioled, membranous, oblong-lanceolate or oblong, acute, base rounded, truncate or shallow wide-cordate, margin serrate, 2–3 in. long, ¾–1½ in. wide, slightly bristly especially on the nerves on both surfaces, otherwise glabrous; petiole ½–1½ in. long; stipules lanceolate, erect, 1½ lin. long. Racemes lateral, slender, rather lax, 1–1½ in. long, with a solitary female flower at the base on a pedicel as long as the rest of the raceme; bracts lanceolate, ascending, pubescent, persisting. Male sepals 3, ovate. Stamens 3, or casually 1–2; anthers extrorse. Female calyx-segments 6, lanceolate, very slightly accrescent. Ovary setose; styles 3, glabrous, united below in a column. Capsule 3-coccous, sparingly setose, ¼ in. across; cocci subglobose. Seeds globose, pale straw-coloured, mottled with brown.—Müll. Arg. in DC. Prodr. xv. ii. 935; Hiern in Cat. Afr. Pl. Welw. i. 984; Durand & De Wild. in Bull. Soc. Bot. Belg. xxxvii.; 106; De Wild. & Durand, Reliq. Dewevr. ii. 212; Th. & Hél. Durand, Syll. Fl. Congol. 498. *T. pedunculata,* Beauv. Fl. Owar. et Benin, i. 90, t. 54.

Upper Guinea. Sierra Leone: near Kurusu, *Scott-Elliot*, **5514**! Ivory Coast: Soubre, *Chevalier*, **19134**! Gold Coast: without precise locality, *Beauvois!* Southern Nigeria: Akwa, *Thomas*, **1325**! **1332**! Cameroons: Esob, near Ntem, **2800** ft., *Ledermann*, **5700**! Yaunde, *Zenker*, **482**! Fernando Po: *Mann*, **75**!

Lower Guinea. Gaboon: Ogowe River; Eninga, *Buchholz!* French Congo: Kitobi, *Lecomte*, **B 99**! Brazzaville, *Thollon*, **421** partly! Belgian Congo: Stanley Pool district, at Lukolela, *Dewèvre*, **549**! Angola: Golungo Alto; near Menhalulu, *Welwitsch*, **382**! Cazengo, *Pearson*, **2323**! *Gossweiler*, **4893**!

Also widely spread in Tropical America; in Africa not impossibly an introduction from the New World.

2. **T. fasciculata,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii., 83. Stems very many, subtriquetrous, slender, wiry, tufted from a cylindric woody horizontal rootstock, 4–5 lin. thick, erect, sparingly branched, the axillary branches all leafy ascending and virgate, densely clothed with spreading or subreflexed tawny setose hairs. Leaves distinctly petioled, narrowly ovate-lanceolate, acute or acuminate, base slightly subhastate-auriculate or shallow wide-cordate, margin finely serrate throughout, 1½–2 in. long, ⅓–½ in. wide across the base, ¼–⅓ in. wide at the middle, rather sparingly tawny-pubescent, more densely so along the nerves on both surfaces; petiole ⅙–¼ in. long, densely tawny-pubescent; stipules lanceolate, erect, 1 lin. long, sparingly setose. Racemes androgynous or at times 1-sexual, terminal on the stem but not on the leafy branches and leaf-opposed below, slender, very lax-flowered, 6–10 in. long; bracts from the middle downwards ¼–1¼ in. apart, gradually more remote, with a short naked densely pubescent basal peduncle ½ in. long; flowers all male or with a solitary basal female; pedicels in both sexes pilose, shorter than their bracts; uppermost male flowers solitary and 2-bracteolate, lower still solitary but 4-bracteolate, then geminate or the lowest in 2–3-flowered cymules with 4–6 bracteoles on common peduncles ¾–1 lin. long; bracts subulate, spreading, 1–1½ lin. long; bracteoles narrower, nearly as long as the bracts, all sparingly pilose. Male sepals usually 3, occasionally 4–5, ovate-triangular, pilose externally. Stamens usually 3, less often 2, rarely 4–5, in some cases replaced by solitary imperfect capsules in the flowers of the lowest cymules; filaments as long as the anthers. Female calyx-segments 6, ovate-triangular, pilose, margin entire or subentire, membranous, hardly accrescent. Ovary hispid; styles 3, short, connate at the base. Capsule 3-coccous, sparingly hispid; cocci subglobose. Seeds "reniform" (*Beille.*)

North Central. Dar Banda: Upper Shari River; Kaga Bongola, *Chevalier*, **7218**!

A very distinct species, not readily comparable with any other known African one. The seeds, which are described by the author as "reniform," we have not seen.

3. **T. polygonoides,** *Prain in Kew Bulletin*, 1912, 193. Stems long, slender, twining, without stinging hairs. Leaves distinctly to long petioled, membranous, ovate-oblong to ovate-lanceolate, narrowed to a rounded mucronulate apex, base distinctly cordate, margin subentire, 2½–4 in. long, ¾–1¼ in. wide, with a few adpressed hairs on the nerves above and very sparingly pubescent on the nerves beneath,

otherwise quite glabrous; petiole $\frac{1}{3}$–$1\frac{3}{4}$ in. long, sparingly puberulous; stipules ovate, acute, erect, $\frac{1}{6}$–$\frac{1}{5}$ in. long, faintly puberulous or glabrous. Racemes lateral, slender, rather dense, $\frac{1}{4}$–$\frac{1}{3}$ in. long, with a naked pubescent peduncle $\frac{1}{3}$–$\frac{1}{2}$ in. long, with several male flowers above and 1–2 basal female flowers; pedicels of male flowers solitary to and shorter than the bracts; male bracts ovate, acute, 1–2 lin. long, glabrous; female bracts orbicular, acutely 3-lobed, bracteoles ovate, acute. Male sepals 3, ovate, with a few apical hairs. Stamens 3; filaments very short. Female calyx-segments 6, rather narrowly oblong, subacute, membranous, entire, 4 lin. long, slightly narrowed to a broad rhachis rather sparingly hirsute on the margins. Ovary rather sparingly hispid; styles 3, finely pubescent, united in a column for three-fourths of their length. Fruit not seen ripe; young capsule very sparsely beset with short white bristles, $\frac{1}{5}$ in. across.

Upper Guinea. Ivory Coast: Bouroukrou, *Chevalier*, **16860**!

Very closely related to *T. spathulata*, Benth., but readily distinguished by the almost glabrous leaves and by the different female calyx-segments which are much smaller and have the laminula much narrower relatively to the stipe.

4. **T. spathulata,** *Benth. in Hook. Niger Fl.* 502. Stems long, slender, twining, armed with stinging hairs. Leaves distinctly to long petioled, membranous, obovate-oblong, acute or shortly and acutely acuminate, base shortly and rather narrowly cordate, margin shortly crenate or serrate, 2–3 in. long, 1–$1\frac{1}{2}$ in. wide, rather sparingly beset with long spreading bristly hairs above, otherwise glabrous, pubescent beneath and also beset with long spreading bristly hairs especially on the nerves; petiole $\frac{1}{2}$–2 in. long, pubescent and also setose with spreading hairs; stipules lanceolate, erect, $\frac{1}{6}$–$\frac{1}{5}$ in. long, pubescent. Racemes lateral, slender, rather dense, $\frac{1}{2}$–$\frac{3}{4}$ in. long, with a naked pubescent peduncle $\frac{3}{4}$–$1\frac{1}{2}$ in. long, with several male flowers above and 1–2 basal female flowers; pedicels of male flowers solitary to and ultimately longer than the bracts, articulate below the middle; male bracts obovate or spathulate, obtuse, 1–2 lin. long, sparingly beset with long bristly hairs; female bracts orbicular-ovate, 3-lobed; bracteoles obovate, obtuse. Male sepals 3, ovate. Stamens 3; filaments short. Female calyx-segments 6, orbicular-subspathulate, membranous, at length accrescent but hardly coriaceous, 4 lin. long, pubescent and hispid, narrowed to a short densely hairy rhachis much shorter than the terminal laminula and without any lateral lobes. Ovary very densely setose; styles 3, finely puberulous, united in a column for two-thirds their length. Capsule 3-coccous, densely bristly, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, brown with white patches.—DC. Prodr. xv. ii. 945.

Upper Guinea. Gold Coast: Cape Coast Castle, *Vogel*, 8! Odumase; Krobo plains, *Johnson*, 1089! Gida Abdulker; Rousu, *Krause!* and without precise locality, *Farmar*, 411! 438! Togo: Misahohe, *Baumann*, 450! Southern Nigeria: Abeokouta, *Irving*, 72! Olokemeji; Esisi, *Foster*, 278!

A very distinct species.

5. **T. laminularis,** *Müll. Arg. in Linnæa*, xxxiv. 183. Stem long, slender, woody and erect below, twining above, armed with

stinging hairs. Leaves distinctly petioled, membranous, obovate-lanceolate to oblong, shortly and acutely acuminate, base truncate or very shallow wide-cordate, margin shortly and coarsely toothed rarely entire, 1½–2 in. long, ⅔–¾ in. wide, rather sparingly beset with long spreading bristly hairs on both surfaces, usually more densely bristly on the nerves beneath, otherwise glabrous; petiole ⅓–¾ in. long, densely setose with spreading bristly hairs; stipules lanceolate, erect, ⅕–¼ in. long, beset with bristly hairs externally. Racemes lateral, slender, rather dense, ¼–½ in. long, with a naked, slender, patently hirsute peduncle ½–¾ in. long, with several male flowers above and 1–2 basal female flowers, pedicels in both sexes much shorter than and solitary to the bracts; male bracts obovate or spathulate, obtuse, 1–2 lin. long, pubescent; female bracts orbicular-ovate, 3-lobed; bracteoles obovate, obtuse. Male sepals 3, ovate. Stamens 3; filaments short. Female calyx-segments 6, obovate-rhomboid, membranous, at length accrescent but hardly coriaceous, 3 lin. long, pubescent but not hispid; rhachis rather narrow, twice as long as the rather small orbicular-oblong terminal laminula, and either without any lateral lobules or in some flowers the sepals alternately without lateral lobules and with one pair of minute lateral lobules immediately subtending the terminal laminula. Ovary rather densely pubescent; styles 3, pubescent, united for half their length. Capsule 3-coccous, rather sparingly strigose, ⅓ in. across; cocci subglobose. Seeds globose, dark brown with white spots.—DC. Prodr. xv. ii. 945.

Upper Guinea. Sierra Leone: without precise locality, *Smeathmann! Afzelius!*

This species is described by Müller as having the female calyx-lobes without lobules on their rhachis. But in the specimens of the original gathering in the Paris Herbarium, some of the female flowers have the calyx-lobes of one series with only a terminal laminula, while the alternating calyx-lobes of the other series have a solitary pair of lateral lobules close to the base of the laminula. Except as regards its female calyx, this species agrees very closely with *T. Chevalieri*, Beille.

6. **T. Chevalieri,** *Beille in Bull. Soc. Bot. France*, lvii. *Mém.* viii. 126. Stems long, slender, twining, armed with stinging hairs. Leaves shortly to distinctly petioled, membranous, ovate-lanceolate to lanceolate, acute, base shortly cordate, margin entire or faintly undulate, 2½–4 in. long, ¾–1¾ in. wide, sparingly beset with bristly white hairs on both surfaces; petiole ¼–1¼ in. long, densely bristly pilose; stipules lanceolate, erect, ⅕–⅙ in. long, hispid. Racemes lateral, slender, rather dense, ¼–½ in. long, with a naked slender pubescent peduncle ¼–½ in. long, with several male flowers above and 1–2 basal female flowers; pedicels in both sexes shorter than and solitary to their bracts; male bracts oblong-subspathulate, obtuse, 1–2 lin. long, hispid, membranous; female bracts orbicular-ovate, 3-lobed; bracteoles ovate, acute, hispid. Male sepals 3, ovate, pubescent on both sides and hispid externally. Stamens 3; filaments short. Female calyx-segments 6, ovate-lanceolate, membranous, 3–4 lin. long, pubescent and hispid on both sides, the margin in the upper third entire, in the lower two-thirds with 4–6

short linear-lanceolate lobules on each side. Ovary rather sparingly hispid: styles 3, very sparsely puberulous, united only in their lower fifth. Fruit not seen.

Upper Guinea. Ivory Coast: Middle Sassandra; Guideko, *Chevalier*, 16471! Southern Nigeria: Lagos; Ajilité, *Millen*, 172! Oban; *Talbot*, 1494!

Most nearly related to *T. Zenkeri*, Pax, but readily distinguished by the long hispid hairs on the peduncles, bracts and calyx-lobes, as well as on the leaves and petioles; in this latter regard it is identical with *P. laminularis*, Müll. Arg., with which it may ultimately be found possible to unite it.

7. **T. Zenkeri,** *Pax in Engl. Jahrb.* xxiii. 528. Stems long, slender, twining, armed with stinging hairs. Leaves distinctly to long petioled, membranous, oblong to obovate-oblong, shortly and acutely acuminate, base truncate or very shallow wide-cordate, margin shortly to distinctly and coarsely toothed, 2–3 in. long, $\frac{3}{4}$–1 in. wide, rather sparingly beset with long spreading bristly hairs on both surfaces, usually more densely bristly, especially on the nerves beneath, otherwise glabrous, sometimes nearly glabrous beneath; petiole $\frac{1}{2}$–2 in. long, densely setose with spreading bristly hairs; stipules lanceolate, erect, $\frac{1}{5}$–$\frac{1}{4}$ in. long, beset with bristly hairs externally. Racemes lateral, slender, rather dense, $\frac{1}{4}$–$\frac{1}{2}$ in. long, with a naked, slender, pubescent peduncle 1–$1\frac{1}{2}$ in. long, with numerous male flowers above and 1–2 basal female flowers, pedicels in both sexes much shorter than and solitary to the bracts; male bracts obovate or spathulate, obtuse, 1–2 lin. long, finely pubescent; female bracts orbicular-ovate 3-lobed; bracteoles obovate, obtuse. Male sepals 3, ovate. Stamens 3; filaments short. Female calyx-segments 6, ovate-lanceolate, membranous, at length accrescent but hardly coriaceous, 3 lin. long, pubescent, pinnately 3-lobed on each side, rhachis rather narrow, lateral lobes short, terminal laminula large, orbicular-oblong, membranous, nearly or quite as long as the rhachis. Ovary rather densely pubescent; styles 3, pubescent, united for half their length. Capsule 3-coccous, rather sparingly strigose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, dark brown with white spots.—De Wild. & Durand, Contrib. Fl. Congo, i. 52 and Reliq. Dewevr. ii. 212; Th. & Hél. Durand, Syll. Fl. Congol. 498.

Nile Land. Uganda: Entebbe, *Bagshawe*, 727!

Upper Guinea. Cameroons: Yaunde, *Zenker & Staudt*, 88!

Lower Guinea. Gaboon: Libreville, *Klaine*, 743! *Duparquet!* Lower Congo: Matadi, near the Lufu River, *Dewèvre*, 437!

Nearly related to, and possibly only a variety of *T. tenuifolia*, Benth.

8. **T. tenuifolia,** *Benth. in Hook. Niger Fl.* 502. Stem long, slender, twining, armed with stinging hairs. Leaves distinctly to long petioled, membranous, ovate, obovate or oblong, acutely acuminate, base shortly to deeply cordate, margin closely and shortly or distinctly and bluntly toothed, $2\frac{1}{2}$–5 in. long, 1–$2\frac{1}{2}$ in. wide, bristly on the nerves above, beneath bristly and sometimes also sparingly softly pubescent on the nerves, elsewhere glabrous; petiole $\frac{1}{2}$–$2\frac{1}{2}$ in. long, puberulous and sparingly bristly; stipules lanceolate, bristly, spreading, $1\frac{1}{2}$ lin. long.

Racemes lateral, slender, rather dense, $\frac{1}{3}$–1 in. long, with a naked slender pubescent and bristly peduncle $\frac{1}{2}$–$1\frac{1}{4}$ in. long, with numerous male flowers above and 1–2 basal female flowers; pedicels in both sexes solitary to and much shorter than the bracts, $\frac{1}{2}$ lin. long or less; male bracts ovate-lanceolate or lanceolate, acuminate, 1–2 lin. long, bristly; female bracts wide-ovate, somewhat 3-lobed, 2–$2\frac{1}{2}$ lin. long; bracteoles subfalcate-lanceolate. Male sepals 3, ovate. Stamens 3, subsessile. Female calyx-segments 6, lanceolate, at first membranous, at length accrescent and thinly coriaceous, 5 lin. long, irregularly pinnatipartite, rhachis rather broad, with 4–6 unequal short or long lobes on each side and an ovate or crescentic terminal membranous laminula, occasionally one or both of the distal pair of lateral lobes ending in a similar laminula; rhachis pubescent and bristly; lateral lobes densely or sparingly persistently setose with stiff white bristles; terminal laminula glabrous or sparingly pubescent. Ovary densely pubescent; styles 3, glabrous, united for half their length. Capsule 3-coccous, sparingly setose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, dark brown with pale blotches.—Müll. Arg. in DC. Prodr. xv. ii. 945; De Wild. & Durand, Contr. Fl. Congo, i. 52, and Pl. Thonner. Congol. 21; Th. & Hél. Durand, Syll. Fl. Congol. 498. *T. manniana*, Müll. Arg. in Flora, 1864, 436, and in DC. Prodr. xv. ii. 941. *T. Klingii*, Pax in Engl. Jahrb. xix. 105. *T. calvescens*, Pax in Engl. Jahrb. xliii. 324.

Upper Guinea. Sierra Leone: Bagroo River, *Mann*, **834**! Scarcies Valley; Kambia, *Scott-Elliot*, **4371**! Togo: Bismarckburg, *Kling*, **140**! *Buettner*, **81**! Misahohe, *Baumann*, **534**! Southern Nigeria: Lower Niger, *Barter*, **511**! Cameroons: Johann-Albrechtshohe, 850 ft., *Buesgen*, **52**! Bonge, *Dusèn*, **318**!

Lower Guinea. St. Thomas Island: *Don*, **39**! **61**! Gaboon: Libreville, *Duparquet*! Loango: Chinchosho, *Soyaux*, **190**!

South Central. Belgian Congo: Bangala; Mongalla, at Bobi near Ngali, 1500 ft., *Thonner*, **43**! Eastern Province: Fort Beni, *Mildbraed*, **2314**! Wambutti, *Mildbraed*, **2893**! between Mawambi and Awakubi, *Mildbraed*, **3162**!

A very distinct species; the form described as *T. manniana*, Müll. Arg., is based on a specimen which only differs from the type by a teratological malformation of some of its female calyx-segments; in most of the specimens examined the female calyx is quite normal. The form described as *T. calvescens*, Pax, only differs from the type in having the female calyx-segments less densely and less persistently white setose.

9. **T. natalensis,** *Sond. in Linnæa*, xxiii. 107. Stems long, slender, twining, armed with stinging hairs. Leaves distinctly to long petioled, membranous, ovate or ovate-oblong, acuminate, base rounded or truncate or shallow-cordate, margin closely and sharply serrate, 2–4 in. long, 1–$2\frac{1}{2}$ in. wide, sparingly to densely softly pubescent on both surfaces and bristly setose especially on the nerves beneath; petiole $\frac{1}{2}$–3 in. long, patently pilose and hispid; stipules linear-lanceolate, erect, $\frac{1}{5}$–$\frac{1}{6}$ in. long, hispid externally. Racemes lateral, slender, rather lax, 1–$1\frac{1}{4}$ in. long, with a naked slender softly and patently pilose peduncle, $\frac{3}{4}$–1 in. long, with several male flowers above and 1–2 basal female flowers; pedicels in both sexes solitary to and shorter than their bracts; male bracts oblong-subspathulate, obtuse or subacute, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, membranous,

entire or sometimes denticulate, softly and patently pilose; female bracts subreniform, cordate, not lobed, their margin closely and sharply serrate; bracteoles oblong, entire, softly pilose. Male sepals 3, wide-ovate, softly pilose externally. Stamens 3; filaments short. Female calyx-segments 6, ovate-lanceolate, membranous, at length accrescent but hardly coriaceous, 5 lin. long, pinnately 8–10-lobulate on each side, lateral lobules and rhachis very densely softly woolly with long hairs, terminal laminula narrowly ovate, almost glabrous, not much larger than the small lateral lobules. Ovary densely adpressed-setose; styles 3, pubescent, united throughout in a narrowly infundibuliform tube, puberulous externally; stigmas free, suberect or very slightly recurved. Capsule 3-coccous, rather densely setose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, dark brown with grey blotches.—Baill. Adansonia, iii. 162; Müll. Arg. in DC. Prodr. xv. ii. 942. *T. involucrata*, Jacq. ex E. Meyer in Drège, Zwei Pfl. Documente, 226; Baill. Étude Gén. Euphorb. 461; not of Linn. *T. mitis*, var. *oblongifolia*, Müll. Arg. in Flora, 1864, 435, and in DC. Prodr. xv. ii. 942. *T. ambigua*, S. Moore, and *T. ambigua*, var. *urticans*, S. Moore in Journ. Linn. Soc. xl. 202-203.

Nile Land. British East Africa: Kibwezi, *Kaessner*, 706! Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Distr. German East Africa: Usambara; Kerematonto, 1700 ft., *Engler*, 3347! Rosallo Valley, *Holst*, 3861! Portuguese East Africa: Moramballa, 3500 ft., *Kirk!* Rhodesia: Chirinda Forest, 3700–4000 ft., *Swynnerton*, 446! 795!

Also in South Africa.

A very distinct species.

10. **T. anomala,** *Prain in Kew Bulletin*, 1912, 194. Stems long, slender, twining, armed with stinging hairs. Leaves distinctly petioled, membranous, oblong, acute, base distinctly narrow-cordate, margin closely crenate or dentate, 3–6 in. long, $1\frac{1}{4}$–$2\frac{1}{4}$ in. wide, sparingly bristly setose on the nerves above, more densely setose on the nerves beneath, otherwise glabrous; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. long, glabrescent or glabrous; stipules linear-lanceolate, reflexed, $\frac{1}{5}$–$\frac{1}{4}$ in. long, very sparingly pubescent externally. Racemes lateral, slender, rather lax, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, with a naked slender finely puberulous peduncle $\frac{1}{2}$–1 in. long, with several male flowers above and 1–2 basal female flowers; pedicels in both sexes solitary to their bracts, the male pedicels up to $\frac{1}{4}$ in. long finely puberulous and longer than the bracts; male bracts oblong-subspathulate, obtuse or subacute, 1–2 lin. long, membranous, puberulous externally; female bracts oblanceolate-oblong, acute, margin with 2–3 lateral teeth but not lobed; bracteoles ovate, acute, toothed like their bracts. Male sepals 3, wide-ovate, sparingly puberulous externally. Stamens 3; filaments short. Female calyx-segments 6, ovate-lanceolate, membranous, at length accrescent but hardly coriaceous, 5 lin. long, pinnately 7–9-lobulate on each side, lateral lobules and rhachis very densely and softly woolly with long hairs, terminal laminula narrowly ovate almost glabrous, not much larger than the male lateral lobules. Ovary densely adpressed setose; styles 3, puberulous, united throughout in a wide pyriform tube, at first as large as the ovary; the stigmas free,

recurved and closely applied to the swollen style-column, at length retracted within the mouth of the columnar tube. Capsule 3-coccous, rather sparingly pilose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, dark brown with grey blotches.

Mozamb. Distr. German East Africa: Ukinga; Mount Kirunde, 6500 ft., *Goetze*, 907! British Central Africa: Nyasaland; Masuku Plateau, 6500–7000 ft., *Whyte*, 269!

A very distinct species with a large style resembling that of *Tragia* (*Sphaerostylis*) *tulasneana*, from Madagascar.

11. **T. cannabina,** *Linn. f. Suppl.* 415. Stems suberect or rambling, not truly twining or only slightly so at the tips, 2–5 ft. high, with spreading branches, glabrous or sometimes hispid upwards and beset with white stinging hairs. Leaves distinctly petioled, membranous, usually deeply 3-partite, sometimes 5-partite at the base, occasionally without lateral lobes, central lobe oblong, $2\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide, lateral lobes lanceolate, subacute or obtuse, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. wide, unlobed leaves sometimes 1 in. wide, margin throughout coarsely gashed and lobed, the lobules triangular or oblong, base cuneate, glabrous above, bristly on the nerves beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, bristly and hispid; stipules lanceolate, suberect or reflexed, membranous, margin setose, $1\frac{1}{2}$ lin. long. Racemes androgynous, lateral leaf-opposed, 1–2 in. long, on naked more or less bristly peduncles 2–3 in. long, with numerous rather lax male flowers above and 2–3 basal female flowers; pedicels in both sexes glabrous, solitary to and shorter than their bracts; bracts lanceolate, acuminate, margin setose, males 1 lin., females $1\frac{1}{2}$ lin. long. Male sepals 3, ovate, glabrous. Stamens 3; filaments as long as the anthers. Female calyx-segments 6, densely setose when young with white bristles, accrescent and ultimately coriaceous; rhachis almost glabrous, narrowly lanceolate, $\frac{1}{3}$ in. long, pectinately 4-lobulate on each side, lobules lanceolate, all about as long as the terminal lobule, longer than the width of the rhachis, permanently white setose. Ovary densely setose; styles 3, connate in their lower half, erect or suberect above. Capsule 3-coccous, sparingly adpressed setose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, grey mottled with brown.—Juss. Euphorb. Gen. Tent. t. 15, fig. 49 B; Dalz. & Gibs. Bomb. Fl. 228; Cooke, Fl. Pres. Bomb. ii. 622. *T. involucrata*, var. *cannabina*, Müll. Arg. in DC. Prodr. xv. ii. 944; Hook. f. Fl. Brit. Ind. v. 465 mainly; Pax in Ann. Istit. Bot. Roma, vi. 184.

Nile Land. Somaliland: Ogaden, *Robecchi*, 338, 390, 421; Milmil Valley, *Riva*, 283; Guelidi; on the Webi River, *Revoil!* Midjourten; Modie Valley, *Revoil*, 130! Sennar: Meshra Zeraf, *Broun*, 1507! Nuer: Shambe on the Bahr-el-Jebel, *Broun*, 1613! Nasser, *Broun*, 1726! Bari country; Lado on the Nile, *Dawe*, 887! British East Africa: Eastern shore of Lake Baringo, 3300 ft., *Gregory!*

Also in India.

Var. *intermedia*, Prain. Stems erect or suberect, 2–3 ft. high, glabrous or pubescent upwards, beset with white stinging hairs. Leaves distinctly petioled, membranous, usually the lowest deeply 3-partite, but the uppermost sometimes all

without lateral lobes, central lobe lanceolate, 3½ in. long, ½ in. wide, lateral narrow-lanceolate, ½–1 in. long, under ¼ in. wide, all acute, margin sparingly sharply toothed, sometimes pubescent or puberulous above, pubescent on the nerves or sometimes generally beneath. Racemes lateral, leaf-opposed. Female sepals with the lateral lobules all about as long as the terminal lobule.—*T. cannabina*, Thw. Enum. Pl. Zeyl. 270; Baill. Étude Gén. Euphorb. 461; Schweinf. Rel. Kotschy. 34, excl. the Matamma plant and the figure; hardly of Linn. f. *T. involucrata*, var. *intermedia*, Müll. Arg. in DC. Prodr. xv. ii. 944. *T. involucrata*, var. *cannabina*, Hook. f. Fl. Brit. Ind. v. 465, partly. *T. tripartita*, Beille in Bull. Soc. Bot. France, lv. Mém. viii. 83, not of Schweinf.

Upper Guinea. Cameroons: Garua, 1000 ft., *Ledermann*, 3304! 4573! 4978! 4991!

North Central. Bagirmi; on Lake Iro, at Koulfé, *Chevalier*, 8996! Souka, *Chevalier*, 9056!

Nile Land. Abyssinia: Harar, *Riva*, 16, *Ellenbeck*, 1126! Sennar: Fazokl *Boriani*. Dinka: on the White Nile, *D'Arnaud! Sabatier!*

Mozamb. Distr. German East Africa: Nyika plateau, *Sacleux*, 2102! British Central Africa: Nyasaland; at Gombra, above Elephant Marsh, on the River Shire, *Scott!* Blantyre, *Buchanan!*

Also in India and Ceylon.

Var. *brouniana*, Prain. Stems dwarf, erect, 4–6 in. high, hispid and beset with white stinging hairs. Leaves very shortly petioled, rather firmly chartaceous, all very deeply 3-partite, narrow-lanceolate, acute, the central lobe 2 in. long, ⅓ in. wide, the lateral ½ in. long, ⅛–⅙ in. wide, margin sparingly unequally toothed, almost glabrous above, pubescent and bristly beneath. Racemes terminal and occasionally lateral leaf-opposed, under 1 in. long. Female calyx-segments with the uppermost pair of lateral lobules ascending as large as central lobule and considerably larger than the others, which are spreading and are not longer than the width of the rhachis.—*T. brouniana*, Prain in Kew Bulletin, 1909, 51.

Nile Land. Somaliland: Webi Habir, *Keller*, 226! Sennar: Sanleil, *Broun*, 775! Kaka Wood Station, *Broun*, 1593! Kordofan: Kadugli, *Wood*, 1344!

A variable and widely distributed species which has often, but with little justification, been treated as a variety of *T. involucrata*, Linn. The varieties here recognised appear, in their extreme forms, very distinct and have at times been regarded as separate species. But the recent communication by Mr. and Mrs. Broun of ample suites of specimens which fully confirm the justice of Cooke's view that *T. cannabina*, Linn. f., is distinct from *T. involucrata*, Linn., has on the other hand not only shown that *T. tripartita*, Beille, not of Schweinf., which cannot be kept apart from *T. involucrata*, var. *intermedia*, Müll. Arg., and the still more distinct *T. brouniana*, Prain, are only varieties of *T. cannabina*, but has raised a doubt as to whether *T. Hildebrandtii*, sub-sp. *glaucescens*, Pax, and *T. Hildebrandtii*, Müll. Arg., itself be more than forms of the same variable species. *T. involucrata*, Linn., which is apparently an equally variable plant, has not been met with on the African continent; so far from being conspecific with *T. cannabina*, *T. involucrata*, though a member of the same section, belongs to a different natural group of forms.

12. **T. Hildebrandtii,** *Müll. Arg. in Abhandl. Naturw. Ver. Bremen*, vii. 26. Stems erect, 2–3 ft. high, from a woody base, sometimes themselves firm and woody, ¼ in. thick, copiously virgately branched, quite glabrous. Leaves very shortly petioled, ascending, membranous, linear-lanceolate, acuminate, base narrow-cuneate, margin entire or with a few strong teeth near the base, the lowest tooth on one, less

often on both sides, sometimes excurrent in an acute lanceolate $\frac{1}{4}$–$\frac{1}{2}$ in.-long lobule, 3–4 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, glabrous above, with a few scattered white bristles along the margin and on the nerves beneath; petiole $\frac{1}{6}$–$\frac{1}{5}$ in. long, sparingly white bristly; stipules lanceolate, reflexed, membranous, with setose margins, $1\frac{1}{2}$ lin. long. Racemes androgynous, terminal on the stem and branches and below leaf-opposed, 1–$1\frac{1}{2}$ in. long, on naked peduncles sparingly beset with long ascending white bristles, the terminal peduncles $\frac{1}{4}$–$\frac{1}{2}$ in., the leaf-opposed up to 2–3 in. long, with numerous rather lax male flowers above, and usually 3 basal female; pedicels in both sexes glabrous, solitary to and shorter than their bracts; bracts ovate-lanceolate, acuminate, males 1 lin., females 2 lin. long, membranous, glabrous. Male sepals 3, ovate, glabrous. Stamens 3; filaments as long as the anthers. Female calyx-segments 6, densely setose when young with white bristles, accrescent and ultimately coriaceous; rhachis almost glabrous, narrowly lanceolate, $\frac{1}{3}$ in. long, pectinately 4-lobulate on each side, lobules lanceolate, permanently white setose. Ovary densely setose; styles 3, connate only at the base. Capsule 3-coccous, sparingly adpressed-setose, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, brown, hardly mottled.—Pax in Engl. Pfl. Ost-Afr. C. 239. *T. Hildebrandtii*, subsp. *glaucescens*, Pax in Engl. Jahrb. xix. 103. *T. mombassana*, Vatke MSS.

Nile Land. British East Africa: near Mombasa, *Hildebrandt*, 1981! 2041!

Mozamb. Distr. German East Africa: Pangani, *Stuhlmann*, I 297B! Bagamoyo; Sadeni, *Kränzlin*, 2941! Syara, *Sacleux!* Usaramo; *Stuhlmann*, 6736!

In flower and fruit this species hardly differs from *T. cannabina*, Linn. f., of which it may only be a local form. This is especially true of the form (*Hildebrandt*, 1981), which Dr. Pax has described as sub-sp. *glaucescens*, which can hardly, as regards foliage, be separated from *T. involucrata*, var. *intermedia*, Müll. Arg. (*T. tripartita*, Beille, not of Schweinf.) and is only distinguishable by its strictly erect habit.

13. **T. tripartita,** *Schweinf. Rel. Kotschy.* 34 (*sub T. cannabina*). Stems erect from a woody base, $1\frac{1}{2}$–2 ft. high, rather sparingly virgately branched, sparsely armed with white stinging hairs, otherwise glabrous. Leaves distinctly petioled, ascending, membranous, deeply 3-partite, lobes lanceolate or linear-lanceolate, acute, the central 4–7 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, with undulate or coarsely toothed margin, lateral $1\frac{1}{4}$–2 in. long, $\frac{1}{4}$ in. wide, with subentire or undulate margin, base narrow-cuneate, with a few white bristles on the main nerves beneath, otherwise glabrous; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. long, sparingly white bristly; stipules lanceolate, reflexed, membranous with setose margins, $1\frac{1}{2}$ lin. long. Racemes androgynous, terminal on the stem and branches and below leaf-opposed, 2 in. long, on naked peduncles 1–3 in. long, rather sparingly beset with short spreading white bristles, with numerous rather lax male flowers above and 1–3 basal female; pedicels in both sexes glabrous, solitary to and shorter than their bracts; bracts lanceolate, acuminate, males $1\frac{1}{2}$ lin. long, females 2 lin. long, with setose margins. Male sepals 3, ovate, acute, glabrous. Stamens 3, occasionally 4; filaments as long as the anthers. Female calyx-segments 6, densely setose when young with white bristles,

accrescent and ultimately coriaceous; rhachis glabrous, alternately wide-ovate and oblong, ½ in. long, pectinately 5–7-lobulate on each side, lobules lanceolate, shorter than the width of the rhachis, permanently white setose. Ovary densely setose; styles 3, connate for half their length in a slender column. Capsule 3-coccous, ½ in. across; cocci subglobose. Seeds globose, grey mottled with white.—*T. cannabina*, Schweinf. Rel. Kotschy. 34, partly, as to t. 34, not of Linn. f. *T. gallabatensis*, Prain in Kew Bulletin 1909, 51.

Nile Land. Galabat: Matamma, *Schweinfurth*, 923!

This species is most nearly related to *T. Hildebrandtii*, Müll. Arg., with which it agrees in habit, but from which it differs in having all the leaves distinctly 3-partite and in its much larger female calyx. Except as regards the female calyx it is hardly distinguishable from *T. cannabina*, Linn. f., var. *intermedia*, and has indeed been included by Schweinfurth in that species. Variable, however, as that species is, this suggestion is not one that it is advisable to adopt.

14. **T. Descampsii,** *De Wild. Études Fl. Katanga*, 207. Stems erect from a woody base, about 1 ft. high, sparingly branched, densely pilose with soft retrorse pubescence and sparingly armed with a few stinging hairs. Leaves very shortly petioled, ascending, membranous, ovate, acute, base rather shallowly wide-cordate, not auriculate, margin sharply serrate, all young, the largest seen ¾ in. long, ½ in. wide, densely velvety and along the nerves rather closely armed with stinging hairs on both surfaces; petiole densely pubescent and sparingly bristly, 1–1½ lin. long; stipules lanceolate, spreading or reflexed, membranous, 1½ lin. long, with setose margins and a few hairs on the outer side. Racemes 1-sexual, dicœcious, terminal on the stem and branches and below leaf-opposed; males up to 4 in. long, with a basal naked softly pilose peduncle ¼–1½ in. long; flowers very numerous, close-set above, sparse (at times ½ in. apart) towards the base, ternate throughout or in very shortly peduncled 3-flowered cymules towards the base; pedicels pilose, shorter than the bracts; bracts linear-lanceolate, 1½ lin. long, densely pilose on the margins and externally. Male sepals 3, wide-ovate, acute, densely pubescent and bristly externally. Stamens 3; filaments longer than the anthers.

South Central. Belgian Congo: Katanga, *Descamps!*

Very closely allied to *T. Rhodesiæ*, Pax, but readily distinguished by the more densely pubescent leaves, shorter in proportion to their width, by the much longer racemes with more definitely and uniformly glomerulate male flowers and by the apparently strictly dicœcious habit. The leaves in the only specimen seen are not full-grown and will doubtless prove to be less pubescent in the adult than in the juvenile state.

15. **T. Rhodesiæ,** *Pax in Engl. Jahrb.* xxxix. 665. Stems erect from a woody base, 8 in. to 2 ft. high, sparingly branched, pilose with soft reflexed pubescence and very sparingly armed with a few spreading or ascending stinging hairs. Leaves very shortly petioled, ascending, membranous, ovate-lanceolate, acuminate, base rather deeply wide-cordate, not auriculate, margin sharply serrate, 1½ in. long, ⅔ in. wide, sparingly adpressed-pubescent and rather closely beset along the nerves

with bristles on both surfaces; petioles 1–1½ lin. long, densely pilose and sparingly bristly; stipules lanceolate, acute, membranous, suberect, 1 lin. long, with setose margins and a few hairs on the outer side. Racemes androgynous, terminal on the stem and branches and below leaf-opposed, ¾–1 in. long, with a basal naked softly pilose peduncle ¼–⅓ in. long, with numerous male flowers above and 1 (rarely 2) basal female; male flowers rather close-set, solitary above, ternate or in very shortly peduncled 3-flowered cymules towards the base; pedicels pilose, shorter than the bracts in both sexes; bracts linear-lanceolate, 1–1½ lin. long, similar in both sexes, with densely pilose margins and sparingly pilose outside. Male sepals 3, wide-ovate, acute, sparingly pilose. Stamens 3; filaments longer than the anthers. Female calyx-segments 6, alternately ovate-lanceolate and wide-ovate, sparingly pilose externally, accrescent and at length coriaceous, 4–5 lin. long, margin pectinately 4-lobulate on each side, lobules short, lanceolate-triangular, densely setose. Ovary densely pilose; styles 3, very shortly connate at the base. Capsule 3-coccous, very sparingly adpressed-pilose, ⅓ in. across; cocci subglobose. Seeds globose, brown mottled with grey.

Mozamb. Distr. Rhodesia: near Salisbury, 5000 ft., *Rand*, 644! 1387! *Engler*, 3073! *Marshall!*

Nearly related to *T. cordifolia*, Vahl, and no doubt the southern representative of that species, but readily distinguished therefrom by its erect habit and its much shorter petioles.

16. **T. cordifolia,** *Vahl, Symb.* i. 76. Stems long, slender, twining, finely puberulous, without stinging hairs. Leaves distinctly to long petioled, membranous, ovate-lanceolate or lanceolate, rarely triangular-ovate, long-acuminate, base shallow- to deep-cordate, margin strongly and sharply serrate, 2½–4 in. long, ¾–1½ (rarely 2) in. wide, puberulous and sparingly to copiously bristly on the nerves on both surfaces but especially beneath; petiole ½–2½ in. long, puberulous and sparingly to copiously bristly; stipules lanceolate, spreading or reflexed, glabrous, 1½ lin. long. Racemes terminal on the stems and branches, androgynous, slender, rather lax, 1½–2½ in. long, with a naked glabrous or sparingly bristly rather stiff peduncle ½–2 in. long, with numerous male flowers above and a solitary basal female; pedicels in both sexes solitary to and as long as their bracts, or occasionally the lower male flowers geminate; male bracts membranous, subulate, reflexed, puberulous, 1 lin. long; female bracts narrow-lanceolate, reflexed, 1½ lin. long. Male sepals 3, wide-ovate, obtuse, glabrous. Stamens 3; filaments broad, not longer than the anthers. Female calyx-segments 6, ovate, membranous, accrescent with an at length rigidly coriaceous rhachis 5 lin. long, pinnately 6–7-lobulate on each side; lateral lobules and rhachis externally bristly with stinging hairs, terminal laminula lanceolate, membranous; lateral lobules lanceolate, spreading, about 1 lin. long, persistent. Ovary silky-pubescent and bristly; styles 3, glabrous, united in their lower half. Capsule 3-coccous, sparingly silky-puberulous and rather copiously clothed with white bristles, ⅓ in. across; cocci subglobose. Seeds globose, pale yellow with small brown blotches.—*T. cordata*, Willd. Sp. Pl. iv. 322; A. Rich.

Tent. Fl. Abyss. ii. 244; Schweinf. Beitr. Fl. Aethiop. 39. *T. pungens*, Müll. Arg. in DC. Prodr. xv. ii. 941; Schweinf. in Bull. Herb. Boiss. vii. App. ii. 310, mainly. *T. mitis*, Schweinf. & Aschers. Aufzähl. Nil-Länd. 263, partly; Engl. Hochgebirgsfl. Trop. Afr. 284, partly; Pax in Engl. Pfl. Ost-Afr. C. 239, in small part; Pax in Ann. Istit. Bot. Roma, vi. 183; not of Hochst. *T. mitis*, var. *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 942, in small part, not *T. mitis*, Hochst. *Jatropha pungens*, Forsk. Fl. Ægypt.-Arab. 163.

Nile Land. Eritrea: Saganeiti; Degerra Gorge, 7300 ft., *Schweinfurth & Riva*, 902! Acrour, 6300 ft., *Schweinfurth & Riva*, 1077! Gheleb, 6300 ft., *Schweinfurth*, 1117! Bogos, *Hildebrandt*, 613! Keren, *Steudner*, 518! Sholio, *Quartin-Dillon & Petit*, 211! Abyssinia: Adowa, *Schimper*, 301! Shadsha, 5500 ft., *Schimper*, 108! Abba Gerima, 6800 ft., *Schimper*, 82! Shoa; Awala, *Ellenbeck*, 1722! and without precise locality, *Salt! Pearce! Schimper*, 427! 661 partly! Somaliland: Maid, 3600 ft., *Hildebrandt*, 1456! near Aloi, on the River Dawa, *Riva*, 498; between Bidduma and Alghe, *Riva*, 1333. Kordofan: El Amira, *Broun*, 1383!

Also in Arabia.

Var. *cinerea*, Prain. Leaves and twigs densely grey-pubescent throughout, otherwise as in the type.—*T. mitis*, var. *cinerea*, Pax in Engl. Jahrb. xix. 103 and in Ann. Istit. Bot. Roma, vi. 184.

Nile Land. Eritrea: Bezen, 6000 ft., *Schweinfurth & Riva*, 1883! Abyssinia: Harar; *Ellenbeck*, 448! 829! *Robecchi-Brichetti*, 170! Jebel Haquin, 6300 ft., *Ellenbeck*, 890! Jacorsa, *Riva*, 475. Somaliland: Zafir Mountains, 6500 ft., *Hildebrandt*, 872A!

A very distinct species originally described as *Jatropha pungens*, by Forskål, from specimens collected in Arabia, where it has again been met with by Deflers. In *DC. Prodromus*, Müller has separated the Arabian from the African plant; while maintaining the former as a valid species, Müller has referred the latter to *T. mitis*, Hochst. The Arabian and the African plants are, however, indistinguishable; on the other hand, in addition to many morphological differences, *T. cordifolia* is easily distinguished from *T. mitis* in being monœcious not diœcious, and in being urticant not bland. The variety distinguished by Pax differs from the typical plant, much as *T. brevipes*, Pax, differs from *T. Benthami*, Baker.

17. **T. arabica,** *Baill. Étude Gén. Euphorb.* 461. Stems short, ascending or twining upwards, sometimes erect, puberulous, without stinging hairs. Leaves distinctly petioled, membranous, triangular-ovate, acute, base shallow-cordate, margin serrate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$ in. wide, puberulous and sparingly bristly on the nerves on both surfaces but especially beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long, puberulous and sparingly bristly; stipules lanceolate, membranous, erect, glabrous, 1 lin. long. Racemes terminal, 1–1$\frac{1}{2}$ in. long, androgynous, rarely 1-sexual, in stiff glabrous or sparingly bristly naked peduncles $\frac{1}{3}$–$\frac{3}{4}$ in. long, with many rather dense male flowers above and 1–2 basal female flowers; pedicels in both sexes solitary to and shorter than their bracts; bracts narrow-lanceolate, membranous, puberulous, under 1 lin. long. Male sepals 3, ovate, subacute, puberulous. Stamens 3; filaments short. Female calyx-segments 6, 2-seriate, accrescent and indurated, 4 lin. long, pinnately 4-lobulate on each side, rhachis lanceolate, lobules linear-lanceolate, densely setose with white stinging hairs. Ovary hispid; styles 3, short, connate for more than half their length. Capsule 3-coccous, sparingly

silky-puberulous and rather densely bristly, $\frac{1}{4}$ in. across; cocci subglobose. Seeds globose, greenish-grey, mottled with red.—*T. mitis*, var. *arabica*, Müll. Arg. in DC. Prodr. xv. ii. 942. *T. pungens*, var. *arabica*, Schweinf. in Bull. Herb. Boiss. vii. App. ii. 310.

Nile Land. Abyssinia: Galla; Belana, *Ellenbeck*, 322! Somaliland: without precise locality, *Mrs. Lort-Phillips!*

Also in Arabia.

Var. *parvifolia*, Prain. Leaves, twigs, peduncles, bracts and male sepals densely grey-pubescent. Female calyx-segments densely clothed with chestnut-brown bristles. Capsule densely hispid. Stems always erect, woody, much-branched, 1 ft. high. Leaves $\frac{1}{2}$ in. long; petioles densely tomentose; otherwise as in the type.—*T. parvifolia*, Pax in Engl. Jahrb. xix. 102.

Nile Land. Abyssinia: Harar, *Ruspoli-Riva*, 304! Somaliland: Ahl Mountains, 6500 ft., *Hildebrandt*, 891A!

Very nearly allied to *T. cordifolia*, Vahl, but with smaller leaves and somewhat different habit, and to *T. moammarensis*, Baill., with which var. *parvifolia* agrees in habit and in the chestnut-brown colour of the bristles on the fruiting calyx, but with rather differently shaped leaves. Except as regards the colour of these bristles the two varieties, which agree as regards foliage, bear to each other exactly the relationship which *T. cordifolia* and its var. *cinerea* bear to each other.

18. **T. mitis,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 244. Stems long, slender, twining, finely puberulous, without stinging hairs. Leaves distinctly to long petioled, membranous, triangular-ovate, acute or shortly acuminate, base shallowly to rather deeply usually widely sometimes narrowly cordate, margin distinctly and sharply serrate, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{2}$–3 in. wide, shortly and softly puberulous on the nerves on both surfaces and without stinging bristles; petiole $\frac{1}{2}$–$2\frac{1}{2}$ in. long, softly puberulous; stipules lanceolate, erect, softly puberulous, 2 lin. long. Racemes terminal on stems and branches, 1-sexual, diœcious, slender; males rather dense at first, soon becoming lax, 2–6 in. long, with a slender naked puberulous peduncle $\frac{1}{4}$–$1\frac{1}{4}$ in. long, often accompanied by a smaller basal raceme and occasionally paniculately branched upwards; pedicels above in 3-flowered glomerules, from the middle downwards in lax 3-flowered cymules; pedicels slender, puberulous, longer than their bracts and much longer than their bracteoles; bracts and bracteoles membranous, subulate, reflexed, puberulous, 1 lin. long; females lax, $1\frac{1}{2}$–3 in. long, with peduncles as in the males but more rigid, the flowers few, up to 12, solitary to their bracts and sessile; bracts ovate-lanceolate, puberulous, $1\frac{1}{2}$–2 lin. long, the uppermost 4–6 often empty; bracteoles similar but smaller. Male sepals 3, wide-ovate, puberulous externally. Stamens 3; filaments as long as the anthers. Female calyx-segments 6, ovate, membranous, accrescent with an at length coriaceous only slightly rigid rhachis 5 lin. long, pinnately 8-lobulate on each side; lateral lobules and rhachis externally silky-pubescent but without stinging bristles; terminal laminula ovate-lanceolate, membranous, lateral lobules lanceolate, spreading, about 1 lin. long, persistent. Ovary silky-pubescent; styles 3, glabrous, united in their lower half. Capsule 3-coccous, sparingly hirsute, without bristles, $\frac{1}{3}$ in.

across; *cocci* subglobose. Seeds globose, pale brown with bright reddish-brown blotches.—Schweinf. & Aschers. Aufzähl. Nil-Länd. 263, partly; Engl. Hochgebirgsfl. Trop. Afr. 284, partly; Pax in Engl. Pfl. Ost-Afr. C. 239, in small part. *T. cordata*, Baill. Étude Gén. Euphorb. 461, excl. syn. Forsk.; not of Willd. *T. mitis*, var. *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 942, in small part.

Nile Land. Galabat: Matamma, near Hammad, *Schweinfurth*, 872! 873! Abyssinia: Mettgalo, 6700 ft., *Schimper*, 107! Shireh, near Marriam, *Schimper*, 517! Farrfera, *Schimper*, 731! Sana; Walcha, *Schimper*, 1600! and without precise locality, *Schimper*, 661 partly! Harar; Jebel Haquin, 6300 ft., *Ellenbeck*, 895!

Nearly related to and usually confused with *T. cordifolia*, Vahl, from which, however, it is readily distinguished in being dicœcious, in having no stinging hairs, and in having cymulose male flowers. The dicœcious habit it shares, among members of the same natural group, with *T. Descampsii*, De Wild., from Katanga, *T. bongolana*, Prain, from Bongo and Mittu, and *T. Balfourii*, Prain (*T. dioica*, Balf. f. in Proc. Roy. Soc. Edin. xii. 95, not of Sond.), from Socotra. Schimper 661 in Herb. Delessert belongs to *T. mitis*, in other collections this number accompanies *T. cordifolia*.

19. **T. bongolana,** *Prain in Kew Bulletin*, 1912, 236. Stems rather long, slender, twining, sparingly retrorsely hispid but without stinging hairs. Leaves distinctly petioled, firm, triangular-ovate, acute, base rather deeply cordate, margin distinctly sharply serrate, 2–2½ in. long, 1½–1¾ in. wide, sparingly hispid on the nerves on both surfaces and with a few stinging bristles especially near the base on the upper surface; petiole ¾ in. long, retrorsely hispid; stipules lanceolate, reflexed, with hispid margins, 1½ lin. long. Racemes terminal on stems and branches, 1-sexual, dicœcious, only male plants seen, up to 4 in. long, rather dense, with a slender naked retrorsely hispid peduncle ¼–1 in. long; pedicels in 3-flowered glomerules, shorter than their bracts; bracts ovate-lanceolate with hispid margins, reflexed, 1 lin. long. Male sepals 3, wide-ovate, obtuse, rather firm, glabrous. Stamens 3; filaments rather longer than their anthers.

Nile Land. Bongo: Sabbi, *Schweinfurth*, 2729! Mittu; between Kero and Reggo, *Schweinfurth*, 2782!

A very distinct species, most nearly allied to *T. mitis*, Hochst., with which it agrees in being dicœcious, but from which it differs in having male flowers more than twice as large, with much shorter pedicels and with longer filaments. The sepals are also much thicker and firmer.

20. **T. brevipes,** *Pax in Engl. Jahrb.* xix. 103. Stems usually long, slender and twining, sometimes shorter and suberect, densely or sparingly pubescent and sparingly armed with stinging hairs. Leaves distinctly petioled, membranous, ovate, acute or acuminate, base deeply narrow-cordate, margin distinctly and sharply serrate, 2–4 in. long, 1½–2 in. wide, sparingly softly pubescent above, densely pubescent, sometimes almost velvety beneath and sparingly beset on both surfaces especially on the nerves with stinging bristles; petiole ¾–2½ in. long, densely pubescent and sparingly bristly; stipules lanceolate, 1–1½ lin. long, reflexed, densely pubescent externally, glabrous within. Racemes

lateral and terminal on the lateral branches, slender, rather lax, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, with a naked peduncle $\frac{1}{3}$–$\frac{1}{2}$ in. long, densely pubescent with reflexed hairs, with many male flowers above and 2–3 basal female flowers; pedicels in both sexes solitary to the bracts, or occasionally the lower male flowers geminate, pubescent and shorter than the bracts; male bracts membranous, subulate, reflexed, pubescent externally, 1 lin. long; female bracts like the male but rather larger. Male sepals 3, wide-ovate, pubescent and sparingly bristly externally. Stamens 3; filaments as long as the anther. Female calyx-segments 6, ovate-lanceolate, membranous, accrescent with an at length indurated rhachis 6 lin. long, pinnately 3–4-lobulate on each side. lateral lobules and rhachis externally densely clothed with silky hairs and stinging bristles, terminal laminula narrowly lanceolate or subulate, membranous, lateral lobules like the terminal laminula ascending, $2\frac{1}{2}$–3 lin. long, ultimately deciduous. Ovary densely strigose and bristly; styles 3, glabrous, united in their lower half. Capsule 3-coccous, sparingly hirsute and densely bristly, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, brown mottled with grey.—Pax in Engl. Pfl. Ost-Afr. C. 240. *T. cordata*, T. Thoms. in Speke's Nile Journ. App. 647, not of A. Rich. *T. mitis*, var. *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 942, partly. *T. mitis*, Oliv. in Trans. Linn. Soc. xxix. 147, not of Hochst. *T. velutina*, Pax in Engl. Jahrb. xix. 104, and in Engl. Pfl. Ost-Afr. C. 240. *T. Volkensii*, Pax in Engl. Pfl. Ost-Afr. C. 239.

Nile Land. Uganda: Ruchigga, *Bagshawe*, 455! British East Africa: Kavirondo, at Kisumu; 4400–6000 ft., *Whyte! Edith Skene*, 153! Mount Kenia, *Mackinder!*

South Central. Belgian Congo: on Lake Albert Edward, *Stuhlmann*, 3044!

Mozamb. Distr. German East Africa: Usambara; Kwai, *Eick*, 389! Lubego, 6600 ft., *Keil*, 120! Kilimanjaro, 4000–5000 ft., *Johnston! Merker*, 598! Marangu, 5000 ft., *Volkens*, 729! Ileto, 4600–5000 ft., *Volkens*, 358! Umbugwe and Iraku, *Merker*, 130! Karagwe, *Speke & Grant*, 388! near Bukoba, *Stuhlmann*, 4085! Marienburg, 5500 ft., *Conrads*, 88! Kafuro, 4500 ft., *Stuhlmann*, 1718! Kagera, *Mildbraed*, 339! Ruanda; Niansaberg, 5600 ft., *Kandt*, 35! British Central Africa: Nyasaland; near Mpata, 2000–3000 ft., *Whyte!*

Very closely allied to *T. Benthami*, Baker, but readily distinguished by the more deeply cordate leaves with usually a narrower sinus and by the pubescence which accompanies the stinging bristles.

21. **T. Benthami,** *Baker in Kew Bulletin*, 1910, 128. Stems long, slender, twining, finely puberulous or nearly glabrous and sparingly armed with stinging hairs. Leaves distinctly petioled, membranous, ovate, acute or acuminate, base shallowly, less often rather deeply wide-cordate, rarely subtruncate or rounded, margin distinctly and sharply serrate, 2–4 in. long, 1–2 in. wide, sparingly or very sparingly bristly setose, especially on the nerves, on both surfaces, otherwise glabrous; petiole $\frac{3}{4}$–$2\frac{1}{2}$ in. long, bristly setose with stinging hairs; stipules lanceolate, 1–$1\frac{1}{2}$ lin. long, spreading or somewhat reflexed, with bristly setose margins, otherwise glabrous. Racemes lateral and terminal on the lateral branches, slender, rather lax, $\frac{1}{2}$–$\frac{3}{4}$ in. long, with a naked peduncle $\frac{1}{4}$–$\frac{1}{3}$ in

long, densely bristly with stinging hairs; with many male flowers above and 2–3 basal female flowers; pedicels in both sexes solitary to the bracts or occasionally with the lower male flowers geminate, sparingly bristly and almost as long as the bracts; male bracts membranous, narrow-lanceolate with bristly margins, otherwise glabrous, 1 lin. long; female bracts like the male but rather larger. Male sepals 3, wide-ovate, sparingly bristly externally. Stamens 3; filaments as long as the anthers. Female calyx-segments 6, ovate-lanceolate, membranous, at length accrescent with an indurated linear rhachis, 6 lin. long, pinnately 3–4-lobulate on each side, lateral lobules and rhachis externally densely beset with stinging bristles, terminal laminula narrowly lanceolate, membranous, lateral lobules like the terminal laminula, ascending, 2–2½ lin. long, ultimately deciduous. Ovary densely strigose and bristly; styles 3, glabrous, united in their lower half. Capsule 3-coccous, sparingly bristly with a few adpressed hairs intermixed, ⅓ in. across; cocci subglobose. Seeds globose, brown mottled with grey.—*T. cordifolia*, Benth. in Hook. Niger Fl. 501; Müll. Arg. in DC. Prodr. xv. ii. 944; Hiern in Cat. Afr. Pl. Welw. i. 984; De Wild. Études Fl. Katanga, 80; Durand & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 106; De Wild. Miss. É. Laurent, 132, and Études Fl. Bas- et Moyen-Congo, ii. 286; Th. & Hél. Durand, Syll. Fl. Congol. 498; not of Vahl. *T. mitis*, var. *Kirkii*, Müll. Arg. in Flora, 1864, 435 and in DC. Prodr. xv. ii. 942. *T. kassiliensis*, Beille in Bull. Soc. Bot. France, lvii. Mém. viii. 126.

Upper Guinea. Ivory Coast: Achouka, *Dybowski*, 149! Agneby Valley, at Kassigué, *Chevalier*, 17050! Gold Coast: Cape Coast, *Vogel*, 53! Ashanti, *Cummins!* Togo: Misahohe, *Baumann*, 283! 450! Dahomey: Adja Onéré, *Le Testu*, 11! 12! Southern Nigeria: Lagos, *Dawodu*, 268! *Lamborn*, 260! Abeokuta, *Millen*, 80! Oban, *Talbot*, 613! Cameroons: Cameroon Mountain, 1000 ft., *Mann*, 1255! Yaunde, *Zenker & Staudt*, 516! Bonge, *Dusèn!* Kumbo, *Dusèn*, 62! Mashita, 2500 ft., *Ledermann*, 5344! Songolong, 2800–4000 ft., *Ledermann*, 5623! Fernando Po; near Clarence, *Vogel*, 26!

Nile Land. Niamniam: by the Nabambisso River, *Schweinfurth*, 2984! Uganda: Busiro, *Dawe*, 194!

Lower Guinea. Spanish Guinea: Uelleberg; Wigu Klaga, *Tessmann*, 415! Bebao; Nichobot, *Tessmann*, 415A! Gaboon: Limbareni; Eninga, *Buchholz!* Monda Island, *Thollon*, 143! Ogowe River, *Thollon*, 418! French Congo; Brazzaville, *Thollon*, 415! Lower Congo: Banana, *Cabra*, 104! Mayumbe; at Bingila, *Dupuis!* Cataracts district, Kitobola, *Laurent!* Stanley Pool; Kisantu, *Gillet*, 386! Mopolenge, *Laurent*, 425! Angola: Bembe, *Monteiro!* Golungo Alto; Sange, Bango and Mussenge, *Welwitsch*, 381! 381B! *Buchner*, 511! San Salvador, *Buettner*, 256!

South Central. Belgian Congo: Kwango district, Lazaret, *Vanderyst!* Catala Canginga, *Rensch*, 322B! Equatorial district; Eala, *Laurent*, 157! Katanga; Lukafu, *Verdick*, 453! Kasai; Mukenge, *Pogge*, 1399!

Mozamb. Distr. German East Africa: Kilimanjaro; Kibo, 4000 ft., *Endlich*, 63! Portuguese East Afriea: between Lupata and Tete, *Kirk!* at Tete, *Kirk!* British Central Africa: Nyasaland; Namasi, *Cameron*, 1!

Very nearly allied to *T. brevipes*, Pax, and only definitely separable by the absence of a soft pubescence accompanying the stinging hairs. In this respect the Niamniam plant (*Schweinfurth*, 2984) identified (probably quite justifiably) by

Baker with this species, serves as a link connecting the two, because the petioles are pubescent though the blades of the leaves are not. The species was originally tentatively identified by Bentham with *T. cordifolia*, Vahl, to which species it is indeed closely allied, but from which it is readily distinguished by the smaller number and the different shape of the lateral lobules of its female calyx-lobes.

22. **T. Okanyua,** *Pax in Bull. Herb. Boiss.* vi. 735. Stems long, slender, twining, sparingly branched, less often suberect below and rather freely branching from a woody base, twining only above, pubescent and copiously armed with stinging hairs. Leaves long-petioled, membranous, ovate-triangular or ovate-lanceolate, acute or acuminate, base cordate from faintly lobed to distinctly subhastate, margin finely to coarsely crenate-dentate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. wide above the basal lobes, 2–$2\frac{1}{4}$ in. wide at the base, puberulous or pubescent and bristly-setose, especially on the nerves, on both surfaces; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. long, pubescent and bristly setose; stipules ovate-lanceolate, reflexed, $1\frac{1}{2}$ lin. long, almost glabrous above, pubescent beneath. Racemes lateral, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, on rather stiff naked bristly-setose peduncles $\frac{3}{4}$–$1\frac{1}{4}$ in. long, with numerous rather lax male flowers above and usually 2 basal female flowers; pedicels all solitary to and equalling or slightly exceeding their bracts; bracts all thinly membranous, male small, ovate, hirsute, female ovate, acute, faintly 3-lobed to distinctly 3-toothed. Male sepals 3, ovate, membranous, glabrous. Stamens 3; filaments considerably longer than the anthers; connective slightly thickened. Female calyx-segments 6, 2-seriate, oblong-ovate, accrescent and coriaceous, 4 lin. long, rhachis narrow-oblong, pinnately 2–3-lobulate on each side, lobules all spreading, rather densely bristly as is the rhachis externally. Ovary moderately hispid; styles 3, connate in a slender column for half their length. Capsule 3-coccous, sparingly bristly-hispid especially above the middle and along the centre, $\frac{1}{4}$ in. across: cocci subglobose. Seeds globose, brownish-grey.—*T. angustifolia*, Pax in Engl. Pfl. Ost-Afr. C. 239 partly; Pax in Baum, Kunene-Samb. Exped. 283, not of Benth. *T. cordifolia*, N. E. Br. in Kew Bulletin, 1909, 141, not of Vahl nor of Benth. *T. madandensis*, S. Moore in Journ. Linn. Soc. xl. 203.

Lower Guinea. Angola: Loanda, *Gossweiler*, 427! Huilla, *Antunes*, 257! Gambos, *Herb. Montpellier!* Mossamedes; on the Cubango, between Kalolo and the Habunga River, 3600 ft., *Baum*, 452! German South-West Africa: Amboland; between Unkuambi and Ondonga, *Rautanen*, 203!

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Boruma, *Menyharth*, 649! Moramballa Marsh, *Scott!* Mozambique; Ilho do Ibo, *Rodrigues de Cavalho!* Gazaland; Mandanda forests, 400 ft., *Swynnerton*, 794! British Central Africa: Nyasaland; Nyika Plateau, *McClounie*, 125! shores of Lake Nyasa, *Simons!* Likowa Island, *Bellingham! Johnson*, 12! Rhodesia: Upper Zambesi; *Mademoiselle Kiener!* Bulowayo, *Gardner*, 55! *Chubb*, 66! Moyon, *Allen*, 509! Ngamiland: Kwebe Hills, 3000 ft., *Lugard*, 66! *Mrs. Lugard*, 61!

Also in South Africa.

Very closely allied to *T. Benthami*, Baker, of which it is the southern representative and into which it passes almost as insensibly as does *T. brevipes*, Pax. Like the latter it is distinguished from *T. Benthami* by the presence of pubescence

as well as stinging bristles; from both it is as a rule readily separable by the more or less markedly trilobate leaves.

23. **T. lukafuensis,** *De Wild. Études Fl. Katanga*, 206. Stems erect, base not seen, sparingly branched, densely and softly pubescent with subadpressed ascending hairs and sparingly armed with stinging hairs. Leaves sessile or very shortly petioled, ascending, membranous, linear-lanceolate or lanceolate, acuminate, base subhastately auriculate, margin finely and rather closely serrate throughout, all young, the largest seen $\frac{4}{5}$ in. long, $\frac{1}{3}$ in. wide at the auriculate base, $\frac{1}{6}$–$\frac{1}{5}$ in. wide above the auricles, pubescent on both surfaces especially beneath and along the nerves armed with stinging hairs; petiole 0–1 lin. long, when present pubescent and bristly; stipules linear-lanceolate, spreading or reflexed, membranous, 1 lin. long, pubescent externally. Racemes 1-sexual, dicœcious, terminal on the stems and branches and below leaf-opposed; males up to 4 in. long, with a basal naked softly pubescent peduncle $\frac{1}{2}$ in. long; flowers very numerous, close-set above, sparse below, glomerulate in threes throughout; pedicels pilose, shorter than the bracts; bracts linear-lanceolate, $\frac{1}{2}$ lin. long, with densely pilose margins and pilose externally. Male sepals 3, ovate, subacute, shortly puberulous within, densely pubescent and bristly externally. Stamens 3; filaments longer than the anthers. Female flowers unknown.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 220!

Very closely allied to *T. Okanyua*, Pax, to which it bears much the relationship that *T. Rhodesiæ*, Pax, bears to *T. cordifolia*, Vahl, but readily distinguished by the more pubescent leaves, by the glomerulate male flowers and by the apparently strictly dicœcious habit. The leaves in the three specimens seen are not full grown, and only the tops of the stems have been collected.

24. **T. physocarpa,** *Prain in Kew Bulletin*, 1912, 238. Stems erect and woody below, from a woody base, above copiously branched; branches long, slender, herbaceous, rigid at first, slightly twining above, finely pubescent, without stinging hairs. Leaves distinctly petioled, membranous, pale green, ovate-triangular, acuminate, base deep-cordate, margin strongly serrate, 2–2$\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, sparingly pubescent and very sparingly bristly-setose on the nerves above, rather closely bristly-setose on the nerves beneath, otherwise glabrous; petiole $\frac{3}{4}$–1 in. long, finely pubescent, without bristles; stipules lanceolate, erect, puberulous, 1$\frac{1}{2}$ lin. long. Racemes lateral, 2 in. long, on rather stiff naked puberulous and sparingly bristly peduncles $\frac{3}{4}$–1 in. long, with numerous rather lax male flowers above and usually 2 basal female flowers; pedicels all solitary to and shorter than their bracts; bracts all thinly membranous, males 1 lin. long, narrow-lanceolate, reflexed, sparingly pubescent, females ovate-lanceolate, 2–2$\frac{1}{2}$ lin. long, distinctly 1–3-toothed on each side; bracteoles similar but smaller, entire or 1–2-toothed on each side. Male sepals 3, oblong, subacute, puberulous outside. Stamens 3; filaments very short. Female calyx-segments 6, 2-seriate, oblong, very accrescent but not at all indurated, at length over $\frac{1}{2}$ in. long, pinnately 4-lobulate on each

side, lobules ascending, narrow-lanceolate, each $\frac{1}{3}$ in. long, pubescent like the rhachis and on their margins very densely beset with stiff white bristles. Ovary nearly glabrous; styles 3, connate at the base in a very short column. Capsule 3-coccous, very sparingly clothed with thin white bristles, its walls thinly coriaceous and flexible, $\frac{3}{4}$ in. across.

Lower Guinea. German South-West Africa: Ovambo; Otavi, *Dinter*, 753!

Most nearly allied to and most closely resembling in habit *T. Okanyua*, Pax, but easily distinguished from this and from all other African species of the genus by its very large, thin-walled fruit.

25. **T. glabrescens,** *Pax in Engl. Jahrb.* xix. 104. Stems long, slender, twining, sparingly branched, glabrous. Leaves distinctly petioled, membranous, triangular-ovate, acute or acuminate, base rather deeply wide-cordate, margin serrate, 1–1$\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, very sparingly bristly on the nerves especially beneath, otherwise glabrous; petiole sparingly bristly, $\frac{1}{2}$–$\frac{3}{4}$ in. long; stipules wide triangular-lanceolate, erect, with a few marginal setæ, 1$\frac{1}{2}$ lin. long. Racemes lateral, 1$\frac{1}{2}$ in. long, on slender naked sparingly bristly peduncles $\frac{3}{4}$–1 in. long, with numerous rather close-set male flowers above and 1–2 basal female flowers; pedicels in the male flowers solitary to and shorter than the bracts; female flowers subsessile, solitary; bracts membranous, rather widely ovate-lanceolate, glabrous, males 1 lin., females 1$\frac{1}{2}$ lin. long. Male sepals 3, ovate, acute, glabrous. Stamens 3; filaments longer than the anthers. Female calyx-segments 6, 2-seriate, broadly ovate, accrescent and coriaceous, 3 lin. long, rhachis obovate or oblong, pectinately 3–4-lobulate on each side, lateral lobules sparingly white-bristly, lanceolate. Ovary hispid and bristly; styles 3, connate in their lower half in a slightly puberulous column. Capsule 3-coccous, sparingly white-bristly, $\frac{1}{4}$ in. across; cocci subglobose. Seeds globose, greenish-yellow marbled with red.—Pax in Engl. Pfl. Ost-Afr. C. 240.

Nile Land. British East Africa: Duruma; Chamtei, *Hildebrandt*, 2345! Magi Chumoi, 570 ft., *Kässner*, 466!

Mozamb. Distr. German East Africa: Usambara; Doda, *Holst*, 2984!

Most closely resembles *T. adenanthera*, Baill., but with different anthers and with a 6-partite female calyx.

26. **T. insuavis,** *Prain in Kew Bulletin*, 1912, 237. Stems long, slender, suberect from a woody base, twining upwards, at first finely puberulous, without stinging hairs. Leaves distinctly petioled, membranous, ovate or oblong, acute or very shortly acuminate, base very shallow-cordate, margin coarsely serrate, 2–4 in. long, 1$\frac{1}{4}$–2$\frac{1}{4}$ in. wide, very sparingly pubescent on the nerves on both surfaces, otherwise glabrous; petiole 1–1$\frac{1}{2}$ in. long, faintly puberulous and with a few scattered bristles; stipules ovate-lanceolate, spreading, puberulous outside, inside glabrous, 1 lin. long. Racemes lateral, $\frac{3}{4}$–1 in. long, on short puberulous peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long, with many dense male flowers above and a solitary basal female flower; pedicels in both sexes solitary

to and shorter than their bracts; bracts broadly ovate, acute, rather firmly membranous, with shortly pubescent and finely glandular margins, otherwise glabrous, bracteoles also ovate, acute, male bracts 1½ lin., female 2 lin. long. Male sepals 3, yellow, orbicular, glabrous. Stamens 3; filaments very short. Female calyx-segments 6, 2-seriate, accrescent but hardly indurated, 4 lin. long, pinnately 5–6-lobulate on each side, rhachis broad oblong-lanceolate, lobules triangular, shorter than the diameter of the rhachis, sparingly setose outside like the rhachis with white bristles. Ovary sparingly hispid; styles 3, connate for half their length. Capsules 3-coccous, very sparingly beset with weak bristles, ⅓ in. across; cocci subglobose.

Mozamb. Distr. German East Africa: Kilimatinde; 3500 ft., *von Prittwitz*, 25!

Nearest to *T. glabrescens*, Pax, from which it is readily distinguished by its stouter stems, larger leaves, much larger male bracts and capsule, and especially by the female calyx-lobes which in fruit have pinnately spreading in place of palmately ascending lobules.

27. **T. Preussii**, *Pax in Engl. Jahrb.* xix. 102. Stem long, slender, twining, without stinging hairs. Leaves distinctly to long petioled, membranous, oblong-lanceolate or oblong, acuminate, narrowed from the middle to the narrow-cordate or subhastate base, margin faintly undulate or entire, 6½–8 in. long, 2–3 in. wide, quite glabrous on both surfaces; petiole 2–2¼ in. long; stipules slightly spreading, narrow-triangular, 2 lin. long. Racemes lateral, leaf-opposed, simple, 1–2 in. long, or in pseudo-panicles terminating lateral branches, the main rhachis with stipules but no leaves, 5–10 in. long, 2½–4 in. across; individual racemes 2–3½ in. long, lax, with many male flowers above and 1–2 female flowers near the base; pedicels in both sexes solitary to and much exceeding the bracts, 2 lin. long; bracts narrow-lanceolate; spreading, shorter than the pedicels. Male sepals 3, ovate. Stamens 3, subsessile. Female calyx-segments 6, lanceolate, hardening but very slightly accrescent in fruit, irregularly pinnatipartite, rhachis narrow, with 2 or 3 unequal short lobes on each side. Ovary sparingly setose; styles 3, glabrous, united below. Capsule 3-coccous, sparingly setose, ¼ in. across; cocci subglobose. Seeds globose, dark brown with paler blotches.—*T. Winkleri*, Pax in Engl. Jahrb. xliii. 82.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 624! Cameroons: Victoria, *Winkler*, 343! Barombi, *Preuss*, 467!

South Central. Belgian Congo: Kasai; Mukenge, *Pogge*, 1396!

A very distinct species readily recognised by the length, not only of its male, but of its female pedicels.

28. **T. ukambensis,** *Pax in Engl. Jahrb.* xix. 105. Stems erect, sparingly branched; branches slender, straight, densely armed with stinging hairs. Leaves petioled, thinly membranous, lanceolate or ovate-lanceolate, acute, base truncate or shallowly cordate, margin serrate except at the base, 1–1½ in. long, ⅓–½ in. wide, sparingly pubescent and densely bristly on the nerves on both surfaces; petiole densely

bristly, $\frac{1}{3}$–$\frac{1}{2}$ in. long; stipules lanceolate, acute, bristly, $1\frac{1}{2}$ lin. long. Racemes terminal and lateral leaf-opposed, $1\frac{1}{3}$–3 in. long, rather dense, with a stiff bristly peduncle $1\frac{1}{2}$–2 in. long, with many male flowers above, and usually 2 basal female flowers these sometimes 1 in. apart; pedicels in both sexes solitary to and shorter than their bracts; bracts bristly, males lanceolate, 1 lin. long, females ovate-lanceolate, 2 lin. long. Male sepals 3, ovate, acute, pubescent externally. Stamens 3; filaments longer than the anthers. Female calyx-segments 6, 2-seriate, accrescent and coriaceous, those alternate with the carpels at length $\frac{1}{3}$ in. long, the others less indurated and $\frac{1}{4}$ in. long; rhachis narrow-oblong, pectinately 3–4-lobulate on each side, lateral lobules lanceolate, very densely bristly like the rhachis externally. Ovary densely hispid; styles 3, connate for half their length. Capsule hispid with white bristly hairs, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, pale to dark grey with reddish blotches.—Pax in Engl. Pfl. Ost-Afr. C. 240.

Nile Land. British East Africa: Taita; Ndi Mountain, *Hildebrandt*, 2419! Ukamba; Kitui, *Hildebrandt*, 2685! *Scott Elliot*, 6326!

A very distinct species.

29. **T. impedita,** *Prain in Kew Bulletin*, 1909, 52. Stems erect, 2 ft. high, much-branched, puberulous or glabrescent, sparingly armed with stinging hairs. Leaves petioled, thinly membranous, ovate, acute, base rounded or truncate, margin serrate except at the base, $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide, glabrous above, sparingly bristly on the nerves beneath, otherwise glabrous; petiole puberulous and sparingly bristly, $\frac{1}{2}$ in. long; stipules lanceolate, ascending or spreading, sparingly beset with stinging hairs, $1\frac{1}{2}$ lin. long. Racemes terminal and lateral, leaf-opposed, 1 in. long, rather dense, with a pubescent and bristly peduncle $\frac{1}{3}$ in. long, with many male flowers above and usually 2 basal female flowers; pedicels in male flowers solitary to and rather longer than their bracts; female flowers subsessile; bracts sparingly pilose, membranous, ovate lanceolate, males $\frac{1}{2}$ lin. long, females $1\frac{1}{2}$ lin. long. Male sepals 3, ovate, acute. Stamens 3; filaments longer than the anthers. Female calyx-segments 6, 2-seriate, 3 orbicular, 3 alternating narrower and oblong, accrescent and coriaceous, at length 3 lin. long; rhachis oblong, pectinately 6-lobulate on each side, lateral lobules lanceolate, shorter than the diameter of the rhachis, sparingly shortly setose. Ovary sparingly pilose; styles 3, connate only in their lower fourth. Capsule not seen.

Nile Land. British East Africa: Mbuyuni, *Scott Elliot*, 6200!

Very nearly allied to the West African *T. angolensis*, Müll. Arg., but somewhat larger, with a woody branching stem; most readily distinguished by the smaller male bracts and the longer male pedicels. Also nearly allied to *T. ukambensis*, Pax, which, however, is densely armed with stinging hairs, and has much longer racemes.

30. **T. angolensis,** *Müll. Arg. in Journ. Bot.* 1864, 333. Stems slender, several from a woody rootstock, erect or suberect, 8 in. to $1\frac{1}{2}$ ft. high or occasionally more or less twining above then 2–$2\frac{1}{2}$ ft. long, very sparingly branched, puberulous or glabrescent, without stinging hairs. Leaves short-petioled or subsessile, firmly membranous, lanceolate or

ovate-lanceolate, acute or acuminate, base rounded or truncate or shallow-cordate, margin finely to coarsely toothed, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. wide, very sparingly hispid or pubescent on the nerves on both surfaces; petioles 0–$\frac{1}{2}$ in. long, sparingly hispid or glabrous; stipules ovate-lanceolate, firm, spreading, sparingly hispid on the margins, $1\frac{1}{2}$ lin. long. Racemes lateral, leaf-opposed, $\frac{1}{2}$ in. long, rather dense, with a puberulous or shortly pubescent peduncle $\frac{1}{3}$ in. long, with many male flowers above and with a solitary, often with no female flower below; pedicels in both sexes puberulous, shorter than and solitary to their bracts; bracts glabrous, firmly membranous, males ovate-lanceolate or lanceolate, spreading, 1 lin. long, females ovate, very shortly 3-toothed at the apex, reflexed, $1\frac{1}{2}$ lin. long. Male sepals 3, wide-ovate, glabrous or faintly puberulous. Stamens 3; filaments short. Female calyx-segments 6, obovate-oblong, 2-seriate, subequal, accrescent and coriaceous, at length $2\frac{1}{2}$ lin. long; rhachis oblanceolate, pectinately 6-lobulate on each side, lateral lobules lanceolate, shorter than the diameter of the rhachis, sparingly shortly setose. Ovary hispid; styles 3, glabrous, connate in their lower half. Capsule 3-coccous, very sparingly hispid, $\frac{1}{4}$ in. across; cocci subglobose. Seeds globose, brown with grey blotches. —DC. Prodr. xv. ii. 940; Hiern in Cat. Afr. Pl. Welw. i. 984.

Lower Guinea. Angola: Pungo Andongo; between Manghe and Candumba, *Welwitsch*, 425! Huilla; near Lopollo, *Welwitsch*, 426! *Dekindt*, 1043! Mounyino, 5900 ft., *Antunes*, 320! on the Cuango River, 10° 30′ S., *Pogge*, 545!

A very distinct species, somewhat variable in habit.

31. **T. shirensis,** *Prain in Kew Bulletin*, 1912, 239. Stems erect, rather stout, from a woody base, 1–$1\frac{1}{2}$ ft. high, sparingly to copiously branched, rather densely hispid above with spreading hairs mixed with a few stinging hairs. Leaves sessile or very shortly petioled, ascending, membranous, linear-lanceolate, acuminate, base shortly cuneate or rounded, margin shortly and sharply toothed, 2–3 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, strigose on the nerves above, strigose and bristly on the nerves beneath; petiole 0–1 lin. long, when present strigose and bristly; stipules lanceolate, rigid, spreading, $1\frac{1}{2}$ lin. long, their margins setose. Racemes androgynous, terminal on the stem and branches, 1–3 in. long, with a basal naked patently strigose peduncle $\frac{1}{4}$–$\frac{3}{4}$ in. long, with numerous scattered male flowers above, and 2–3 basal female; pedicels filiform, sparingly pilose, in both sexes longer than the bracts, males glomerulate in threes, females solitary; bracts lanceolate with setose margins, 1 lin. long, membranous. Male sepals 3, ovate, acute, sparingly pilose externally. Stamens 3; filaments much longer than the anthers. Female calyx-segments 6, 2-seriate and dissimilar, sparingly pilose externally, accrescent and coriaceous in fruit, ultimately 3–4 lin. long, 3 outer ovate, pectinately 3–4-lobulate on each side, lobules short, ovate, acute, 3 inner reduced to an oblong-lanceolate rhachis with entire margin but with at the base 3–4 lanceolate lobules, reflexed and patent. Ovary sparingly hispid and bristly; styles 3, connate for more than half their length in a rather stout puberulous column. Capsule

3-coccous, sparingly bristly, ½ in. across; cocci bluntly angled on the back. Seeds globose; brown mottled with grey.

Mozamb. Distr. British Central Africa: Nyasaland; Shire Highlands, near Blantyre, *Last!*

A very distinct species.

32. **T. Schweinfurthii,** *Baker in Kew Bulletin*, 1909, 308. Stems erect from a woody base, 4–8 in. high, much-branched, densely pilose with stiff pubescence but without stinging hairs. Leaves sessile or very shortly petioled, ascending, chartaceous, lanceolate, subacute or acute, base rounded, margin minutely serrate, 1½–2 in. long, ⅓ in. wide, densely pilose with stiff hairs on both surfaces; petiole 0–1 lin. long, when present densely pilose; stipules lanceolate, under 1 lin. long, rigid, reflexed, pilose. Racemes 1-sexual, diœcious, terminal on stem and branches and below leaf-opposed, more numerous in the male plant; male racemes 1½–4 in. long with a very short naked peduncle pilose like the rhachis; flowers close-set above, more distant below, very numerous; pedicels pilose, solitary to and shorter than the bracts; bracts lanceolate, 1 lin. long, sparingly pilose; female racemes ¾–1½ in. long, with a distinct naked pilose peduncle ⅓–½ in. long; flowers few (3–6), rather remote; pedicels pilose, solitary, ⅕ in. long, much exceeding the bracts, which are exactly as in the male. Male sepals 3, wide-ovate, pilose. Stamens 3; filaments considerably longer than the anthers. Female calyx-segments 6, densely pilose externally, ovate-lanceolate, chartaceous, at length accrescent but not coriaceous, 3 lin. long, 3- (sometimes 4-) partite at the tip, lobules short, lanceolate. Ovary densely adpressed-pilose; styles 3, very short, slightly connate at the base. Capsule 3-coccous, rather sparingly adpressed-pilose, ¼ in. across; cocci subglobose. Seeds globose, brown with grey blotches.

Nile Land. Dar Fertit: by the Biri River, *Schweinfurth,* III, 152! Golo Country, *Schweinfurth,* III, 153!

A very distinct species; agreeing, except in the absence of stinging bristles, as regards foliage and habit with *T. Wildemanii,* Beille, but differing in being dioœcious, in having a 6-partite female calyx and in having solitary male flowers.

33. **T. akwapimensis,** *Prain in Kew Bulletin*, 1912, 235. Stems suberect from a woody base, 1½–2 ft. high, much-branched, thinly puberulous and sparingly armed with stinging hairs. Leaves sessile or very shortly petioled, ascending, firmly membranous, lanceolate, obtuse with mucronulate tip, base shortly cuneate, or rounded, margin sparingly serrate towards the apex, elsewhere entire, 1½–2 in. long, ⅓ in. wide, very sparingly shortly setose on the nerves on both surfaces and along the margins, otherwise glabrous; petiole 0–2 lin. long, sparingly setose and bristly; stipules lanceolate, under 1 lin. long, rigid, reflexed, glabrous or sparingly shortly setose. Racemes 1-sexual, diœcious, terminal on stem and branches and below leaf-opposed; male racemes 6–10 in. long, with a naked peduncle 2 in. long, thinly puberulous and sparingly bristly like the rhachis; flowers very numerous, rather remote throughout; pedicels shortly pilose, solitary to their bracts or the lowest geminate, not longer than the bracts; bracts lanceolate, 1 lin. long,

sparingly pilose; female racemes not seen. Male sepals 3, wide-ovate, sparingly shortly pilose. Stamens 3; filaments considerably longer than the anthers.

Upper Guinea. Gold Coast: Aburi, *Anderson*, **54**!

Very closely allied to *T. Schweinfurthii*, Baker, but readily distinguished by the obtuse almost glabrous leaves and the much longer male racemes.

34. **T. dioica,** *Sond. in Linnæa*, xxiii. 109. Stems erect or suberect, several from a woody base, sparingly branched upwards, rather copiously armed with stinging hairs. Leaves shortly to distinctly petioled, membranous, lanceolate, acute above, base shallowly broadly auriculate-cordate, basal lobes oblong and coarsely toothed, mid-lobe remotely and shortly serrate, 2–3 in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. wide above the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide at the base, rather sparingly bristly setose, especially on the nerves, on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{2}$ (rarely $\frac{3}{4}$) in. long, copiously bristly setose; stipules lanceolate, reflexed, sparingly setose, $1\frac{1}{2}$ lin. long, Racemes terminal and lateral, leaf-opposed, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, on stiff naked bristly setose peduncles $\frac{1}{2}$–$1\frac{1}{2}$ in. long, with numerous dense male flowers above and 1–3 basal female flowers; pedicels in both cases solitary to and rather longer than the bracts, puberulous or pubescent; bracts membranous, ovate, puberulous or pubescent, males under 1 lin. long, females nearly 2 lin. long. Male sepals 3, ovate, subacute, puberulous. Stamens 3; filaments short. Female calyx-segments 1-seriate, very irregular, often apparently 3 but with usually a small additional lobe sometimes reduced to a single linear lobule, not infrequently 5–6, occasionally 7, at least three very accrescent and coriaceous, 4 lin. long, deeply subpectinately 3–7-lobulate on each side, lobules lanceolate, densely bristly, rhachis from lanceolate to suborbicular, glabrous within, bristly externally. Ovary rather sparingly hispid; styles 3, connate half their length in a puberulous column. Capsule 3-coccous, sparingly bristly hispid, $\frac{2}{5}$ in. across; cocci subglobose. Seeds globose, dark grey with brown blotches.—Walp. Ann. iii. 363; Baill. Adansonia, iii. 162. *T. rupestris*, var. *lobata*, Müll. Arg. in DC. Prodr. xv. ii. 941. *T. Schinzii*, Pax in Bull. Herb. Boiss. vi. 734.

Lower Guinea. German South-West Africa: Amboland; Okasima, *Schinz*, 896! Oshihehe, *Schinz*, **896A**! Otyitno, *Dinter*, **870**! Hereroland; Okahandya, *Dinter*, **82**! Quaaiputs, *Dinter*, **193**! Rehoboth, *Fleck*, **444**! **446**! **451**!

Mozamb. Distr. Rhodesia: Bulawayo, *Kolbe in Herb. Bolus*, 4109!

Also in South Africa, where the species occurs in two distinct forms, hardly deserving of recognition as separate varieties. The first form, on which the species was originally based, is rather densely aculeate on the stems and leaves, and casually, as in some specimens collected in the Macalisberg range by Zeyher and Burke, may be polygamo-diœcious. The second form is much more sparingly setose. All the specimens from our area belong to the less setose form of the species, which is the original basis of *T. Schinzii*, Pax, except Dinter's **870**, which is referable to the other form.

35. **T. Wildemanii,** *Beille in Bull. Soc. Bot. France*, lv. *Mém.* viii. 82. Stems erect from a woody base, 1–$1\frac{1}{2}$ ft. high, sparingly branched, densely softly pubescent and sparingly armed with stinging hairs. Leaves sessile or very shortly petioled, ascending, membranous, lanceolate,

acuminate, base rounded, margin distinctly serrate, 1½–2 in. long, ⅓ in. wide, softly pubescent on both surfaces but especially beneath and beset with stinging hairs especially on the nerves on both sides; petiole 0–1 lin. long, when present softly pubescent and bristly; stipules lanceolate, 1½ lin. long, membranous, reflexed, pubescent. Racemes androgynous, terminal and leaf-opposed on stems and branches, 6–10 in. long, with a basal naked peduncle ½–¾ in. long, softly pubescent like the rhachis, with numerous male flowers above and a solitary basal female; male flowers in scattered 3-flowered cymules, ⅕ in. long, throughout the raceme but with 2–3 solitary flowers at the base and 5–6 solitary flowers at the apex; pedicels softly pubescent, 2-bracteolate, shorter the bracts, female pedicel softly pubescent, as long as the bract; bracts similar in both sexes, membranous, pubescent, ovate, acute, 1–2 lin. long.. Male sepals 3, wide-ovate, pubescent. Stamens 3; filaments considerably longer than the anthers. Female calyx-segments 3, densely pubescent externally, wide-ovate, chartaceous, at length accrescent but not coriaceous, 3 lin. long, margin pectinately 4–5-lobulate on each side, lobules short, lanceolate. Ovary densely adpressed-pilose; styles 3, connate for more than half their length in a slender sparingly pubescent column. Capsule 3-coccous, sparingly adpressed-pilose, ⅓ in. across; cocci subglobose. Seeds globose, brown blotched with grey.

Upper Guinea. Upper Niger: Katou, *Chevalier*, 539!

A very distinct species, with female calyx and fruit like that of *T. angustifolia*, Benth., but very different in all other respects.

36. **T. Gardneri,** *Prain in Kew Bulletin*, 1909, 52. Stems erect from a woody base, 1½ ft. high, copiously branched, sparingly puberulous and rather copiously armed with stinging hairs. Leaves sessile or very shortly petioled, ascending, chartaceous, ovate, acute, base truncate or wide-cuneate, entire, margin elsewhere distinctly sharply serrate, ¾ in. long, ⅓ in. wide, sparingly puberulous on both surfaces, without stinging hairs above, rather copiously armed with stinging hairs on the nerves beneath; petiole 0–1 lin. long, when present glabrous or with a few bristles on the lower aspect only; stipules ovate-lanceolate, rigid, reflexed, glabrous. Racemes androgynous, terminal on stem and branches and leaf-opposed below, 1 in. long, with a naked puberulous and rather densely bristly peduncle 1½–2 in. long, with numerous rather close-set male flowers above and 1–2 basal female; pedicels in both sexes solitary to and shorter than their bracts; bracts ovate-lanceolate, usually acute but the uppermost obtuse, rather firm, glabrous. Male sepals 3, ovate, subacute, glabrous. Stamens 3, occasionally 4; filaments longer than the anthers. Female calyx-segments 3, sparingly puberulous externally, suborbicular, chartaceous, accrescent but hardly indurated in fruit, margin pectinately 5–6-lobulate on each side, lobules very short, triangular, setose. Ovary densely pilose; styles 3, almost free throughout. Capsule 3-coccous, densely adpressed-setose, ¼ in. across; cocci subglobose. Seeds globose, reddish-brown with grey blotches.

Mozamb. Distr. Rhodesia: Gwelo, *Gardner*, 34!

A very distinct species.

37. **T. Dinteri,** *Pax in Engl. Jahrb.* xliii. 82. Stems erect and woody below, from a very stout woody base, above copiously branching; branches long, slender, herbaceous, rigid, straight, finely puberulous and armed with stinging hairs. Leaves distinctly petioled, membranous, pale green, ovate-triangular, acuminate, base deep-cordate, margin rather coarsely serrate, 1½–2¼ in. long, ¾–1½ in. wide, closely bristly setose on the nerves on both surfaces, otherwise glabrous; petiole 1–2 in. long, bristly setose; stipules lanceolate, reflexed, with sparingly bristly margins, otherwise glabrous, 1½ lin. long. Racemes androgynous or sometimes 1-sexual, lateral, leaf-opposed, ¼–½ in. long, on short, rather stiff, puberulous and densely bristly peduncles ¼–½ in. long, with few rather lax male flowers above and usually 2 basal female flowers; pedicels all solitary to and shorter than their bracts; bracts all thinly membranous, males 1 lin. long, narrow-lanceolate, reflexed, sparingly pubescent, females lanceolate, 2 lin. long, of the upper female flower entire, of the lower 1-toothed on each side near the base; bracteoles lanceolate, entire. Male sepals 3, orbicular, obtuse, puberulous outside. Stamens 3; filaments considerably longer than the anthers, incurved and subconnivent; connective slightly thickened. Female calyx-segments 3, 1-seriate, ovate, membranous, accrescent but hardly indurated, 4 lin. long, rhachis broadly ovate-oblong, pectinately 4-lobulate on each side, sparingly hirsute externally, lateral lobules ascending, persistent, about as long as the diameter of the rhachis, rather closely bristly setose. Ovary nearly glabrous; styles 3, glabrous, very long, connate for nearly three-fourths their length in a rigid slender column. Capsule 3-coccous, sparingly finely puberulous and with a few white bristles especially along the middle, ¼ in. across; cocci bluntly angled along the back.

Lower Guinea. German South-West Africa: Hereroland; between Okahandya and Otyisasu, 4000 ft., *Dinter*, 942!

A distinct species with male flowers like those of *T. kirkiana*, Müll. Arg., but otherwise very different.

38. **T. furialis,** *Bojer, Hort. Maurit.* 286. Stems long, slender, twining, finely puberulous or nearly glabrous and sparingly armed with stinging hairs. Leaves distinctly petioled, membranous, ovate or ovate-oblong, acute or acuminate, base distinctly cordate, margin shortly to distinctly serrate, 2–4 in. long, 1–2½ in. wide, sparingly to distinctly bristly setose, especially on the nerves and especially beneath, otherwise glabrous; petiole ¾–2½ in. long, sparingly to closely bristly setose with stinging hairs; stipules lanceolate, 1–1½ lin. long, spreading or somewhat reflexed with setose margins, otherwise glabrous. Racemes lateral and terminal on the lateral branches, slender, rather dense, ½–¾ in. long, with a puberulous naked peduncle ¼–⅓ in. long, with many male flowers above and 1–3 basal female flowers; pedicels in both sexes solitary to and shorter than the bracts; male bracts membranous, narrow-lanceolate, sparingly hirsute, 1 lin. long, reflexed; female bracts like the male but slightly larger. Male sepals 3, wide-ovate, sparingly hirsute externally. Stamens 3; filaments as long as the anthers.

Female calyx-segments 3, 1-seriate, ovate, membranous, accrescent but hardly indurated, 5 lin. long, rhachis broadly ovate-oblong, pectinately 6-7-lobulate on each side, softly hirsute externally, lateral lobules ascending, persistent, not exceeding the diameter of the rhachis in length, softly hirsute and sparingly beset with stinging bristles. Ovary sparingly strigose and bristly; styles 3, glabrous, shortly connate at the base only. Capsule 3-coccous, sparingly bristly, $\frac{1}{3}$ in. across; cocci subglobose. Seeds globose, grey mottled with brown.—Baill. Étude Gén. Euphorb. 461 and Adansonia, i. 275. *T. angustifolia*, var. *furialis*, Müll. Arg. in DC. Prodr. xv. ii. 939.

Mozamb. Distr. Zanzibar, *Sacleux*, 588 !

Perhaps only casually introduced to Zanzibar from Madagascar or the Comoro Islands where it is plentiful. Though usually identified with *T. angustifolia*, Benth., it only agrees with that species in having a 3-partite female calyx.

39. **T. Scheffleri,** *Baker in Kew Bulletin*, 1908, 439. Stems long, slender, twining, finely puberulous or glabrous and sparingly armed with stinging hairs. Leaves distinctly petioled, membranous, ovate, acuminate, base usually deeply (rarely shallow) cordate, margin sharply serrate, 2–4 in. long, $1\frac{1}{4}$–2 in. wide, faintly puberulous and occasionally with a few white bristles on the nerves on both surfaces, otherwise glabrous; petiole 1–2 in. long, faintly puberulous and sometimes sparingly bristly; stipules lanceolate, reflexed, membranous, glabrous, $1\frac{1}{2}$ lin. long. Racemes lateral, $1\frac{1}{4}$ in. long, slender, rather lax, with a sparingly puberulous naked peduncle $\frac{1}{3}$ in. long, with many male flowers above and 1–2 basal female flowers; pedicels in both sexes shorter than the bracts, males solitary above, in fascicles of 3 lower down; bracts membranous, ovate-lanceolate, with puberulous margins, males 1 lin., females $1\frac{1}{2}$ lin. long. Male sepals 3, wide-ovate, sparingly puberulous or glabrous externally. Stamens 3; filaments as long as the anthers; connective somewhat thickened. Female calyx-segments 3, 1-seriate, wide-ovate, membranous, accrescent, but only chartaceous, 8 lin. long, rhachis broadly ovate-oblong, pectinately 5–6-lobulate on each side, glabrous externally, lateral lobules persistent, lanceolate, up to 3 lin. long, exceeding in length the diameter of the rhachis, sparingly beset with white bristles. Ovary sparingly setose; styles 3, connate more than halfway in a slender column. Capsule 3-coccous, almost glabrous or with only a few adpressed bristles, $\frac{1}{3}$ in. across; cocci bluntly angled on the back. Seeds globose, brown with grey blotches.

Mozamb. Distr. Zanzibar, *Sacleux*, 589 ! *Bojer !* Pemba Island, *Bojer !* German East Africa: Usambara; Nquelo, 3300 ft., *Scheffler*, 47 ! Gonja, 2300–4200 ft., *Holst*, 4321A ! *Engler*, 1547 ! 1554 ! Amani, 2000 ft., *Zimmermann*, 83 ! Bomole, *Braun*, 749 !

Nearest to *T. furialis*, Bojer, from which it is readily distinguished by its much more deeply lobulate female calyx-segments. Sacleux remarks of the two species, both of which he has collected in Zanzibar, that externally they closely resemble each other, but that while *T. furialis* is intensely, *T. Scheffleri* is hardly, if at all, urticant.

40. **T. adenanthera,** *Baill. Adansonia*, i. 275. Stems long, slender, twining, rather copiously branched, pubescent or patently pilose. Leaves long-petioled, membranous, ovate-triangular to ovate-lanceolate or lanceolate, acute or acuminate, base cordate, from faintly lobed to distinctly subhastate, margin finely to coarsely crenate-dentate, 1½–2½ in. long, ¼–1¼ in. wide, from finely puberulous to densely pilose especially on the nerves on both surfaces but especially beneath; petiole ½–1¼ in. long, from sparingly pubescent to densely patently pilose; stipules ovate-lanceolate, reflexed, 1½–2 lin. long, almost glabrous above, pubescent to densely pilose beneath. Racemes lateral, 2–3 in. long, on rather stiff naked pubescent to pilose peduncles ¾–1¼ in. long, with many very densely set male flowers above and 1–3 basal female flowers separated by short intervals from the lowest males and from each other; pedicels all solitary to and shorter than their bracts; bracts all firmly membranous, male triangular-ovate, their margins minutely glandular toothed, females wide-ovate, acute, with distinctly toothed margins as have their bracteoles. Male sepals 3, ovate, acute, thick, glandular. Stamens 3; filaments rather short; connective much thickened and glandular. Female calyx-segments 3, very rarely 4 or 5, 1-seriate, broadly ovate or suborbicular, accrescent and coriaceous, 3 lin. long, rhachis very shortly wide-oblong, pectinately 6–8-lobulate on each side, lobules all ascending, sparingly white bristly, very short. Ovary sparingly hispid; styles 3, short, slightly connate at the base only. Capsule 3-coccous, almost glabrous, ¼ in. across; cocci subglobose. Seeds globose, brownish grey.—Müll. Arg. in DC. Prodr. xv. ii. 938; Pax in Engl. Pfl. Ost-Afr. C. 239.

Mozamb. Distr. Zanzibar, *Boivin! Stuhlmann*, 362! *Hildebrandt*, 1040! *Sacleux*, 399! 2054! German East Africa: Pangani, *Stuhlmann*, 695! Usaramo; Rukinga, *Stuhlmann*, 6907! British Central Africa: Nyasaland; Zomba Plain, *Whyte!*

A very distinct and easily recognised species which, while unusually variable as regards the shape and degree of pubescence of the foliage, is extremely uniform as regards its bracts and flowers.

41. **T. subsessilis,** *Pax in Engl. Jahrb.* xix. 101. Stems erect from a woody base, 1–2 ft. high, sparingly branched, densely softly pubescent with reflexed hairs and sparingly armed with spreading or ascending stinging hairs. Leaves sessile or very shortly petioled, ascending, membranous, linear-lanceolate to ovate-lanceolate, acuminate or acute and mucronulate, base subhastately auriculate, margin coarsely and rather irregularly toothed especially on the auricles, 1½–3¼ in. long, ¾–1½ in. wide at the auriculate base, ¼–1 in. wide above the auricles, sparingly bristly on the nerves above, more copiously so beneath, otherwise glabrous; petiole 0–1½ lin. long, when present softly pubescent and bristly; stipules lanceolate, recurved, membranous, 1–3 lin. long, their margins setose. Racemes androgynous, terminal on stem and branches and leaf-opposed below, 1 in. long, with a basal naked softly pubescent and bristly peduncle ¼ in. long, with numerous rather close-set male flowers above and 1–2 basal female; pedicels in both sexes solitary to and shorter than their bracts; bracts ovate-lanceolate, acute,

with sparingly setose margins, males 1 lin., females 2 lin. long, membranous. Male sepals 3, ovate, sparingly pilose or glabrous. Stamens 3; filaments as long as the anthers. Female calyx-segments 3, sparingly pubescent externally, wide-ovate, chartaceous, hardly accrescent and very slightly indurated in fruit, margin pectinately 2–3-lobulate on each side, lobules short, lanceolate. Ovary densely hispid; styles 3, connate for less than half their length in a slender column. Capsule 3-coccous, sparingly adpressed-setose, $\frac{1}{3}$ in. across; cocci bluntly angular. Seeds globose, pale brown, faintly mottled with darker patches.—Pax in Engl. Pfl. Ost-Afr. C. 239.

Mozamb. Distr. German East Africa: Umbugwe and Iraku; Kiwawa, *Merker*, 125! and without precise locality, *Fischer*, 6!

The bluntly angled cocci indicate that this species is most nearly allied to the group which includes *T. angustifolia*, Benth., and *T. kirkiana*, Müll. Arg.

42. **T. kirkiana,** *Müll. Arg. in Flora*, 1864, 538. Stems long, slender, twining, sparingly branched, glabrous or with a few white bristles. Leaves distinctly petioled, membranous, ovate-lanceolate or lanceolate, rarely triangular-ovate, acuminate, base deeply cordate and usually distinctly hastate, rarely only faintly lobed, 2–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. wide at the base, margin sharply serrate, usually more strongly in the lower half, sparingly hispid on the nerves on both surfaces, especially beneath, otherwise glabrous; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. long, sparingly bristly; stipules ovate-lanceolate, reflexed, membranous, with sparingly bristly margins, $1\frac{1}{2}$ lin. long. Racemes lateral, up to 2 in. long, dense, with a puberulous and sparingly bristly peduncle 1–$1\frac{1}{2}$ in. long, with many male flowers above and 1–3 basal female flowers; pedicels in both sexes shorter than and solitary to the bracts; bracts rather firm, ovate-lanceolate, spreading, their margins glabrous or very sparingly ciliolate, males 1 lin., females $1\frac{1}{2}$ lin. long. Male sepals 3, wide-ovate, glabrous. Stamens 3; filaments considerably longer than the anthers, incurved and subconnivent; connective distinctly thickened. Female calyx-segments 3, 1-seriate, oblong, accrescent and coriaceous, 3–4 lin. long, rhachis obovate, pectinately 5–6-lobulate on each side, lobules sparingly white bristly, shorter than the breadth of the rhachis. Ovary sparingly bristly; styles 3, connate in their lower half in a slender column. Capsule 3-coccous, almost glabrous, $\frac{1}{4}$ in. across; cocci bluntly angled on the back. Seeds globose, grey mottled with pale brown.—DC. Prodr. xv. ii. 939; Pax in Engl. Pfl. Ost-Afr. C. 239. *T. angustifolia*, var. *hastata*, Müll. Arg. in DC. Prodr. xv. ii. 939.

Mozamb. Distr. Portuguese East Africa: Cundine, *Le Testu*, 627! Mossurezi, 500 ft., *Johnson*, 113! Lower Shire River; base of Morambala Mountain, *Kirk* (1858)! Morambala, *Kirk* (1863)! Shupanga, *Kirk* (1859)! British Central Africa: Nyasaland: between Songwe and Karonga, 1700–2000 ft., *Whyte!* Zomba Plains, 2500–3000 ft., *Whyte!* Ntondwe, *Cameron*, 111! Mount Sochi, *Scott-Elliot*, 8549! 8599 partly!

Nearly related to and intermediate between *T. angustifolia*, Benth., and *T. adenanthera*, Baill., but readily distinguished from both by its male flowers.

43. **T. angustifolia,** *Benth. in Hook. Niger Fl.* 502, *not of Nutt.* Stems 7 feet long or longer, slender, twining, freely branching, sparingly pubescent or glabrous, and sparsely armed with stinging hairs. Leaves distinctly petioled, membranous, ovate-lanceolate or lanceolate, acuminate, base shallow-cordate, margin finely and sharply serrate, very rarely coarsely toothed, $3\frac{1}{2}$–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. wide at the base, finely puberulous on the nerves on both surfaces and sparingly armed with white bristles beneath, or quite glabrous except for the white bristles on both surfaces; petiole $\frac{1}{4}$–1 in. long, puberulous and bristly; stipules ovate-lanceolate, reflexed, membranous, sparingly puberulous, $1\frac{1}{2}$ lin. long. Racemes lateral, up to 3 in. long, dense, with a puberulous and densely bristly peduncle $\frac{1}{2}$ in. long, with many male flowers above and 1–2 basal female flowers; pedicels in both sexes shorter than the bracts, males solitary above, geminate below, females solitary; bracts membranous, ovate-lanceolate, their margins finely ciliolate, males 1 lin., females $1\frac{1}{2}$ lin. long. Male sepals 3, wide-ovate, sparingly puberulous outside. Stamens 3; filaments as long as the anthers; connective distinctly thickened. Female calyx-segments 3, 1-seriate, oblong, accrescent and coriaceous, 3–4 lin. long, rhachis obovate, pectinately 6–8-lobulate on each side, lobules densely white bristly, shorter than the breadth of the rhachis. Ovary densely hispid and bristly; styles 3, glabrous, connate in their lower half in a slender column. Capsule 3-coccous, rather sparingly bristly, $\frac{1}{4}$ in. across; cocci bluntly angled on the back. Seeds globose, grey mottled with pale brown.—Walp. Ann. iii. 363; Müll. Arg. in DC. Prodr. xv. ii. 939.

Upper Guinea. Northern Nigeria: Nupe, *Barter,* **1732**! Lower Niger, *Vogel,* 108! Lagos, *Dawodu,* **205**! Cameroons: on the River Benue, 1000 ft., *Ledermann,* **4794**! Garua, 1000 ft., *Ledermann,* **4997**!

A very distinct species.

44. **T. senegalensis,** *Müll. Arg. in Linnæa,* xxxiv. 182. Stems erect or suberect or rambling, not truly twining or only slightly so at the tips, 2–6 ft. high from a woody base, very sparingly branched, pubescent and sparingly armed with stinging hairs. Leaves distinctly to long petioled, membranous, ovate-lanceolate, acuminate, base shallow to deeply cordate, margin sharply toothed, $3\frac{1}{2}$–4 in. long, $1\frac{1}{2}$–2 in., rarely only $\frac{3}{4}$ in. wide, strigose and bristly especially on the nerves on both surfaces; petiole $\frac{1}{4}$–1 (rarely $1\frac{1}{2}$) in. long, strigose and bristly; stipules ovate-lanceolate, reflexed, membranous, sparingly hirsute, $1\frac{1}{2}$ lin. long. Racemes terminal and lateral, up to 1 in. long, dense, with a pubescent and bristly peduncle $\frac{1}{4}$–$\frac{1}{2}$ in. long, with many male flowers above and usually 2 basal female flowers; pedicels in both sexes shorter than the bracts, males fascicled, females solitary; bracts membranous, ovate-lanceolate, rather densely pilose externally, males 1 lin., females $1\frac{1}{2}$ lin. long. Male sepals 3, wide-ovate, sparingly puberulous outside. Stamens 3; filaments as long as the anthers; connective much thickened. Female calyx-segments 3, rarely 4–5, 1-seriate, oblong or suborbicular, accrescent and coriaceous, 5 lin. long, rhachis wide-obovate, pectinately 6–8-lobulate on each side, lateral lobules densely white bristly, shorter than

the breadth of the rhachis. Ovary densely hispid and bristly: styles 3, glabrous, connate in their lower half in a slender column. Capsule 3-coccous, rather sparingly bristly, $\frac{1}{3}$ in. across; cocci bluntly angled on the back. Seeds globose, grey mottled with pale brown.—DC. Prodr. xv. ii. 938.

Upper Guinea. Senegambia: Albuda, in ricefields, *Leprieur*, 736! French Guinea: neighbourhood of Timbo, *Maclaud*, 30! Gold Coast: Salaga, *Krause!* Togo: Kekejande, 1000 ft., *Kersting*, A 615! Kete Krechi, *Zech*, 301! Northern Nigeria: Yola, *Dalziel*, 157! Lokoja, *Parsons*, 45! Cameroons: Balda, 1250 ft., *Ledermann*, 4019! Limbameni, 1000 ft., *Ledermann*, 4327!

Nearest to *T. angustifolia*, Benth., and only satisfactorily distinguished by its smaller stature, its erect or suberect habit, its broader bracts and its shorter racemes.

77. **HAMILCOA,** Prain in Kew Bulletin, 1912, 107.

Flowers dicœcious, apetalous. Male: Sepals 5, imbricate. Stamens 18; anthers subsessile, smooth, 2-celled, dehiscence longitudinal. Rudimentary ovary 0. Female: Calyx 6-partite. Disk urceolate; ovary 3-celled; styles thick, with 3 free stout stigmas. Fruit capsular, 3-coccous; cocci opening loculicidally from the base upwards; pericarp coriaceous. Seeds large, globose; embryo small, cotyledons broad, flat.—Shrub, climbing; leaves alternate, unequally petioled; petioles pulvinate at the base and apex; flowers racemose; racemes axillary; pedicels thickened.

A single endemic species.

1. **H. Zenkeri,** *Prain in Kew Bulletin*, 1912, 107. Shrub, climbing; stems 20–30 ft. high. Leaves nearly sessile or long-petioled on the same branch, ovate-oblong, caudate-acuminate, base wide-cuneate, margin remotely serrate, thinly coriaceous, 4–10 in. long, $1\frac{3}{4}$–4 in. wide, somewhat shining above, glabrous on both surfaces; secondary nerves 8–10 pairs, raised beneath, looping within the margin; petiole slightly pulvinate at the base, distinctly pulvinate and geniculate at the apex, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, or at times reduced to the apical pulvinus and then only 1–2 lin. long. Racemes axillary, 6–8-flowered, peduncled; males $\frac{3}{4}$–1 in., females $1\frac{1}{2}$ in. long; peduncles $\frac{1}{3}$ in. long; pedicels distinctly thickened upwards, almost fleshy, males $\frac{1}{4}$ in., females $\frac{1}{2}$ in. long. Male: sepals 5, free, strongly imbricate, ovate-oblong, obtuse. Stamens 18, almost sessile; anthers 2-celled, dehiscence longitudinal. Rudimentary ovary 0. Female: Calyx 6-partite; segments ovate, obtuse. Disk urceolate. Ovary 3-celled, glabrous; style thick; stigmas 3, free, stout. Capsule 3-celled, $\frac{4}{5}$ in. across; cocci subglobose, opening loculicidally from the base. Seed large, globose, $\frac{1}{2}$ in. across; testa smooth, mottled externally, spongy; embryo very small, cotyledons broad, flat.—*Plukenetia Zenkeri*, Pax in Engl. Jahrb. xliii. 83.

Upper Guinea. Cameroons: Bipinde; Mimfia, *Zenker*, 2865! 3028B, 3646! 4130!

Tentatively referred to *Plukenetia* by Pax, this plant does not belong to that genus but represents a distinct one, perhaps most nearly allied to *Plagiostyles*, Pierre, and *Pimeleodendron*, Hassk.

78. **PLAGIOSTYLES,** Pierre in Bull. Soc. Linn. Paris, ii. 1326.

Flowers diœcious, apetalous. Male: Calyx depressed-globose, open in bud; lobes 5–6, unequal, imbricate. Stamens 15 or 18 or 21; anthers subsessile, very finely scabridulous externally, 2-celled, dehiscence longitudinal. Rudimentary ovary 0. Female: Calyx 5-lobed. Disk 0. Ovary 1-celled; style very short, cylindric, slightly eccentric, in fruit becoming lateral; stigma depressed-globose, finely papillose, entire; ovule solitary. Fruit indehiscent, 1-celled, transversely oblong, subcoriaceous. Seed filling the fruit cavity, somewhat adherent to the pericarp, with a lateral raphe at the end under the style; albumen abundant, oily; embryo large, cotyledons reniform-cordate, much expanded transversely, flat.—Tree. Leaves alternate, distinctly petioled; petioles pulvinate at the base and apex. Flowers racemose; racemes axillary; pedicels thickened.

A single endemic species.

Referred, on page 171 of this volume, to *Monimiaceæ*, the genus *Plagiostyles*, in the light of the more ample material now available, seems better placed in *Euphorbiaceæ*.

1. **P. klaineana,** *Pierre in Bull. Soc. Linn. Paris*, ii. 1327. A tree reaching 40 ft. in height, juice milky; branches terete, glabrous; bark warm brown, lenticelled. Leaves petioled, oblong, acuminate, margin faintly toothed, base wide-cuneate or rounded, 6–8 in. long, $2\frac{1}{4}$–$2\frac{1}{2}$ in. wide, thinly coriaceous, glabrous; lateral nerves about 5 on each side, looping within the margin; petiole up to $\frac{1}{2}$ in. long, glabrous, slightly pulvinate at the base, more distinctly at the apex. Flowers in axillary racemes shorter than the leaves, rhachis glabrous, under 2 in. long; pedicels short, somewhat thickened upwards, glabrous. Male: Calyx glabrous, open in bud, cupular soon explanate above, fleshy; lobes 5–6, sometimes up to 8, imbricate, unequal. Stamens 15 or 18 or 21; anthers subsessile, finely scabridulous. Female: Calyx as in male. Ovary oblong, glabrous, slightly oblique. Fruit transversely oblong, $\frac{3}{4}$ in. across, $\frac{1}{3}$ in. high. Seed conform with the fruit, $\frac{2}{3}$ in. long; testa thinly crustaceous; albumen abundant, oily; embryo large; cotyledons transversely reniform-cordate, $\frac{1}{2}$ in. across, flat; radicle superior.—Pax in Engl. & Prantl, Pflanzenfam. Nachtr. ii.–iii. 38; De Wild. & Durand in Bull. Herb. Boiss. 2^{me} sér. i. 836 and Reliq. Dewevr. ii. 205; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 270; Th. & Hél. Durand, Syll. Fl. Congol. 487; C. H. Wright in Dyer, Fl. Tr. Afr. vi. i. 171. *P. africana*, Prain in Kew Bulletin, 1912, 107. *Daphniphyllum africanum*, Müll. Arg. in Flora, 1864, 536, and in DC. Prodr. xvi. i. 5.

Upper Guinea. Southern Nigeria: Oban, *Talbot!* Cameroons: Bipinde, *Zenker*, 1730! 3008A! 3539! Mimfia, 670 ft., *Zenker*, 2789! Barombi, *Preuss*, 421! Johann-Albrechtshöhe, *Staudt*, 496! Efulen, *Bates*, 374!

Lower Guinea. Spanish Guinea: Kongui River, *Mann*, 1811! Bebao, *Tessmann*, 472! Gaboon: Libreville, *Klaine*, 555! 645! 1010! 1095! 1096! 1202! French Congo: without precise locality, *Autran*, 738! Lower Congo: Stanley Pool district; Kimuenza, *Gillet*, 1716! Dembo Marshes, *Gillet* 1562! near Sanda, *Oddon!* Kwango; Dyuma Valley, *Gentil!*

South Central. Belgian Congo: Equatorial district; on the Lulenga, *Dewèvre*, 855!

79. **MAPROUNEA**, Aubl.; Benth. et Hook. f. Gen. Pl. iii. 333.

Flowers usually monœcious, occasionally diœcious, apetalous. Disk 0. Male: Calyx small, membranous, urceolate, shortly 2–3-lobed, lobes imbricate. Stamens 1–3, usually 2, exserted; filaments united in a slender column below, free above; anthers oblong, their cells parallel, opening longitudinally. Rudimentary ovary 0. Female: Calyx short, 3-lobed. Ovary 3-celled; ovules in each cell solitary; styles connate in a short column below, free and entire above. Capsule subglobose or slightly 3-gonous, breaking up into three 2-valved cocci. Seeds obovoid with a large fleshy caruncle; testa crustaceous, foveolate or rugulose or smooth; albumen fleshy; cotyledons broad, flat.—Trees or shrubs, everywhere glabrous. Leaves alternate, entire, petioled, usually reticulate; stipules small. Flowers in usually 2-sexual (rarely 1-sexual) spikes; males densely ovoid or subglobose, terminal on special much contracted branchlets; bracts small, imbricate, glandular at the base on each side, each subtending 3, very rarely 5, sessile flowers; females 1–3 below the male spike, pedicelled, solitary to their bract or in one species usually few in a distinct raceme without an accompanying male spike.

Species about 5, three in Tropical Africa, two American.

Seeds rugulose, hardly as large as their caruncle, small, $\frac{1}{5}$ in. or less in diam.; inflorescence usually 1-sexual and plants sometimes diœcious; male spikes subglobose, red, under $\frac{1}{4}$ in. long; a tree up to 50 ft. high — **1.** *M. membranacea.*

Seeds smooth, larger than their caruncle, inflorescence usually androgynous and plants always monœcious.

Seeds small, $\frac{1}{5}$ in. or less in diam., twice as large as their caruncle; male spikes subglobose, greenish-yellow, under $\frac{1}{4}$ in. long; a shrub 5–7 ft. high . — **2.** *M. gracilis.*

Seeds relatively larger, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., three to four times as large as their caruncle; male spikes ovoid or elliptic, pale-yellow, over $\frac{1}{3}$ in. long; a tree up to 30 ft. high . . . . . — **3.** *M. africana.*

1. **M. membranacea,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman.* 178. A tree up to 50 ft. high, all parts glabrous; ultimate twigs passing into the inflorescence 1–1½ in. long. Leaves short-petioled, thinly membranous, with age becoming firmly papery, lanceolate or oblong-lanceolate, bluntly acuminate, base cuneate or somewhat rounded, margin entire, 1½–3 in. long, ¾–1¼ in. wide, finely nerved and reticulate; petiole slender, ⅓ in. long; stipules small, triangular. Inflorescence usually 1-sexual, diœcious or monœcious, occasionally androgynous. Male spikes globose or subglobose, ⅕ in. long, dense-flowered, with usually only a few empty basal female bracts; male bracts 2-glandular at the base, wide-triangular, acute, each 3–5-flowered; bracts and flowers red. Female racemes few-flowered, occasionally, even when 1-sexual, accompanied by a much-reduced abortive male spike; pedicels in fruit up to ¾ in. long. Male calyx thinly membranous, 2–3-lobed, very small. Stamens 2, exserted.

Ovary ovoid. Capsule red, globose, about $\frac{1}{5}$ in. across. Seeds black, ovoid, irregularly rugulose, $\frac{1}{6}$ in. long; caruncle vermilion, as large as the body of the seed.—*M. africana*, Pax ex Durand & De Wild. Contrib. Fl. Congo, i. 52; De Wild. & Durand, Reliq. Dewevr. 213; De Wild. Études Fl. Bas- et Moyen-Congo, i. 279, wholly, and ii. 289, partly (Moanda and Eala specimens only) Th. & Hél. Durand, Syll. Fl. Congol. 499, partly: not of Müll. Arg. *M. bridelioides*, Pierre MSS.

Upper Guinea. Cameroons: Batanga, *Dinklage*, **1425**! Bipinde, *Zenker*, 2086! 2412! 2557! 3003! 3436!

Lower Guinea. Spanish Guinea: Bebao, *Tessmann*, 670! Gaboon: Libreville, *Klaine*, 108! 148! 332! 584! 6430! French Congo: Modgaka, *Thollon*, 37! Kitobi, *Lecomte*, B 65! Brazzaville, *Chevalier*, 5008! Lower Congo: Banana; Moanda, *Gillet*, 4070! Stanley Pool district; near Leopoldville, *Gillet!*

South Central. Belgian Congo: Equatorial Prov.; Eala, *Pynaert*, **1261**! 1327! *Seret*, 820! Bangala district; Bangala, *Dewèvre*, 877!

A very distinct species whose features have been well elucidated by its authors, and also by Pierre, who has issued an excellent series of analytical drawings, but whose unpublished name has unfortunately not been taken up. Pax and Hoffmann think the species is perhaps more nearly allied to the American than to the other African forms; Pierre has considered it equally distinct from both, and has suggested that it may be treated as the type of a distinct section which he has named *Sphærandra*. It is to be noted that in the Cameroons and in Spanish Guinea the spikes appear, as Pax and Hoffmann state, to be always 1-sexual and the plants to be usually diœcious. In the Gaboon, however, and in the Banana district of the Belgian Congo, while the spikes appear to be usually 1-sexual, the plants are usually monœcious. In the French Congo, on the other hand, and in the Belgian Congo from Stanley Pool eastwards, it is unusual to find a specimen without some androgynous spikes.

2. **M. gracilis,** *Dewèvre MSS. in Herb. Brux.* A shrub 5–7 ft. high, all parts glabrous; ultimate twigs passing into the inflorescence 1–1½ in. long. Leaves short-petioled, thinly membranous, with age becoming firmly papery, ovate-lanceolate or ovate, obtuse, base rounded or faintly cordate, margin entire, ½–1¼ in., very rarely 2 in. long, ⅓–1 in. wide, glaucescent beneath, finely nerved and reticulate; petiole slender, ¼–⅓ in. long; stipules small, triangular. Inflorescence usually 2-sexual; male portion globose or subglobose, $\frac{1}{5}$ in. long, dense-flowered; female flowers 1–2, basal, long-pedicelled, pedicels in fruit up to ¾ in. long; male bracts lanceolate, acute, each 3-flowered, with 2 simple or occasionally 2-partite basal glands; bracts and flowers greenish-yellow. Male calyx irregularly 2–3-lobed. Stamens 2–3, exserted. Ovary subglobose. Capsule red, globose, about ¼ in. (rarely ⅓ in.) across. Seeds dark slate-grey or dull black, subglobose, smooth, $\frac{1}{5}$ in. long; caruncle half as large as the body of the seed.—*M. africana*, Pax ex Durand & De Wild, in Bull. Soc. Bot. Belg. xxxvii. 107, wholly; Th. & Hél. Durand, Syll. Fl. Congol. 499, partly: not of Müll. Arg. *M. africana*, var. *obtusa*, Pax l.c., and Th. & Hél. Durand, l.c. 500, partly (as to Laurent 14 only). *M. africana*, var. *gracilis*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 179.

Upper Guinea. Cameroons: Tibati, 3000 ft., *Ledermann*, 2435!

Lower Guinea. French Congo: Niari region. *Thollon*, 977! Lower Congo: Mayumbe; Shinon, *Laurent*, 14! Bingila, *Dupuis!* Stanley Pool district; Kisantu, *Gillet*, 76! Kisedinse, *Gillet!* near Lemfu, *Butaye!* and without precise locality, *Smith*, 51! *Laurent!*

A very distinct species, and the first of the African forms of *Maprounea* to find its way into European herbaria, where it has been treated independently by Baillon and by Müller as a state of the American *M. guyanensis*, Aubl. It is, however, as Pax and Hoffmann explain, more nearly related to *M. africana*, Müll. Arg. From that species, however, it differs so greatly in its seeds, and in other respects, that it seems preferable to treat it as deserving independent recognition.

3. **M. africana,** *Mull. Arg. in DC. Prodr.* xv. ii. 1191 *partly and as to fruit only; Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman.* 178, *excl. var. gracilis.* A tree 15–30 ft. high, all parts glabrous; ultimate twigs passing into the inflorescence $\frac{1}{2}$ in. long or shorter; bark on young branches grey or reddish-brown. Leaves short-petioled, firmly papery, with age becoming subcoriaceous, oblong or ovate-oblong, bluntly acute or acuminate, sometimes rounded cuspidate, or rounded obtuse, base rounded, margin entire, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, dark shining green above, pale green beneath, distinctly reticulate; petiole slender, $\frac{1}{3}$–$\frac{2}{3}$ in. long; stipules small, triangular. Inflorescence usually 2-sexual; male portion oblong or ovoid, rarely subglobose, $\frac{1}{3}$–$\frac{1}{2}$ in. long, dense-flowered; female flowers 1–3, basal, long-pedicelled, pedicels in fruit up to $1\frac{1}{4}$ in. long; male bracts narrow-lanceolate, acuminate, from a wide-triangular or rhomboid base, each 3-flowered, with two 2–3-partite basal glands; bracts and flowers pale yellow. Male calyx irregularly 2–3-lobed. Stamens 2–3, exserted. Ovary oblong. Capsule brown, slightly 3-sulcate, $\frac{1}{3}$–$\frac{2}{5}$ in. across. Seeds black, subglobose, smooth, $\frac{1}{4}$–$\frac{1}{3}$ in. long, caruncle under one-fourth the size of the body of the seed.—Hiern in Cat. Afr. Pl. Welw. i. 985 (as to fruit of Welwitsch 401 only and exclud. Welwitsch 401*b*); De Wild. Miss. É. Laurent, 141, and Études Fl. Bas- et Moyen-Congo, ii. 289 partly (Kitobola and Madibi specimens only); Th. & Hél. Durand, Syll. Fl.Congol. 499, in small part only; S. Moore in Journ. Linn. Soc. xl. 204; De Wild. Comp. Kasai, 342. *M. obtusa*, Pax in Engl. Jahrb. xix. 116 and in Engl. Pfl. Ost-Afr. C. 241. *M. vaccinioides*, Pax in Engl. Jahrb. xix. 116. *M. africana*, var. *obtusa*, Pax ex Durand & De Wild. in Bull. Soc. Bot. Belg. xxxvii. 107, partly (as to Dewèvre 346 only); Th. & Hél. Durand, Syll. Fl. Congol. 500, partly (as to Dewèvre 346 only). *M. africana*, var. *benguelensis*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 180. *Excœcaria magenjensis*, Sim, For. Fl. Port. E. Afr. 104, t. 100 A.

Lower Guinea. French Congo: Bateke country, *Thollon*, 411! Lower Congo: Mayumbe; near Zobe, *Dewèvre*, 346 (*obtusa*)! Cataracts district; Kitobola, *Pynaert*, 30! *Flamigni*, 278! Stanley Pool district; near Leopoldville, *Laurent! Claessen*, 82! *Allard*, 13! Kisantu, *Vanderyst! Gillet*, 849! Inkisi Valley, *Vanderyst* (also with *obtusa*)! Kwango district, Madibi, *Sapin!* Kimpaka, *Sapin* (*obtusa*)! Angola: Benguela; Kahungula, *Buchner*, 505! Malange, *Marques*, 46! Pungo Andongo, *Gossweiler*. 959! 963! Ganguella, *Gossweiler!* Incangula, *Gossweiler*, 1907 (*vaccinioides*)! Cuanaval River, *Gossweiler*, 3039! Huilla, 5800–6000 ft., *Antunes & Dekindt*, 782! *Antunes*, 3127! Bumbo, *Welwitsch*, 401 (as to fruit only)! Lunda; Kimbundo, *Pogge*, 123 (*vaccinioides*)!

South Central. Belgian Congo: Kasai; Illongonga, *Sapin !*

Mozamb. Distr. German East Africa: Muanza; Salanda, *Fischer*, 528 (*obtusa*)! shores of Lake Victoria Nyanza, *Holtz*, 1624 (*obtusa*)! Portuguese East Africa; near Beira, in open woods, *Swynnerton*, 1503! 1734! Maganja, *Sim*. Rhodesia: Batoka country, 3000 ft., *Kirk* (*vaccinioides*)!

Also in South-East Africa.

Var. *cinnamomea*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 179. Bark bright reddish-brown. Leaves oblong or ovate-oblong, narrowed to a blunt apex. Bract-glands usually 2-partite, sometimes simple. Flowers pale rose, basal females sometimes subsessile. Seeds not seen.

North Central. Adamawa: Alhadjin Galibu, 1650 ft., *Ledermann*, 3721!

Var. *orientalis*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 179. Bark grey. Leaves ovate, obtuse or narrowed to a blunt apex. Bract-glands simple, cylindric. Flowers pale yellow. Seeds black.

Mozamb. Distr. Zanzibar: on dry hillsides, *Sacleux*, 1712! German East Africa: Usaramo; Kangani, *Stuhlmann*, 6597! Dar-es-Salaam, *Busse*, 24! 3147! *Engler*, 2140! 3226! 3243! *Holtz*, 28! Lukimwa River, *Busse*, 972! Rondo plateau, *Busse*, 2569! Kamba-Yamate, *Holtz*, 1019! and without precise locality, *Böhm!*

Var. *leucosperma*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 179. Bark grey. Leaves oblong or ovate-oblong, narrowed to a blunt apex. Bract-glands simple. Flowers pale-yellow. Seeds pale greenish-yellow.

Upper Guinea. Cameroons: Labare, 3600 ft., *Ledermann*, 2258! Bakari, 3400 ft., *Ledermann*, 2288!

North Central. Darbauda: Senoussi country; Kaga Toulou, 1800 ft., *Chevalier*, 7393!

M. africana, Müll. Arg., is a species the characters of which have always been obscure. It was based in the first instance upon specimens collected in Angola by Welwitsch, and issued as n. 401 and 401B. The plant referred to 401B is, however, *Spirostachys africana*, Sond., and not a *Maprounea* at all; under 401 has been issued a mixture of flowering specimens of *Spirostachys africana*, Sond., with fruiting specimens of the particular *Maprounea* distinguished by Pax & Hoffmann as *M. africana*, var. *benguelensis*. It is owing to this circumstance that Müller has described the spikes of *M. africana* as lateral, sessile and, when young, cylindric. Those statements, accurate as regards the *Spirostachys* from which Müller's description was taken, are not applicable to the flowering spikes of *M. africana*, which are always terminal on specialised branchlets and when young are shorter as compared with their diameter than they are at later stages. We have failed to find a good character whereby to distinguish var. *obtusa*, Pax, from typical *M. africana*, and we maintain var. *orientalis*, Pax & K. Hoffm., on the authority of its authors with a feeling that the communication of fuller material may render its recognition unnecessary. On the other hand, it is not impossible that var. *leucosperma*, Pax & K. Hoffm., may ultimately prove, as *M. gracilis* has proved, to deserve separate recognition; while var. *cinnamomea*, Pax & K. Hoffm., may also, when more fully known, call for separate treatment.

80. **SPIROSTACHYS**, Sond. in Linnæa, xxiii. 106.

Flowers monœcious or occasionally polygamous, apetalous. Disk 0. Male: Calyx small, deeply 4–5-lobed; lobes slightly imbricate. Stamens 3, far exserted; filaments connate in a narrow slender tube; anthers free, extrorse, dehiscence longitudinal. Rudimentary ovary 0. Female: Calyx deeply 3–5-lobed. Ovary 3-celled, less often 2-celled;

ovules in each cell solitary; styles 2–3, shortly connate below, free above, entire. Capsule 3-dymous, occasionally 2-dymous, breaking up explosively into two or three 2-valved cocci. Seeds wide-ovoid, without a caruncle; albumen fleshy; cotyledons broad, flat.—A tree, everywhere glabrous; wood hard, durable, odoriferous. Leaves 2-glandular at the apex of the petiole, alternate, crenulate, firm; stipules minute, deciduous. Flowers in normally 2-sexual cylindric sessile lateral catkin-like spikes, which precede the leaves; bracts imbricate, eglandular, each subtending a solitary flower; males numerous; females 1–3 at the base of the catkin or occasionally absent; at times only 1-sexual male catkins found on an individual tree, usually both male and androgynous catkins present, sometimes all the catkins androgynous.—*Stillingia*, Baill. Étude Gén. Euphorb. 522, in small part; Harv. Gen. S. Afr. Pl. ed. ii. 340, mainly: not of Gard. *Excœcaria*, Müll. Arg. in Linnæa, xxxii. 122, and in DC. Prodr. xv. ii. 1213; Benth. in Benth. & Hook. f. Gen. Pl. iii. 337, all in small part: not of Linn. *Excœcariopsis*, Pax in Engl. Jahrb. xlv. 239. *Spirostachys*, sect. *Eglandulosæ*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 155.

A single species, widely spread in Tropical and South-east Africa.

A very marked genus, readily distinguished by its united filaments. The section *Glanduligeræ*, recognised by Pax & K. Hoffmann, is, we believe, better left in *Excœcaria*. In our generic key, p. 448, the male calyx-lobes have inadvertently been stated to be valvate; they are however, distinctly, if slightly, imbricate as in the allied genus *Maprounea*.

1. **S. africana,** *Sond. in Linnæa*, xxiii. 106. A tree from 20–70 ft. high, all parts glabrous. Leaves short-petioled, firmly membranous or subcoriaceous, ovate-oblong, narrowed to a short blunt or subemarginate tip, base rounded, margin crenulate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, somewhat polished above, paler beneath, obscurely penninerved; petiole $\frac{1}{3}$ in. long, 2-glandular at the top; stipules very small. Inflorescences catkin-like, lateral, sessile, appearing before the leaves, very dense, cylindric, $\frac{1}{3}$–$\frac{3}{4}$ in. long; bracts closely imbricate, eglandular, spirally arranged, each subtending a single flower and concealing the calyx; flowers many, sessile males above, 1–3 basal shortly pedicelled female, their pedicels elongating in fruit. Capsule subglobose, $\frac{2}{5}$ in. across; cocci 2-valved, valves thinly woody, opening explosively; pedicels in fruit $\frac{1}{3}$ in. long. Seeds wide-ovoid, $\frac{1}{4}$ in. long. —Walp. Ann. iii. 360; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 155. *S. synandra*, Pax, l.c. *Stillingia africana*, Baill. Étude Gén. Euphorb. 522 and in Adansonia, iii. 163. *Excœcaria africana*, Müll. Arg. in Linnæa, xxxii. 123, and in DC. Prodr. xv. ii. 1215; Sim, For. Fl. Cape Col. 319, t. 144, fig. 2, and For. Fl. Port. E. Afr. 104, t. 100 B. *E. Agallocha*, Benth. in Benth. & Hook. f. Gen. Pl. iii. 337, partly; not of Linn. *E. synandra*, Pax in Engl. Jahrb. xliii. 223. *Maprounea africana*, Müll. Arg. in DC. Prodr. xv. ii. 1191, mainly; Hiern in Cat. Afr. Pl. Welw. i. 985, mainly. *Sapium africanum*, O. Kuntze, Rev. Gen. Pl. iii. ii. 293. *Excœcariopsis Dinteri*, Pax in Engl. Jahrb. xlv. 239. *E. synandra*, Pax, l.c.

Lower Guinea. Angola: Bumbo, *Welwitsch*, 401 (fl. specimens)! 401B (wholly)! German South-west Africa; Amboland; various localities, *Rautanen*, 210! 217! 345! *Schinz*, 730! Hereroland: Neitsas, *Dinter*, 677! *Nels*, 88!

Mozamb. Distr. German East Africa: Wilhelmstal; Kwai, 6000 ft., *Albers*, 340! Tanga; Luengertal near Amani, *Braun*, 1604! descent to the Luengertal, 2700–3400 ft., *Engler*, 888A! Bagamoyo; Usaugaui, *Holtz*, 1129! Mandéra, *Sacleux*, 1316! Mhomla, *Sacleux*, 1840! Morogoro; Uluguru, *Holtz*, 1735! Dar-es-Salaam; between Bama and Massamgauia, *Holst*, 996! Kisserawe, *Holst*, 1019! between Msenga and Mafisi, *Busse*, iii.! Portuguese East Africa: Lower Zambesi; Tete, *Kirk*, 9! Sena, *Johnson*, 290! Goruro, *Dawe*, 520! Maganja, *Sim*; Gazaland, *Sim*.

Also in South Africa.

Timber hard, durable, dark brown, with the odour of cedar (*Kirk*, *Holtz*) or sandal-wood (*Johnson*). In Sacleux's specimens from Mandéra the staminal tube is as long as it is in the South African specimens.

81. SEBASTIANIA, Spreng.: Benth. et Hook. f. Gen. Pl. iii. 336.

Flowers monœcious, very rarely dicœcious, apetalous. Disk 0. Male: Calyx minute, open in bud, membranous, usually 3- (occasionally 4–5-) lobed, lobes often unequal. Stamens 2–3, rarely 4; filaments short, free or connate at the base; anther-cells parallel, dehiscing longitudinally. Rudimentary ovary 0. Female: Calyx very deeply 3-lobed, usually larger than in the male but shorter than the ovary. Ovary 3- (or occasionally 2-) celled; ovules in each cell solitary; styles 3 or occasionally 2, revolute or spreading, entire, free or nearly so, rarely distinctly connate at the base. Capsule 3-dymous or subglobose, breaking up into 3 (rarely 2) 2-valved smooth or dorsally armed cocci. Seed oblong, subglobose or cylindric, carunculate; testa smooth; albumen fleshy; cotyledons broad, flat.—Herbs, shrubs or trees, sometimes armed with spines. Leaves alternate, rarely opposite, shortly petioled, penninerved; stipules very small. Spikes usually slender, rarely stoutish, simple, rarely branched, solitary or fascicled, terminal or leaf-opposed, very rarely axillary; bracts glandular. Flowers small; males solitary or several to a bract, sessile or subsessile, often the spikes 1-sexual male; females 1–3 at the base of the male spikes or occasionally few in 1-sexual female spikes.

Species about 75, all American save the two here described and another, which is confined to the Malay Archipelago.

Shrub; leaves ovate; spikes branched; ovary smooth	.	1. *S. inopinata.*
Herb; leaves linear-lanceolate; spikes simple; ovary aculeolate	. . . . .	2. *S. Chamælea.*

1. **S. inopinata,** *Prain in Kew Bulletin*, 1910, 128. Shrub 8–12 ft. high, all parts glabrous; branches slender, cylindric, unarmed. Leaves shortly petioled, firmly papery, ovate or elliptic-ovate, caudate-acuminate, base rounded, margin entire, $2\frac{1}{4}$–5 in. long, $1\frac{1}{4}$–2 in. wide, main-nerves 6–8 on each side, base eglandular, somewhat polished above, paler beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long. Spikes slender, axillary, fascicled, sparingly branched, $\frac{2}{3}$–$\frac{3}{4}$ in. long, females mixed with the males; male bracts ovate, eglandular, 3–5-flowered. Male: Sepals

almost free, suborbicular, obtuse, their margin undulate. Stamens 3, casually 2 or 4. Female: Sepals 3, ovate, acute, denticulate, eglandular. Ovary smooth; styles united below in a column $\frac{1}{5}$ in. long. Fruit not seen.—Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 120, fig. 23. *S. multiramea*, var. *luschnathiana*, Müll. Arg. in DC. Prodr. xv. ii. 1177, partly and as to African plant only.

Upper Guinea. Cameroons: on the Cameroon River, *Mann*, 755! 2225! Bipinde, *Zenker*, 3225! and without precise locality, *Mildbraed*, 3626.

A distinct species; though very nearly related to the Brazilian plant with which Müller has identified it, readily distinguished therefrom by its differently shaped leaves and its eglandular bracts.

2. **S. Chamælea,** Mull. Arg. in DC. Prodr. xv. ii. 1175. Herb, annual or perennial; stems slender, glabrous, tufted, 6 in. to 2 ft. high. Leaves subsessile or very shortly petioled, membranous, linear-lanceolate, obtuse or sub-obtuse, somewhat narrowed to the base, finely sharply denticulate, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{6}$–$\frac{1}{3}$ in. wide, base eglandular, pubescent or puberulous beneath; petiole $\frac{1}{12}$–$\frac{1}{8}$ in. long; stipules small, ovate, acute, ciliate. Spikes terminal or leaf-opposed, slender, spirally floriferous, male portion $\frac{1}{3}$–$\frac{3}{4}$ in. long, with 1 or more female flowers at the base of the spike or below the spike; male bracts 1–2-flowered, triangular, acute, glandular on each side at the base; female bracts lanceolate, denticulate, with a large cylindric basal gland as long as the bract at each side. Male: Sepals ovate, acute, denticulate. Stamens 3. Female: Sepals ovate, acuminate, lacerate, with a simple or lobed gland at each side on the inner face. Ovary glabrous, aculeolate. Capsule 3-coccous, or casually 2-coccous, $\frac{1}{6}$–$\frac{1}{4}$ in. long; cocci 2-seriately many-aculeolate on the back. Seeds ellipsoid-oblong, $\frac{1}{10}$–$\frac{1}{6}$ in. long, smooth, blackish or grey.—Benth. & F. Müll. Fl. Austr. vi. 151; Hook. f. Fl. Brit. Ind. v. 475; Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 116. *S. Chamælea*, var. *chariensis*, Beille in Bull. Soc. Bot. France, lvii. Mém. viii. 128; var. *africana*, Pax & K. Hoffm. l.c. 117. *Tragia Chamælea*, Linn. Sp. Pl. ed. i. 981. *Microstachys Chamælea*, Juss. Tent. Gen. Euphorb. 49; Müll. Arg. in Linnæa, xxxii. 95. *M. supina*, Klotzsch ex Pax & K. Hoffm. l.c. 116. *Cnemidostachys Chamælea*, Spreng. Syst. iii. 835. *C. linearifolia*, Miq. Fl. Ind. Bat. Suppl. i. 460. *Elachocroton asperococcum*, F. Müll. in Hook. Journ. Bot. ix. (1857) 17. *Stillingia Chamælea* Baill. Étude Gén. Euphorb. 516. *S. asperococca*, Baill. ex Müll. Arg. in DC. Prodr. xv. ii. 1161, 1175. *Excœcaria Chamælea*, Baill. Adansonia, vi. 323.

Upper Guinea. Togo: Agome, *Schlechter*, 12965! Lome, *Warnecke*, 186! Dahomey: Cotonou, *Poisson*, 131! Southern Nigeria: Lagos, *Dawodu*, 287! Atta (Idda), *Vogel*, 57! Stirling Hill, *Vogel! Ansell!* Northern Nigeria: Nupe, *Barter*, 1492! Lokoja, *Parsons*, 7! Zungeru, *Dalziel*, 72! Yola, *Dalziel*, 160! Cameroons, 1000–1800 ft.: Sagche, *Ledermann*, 3737! Duma, *Ledermann*, 4341! Lagdo, *Ledermann*, 4410! Garur, *Ledermann*, 4637! Shamba, *Ledermann*, 5241!

North Central. Bagirmi: Souka, *Chevalier*, 9055! Kolkile, *Chevalier*, 9775!

Also widely spread throughout South-eastern Asia to Northern Australia.

The African specimens, which are very uniform, have rather larger leaves, capsules and seeds than the Asiatic and Australian plant, and on this account have been treated as belonging to a distinct variety both by Beille and, at a later date, by Pax and Hoffmann. Except as regards size, however, the African plant does not in any way differ from the Asiatic one and some of the Indian specimens are as large as many of the African ones.

82. **SAPIUM**, P. Br.: Benth. et Hook. f. Gen. Pl. iii. 334.

Flowers monœcious, rarely diœcious, apetalous. Disk 0. Male: Calyx small, membranous, usually 3-lobed; lobes valvate, subvalvate or open. Stamens 2–3; filaments free; anthers longitudinally dehiscent. Rudimentary ovary 0. Female: Calyx 2–3-fid or partite, rarely subtubular, shortly 3-toothed. Ovary 3- (rarely 2-) celled and didymous; ovules in each cell solitary; styles 3, rarely 2, free or slightly connate below, entire. Capsule globose, pyriform or 2–3-coccous, woody or fleshy, breaking up into 2-valved cocci or separating into indehiscent cocci or quite indehiscent. Seeds globose or narrow-oblong, usually without a caruncle (except in 2, *S. Bussei*), but often with a pulpy outer coat; albumen fleshy; cotyledons broad, flat.—Trees or shrubs, rarely undershrubs, everywhere glabrous. Leaves petioled, alternate, rarely apparently opposite, penninerved, often with glandular margins; petiole usually 2-glandular at the apex; stipules usually small. Spikes terminal, androgynous, with usually many male flowers above and a few basal female; bracts small but wide, males usually several- (rarely 1-) flowered, usually 2-glandular at the base.

Species about 100, widely spread in the Tropics of both hemispheres.

Male flowers solitary to each bract; leaf-base shortly decurrent on the petiole; ovary 3-celled, not horned; valves of the cocci thin, crustaceous.
- Leaves opposite; buds enveloped by the stipules, not perulate . . . . . 1. *S. madagascariense.*
- Leaves alternate; buds perulate.
  - Capsule 2 in. wide; seeds carunculate . . 2. *S. Bussei.*
  - Capsule under 1 in. wide; seeds ecarunculate.
    - Leaves glandular at the base, their margin herbaceous.
      - Leaves membranous . . . . 3. *S. guineense.*
      - Leaves coriaceous . . . . . 4. *S. Grahami.*
    - Leaves not glandular at the base, their margin cartilaginous and minutely spinulose . . . . . 5. *S. faradianense.*

Male flowers several to each bract; leaf-base minutely auriculate-cordate but not decurrent on the petiole.
- Ovary 3-celled; valves of the cocci with a thick woody endocarp.
  - Valves of the cocci with a projecting dorsal wing or horn.
    - Epicarp coriaceous, thick, separating spontaneously from the woody endocarp . 6. *S. armatum.*

Epicarp chartaceous, thin, not separating from the woody endocarp.	
Bracts denticulate but not 3-lobed . .	7. *S. cornutum.*
Bracts distinctly 3-lobed	8. *S. oblongifolium.*
Valves of the cocci smooth, not horned; epicarp chartaceous, thin, not separating from the woody endocarp.	9. *S. triloculare.*
Ovary 2-celled, smooth; valves of the cocci with a thin endocarp and a thick coriaceous epicarp not separating; fruit subindehiscent . .	10. *S. mannianum.*

1 **S. madagascariense,** *Prain.* A shrub or small tree, 15–20 ft. high, everywhere glabrous; branches slender; twigs not perulate. Leaves shortly petioled, opposite, firmly papery to thinly coriaceous, ovate-lanceolate to ovate-oblong, gradually narrowed to an obtuse or subacute or slightly retuse mucronulate apex, base cuneate, decurrent on the petiole, margin entire, 4–5 in. long, 1–2 in. wide; petiole $\frac{1}{4}$ in. long or less, stout, channelled above, eglandular; stipules orbicular, mucronulate, fimbriately lacinulate, caducous: young foliage very bright red; lateral nerves very many, up to 20 on each side, very slender, subhorizontal, parallel. Spikes terminal and in the upper axils, 1–1$\frac{1}{2}$ in. long, slender, with a peduncle about $\frac{1}{8}$ in. long, with many rather dense sessile male flowers above and usually 1–2 subsessile basal females, but occasionally the spikes are male only; bracts in both sexes 1-flowered, widely and shortly oblong, denticulate, 2-glandular at the base. Male: Calyx deeply 3-partite; lobes lanceolate, acute. Stamens 3, exserted. Female: Calyx deeply 3-sect; lobes ovate, acute or obtuse, denticulate. Ovary glabrous, not horned; styles 3, shortly connate at the base. Capsule thinly crustaceous, $\frac{1}{3}$ in. across, breaking up into three 2-valved cocci. Seeds globose, brown, faintly blotched.—*Stillingia madagascariensis*, Baill. Étude Gén. Euphorb. 522 and in Adansonia, ii. 30. *Spirostachys madagascariensis*, Baill. Étude Gén. Euphorb. Atl. 17, t. 8, fig. 19, 21. *Excœcaria madagascariensis*, Müll. Arg. in DC. Prodr. xv. ii. 1219; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 160. *E. sylvestris*, S. Moore in Journ. Linn. Soc. xl. 204.

Nile Land. British East Africa: Tana Province; on the Tana River, 3000 ft., *Battiscombe*, 245!

Mozamb. Distr. German East Africa: Bagamoyo; Mandera, *Alexandre in Herb. Sacleux*, 1836! Rhodesia: Gazaland; Chirinda forest, 3700–4000 ft., *Swynnerton*, 72!

Also in Madagascar.

A very distinct species, the Eastern representative of *S. guineense*, O. Kuntze, from which it is readily distinguished by its almost uniformly opposite leaves with more numerous, more slender and more parallel secondary nerves, by the absence of glands from the petiole or the leaf-base, and by the buds being enveloped in the stipules, without special bud-scales. This is very distinct from *S. madagascariense*, Pax (*Conosapium madagascariense*, Müll. Arg. in Linnæa, xxxii. 87.)

2. **S. Bussei,** *Pax in Engl. Jahrb.* xxxiii. 284. A shrub or small tree 12–16 ft. high, everywhere glabrous; twigs rather stout, perulate at

the base; scales large, coriaceous, ovate-lanceolate, acute, pink, deciduous. Leaves short-petioled, firmly papery, elliptic or rhomboid-oblong, very shortly and bluntly acuminate, base cuneate, decurrent on the petiole, margin rather irregularly crenulate, 4½–5 in. long, 2¼–2¾ in. wide; petiole ¼–⅔ in. long, stout, channelled above, eglandular; stipules minute, ovate-acute, deciduous. Spikes terminal and in the uppermost axils, 2–2½ in. long, rather stout, with a peduncle under ¼ in. long, with rather lax male flowers above and 1–2 subsessile basal female flowers, bracts in both sexes 1-flowered, males rounded, shortly apiculate, denticulate, with a large oblong basal gland at each side, females oblong, acuminate, 2-glandular at the base. Male: Calyx deeply 3-partite; lobes ovate-lanceolate, inflexed at the tip. Stamens 3, exserted. Female: Calyx 3-sect; lobes wide-ovate, acute, denticulate. Ovary glabrous, not horned; styles 3, more or less connate at the base, Capsule thinly crustaceous, very large, 2 in. across, breaking up into three 2-valved cocci; fruiting pedicel very short. Seeds globose, brown, faintly blotched, with a caruncle which separates from the seed and remains adnate to the columella.—*Excœcaria Bussei*, Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 169. *E. sambesiaca*, Pax & K. Hoffm. l.c. 170.

Mozamb. Distr. German East Africa: Ugogo; Mpapwa, *Busse*, 96! *Holtz*, 1324! Irangi; Kondoa-Irangi, *Sauer*, 1974! Portuguese East Africa: Lower Zambesi; Boruma, *Menyharth*, 746!

A very distinct species. Menyharth's specimens from Boruma only differ from those in German East Africa in having the styles somewhat more distinctly connate at the base, and in having a slightly narrower ovary.

3. **S. guineense,** *O. Kuntze*, *Rev. Gen. Pl.* iii. ii. 293. A small shrub, usually 2–5 ft., rarely 10 ft. high, everywhere glabrous; branches slender; twigs perulate at the base, scales ovate-lanceolate, acuminate, pink. Leaves shortly petioled, thinly to firmly membranous, oblong-ovate or obovate-oblong, shortly to distinctly caudate-acuminate, base cuneate or occasionally almost rounded, decurrent on the petiole, margin entire or sparingly and shortly toothed in the upper half, 2–9 in. long, 1¾–3 in. wide; petiole ⅓–¾ in. long, stout, channelled above, with usually 1–2 glands on each side at or above the junction with the lamina; stipules fimbriately laciniate, caducous. Spikes terminal and sometimes also in the upper axils, 1–2½ in. long, slender, with a peduncle under ¼ in. long, with many rather lax sessile male flowers above and 1–2 subsessile basal female flowers; bracts in both sexes 1-flowered, ovate, acute, denticulate, 2-glandular at the base. Male: Calyx deeply 3-partite; lobes ovate, acuminate, denticulate. Stamens 3, exserted. Female: Calyx 3-sect, triangular, acute, denticulate. Ovary glabrous, not horned; styles 3, connate at the base. Capsule thinly crustaceous, ⅓ in. wide, breaking up into three 2-valved cocci; fruiting pedicel $\frac{1}{10}$ in. long. Seeds globose, yellow and brown.—*Stillingia guineensis*, Benth. in Hook. Niger Fl. 501; Walp. Ann. iii. 362. *Excœcaria guineensis*, Müll. Arg. in Linnæa, xxxii. 123, and in DC. Prodr. xv. ii. 1215; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 164. *E. guineensis*, var. *cavalliensis*, and var.

comoensis, Beille in Bull. Soc. Bot. France, lvii. Mém. viii. 129. *E. angustifolia*, Afzel. ex Pax, l.c. *Sapium mannianum*, De Wild. Études Fl. Bas- et Moyen-Congo, ii. 288, partly (Lukolela and Djuma Valley specimens only); Th. & Hél. Durand, Syll. Fl. Congol. 500, partly; not of Benth.

Upper Guinea. Sierra Leone: Freetown and elsewhere, *Afzelius! Smeathman! Don! Morson! Scott-Elliot*, 5906! Liberia: Monrovia, *Dinklage*, 2418! Ivory Coast: Grabo; Mount Toni, 650 ft., *Chevalier*, 16979! Mount Cope, 800 ft., *Chevalier*, 19701! Lower Comoe; Bettie, *Chevalier*, 17577! Southern Nigeria: Oban, *Talbot*, 666! Cameroons: Johann Albrechtshöhe, *Buesgen*, 108! *Staudt*, 609! between Bajila and Mundame, *Winkler*, 999! Batanga, *Dinklage*, 797! Bipinde, 350 ft. *Zenker*, 1165!

Lower Guinea. Princes Island: *Mann!* Lower Congo: Stanley Pool district; Lukolela, *Laurent! Kriekels!* Kwango district; Dyuma Valley, *Gentil!*

4. **S. Grahami,** *Prain.* A small shrub; rootstock deeply buried, creeping and giving off erect underground shoots 1½ ft. high at intervals of 8–10 in., everywhere glabrous; stems herbaceous or subherbaceous, several from the crown of each erect subterranean shoot, simple, 6–15 in. high, perulate at and above the base; scales coriaceous, oblong, obtuse. Leaves subsessile, coriaceous, oblong or oblong-lanceolate, obtuse or subacute, base rounded or wide-cuneate, decurent on the petiole, margin minutely toothed, 1½–5 in. long, 1–2 in. wide; petiole 1 lin. long or less, with a gland on each side at its junction with the lamina; stipules fimbriately laciniate, caducous. Spikes terminal, ½–2 in. long, slender, with a peduncle under ¼ in. long, with many rather dense sessile spirally arranged male flowers above and 1–2 subsessile basal female flowers; bracts in both sexes 1-flowered, ovate, obtuse, entire, 2-glandular at the base. Male: Calyx deeply 3-partite; lobes elliptic, inflexed at the tip. Stamens 3, exserted. Female: Calyx 3-sect; lobes orbicular-ovate, obtuse, entire or subentire. Ovary glabrous, not horned; styles 3, free almost to the base. Capsule thinly crustaceous, ⅔ in. wide, breaking up explosively into three 2-valved cocci; fruiting pedicel $\frac{1}{10}$ in. long. Seeds globose, yellow and brown.—*Excœcaria Grahami*, Stapf in Kew Bulletin, 1906, 81; Pax in Engl. Pflanzenr. Euphorb.-Hippoman, 164. *E. guineensis*, Beille in Herb. Chevalier; not of Müll. Arg.

Upper Guinea. Ivory Coast: Penue, *Chevalier*, 823! Gold Coast: Northern Territory at Gambaga, *Graham!* and without precise locality, *Evans*, 8! Togo: Gabotawe, 1000 ft., *Kersting*, 276! Basari, *Kersting*, 605!

5. **S. faradianense,** *Pax in Engl. Pflanzenr. Euphorb.-Hippoman.* 247. A small undershrub, everywhere glabrous; rootstock slender, erect; stems several from the crown of the rootstock, slender, woody, sparingly branched; twigs perulate at and above the base; scales very small, membranous, triangular, caducous. Leaves very shortly petioled or subsessile, firmly membranous, ovate, obtuse, base rounded or shortly wide-cuneate, decurrent on the petiole, margin hyaline and minutely denticulate with cartilaginous teeth, 1–1¼ in. long, ½–⅔ in. wide, rather pale green, nerves obscure; petiole ⅛ in. long or less, eglandular; stipules linear from a triangular base, very small. Spikes terminal on

the twigs, $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, with many rather dense male flowers above and 1–2 basal female flowers, in both sexes very shortly pedicelled and solitary to their bracts; bracts 3-lobed, central lobe lanceolate, acute, twice as long as the two lateral suborbicular glandular lobes. Male: Calyx deeply 3-sect; lobes triangular, denticulate. Stamens 3, hardly exserted. Female: Calyx 3-partite; lobes suborbicular, denticulate, eglandular. Ovary glabrous, not horned; styles 3, almost free. Capsule not seen ripe; its valves thinly crustaceous. Seeds narrow-ovoid, smooth, yellow.—*Excœcaria faradianensis*, Beille in Bull. Soc. Bot. France, lvii. Mém. viii. 128.

Upper Guinea. French Guinea: Faradiana, *Chevalier*, **610**! between Karokaro and Niana, *Chevalier*, **2611**!

A very distinct species, readily recognised by its hyaline and denticulate leaf-margins. Beille describes the cocci of the unripe capsule as appendaged on the back. There is, however, no trace of appendages on the ovary itself in the flowers examined by us and the appearance described, which is also met with in young capsules of *S. Grahami*, is perhaps the result of irregular shrinking of the thin capsule-walls in drying. The species is most nearly allied to *S. Grahami*.

6. **S. armatum,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman.* 244, *fig.* 46 *E*. A shrub or small tree, reaching 15–16 ft. in height, everywhere glabrous; twigs slender, perulate at the base; scales oblong, obtuse. Leaves short-petioled, papery or thinly coriaceous, ovate or oblong-ovate, more or less cuspidately acuminate, base rounded, minutely auriculate-cordate but not glandular at the point of junction with the petiole, margin minutely crenate, 4–5 in. long, $1\frac{3}{4}$–$2\frac{1}{4}$ in. wide, dark green above, paler beneath; lateral nerves 9–10 on each side; petiole slender, $\frac{1}{4}$–$\frac{1}{3}$ in. long, slightly channelled above; stipules very caducous, not seen. Spikes terminal on the twigs, male portion not seen, with usually 2 distinctly pedicelled basal female flowers; female bracts ovate, $\frac{1}{8}$ in. long, eglandular, with ciliately laciniate margins, each 1-flowered; pedicels in fruit $\frac{1}{2}$–$\frac{2}{3}$ in. long. Female: Calyx deeply 3-sect; lobes wide-ovate, acute, denticulate, with a small or large gland at each sinus. Ovary glabrous, with 2 short triangular horns on the back of each carpel; styles 3, shortly connate at the base. Capsule deeply 3-dymous, when fully ripe $\frac{2}{3}$ in. across, with a coriaceous separable somewhat reticulately wrinkled epicarp and a very thick woody endocarp, breaking up into three 2-valved cocci, each coccus with a short triangular coriaceous acute appendage $\frac{1}{8}$ in. long. Seeds rather wide-ovoid, grey or yellowish with minute scattered brown specks.

Mozamb. Distr. German East Africa: Lindi; Mayanga, *Busse*, **2541**! Rondo; Lutamba Lake, *Braun*, **1159**! Pugu, *Holtz*, **1069**!

7. **S. cornutum,** *Pax in Engl. Jahrb.* xix. 114. A shrub or small tree, 4–15 ft. high, glabrous everywhere; twigs slender, perulate at the base, scales wide-oblong, obtuse. Leaves short-petioled, at first membranous, soon chartaceous, when fully mature coriaceous, ovate or oblong, shortly to distinctly cuspidately acuminate, base subcordate or rounded or shortly wide cuneate, minutely auriculate-cordate but

not glandular at the point of junction with the petiole, margin entire or obscurely to distinctly crenately toothed, 4–6 in. long, 1¾–2 in. wide, medium to dark-green above, paler beneath; lateral nerves 11–12 on each side, secondary reticulation distinct; petiole stout, ⅙–¼ in. long, channelled above; stipules lanceolate, acuminate, ⅛ in. long, very taducous. Spikes terminal on the twigs, 1–4 in. long, appearing after the leaves, with many rather lax shortly pedicelled male flowers above and usually a solitary distinctly pedicelled basal female flower, occasionally female flowers 2, or 0; male bracts short, wide, subtruncate, denticulate, 2-glandular at the base, each 3–5-flowered; female bracts lanceolate, deciduous, 1-flowered; male pedicels distinctly articulate, slightly exceeding the bracts; female pedicel ⅓ in. long. Male: Calyx 3-partite; lobes triangular, obtuse. Stamens 3, shortly exserted. Female: Calyx deeply 3-sect; lobes rhomboid, acute, with a gland at each sinus. Ovary glabrous, with 2 long lanceolate horns on the back of each carpel; styles 3, shortly connate at the base. Capsule deeply 3-dymous, when fully ripe ¾ in. across, with a thin smooth or reticulately wrinkled epicarp and a very thick woody endocarp, breaking up rather tardily into three 2-valved cocci, each coccus with a narrow acute appendage about ¼ in. long. Seeds rather wide-ovoid, smooth, brown or mottled.—Durand & Schinz, Études Fl. Congo, 247; Th. & Hél. Durand, Syll. Fl. Congol, 500; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 246, fig. 46 A. *S. cornutum*, var. *coriaceum*, Pax in Engl. Jahrb. xix. 115; Durand & Schinz, Études Fl. Congo 247; Th. & Hél. Durand, Syll. Fl. Congol. 500. *S. Poggei*, Pax in Engl. Jahrb. xix. 115; Durand & Schinz, Études Fl. Congo, 247; Th. & Hél. Durand, Syll. Fl. Congol. 500. *S. xylocarpum*, Pax in Engl. Jahrb. xix. 115; Durand & Schinz, Études Fl. Congo 247; Th. & Hél. Durand, Syll. Fl. Congol. 500; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 246, fig. 46 B. *S. oblongifolium*, De Wild. & Durand, Contrib. Fl. Congo. i. 52 and ii. 57, and Rel. Dewevr 213; De Wild. Miss. É. Laurent, 141 and in Études Fl. Bas- et Moyen-Congo, i. 279, and ii. 288; Th. & Hél. Durand, Syll. Fl. Congol. 500 (excl. syn. Müll. Arg. and Hiern); De Wild. Comp. Kasai, 342; not of Pax. *S. mannianum*, Pax ex Durand and De Wild. in Bull. Soc. Bot. Belg. xxxvii. 107, wholly; De Wild. & Durand, Contrib. Fl. Congo, ii. 57, wholly; De Wild. Miss. É. Laurent 141, partly (Ibali specimens only) and in Études Fl. Bas- et Moyen-Congo ii. 288, partly (Lubi specimens only); Th. & Hél. Durand, Syll. Fl. Congol. 500 (Sona-Gongo, Ibali, Lusambo and Lubi specimens only); De Wild. Comp. Kasai, 341; not of Benth. *S. cornutum*, var. *Poggei*, Pax, and *S. xylocarpum*, var. *lineolatum*, Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 246, 247.

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessmann*, 275! 334! French Congo: Nyanza Valley, *Vanderyst!* Brazzaville, *Brazza*, 181! 182! *Chevalier*, 11186! northward from Stanley Pool, *Dewèvre*, 711B! Lower Congo: Cataracts district; Sona-Gongo, *Luja*, 103! Stanley Pool district; near Stanley Pool, *Demeuse*, 201! *Schlechter*, 12540! Leopoldville, *Dewèvre*, 478! Galiema, *Pynaert*, 124! Kisantu, *Gillet*, 484! *Butaye!* Dembo, *Gillet*! *Vanderyst*, C 15!

Kimuenza, *Gillet*, 1653! Sanda, *Oddon*, 3581! Kwango district; Dyuma Valley, *Gentil*! Kimpaka, *Vanderyst!* Madibi, *Sapin!* and without precise localities, *Allard*, 333! *Jespersen!* Angola: Lunda, Malange, *Buchner*, 151! *Marques*, 205! *Gossweiler*, 968! 985! Chimbang, *Buchner*, 512!

South Central. Belgian Congo: Lake Leopold II. district; Ibali, *Laurent!* Kutu, *Laurent*! near Lake Leopold II., *Body!* Kasai; Lusambo, *Laurent!* Lukombi, *Sapin!* Lubi, *Sapin!* Bena-Makima, *Sapin!* Bienge, *Sapin*, C 26! Kaboko-Komba, *D'Obbilam*! Mukenge, *Pogge*, 1385! 1407! 1411! 1416!

Very nearly allied to and possibly not specifically distinct from *S. oblongifolium*, Pax. The ample material preserved in the Brussels herbarium shows that *S. cornutum* as originally described by Pax passes insensibly into the form distinguished as var. *coriaceum*, and that these in turn are identical both with *S. Poggei* and with *S. xylocarpum*, and its var. *lineolatum*, Pax, In Engler's Pflanzenreich, Euphorb.-Hippoman. figure 46A, inadvertently cited as the fruit of *a, genuinum* is in reality that of *γ, Poggei.* The fruit figured is immature; the full grown fruit is as described under *S. xylocarpum*, var. *lineolatum*, Pax, and as figured under fig. 46B, though as a rule the horns on the valves of the cocci are larger than in the fruit there figured.

8. **S. oblongifolium,** *Pax in Engl. Jahrb.* xix. 114, *in obs.* A small shrub, everywhere glabrous; rootstock rather slender, ascending or horizontal; stems several from the crown of the rootstock, slender, woody, simple or sparingly branched, perulate at and above the base; scales coriaceous, oblong, obtuse. Leaves shortly petioled, at first membranous, soon firmly papery, ovate or ovate-lanceolate or lanceolate, obtuse or subacute, base subcordate or rounded or shortly wide-cuneate, minutely auriculate-cordate but not glandular at the point of junction with the petiole, margin entire or obscurely toothed, $1\frac{3}{4}$–3 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. wide, medium to dark green above, paler beneath; lateral nerves 9–10 on each side, secondary reticulation distinct; petiole stout, $\frac{1}{6}$–$\frac{1}{3}$ in. long, channelled above; stipules linear-lanceolate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, deciduous. Spikes terminal on the twigs, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, appearing after the leaves, with many rather lax shortly pedicelled male flowers above and usually a solitary distinctly pedicelled basal female flower, occasionally female flowers 2 or 0; male bracts short, wide, somewhat distinctly 3-lobed, denticulate, 2-glandular at the base, each 3–5-flowered; female bracts 1-flowered, 3-lobed; male pedicels distinctly articulate, slightly exceeding the bracts; female pedicel $\frac{1}{3}$ in. long. Male: Calyx 3-partite; lobes triangular, denticulate, somewhat unequal. Stamens 3, shortly exserted. Female: Calyx deeply 3-sect; lobes denticulate, with either a gland or a small ligule at each sinus. Ovary glabrous, with 2 long lanceolate horns on the back of each carpel; styles 3, shortly connate at the base. Capsule deeply 3-dymous, when fully ripe $\frac{3}{4}$ in. across, with a thin smooth or reticulately wrinkled epicarp and a very thick woody endocarp, breaking up rather tardily into three 2-valved cocci, each coccus with a triangular winged appendage about $\frac{1}{6}$ in. long. Seeds rather wide-ovoid, smooth, dark brown.—Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 247. *S. suffruticosum*, Pax in Baum, Kunene-Samb. Exped. 284, and in Engl. Pflanzenr. Euphorb.-Hippoman. 247. *Excœcaria oblongifolia*, Müll. Arg. in Journ. Bot. 1864, 337, and in DC. Prodr. xv. ii. 1214; Hiern in Cat. Afr. Pl. Welw. i. 986.

Lower Guinea. Angola: Loanda; Pungo Andongo, *Welwitsch*, 375! Lunda; Malange, *Gossweiler*, 986! Benguela; Nambali, 5000 ft., *Baum*, 257! Bailundo, 1500 ft., *Wellman!*

A very distinct species. The male bracts are not as described by Müller, but are as described by Pax under *S. suffruticosum*.

9. **S. triloculare,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb-Hippoman.* 251, *fig.* 48 *F.* A tree, 18–25 ft. high, glabrous everywhere except on the margins of the stipules; twigs slender, perulate at the base, scales oblong, obtuse. Leaves short-petioled, membranous or thinly papery, oblong-ovate, more or less cuspidately acuminate, base cuneate or somewhat rounded, minutely auriculate-cordate, but not glandular, at the point of junction with the petiole, margins entire or obscurely crenulate-toothed, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, 1–$1\frac{1}{2}$ in. wide, dark green above, paler beneath; lateral nerves 7–8 on each side; petiole slender, $\frac{1}{6}$–$\frac{1}{3}$ in. long, slightly channelled above; stipules large, oblong-lanceolate, acute, $\frac{1}{5}$ in. long, with ciliate margins, otherwise glabrous, very caducous. Spikes terminal on the twigs, $2\frac{1}{4}$–3 in. long, appearing before the leaves which sometimes fail to develop, the scaly branch below the lateral leaf-bud at the base of the spike $\frac{1}{2}$–$\frac{3}{4}$ in. long, with many rather lax distinctly pedicelled male flowers above, and usually 2 distinctly pedicelled basal female flowers; male bracts small, suborbicular, acute or obtuse, denticulate, 2-glandular at the base, each 3–12-flowered; female bracts oblong-lanceolate, acute, $\frac{1}{8}$ in. long, eglandular, like the stipules but smaller and not or obscurely ciliate on the margin, each 1-flowered; pedicels in both sexes exceeding the bracts, males distinctly articulate, females twice as long as the males in flower. Male: Calyx cupular, 2–3-lobulate; lobes denticulate. Stamens 2, shortly exserted; Female: Calyx deeply 3-sect; lobes wide-triangular, acute, denticulate, with a large gland at each sinus. Ovary glabrous, not horned, 3-celled; styles 3, shortly connate at the base. Capsule with a thin leathery exocarp and a very thick woody endocarp, slightly 3-dymous, breaking up rather tardily into three 2-valved cocci, $\frac{1}{2}$ in. across; pedicel in fruit $\frac{1}{2}$ in. long. Seeds narrowly ovoid-cylindric, smooth, brown.

Mozamb. Distr. German East Africa: Useramo; Bunha, *Stuhlmann*, 7046! Morogoro: Pugu, *Holtz*, 1066! *Engler*, 3971!

A very distinct species, remarkable among its allies as having no horns on the cocci.

10. **S. mannianum,** *Benth. in Benth. et Hook. f. Gen. Pl.* iii. 335. A tree of very variable size, sometimes exceeding 100 ft. in height, glabrous everywhere except the finely puberulous inflorescence, and occasionally the scaly portion of the young twigs; branches drooping; twigs slender, perulate at the base, scales coriaceous, ovate or suborbicular, obtuse, caducous. Leaves short-petioled, firmly membranous to thinly coriaceous, oblong-ovate or -obovate to oblong-elliptic or elliptic-lanceolate, acute to shortly cuspidate, base cuneate to rounded, minutely auriculate-cordate and with usually 1–2 glands on each side above the junction with the lamina, margin more or less toothed, rarely subentire,

2½–6 in. long, ¾–2 in. wide, dark to pale green above, always paler beneath; lateral nerves 7–12 on each side; petiole slender, ⅙–⅓ in. long, slightly channelled above; stipules ovate-triangular, acute, usually soon deciduous. Spikes terminal, 2–4½ in. long, rather stout, sessile, with many rather dense shortly pedicelled male flowers above and 1–3 distinctly pedicelled basal female flowers; male bracts small, orbicular-ovate, obtuse, denticulate, 2-glandular at the base, each 3–7-flowered; female bracts ovate, acute, each 1-flowered; pedicels in both sexes exceeding the bracts, female in flower about twice as long as the male. Male: Calyx deeply and unequally 2–3-fid, puberulous like the bracts and pedicels; lobes obtuse. Stamens 2, occasionally 3, shortly exserted. Female: Calyx deeply 3-partite, sometimes with intercalary glandular lacinulæ. Ovary glabrous, not horned, 2- (rarely 3-) celled; styles 2, very rarely 3, connate in their lower third. Capsule coriaceous, hardly dehiscent, usually markedly 2-dymous, occasionally by abortion 1-coccous, ⅓ in. across; pedicel in fruit ⅓–⅔ in. long. Seeds subglobose, pale brown.—Pax in Bolet. Soc. Brot. x. 161; Hiern in Cat. Afr. Pl. Welw. i. 986; De Wild. Miss. É. Laurent 141, mainly, and in Études Fl. Bas- et Moyen-Congo, i. 279, wholly, and ii. 288 (Eala and Umangi specimens only); Rendle in Journ. Linn. Soc. xxxvii. 213; Th. & Hél. Durand, Syll. Fl. Congol. 500, in part only; S. Moore in Journ. Linn. Soc. xl. 204. *S. abyssinicum*, Benth. l.c.; Engl. Hochgebirgsfl. Trop. Afr. 285; Pax in Engl. Pfl. Ost-Afr. C. 241. *S. Kerstingii*, Pax in Engl. Jahrb. xliii. 85. *S. ellipticum*, Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 253. *Sclerocroton ellipticus*, Hochst. in Flora, 1845, 85; Sond. in Linnæa, xxiii. 107; Baill. Étude Gén. Euphorb. 523, t. 8, fig. 17. *Stillingia elliptica*, Baill. Adansonia, iii. 162. *Excœcaria indica*, Müll. Arg. in Linnæa, xxxii. 123 and in DC. Prodr. xv. ii. 1216, partly, and as to the African plant only. *E. manniana*, Müll. Arg. in Flora, 1864, 433, and in DC. Prodr. xv. ii. 1217. *E. reticulata*, Sim, For. Fl. Cap. Col. 320, partly, t. 140, fig. 2, wholly, and in For. Fl. Port. E. Afr. 103, partly; not of Müll. Arg. *Tragia elliptica*, Hochst. ex Müll. Arg. in DC. Prodr. xv. ii. 1216; Pax in Engl. Pflanzenr. Euphorb.-Hippoman. 253.

Upper Guinea. Sierra Leone: near Farana on the Niger, *Scott-Elliot*, 5342! near Kurusu, *Scott-Elliot*, 5508! Togo: various localities, 1300 ft., *Kersting*, 43! 106! 226! 325! 391! 580! Northern Nigeria: Kataguru, *Dalziel*, 423! Cameroons: Bipinde, *Zenker*, 2536! 3271! 3272 partly! 3286! 3320 partly! 4103! Buea, 3300 ft., *Deistel*, 39! Ngom, 3100 ft., *Ledermann*, 2069! Tapare, 4300 ft., *Ledermann*, 2130! Tchape Pass, 4700 ft., *Ledermann*, 2805! Mba, 3700 ft. *Ledermann*, 5529! Lom, 600–1000 ft., *Ledermann*, 6329!

North Central. Bagirmi: Senoussi Country; Ndelli, *Chevalier*, 7659!

Nile Land. Abyssinia: Amhara, *Rosen!* Amhasea, 6000 ft., *Schimper*, 565! Begemeder, *Schimper*, 871! 884! 1691! Adoa, *Schimper*, 2039! Uganda: Unyoro; Budonga Forest, 3500 ft., *Bagshawe*, 1492! east side of Lake Albert Edward, *Scott-Elliot*, 8064! Toro, 5000 ft., *Dawe*, 461! Ankole; Musozi, *Bagshawe*, 145! Kampala, *Whyte!* Lubwas, *Whyte!* Entebbe, 4000 ft., *Winkler*, 4138! *Scott-Elliot*, 7182! *Mahon! Dawe!*

Lower Guinea. Island of St. Thomas: at 2000 ft., *Mann*, 1056! Lower Congo: Mayumbe, Temvo, *Laurent!* Cataracts district; Kitobola, *Laurent!* Stanley Pool district; Kisantu, *Gillet*, 1031! Makela, *Van Houlte*, 3443! Angola:

Loanda; Golungo Alto, 2100 ft., *Welwitsch*, 376! Cazengo, *Gossweiler*, 4409! *Welwitsch*, 380! Malange, *Gossweiler*, 994! Benguela; Huilla; Otyinkhula, *Dekindt*, 874! Mounyino, 5800 ft., *Dekindt*, 229! *Autunes*, 304! 3133!

South Central. Belgian Congo: Equatorial Prov.; Eala, *Laurent*, 1299! Bangala district; Umangi, *Laurent!* west side of Lake Albert Edward, *Mildbraed*, 1964!

Mozamb. Distr. German East Africa: Bukoba; Bukoba, 3800 ft., *Stuhlmann*, 1452! 1534! Usambara; Kilanguri, *Buchwald*, 679! *Holst*, 3742! Amani, 2500–3000 ft., *Nishetski*, 3066! *Knorr*, 991! *Engler*, 860! 3400! *Zimmermann*, 110! 896! *Holtz*, 741! Derema, 2700 ft., *Scheffler*, 143! Morogora; Ulugnru, 2000 ft., *Stuhlmann*, 8922! and without precise locality, *Warnecke*, 110! Portuguese East Africa: Gazaland; Mount Maruma, 3500 ft., *Swynnerton*, 742! Chitamboga Valley, *Swynnerton*, 1108! Nyasaland: Namasi, *Cameron*, 3! Shire Highlands, *Buchanan*, 98! 133! 314! Rhodesia: Chipete, 3800 ft., *Swynnerton*, 103! near Chirinda, 3800 ft., *Swynnerton*, 741!

Also in South Africa.

83. **EXCŒCARIA**, Linn.: Benth. et Hook. f. Gen. Pl. iii. 337.

Flowers dicœcious or rarely moncœcious, apetalous. Disk 0. Male: Calyx small, usually 3-lobed, rarely 2-lobed, very rarely 4–5-lobed; lobes slightly imbricate. Stamens 2–3, exserted; filaments free; anthers longitudinally dehiscent. Rudimentary ovary 0. Female: Calyx 3-(rarely 4–5-)lobed. Ovary 3-celled; ovules in each cell solitary; styles 3, shortly connate below, free above, entire. Capsule 3-dymous, breaking up into three 2-valved cocci. Seeds globose, without a caruncle; albumen fleshy; cotyledons broad, flat.—Trees or shrubs, everywhere glabrous. Leaves alternate or opposite, entire or crenulate, usually firm; stipules usually minute. Flowers in 1-sexual (less often 2-sexual) stout or slender axillary spikes which accompany the leaves; males usually dense, females more lax with the flowers distinctly pedicelled; pedicels usually solitary to their bracts, occasionally in threes; bracts usually densely imbricate and glandular.

Species about 20, in the tropics of the Old World, rare in Africa, absent from America.

The genus *Excœcaria*, as here understood, is distinguished from *Sapium* by having only lateral inflorescences. The solitary Tropical African species has, however, been referred by Pax and K. Hoffmann, as a distinct section, to *Spirostachys*, Sond., from which it differs in having free filaments. Müller has included both *Sapium* and *Spirostachys* under *Excœcaria*; Kuntze has included both *Excœcaria* and *Spirostachys* under *Sapium*. Bentham, while including *Spirostachys* under *Excœcaria*, has kept the latter genus apart from *Sapium* because in *Excœcaria*, as understood by him, the calyx is more deeply lobed than it is in *Sapium*.

1. **E. venenifera,** *Pax in Engl. Jahrb.* xix. 113. A small tree, up to 18 ft. high, everywhere glabrous. Leaves short-petioled, firmly membranous or subcoriaceous, narrow-oblong or ovate-oblong, bluntly acuminate, base rounded, margin crenulate, 2-3 in. long, 1–1½ in. wide, somewhat polished above, paler beneath, obscurely penninerved; petiole ½–⅔ in. long, 2-glandular at the top; stipules very small. Inflorescences 1-sexual; males catkin-like, lateral, sessile in the axils of the leaves, very dense, cylindric, 1½–2 in. long; bracts closely imbricate, glandular,

spirally arranged, each subtending a single flower and concealing the calyx; females in short 2–3-flowered axillary cymules, shortly peduncled and pedicelled; pedicels elongating slightly in fruit. Male: Calyx deeply 5-lobed: lobes obovate-spathulate, obtuse. Stamens 3; filaments far exserted, free; anther-cells subglobose. Capsule depressed-globose, $\frac{1}{5}$ in. across; cocci 2-valved, valves thinly crustaceous; pedicels in fruit $\frac{1}{5}$ in. long, Seeds globose, $\frac{1}{6}$ in. across.—*E. glomeriflora*, Pax in Engl. Pfl. Ost-Afr. C. 241. *Spirostachys venenifera*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 154. *S. glomeriflora*, Pax & K. Hoffm. l.c. 156.

Nile Land. British East Africa: Tana Province; Kaon, near the mouth of the Tana River, *Leroy in Herb. Sacleux*, **1075**! Ukamba Province: Kitui, *Hildebrandt*, **2687**!

Mozamb. Distr. German East Africa: Pangani, *Stuhlmann*, **348**! **592**! Bagamoyo; between Kwa Ibrahim and Pongwe, *Holtz*, **1200**!

The collection by Leroy of complete material of this interesting species shows that *E. glomeriflora*, Pax, and *E. venenifera*, Pax, are the female and male of the same species. In Leroy's, as in Hildebrandt's, Stuhlmann's and Holtz's specimens, the inflorescences are 1-sexual, but one of Leroy's specimens is interesting in having one male catkin and many female cymules on the same leafy twig. The species is the representative in Africa of the South-Eastern Asiatic *E. Agallocha*, Linn.

84. **HURA**, Linn.: Benth. et Hook. f. Gen. Pl. iii. 339.

Flowers monœcious, apetalous. Disk 0. Male: Calyx membranous, eglandular, shortly cup-shaped, limb truncate, denticulate. Stamens 8–20; filaments prolonged into the connective and connate in a stout somewhat dilated column almost flattened at the apex, which rises slightly above the anther-cells; anthers discrete, extrorse, their cells distinct and parallel, in 2 or more whorls round the upper portion of the column. Rudimentary ovary 0. Female: Calyx coriaceous, eglandular, widely cup-shaped; limb truncate, quite entire, loosely enveloping the ovary. Ovary 5–20-celled; ovules in each cell solitary; styles connate in a long fleshy column with as many radiately divergent undivided arms. Capsule large, depressed, the whorled woody cocci separating explosively from the columella. Seeds laterally compressed, without a caruncle; testa crustaceous; albumen fleshy; cotyledons broad, suborbicular, flat.—Lofty trees. Leaves alternate, petioled, broad, closely penninerved. Male flowers in terminal peduncled oblong stout spikes; each flower solitary to its bract, subsessile; bracts membranous, at first closed and enveloping the buds, at length irregularly torn by the expanding flower. Female flowers solitary, basal to the male spikes or in the upper leaf-axils, distinctly pedicelled; pedicel stout.

Species 2, American; one widely cultivated in the Old World and in our area occasionally naturalised.

1. **H. crepitans,** *Linn. Sp. Pl. ed.* i. 1008. A tree 50–80 ft. high; branches armed with cylindric spines, or unarmed. Leaves long-petioled,

firmly membranous, ovate, cuspidate-acuminate, base rounded or cordate, entire or finely and remotely toothed, 2½–8 in. long, 2–6½ in. wide, main-nerves 10–12 pairs, secondary venation parallel, distinct pilose with long spreading hairs on the nerves beneath; petiole 3–6 in. long, glabrous; stipules linear-lanceolate, ½ in. long, deciduous. Peduncle of male spike 2–3 in. long; spike cylindric-conic, bright red, 2 in. long, ¾ in. wide at the base. Pedicel of female flowers ½ in. long, much elongated in fruit. Anthers usually in 2–3, rarely in single whorls. Ovary including the style 1¼–2 in. long; stigma ½ in. across, reddish-violet. Capsule depressed, 1⅓ in. deep, 3 in. wide hollowed at the apex and base, deeply sulcate between the cocci.—Baill. Étude Gén. Euphorb. Atl. 14, t. 6, fig. 21–35; Müll. Arg. in DC. Prodr. xv. ii. 1229; Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Hippoman. 272.

Upper Guinea. Ivory Coast: Dabou, cultivated, *Jolly,* 56! Cameroons: Victoria, cultivated, *Deistel,* 140.

Var. *senegalensis,* Müll. Arg. in DC. Prodr. xv. ii. 1230. Leaves quite glabrous beneath.—*H. senegalensis,* Baill. Adansonia, i. 77.

Upper Guinea. Senegal: Harkandy, in dry and rocky situations, naturalised, but rare, *Heudelot,* 846!

No doubt this variety, so far known only from African material, has been introduced from America; it is only distinguishable from American specimens by the absence of pubescence on the nerves beneath. The plant in the Dabou garden, communicated by Jolly, has the leaves densely pilose on the nerves on the under surface.

ADDENDA

5. **Salsola Zeyheri,** *Schinz.* Add:

Lower Guinea. German South-west Africa: Damaraland; Richthofen, *Galpin and Pearson*, 7546!

3. **Polygonum plebeium,** *R. Br.* Add:

Lower Guinea. Damaraland: Mouth of Swakop River, *Galpin and Pearson*, 7537!

2*a*. **Tylostemon jabassensis,** *Engl. & Krause in Engl. Jahrb.* xlvi. 143. An erect shrub or tree of moderate height; branchlets slender, terete, glabrous or very shortly puberulous when young; bark smooth, brown. Leaves oblong or oblanceolate-oblong, long-acuminate, slightly attenuated towards the cordate-emarginate base, 6–10 in. long, 3–4¼ in. broad, thinly coriaceous, glabrous, drying greyish above and brownish beneath; lateral nerves 9–12, slightly impressed (rarely raised) above, prominent underneath; petiole stout, 3–6 in. long, widely channelled above. Panicles many-flowered, 5–7 in. long, shortly puberulous. Perianth campanulate, whitish when fresh, drying yellowish-brown, scarcely over ½ lin. long, hairy within and without; segments ovate. Introrse stamens with broad, densely hairy filaments; extrorse stamens slightly narrower with a large roundish gland on each side of the base; staminodes subcordate-ovate. Ovary broad ovoid, gradually passing into the short stout style.

Upper Guinea. Cameroons: in a high forest on rocky ground, at Jabassi, by the Wuri River, *Ledermann*, 1105, 1107.

4*a*. **Tylostemon ndongensis,** *Engl. & Krause in Engl. Jahrb.* xlvi. 143. A tree 25–35 ft. high; branchlets stout, up to 3 lin. thick, terete, glabrous; bark dirty grey to greyish-black. Leaves oblong, rarely obovate-oblong, long-acuminate, narrowed towards the base, 6–8 in. long, 2–3 in. broad, coriaceous, quite glabrous, dark green, drying brown; lateral nerves 7–10 curved towards the margin and like the stout midrib prominent beneath, slightly impressed or raised above; petiole stout, 5–8 lin. long, channelled above. Panicles many-flowered, loose, 4 in. long, sparingly and very shortly pubescent or glabrous, peduncle slightly flattened. Perianth hemispheric, pale green when fresh, drying brownish-black, scarcely over ½ lin. long, glabrous; segments short, ovate. Introrse stamens with slightly widened hairy filaments; extrorse stamens

somewhat narrower with a roundish large gland on each side of the base; staminodes ovate-lanceolate. Ovary broad-ovate, gradually passing into the style which is as long as the ovary.

Upper Guinea. Cameroons: in dense forest, by the Neonako River, near Ndonge, 2300–2700 ft., *Ledermann*, 6165.

5*a*. **Tylostemon congestiflorus,** *Engl. & Krause in Engl. Jahrb.* xlvi. 144. An erect tree, 40–50 ft. high, with a large top; branchlets stout, up to $2\frac{1}{2}$ lin. thick, terete, glabrous except when quite young; bark dirty brown. Leaves oblong or oblanceolate-oblong, acute, narrowed at the base, 4–6 in. long, 2–$2\frac{1}{2}$ in. broad, thinly coriaceous, quite glabrous, light green when fresh, drying pale brown; midrib somewhat broad, slightly impressed above and raised below; lateral nerves 8–10, rising at an angle of about 45°, curved towards the margin, slightly prominent on both sides. Panicles dense, up to 1 in. long; peduncle compressed and like the ovate-lanceolate, acuminate, 3–$4\frac{1}{2}$ lin.-long bracts densely fulvo-tomentose. Perianth broad-turbinate, light green when fresh, drying brownish-yellow, $1\frac{1}{4}$ lin. long, hairy within and outside; segments ovate, slightly shorter than the receptacle. Introrse stamens with broad hairy filaments; extrorse stamens somewhat narrower, with a large reniform gland on each side. Ovary ovoid, glabrous, gradually passing into the slender style.

Upper Guinea. Cameroons: Tchape Pass, in bush by streams, also occasionally in the Savanna, 4600 ft., *Ledermann*, 2804.

5*b*. **Tylostemon acutifolius,** *Engl. & Krause in Engl. Jahrb.* xlvi. 145. An erect tree, 18–20 ft. high; branchlets terete, about $1\frac{1}{2}$ lin. long, glabrous or minutely pubescent when young; bark brown. Leaves oblong or oblanceolate-oblong, acute, gradually contracted at the base, 6–10 in. long, 2–4 in. broad, very coriaceous, quite glabrous, drying greyish-green to brown; lateral nerves 7–9, curved towards the margin, more or less raised, particularly beneath; petiole stout, 3–5 lin. long. Panicles dense, $1\frac{1}{4}$–2 in. long, densely fulvo-tomentose; peduncle slightly compressed; bracts ovate, acuminate, 4–5 lin. long, densely hairy. Perianth hemispheric, yellowish-green when fresh, 1–$1\frac{1}{4}$ lin. long, hairy within and without; segments broad-ovate to rotundate. Introrse stamens densely hairy, widened towards the base; extrorse stamens slightly narrower, with a large reniform gland on each side; staminodes ovate-lanceolate. Ovary ovoid, gradually passing into a short stout style.

Upper Guinea. Cameroons: in a narrow stony stunted gallery-forest, at Tchape Pass, 4700 ft., *Ledermann*, 2729.

5*c*. **Tylostemon anacardioides**, *Engl. & Krause in Engl. Jahrb.* xlvi. 145. An erect tree, 50–60 ft. high; branchlets terete, stout, about $2\frac{1}{2}$ lin. thick, glabrous, striate; bark dark brown. Leaves oblong-elliptic or obovate-elliptic, obtuse at the apex, acute at the base, $5\frac{1}{2}$–7 in. long, 3–4 in. broad, very coriaceous, quite glabrous, shining, dark green when fresh, drying brownish; midrib stout, flat above, very prominent

beneath; nerves 6–8 on each side, somewhat curved, raised, particularly below; petiole stout, 10–12 in. long, channelled. Panicles dense, 2–3 in. long, densely fulvo-tomentose; peduncle stout, slightly compressed. Perianth wide-turbinate, when fresh yellowish-green, when dried brown, $1\frac{1}{4}$ lin. long, hairy within and outside; segments ovate, as long as the receptacle. Introrse stamens stout, subcylindric, hairy; extrorse stamens somewhat smaller, on each side of the base with a large roundish gland; staminodes ovate-triangular. Ovary ovoid, glabrous, attenuated into a rather stout style of the same length.

Upper Guinea. Cameroons; Tibati, *Ledermann*, 2447.

6*a*. **Tylostemon crassipes,** *Engl. & Krause in Engl. Jahrb.* xlvi. 146. A small tree 12–16 ft. high; branchlets terete, stout, glabrous, about 3 lin. thick; bark dirty grey to pale grey. Leaves oblong or oblanceolate-oblong, shortly acuminate, narrowed towards the base, about 10 in. long, up to 5 in. broad, when fresh shining green, when dried turning brown, coriaceous, quite glabrous; midrib stout, broad in its lower third; nerves 8–10 on each side, curved, raised, particularly below; petiole stout, channelled, 5–9 lin. long. Panicles short, many-flowered, lax, glabrous or very sparingly and minutely hairy. Perianth wide-turbinate, when fresh whitish-brown, when dry brown, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, hairy within and outside; segments ovate, equalling or exceeding the receptacle. Introrse stamens very broad, densely hairy; extrorse stamens narrower, with a large round gland on each side of the base; staminodes ovoid. Ovary ovoid, glabrous, gradually passing into the style.

Upper Guinea. Cameroons: in open forest near Lom, *Ledermann*, 6460.

6*b*. **Tylostemon barensis,** *Engl. & Krause in Engl. Jahrb.* xlvi. 146. A small tree or a shrub 12–16 ft. high; branchlets terete, stout, glabrous, up to $3\frac{1}{2}$ lin. thick; bark smooth, dirty grey. Leaves oblong or oblanceolate-oblong, shortly acuminate, narrowed at the base, 6–9 in. long, 2 to almost 4 in. broad, coriaceous, quite glabrous, drying brown; nerves 7–10, curved towards the margin, raised on both sides, particularly below; petiole stout, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long, channelled. Panicles many-flowered, lax, 5–7 in. long, very finely pubescent; bracts early deciduous, ovate, acuminate, $3\frac{1}{2}$–4 lin. long, pubescent. Perianth wide-turbinate, 1–$1\frac{1}{2}$ lin. long, yellowish or yellowish-green, when dry brown, sparingly pubescent; segments ovate, shorter than the receptacle. Introrse stamens, much dilated below, densely hairy; extrorse stamens slightly shorter, with a large gland on each side of the base; staminodes ovate-triangular. Ovary broad-ovoid, glabrous, attenuated into the slender style which is of equal length.

Upper Guinea. Cameroons: Bare, *Ledermann*, 1231; near Semukine, in virgin forest, *Ledermann*, 1217.

6*c*. **Tylostemon Ledermannii,** *Engl. & Krause in Engl. Jahrb.* xlvi. 147. An erect tree 25–40 ft. high; branchlets terete, stout, up to 3 lin. thick, glabrous; bark grey. Leaves oblong or oblanceolate,

acuminate, narrowed towards the base, 6–8 in. long, 2–3½ in. broad, coriaceous, quite glabrous, when fresh light green, drying brown; midrib stout; nerves 7–8 on each side, curved, raised on both sides, particularly below; petiole 4½–6 lin. long. Panicles many-flowered, lax, up to 8 in. long, wide, very shortly pubescent. Perianth wide-turbinate, 1 lin. long, when fresh reddish, when dry brown, sparingly puberulous within and outside; segments ovate. Introrse stamens much dilated below, densely hairy; extrorse stamens slightly narrower with a large subreniform gland on each side of the base; staminodes ovate-lanceolate. Ovary ovoid, glabrous, gradually passing into the slender style which is as long as or slightly longer than it.

Upper Guinea. Cameroons: in a gallery-forest by the Moam River, at Bare, *Ledermann*, 1284; in dense forest at Ndonge, 2600–3300 ft., *Ledermann*, 6235.

6*d*. **Tylostemon lancifolius,** *Engl. & Krause in Engl. Jahrb.* xlvi. 148. A tree, 20–25 ft. high; branchlets terete, stout, 2 lin. thick, glabrous; bark grey or when young dirty brown. Leaves oblanceolate, long and obtusely acuminate, gradually narrowed towards the base, 6–9 in. long, 1½–2¼ in. broad, thinly coriaceous, quite glabrous, when fresh shining green with whitish nerves, drying grey or brown; midrib somewhat stout; nerves 10 to 12 on each side, rising at an angle of 45°, raised on both sides, particularly below; petiole 8–11 lin. long, channelled. Panicles many-flowered, 4 in. long, finely pubescent; peduncle stout, flattened. Perianth wide-turbinate, 1 lin. long, when fresh greyish green, when dry brown, hairy within and without; segments broad-ovate or rotundate. Introrse stamens broad, very hairy; extrorse stamens somewhat narrower, with a large gland on each side of the base, almost equalling the stamen; staminodes lanceolate-ovate. Ovary ovoid, glabrous, attenuated into a style as long as or shorter than it.

Upper Guinea. Cameroons: in forest at Babangi Tungo, 4400 ft., *Ledermann*, 5810.

7*a*. **Tylostemon kamerunensis,** *Engl. & Krause in Engl. Jahrb.* xlvi. 148. A tree, 40–50 ft. high; branchlets terete, glabrous or very sparingly and minutely pubescent when young, up to 2 lin. thick. Leaves oblong or obovate-oblong, acuminate, narrowed towards the base, 5–8 in. long, 2¼–3½ in. broad, thinly coriaceous, quite glabrous, when fresh dark green, drying brown; midrib broad; nerves 7–9 on each side, curved towards the margin, raised below; petiole 5–8 lin. long. Panicles many-flowered, divaricate, lax, 4 in. long; rhachis sparingly pubescent. Perianth wide-campanulate, 1½ lin. long, glabrous, yellowish-green, suffused with red, drying brown; segments ovate, obtuse, equalling the receptacle. Introrse stamens stout, cylindric, densely hairy; extrorse stamens slightly smaller, with a roundish gland on each side of the base; staminodes ovate-triangular. Ovary ovoid, glabrous, passing into a slender style of equal length.

Upper Guinea. Cameroons: in forest at Ndonge, 2300–2600 ft., *Ledermann*, 6292.

2. **Gyrocarpus hababensis,** *Chiov. in Ann. di Bot., Roma*, ix. 132. Branchlets fairly stout, straight, $1\frac{1}{2}$–2 lin. in diam. 6 in. below the apex, minutely and inconspicuously pubescent at the apex, quickly becoming glabrous, bark at first brownish, soon becoming ashy-grey and irregularly cracked longitudinally. Leaves 3–5 together at the ends of the branchlets, suborbicular, $\frac{3}{4}$–1 in. long, 1–$1\frac{1}{4}$ in. broad, rounded at the apex, shortly and abruptly subcuneate into the petiole from a rounded or subtruncate base, papery or thinly coriaceous, glabrous, 3-nerved with the lateral nerves soon forked, veinlets dark, loosely reticulate, slightly impressed and inconspicuous on the upper surface, hardly raised but conspicuous by their colour on the paler lower surface; petiole slender, minutely puberulous, 5–10 lin. long. Cymes 2–4, fascicled at the ends of the branchlets, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long; rhachis and its branches black, minutely and sparingly pubescent or puberulous; pedicels about $\frac{1}{4}$ lin. long, puberulous. Perianth $\frac{1}{4}$–$\frac{3}{8}$ lin. long in male, rather longer in hermaphrodite flowers (*Chiovenda*), irregularly lobed, coarsely pilose. Filaments up to $\frac{1}{2}$ lin. long, coarsely and sparingly pilose; anthers oblong, $\frac{3}{8}$ lin. long. Staminodes clavate, $\frac{3}{8}$ lin. long, densely villous. Ovary subglabrous or minutely and sparingly puberulous (*Chiovenda*). Fruits ovoid, 4–$4\frac{1}{2}$ lin. long, black, glabrous, faintly 8-ribbed; wings linear-oblanceolate, about $2\frac{1}{4}$ in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, glabrous.

Nile Land. Eritrea: Hababa; Aide Lebca, *Terracciano & Pappi*, **1268**! Naro, *Pappi*, **8256**! Assaorta, Mount Ghedem, *Terracciano & Pappi*, **4**!

1*a*. **Loranthus patentiflorus,** *Engl. & Krause in Engl. Jahrb.* xlv. 281. An erect bush, 1–$1\frac{1}{2}$ ft. high. Branchlets terete, fairly stout, up to $2\frac{1}{2}$ lin. in diam., brownish-red or greyish-brown, smooth in a young state, covered with numerous punctiform lenticels when adult. Leaves oblong or lanceolate-oblong, narrowed above to an obtuse or rounded apex, acute or subacute at the base, 2–$3\frac{1}{2}$ in. long, 8–15 lin. broad, thinly coriaceous, glabrous, dull, nerves fairly prominent on both surfaces in a young state; petioles $2\frac{1}{2}$–4 lin. long. Racemes axillary, shortly peduncled, numerous-flowered, shorter than the leaves, up to $2\frac{1}{3}$ in. long; pedicels 1–$1\frac{1}{2}$ lin. long; bract ovate, acute, $\frac{3}{4}$–$\frac{7}{8}$ lin. long, ciliate, much thickened dorsally in the lower half or two-thirds. Receptacle and calyx together narrowly campanulate, about 1 lin. long. Calyx ascending, $\frac{1}{4}$ lin. long, shallowly lobed, ciliolate. Corolla white, nearly 5 lin. long, slender in bud. Filaments 1–$1\frac{1}{2}$ lin. long; anthers $2\frac{1}{2}$ lin. long. Style nearly 4 lin. long.

Upper Guinea. Cameroons: between Jakuba and the camp on the Mao Jim, 4000 ft., *Ledermann*, **2630**! **2675**.

Apparently allied to *L. Wildemanii*, Sprague, from which it differs in the much larger bract, shorter receptacle and longer calyx. Fully developed flowers are not known.

2*a*. **Loranthus rubrostamineus,** *Engl. & Krause in Engl. Jahrb.* xlv. 282. Branchlets terete, fairly stout, glabrous, dark brown, up to $1\frac{1}{2}$ lin. in diam. 8–10 in. below the apex, smooth or slightly striate in a

young state, minutely lenticellate when adult. Leaves opposite, oblong or oblong-lanceolate, sometimes slightly oblique, narrowed to an obtuse apex, obtuse or subacute at the base, $2\frac{1}{2}$–4 in. long, 10–14 lin. broad, thinly coriaceous, glabrous, dull, lateral nerves slightly raised on the upper surface, hardly visible on the lower; petioles 3–5 lin. long. Racemes axillary, shortly peduncled, many-flowered, shorter than the leaves, up to 3 in. long; pedicels 1 lin. long; bract ovate, minutely ciliolate, $\frac{1}{2}$–$\frac{5}{8}$ lin. long, much thickened dorsally in the lower two-thirds. Receptacle and calyx together narrowly campanulate, $1\frac{3}{8}$–$1\frac{1}{2}$ lin. long. Calyx reduced to a mere rim. Corolla in bud rather stout, quadrangular in its lower part, the angles ribbed; petals pinkish, about $4\frac{1}{2}$ lin. long, lower part oblong, $1\frac{1}{4}$ lin. long, nearly 1 lin. broad, faintly ribbed outside, minutely papillate inside, upper part reflexed when the flower is expanded, linear-subulate, $3\frac{1}{2}$ lin. long, papillate on the inner edges, otherwise glabrous, $\frac{1}{2}$ lin. broad at the base. Stamens 3–$3\frac{1}{4}$ lin. long; filaments $\frac{3}{4}$–1 lin. long, glabrous; anthers elongate-subulate, $2\frac{1}{8}$–$2\frac{1}{4}$ lin. long, cells 22–23 in each row. Style $2\frac{3}{4}$ lin. long.

Upper Guinea. Cameroons: on the Tchape Pass, 4700 ft., *Ledermann*, 2699!

Allied to *L. combretoides*, Engl., from which it differs in the shape of the leaves, the longer receptacle and the much reduced calyx.

3*a*. **Loranthus ikelembensis,** *De Wild. in Bull. Jard. Bot. Brux.* iii. 256. Branches glabrous; bark brown, obscurely lenticellate. Leaves opposite, "ovate-lanceolate, oblong," 2–4 in. long, $\frac{2}{3}$–$1\frac{1}{2}$ in. broad, obtusely acuminate, broadly cuneate or rounded at the base, more or less decurrent into the petiole, coriaceous, glabrous, margin revolute, lateral nerves slightly raised on both surfaces; petiole channelled, 4–6 lin. long. Racemes axillary, nearly equalling the leaves, up to $2\frac{3}{4}$ in. long, rhachis glabrous; pedicels about $1\frac{1}{2}$ lin. long; bract triangular, about $\frac{1}{2}$ lin. long. Petals 3–4 lin. long, upper part linear-subulate, subpapillose on the margin. Anthers elongate, subulate. Style glabrous, about 3 lin. long.

South Central. Belgian Congo: Bombimba, on the Ikelembe River, *Laurent*, 1159.

Said to be near *L. Mannii*, Oliv. I have not seen a specimen.

21*a*. **Loranthus Talbotiorum,** *Sprague*. Leaf-buds densely rusty-tomentose with much-branched hairs. Branches terete, stout, up to 4 lin. in diam., rusty-tomentose above the insertion of the petioles, otherwise glabrous in the adult state, smooth, slightly glossy, sparingly lenticellate, lenticels narrowly elliptic-oblong to linear, up to 3 lin. long; internodes 3–$4\frac{1}{2}$ in. long, the upper ones strongly compressed. Leaves shortly petioled, ovate-oblong or lanceolate-oblong, recurved a short distance below the acute apex, very narrowly cordate at the base, 6–7 in. long, $2\frac{1}{2}$–$3\frac{1}{4}$ in. broad, thickly coriaceous, upper surface glabrous and glossy, lower surface dull, nearly glabrous except the midrib, which is scurfy with rusty much-branched hairs; petioles 3–$3\frac{1}{2}$ lin. long, rusty-tomentellous or glabrescent. Umbels fascicled in the axils, 3–4-flowered, rusty-pubescent; peduncle $1\frac{1}{4}$ lin. long; pedicels $\frac{3}{4}$ lin. long; bract erect, ovate or

elliptic, rounded at the apex, about 1½ lin. long, over 1 lin. broad, pubescent outside, glabrous inside. Receptacle and calyx together subcylindric, about 1 lin. long. Calyx shortly toothed, ¼ lin. long including the teeth. Corolla 1¾ in. long, reddish-tomentellous outside with much-branched hairs; tube split unilaterally 8–11 lin. down, glandular within, basal swelling inconspicuous, ovoid-oblong, 3–4 lin. long, more or less curved towards the base; lobes erect, spathulate, 5–5½ lin. long, enlarged part ovate-elliptic, 1½ lin. long, nearly 1 lin. broad. Filaments inserted at the base of the corolla-lobes, about 4 lin. long; anthers oblong, ⅝ lin. long, cells 4 in each row. Disc very small, rusty-pilose. Style glabrous, skittle-shaped above, thickened part paler, 3 lin. long, neck ⅝ lin. long; stigma capitate, ¼ lin. in diam.

Upper Guinea. Southern Nigeria: Oban district, *Talbot*, 1281!

Approaches *L. emarginatus*, Engl., from which it may be distinguished by the distinctly, though shortly, petioled acute leaves, larger tomentellous flowers, longer corolla-lobes and more numerous anther-cells.

25*a*. **Loranthus luteovittatus,** *Engl. & Krause in Engl. Jahrb.* xlv. 288. A pendulous bush, 2–2⅓ ft. long. Branches pendulous, terete, stout, nodose, nearly 3 lin. in diam. 12–14 in. below the apex, rusty-tomentose with much-branched hairs in a young state, glabrous when adult, dark grey or brown, coarsely lenticellate, lenticels numerous, oblong. Leaves ovate, ovate-oblong or ovate-lanceolate, obtuse at the apex, rounded, subtruncate or sometimes emarginate at the base, 4–4¾ in. long, 2–2⅓ in. broad, coriaceous, pubescent above in a young state, quickly becoming glabrous, rusty-tomentellous beneath, lateral nerves slightly raised on the upper surface, not visible on the lower; petioles stout, channelled above, 7–10 lin. long, tomentellous with branched hairs. Umbels axillary, subsessile, few-flowered; pedicels ½–¾ lin. long, rusty-tomentellous; bract sharply ascending, subfoliaceous, oblong or elliptic-oblong, rounded at the apex, 2½–3 lin. long, 1–1¼ lin. broad, tomentellous outside, puberulous or nearly glabrous inside. Receptacle subcylindric, slightly narrowed downwards, ¾ lin. long, rusty-villous. Calyx obsolete. Corolla about 1¾ in. long, apical swelling ovoid, subacute, 2 lin. long, pentagonal, angles ribbed; tube split unilaterally 8–9 lin. down, very slightly enlarged towards the base, rusty-tomentellous outside with short much-branched hairs, densely glandular within, red with yellow stripes; lobes erect, spathulate, 7 lin. long, upper enlarged part 2 lin. long, hardly ¾ lin. broad. Filaments inserted ½ lin. above the base of the corolla-lobes, 5 lin. long; anthers oblong, slightly narrowed downwards, hardly 1 lin. long, cells 4–5 in each vertical row. Disc small, acutely pentagonal, minutely and densely rusty-pilose. Style glandular, skittle-shaped above, neck hardly 1 lin. long; stigma capitate, ½ lin. in diam.

Upper Guinea. Cameroons: Tchape Pass, 4700 ft., *Ledermann*, 2681!

Nearly related to *L. angolensis*, Engl., from which it differs in the broader leaves, large bracts, obsolete calyx and slightly longer anthers.

39. **Loranthus incanus,** *Schum. & Thonn.* Add: *L. pallidifolius,* Engl. & Krause in Engl. Jahrb. xlv. 283.

Upper Guinea. Cameroons: near Dchang, 4300 ft., *Ledermann,* 1572!

I have little hesitation in referring *L. pallidifolius* to *L. incanus* in spite of the very young condition of the flowers. *Barter,* 3288, from Eppah, South Nigeria, which is undoubtedly *L. incanus,* has flower-buds at about the same stage of development and exhibiting the same type of indumentum as those of *L. pallidifolius.* The indumentum of the corolla in *Loranthus* always appears denser in young buds than in the fully expanded flower, owing to the great increase in size of the corolla and the resulting looser arrangement of the hairs.

45. **Loranthus glaucocarpus,** *Peyr.* Add: *L. otavensis,* Engl. & Krause in Engl. Jahrb. xlv. 285.

Lower Guinea. German South-west Africa: near Otavi, on *Croton* sp., *Dinter,* 901!

According to Engler and Krause, Dinter's specimen bears both pentamerous and hexamerous flowers. This is the only African species of *Loranthus* in which the number of corolla-lobes and stamens is known to vary. *Loranthus hexasepalus,* Engl. (*Thelecarpus hexasepalus,* Van Tiegh.) may, however, prove to be nothing but a hexamerous form of the widely distributed *L. incanus,* Schum. & Thonn.

49. **Loranthus fulvus,** *Engl.* Add: *L. Dombeyæ,* Krause & Dinter in Engl. Jahrb. xlv. 283.

Lower Guinea. German South-west Africa: near Otavi, on *Dombeya* sp., *Dinter,* 933!

56. **Loranthus oreophilus,** Oliv. Add: *L. ciliolatus,* Engl. & Krause in Engl. Jahrb. xlv. 285. *L. rigidissimus,* Engl. & Krause, l.c. 287.

Upper Guinea. Cameroons: Tchape Pass, 4700 ft., *Ledermann,* 2690, 2760! 2841!

It is a matter of great difficulty to define the limits of some of the species of *Loranthus,* sect. *Cupulati.* As far as can be judged, however, from the detached leaves and inflorescences of *L. ciliolatus* and *L. rigidissimus* which have been seen by the writer, these two species, which were collected in the same locality, can hardly be distinguished from each other or from *L. oreophilus.*

58. **Loranthus Braunii,** *Engl.* Add: *L. togoensis,* Engl. & Krause in Engl. Jahrb. xlv. 286. *L. scarlatinus,* Engl. & Krause, l.c.

Upper Guinea. Togo: near Bagida, *Warnecke,* 109! Cameroons: Bambutto Mountains, near Singwa Market, 7000 ft., *Ledermann,* 1609!

L. Braunii, Engl., as treated above (p. 303) includes six species which have been considered distinct by Continental botanists. Those who admit the correctness of this treatment will include *L. togoensis* and *L. scarlatinus* also under *L. Braunii.* The material accessible to the writer is too incomplete to determine to which of the varieties of *L. Braunii* they should be referred.

60*a*. **Loranthus pachycladus,** *Sprague in Kew Bulletin,* 1912, 233. A bush about 5 ft. in diam. Branches stout, nodose, cinnamon-brown, 3–4 lin. in diam., bark irregularly cracked longitudinally; branchlets striate, glabrous, greenish-brown in a dried state, internodes

compressed, $\frac{1}{3}$–2 in. long, $1\frac{1}{2}$–2 lin. broad. Leaves opposite, elliptic or broadly ovate, rounded or very obtuse at the apex, rounded or subcuneate at the base (the lower ones of the branchlets obovate), $1\frac{3}{4}$–$2\frac{3}{4}$ in. long, $1\frac{1}{4}$–2 in. broad, thickly coriaceous, glabrous, dull and finely wrinkled in a dried state; midrib raised on the upper surface, its lower half raised on the lower surface; lateral nerves about 4 on each side, irregularly pinnate (subpalmate from the base in the lowermost leaves of the branchlets), raised on the upper surface, usually inconspicuous on the lower; petiole stout, $2\frac{1}{2}$–4 lin. long. Umbels fascicled on the older branches, 4–5-flowered; peduncle stout, $2\frac{1}{2}$–4 lin. long, receptacular part depressed-pyramidal, shortly produced beyond the saucer-shaped sockets of the pedicels, scurfy-pilose at the apex and inside the sockets, elsewhere glabrous; pedicels 2–3 lin. long, glabrous; bract suberect from a saucer-shaped base, oblong, very concave, conspicuously bifid, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long. Receptacle and calyx together shortly campanulate, slightly constricted in the middle, $1\frac{1}{2}$–$1\frac{5}{8}$ lin. long. Calyx about 1 lin. long, hardly toothed. Corolla (only seen in bud) about $1\frac{1}{3}$ in. long, 5-angled, red shading into pink towards the apex, apical swelling about $2\frac{1}{4}$ lin. long; tube broadened in the lowermost 3 lin. Filaments $6\frac{1}{2}$–7 lin. long; anthers cuneate, $1\frac{1}{2}$ lin. long. Disc $\frac{1}{3}$ lin. high. Neck of the style $1\frac{1}{2}$ lin. long; stigma peltate, nearly $1\frac{1}{2}$ lin. in diam. – *L. anguliflorus*, Engl. in Engl. Jahrb. xxx. 301, not l.c. xx. 107.

Mozamb. Distr. German East Africa: Ussangu; Northern Kinga (Livingstone) Mountains, on the slopes of Mount Tyuni, *Goetze*, 1003!

Described from specimens in the Berlin Herbarium.

80. **L. Bosciæ,** *Engl. & Krause.* Add: *L. Juttæ*, Dinter, Deutsch-Südw.-Afr. 56.

Dinter's description of *L. Juttæ* is by itself insufficient for identification, but taking it in conjunction with his remark that the species lives exclusively on *Boscia Pechuelii*, Kuntze, and is common at Okahandya, there can be little doubt that it is identical with *L. Bosciæ*, Engl. & Krause.

96*a*. **Loranthus alboannulatus,** *Engl. & Krause in Engl. Jahrb.* xlv. 282. Branches terete, fairly stout, $1\frac{1}{2}$–2 lin. in diam., glabrous, reddish-brown, lenticellate, lenticels numerous, small, rounded. Leaves very shortly petioled, obliquely lanceolate or ovate-lanceolate, acute at the apex, acute or obtuse at the base, 2–4 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. broad, rigidly coriaceous, glabrous, dull, conspicuously 3-nerved from the base; nerves raised on both surfaces, veins inconspicuous; petiole 1–$1\frac{3}{4}$ lin. long. "Umbels sessile, rather many-flowered"; pedicels about $\frac{1}{2}$ lin. long; bract obliquely cupular, ventral margin $\frac{3}{8}$ lin. long, dorsal margin $\frac{5}{8}$ lin. long, truncate. Receptacle and calyx together tubular, constricted in the middle, $1\frac{1}{4}$ lin. long; receptacle about $\frac{1}{2}$ lin. long. Calyx $\frac{3}{4}$ lin. long, subtruncate. Corolla $1\frac{1}{6}$ in. long, dark carmine with a white ring near the apex, suprabasal swelling commencing about $\frac{1}{2}$ lin. above the base, ellipsoid, 1 lin. long; lobes linear, acute, rigid, nearly 4 lin. long. Filaments 2 lin. long, tapering upwards, about $\frac{1}{2}$ lin. broad at the base,

$\frac{1}{6}$ lin. broad at the apex, not toothed; anthers oblong-linear, truncate, nearly 1 lin. long. Style slightly skittle-shaped above.

Upper Guinea. Cameroons: near Dchang, 4300 ft., *Ledermann*, 1572!

Engler and Krause consider that *L. alboannulatus* should be placed in the section *Rigidiflori*. It appears to the writer, however, to have more in common with the *Infundibuliformes* as defined above (p. 257). The corolla-lobes are much shorter than the tube, and the anthers are only one-third to half as long as those of the *Rigidiflori*. In both these respects, as well as in habit, *L. alboannulatus* agrees with *L. trinervius*, Engl., *L. djurensis*, Engl., and *L. brunneus*, Engl. (sect. Infundibuliformes). It runs down in the key (p. 265) beside *L. brunneus*.

139*a*. **Loranthus apodanthus,** *Sprague*. A pendulous bush, 5 ft. long. Branches pendulous, terete, stout, up to nearly 4 lin. in diam., glabrous, greyish-brown, smooth in a young state, minutely and rather densely lenticellate when adult. Leaves ovate or ovate-oblong, gradually narrowed towards the acute apex, rounded at the base, 3–4$\frac{3}{4}$ in. long, 1$\frac{1}{3}$–2$\frac{1}{3}$ in. broad, rigidly coriaceous, glabrous; petiole stout, channelled, 5–7 lin. long. Heads 4-flowered; peduncle stout, 2 lin. long, enlarged above, sockets of the flowers obliquely inserted, cupular, nearly $\frac{1}{2}$ lin. deep, touching one another laterally and separated in the centre by a shallow apical depression; bract obliquely cupular, ventral margin over $\frac{1}{2}$ lin. long, dorsal margin 1$\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate, about 2 lin. long. Calyx subtruncate, 1 lin. long. Corolla 1 in. long in bud, not known in a fully developed state, carmine-red, dark green above, slightly swollen at the base, apical swelling ellipsoid, 2 lin. long, nearly 1$\frac{1}{2}$ lin. in diam., pentagonal, the angles strongly ribbed. Filaments 2$\frac{1}{2}$ lin. long, excluding the tooth, tooth stout, acute, $\frac{3}{8}$ lin. long; anthers oblong-linear, over 1 lin. long. Disc distinctly lobed, $\frac{1}{6}$ lin. high. Style strongly skittle-shaped above.—*L. sessiliflorus*, Engl. & Krause in Engl. Jahrb. xlv. 290, not of Merrill.

Upper Guinea. Cameroons: Tchape Pass, 4700 ft., *Ledermann*, 2740!

The systematic position of *L. apodanthus* must remain doubtful until fully developed flowers are known. It may be placed in the meantime beside *L. Pentagonia*, DC., and *L. senegalensis*, De Wild.

142*a*. **Loranthus findens,** *Sprague in Kew Bulletin*, 1911, 360. Branchlets reddish-brown, finely and densely lenticellate, glabrous. Leaves ovate-lanceolate, shortly acuminate to an obtuse apex, rounded at the base, 2$\frac{1}{4}$–3$\frac{1}{4}$ in. long, 1–1$\frac{1}{2}$ in. broad, coriaceous, glabrous, dull on both surfaces, margin crispate; nerves very indistinct, the lateral rather oblique, veins hardly visible; petiole about 3 lin. long. Umbels axillary, solitary, 4-flowered, glabrous; peduncle stout, 1–1$\frac{1}{4}$ lin. long, sockets of the pedicels saucer-shaped, $\frac{3}{4}$ lin. in diam., separated by the small flat top of the peduncle; pedicels stout, about $\frac{1}{2}$ lin. long; bract shallowly and obliquely cupular, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{3}{8}$ lin. long. Receptacle and calyx together narrowly campanulate, 1$\frac{1}{2}$ lin. long; receptacle nearly $\frac{3}{4}$ lin. long, gradually broadened upwards, $\frac{3}{4}$ lin. in diam. at the apex. Calyx ascending, $\frac{3}{4}$ lin. long, truncate, irregularly split, with a slight annular thickening inside near the base. Corolla 1$\frac{3}{4}$ in.

long in bud, glabrous; tube splitting between all the lobes 4–8 lin. down from the insertion of the stamens (to 9–10 lin. above the base), basal swelling obovoid, $2\frac{1}{4}$ lin. long; lobes reflexed, lanceolate-spathulate, $4\frac{1}{4}$–$4\frac{1}{2}$ lin. long from the insertion of the stamens, upper enlarged part lanceolate, acute, 2 lin. long, over $\frac{1}{2}$ lin. broad. Filaments inflexed, tapering upwards, $2\frac{1}{2}$–$2\frac{5}{8}$ lin. long; tooth $\frac{1}{4}$ lin. long; anthers oblong, nearly 1 lin. long. Disc pentagonal, hardly lobed, $\frac{1}{6}$ lin. high. Style skittle-shaped above, thickened part $2\frac{1}{2}$ lin. long, neck 1 lin. long, the upper half much thicker than the lower; stigma oblong-ellipsoid, about $\frac{1}{2}$ lin. long.

South Central. Belgian Congo: Lukolela, on the Congo, collector not known. Described from a specimen in the Brussels Herbarium.

143. **Loranthus globiferus,** *A. Rich.*

Var. *borauensis*, Sprague. Add.: *L. spathulifolius*, Engl. & Krause in Engl. Jahrb. xlv. 291.

Upper Guinea. Cameroons: near Garua, 1000 ft., *Ledermann*, 3503, 3593!

Var. *salicifolius*, Sprague. Add: *L. Ostinii*, Chiov. in Ann. di Bot., Roma, ix. 133.

Nile Land. Abyssinia: Dembia; Asoso (on *Acacia verugera*, Schweinf.) *Chiovenda*, 2696! Cococc Valley, above Gondar, *Chiovenda*, 1845.

147. **Loranthus lanceolatus,** *Beauv.* Add: *L. dodensis*, Engl. & Krause in Engl. Jahrb. xlv. 289.

Upper Guinea. Cameroons: near Dodo, 2300 ft., *Ledermann*, 2954!

147*a*. **Loranthus ophiodes,** *Sprague in Bull. Soc. Bot. France*, lviii. *Mém.* viii. 202. Branchlets glabrous, smooth and brownish in a young state, afterwards ash-coloured, densely and finely lenticellate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. in diam. 1 ft. below the apex. Leaves ovate or lanceolate, more or less acuminate to an obtuse apex, sometimes slightly apiculate, cuneate or subcuneate into the base, 2–$3\frac{1}{2}$ in. long, $\frac{2}{3}$–$1\frac{1}{2}$ in. broad, coriaceous or subcoriaceous, dull on both surfaces, glabrous, margin crispate; lateral nerves 4–5 on each side, oblique, anastomosing indistinctly a short distance within the margin, slightly raised on both surfaces; petiole 1–3 lin. long. Heads axillary, solitary, 5–6-flowered, glabrous; peduncle $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; sockets of the flowers arranged in a circle, saucer-shaped, $\frac{3}{4}$-1 lin. in diam., about $\frac{1}{4}$ lin. deep, the inner part of their walls enclosing the pentagonal or hexagonal slightly concave apex of the peduncle; bract shallowly cupular, dorsal margin about $\frac{3}{4}$ lin. long, minutely ciliate, ventral margin $\frac{1}{2}$ lin. long. Receptacle and calyx together campanulate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long. Calyx truncate, irregularly split, about 1 lin. long. Corolla glabrous, $1\frac{1}{4}$ in. long in bud, apical swelling ovoid-oblong, subacute, $2\frac{1}{2}$ lin. long, over 1 lin. in diam., pentagonal, angles ribbed, basal swelling subglobose, 2–$2\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. in diam.; tube split unilaterally 6–$6\frac{1}{2}$ lin. down; lobes reflexed, linear-spathulate, very acute, $4\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad. Filaments inserted $\frac{7}{8}$ lin. below the base of the corolla-lobes, involute, tapering upwards, 3 lin. long, $\frac{7}{16}$ lin. broad at the base, tooth stout, $\frac{3}{8}$ lin. long; anthers narrowly oblong, $1\frac{1}{4}$ lin. long. Disc pentagonal, fleshy, glabrous, $\frac{1}{6}$–$\frac{1}{5}$ lin. high. Style skittle-shaped above,

thickened part $3\frac{3}{4}$–$4\frac{1}{4}$ lin. long, neck hardly 1 lin. long, constricted in the lower third; stigma cylindric, truncate, with a minute apical depression, about $\frac{1}{2}$ lin. long, $\frac{1}{16}$ lin. in diam.

Upper Guinea. Gourma: between Fada and Koupela, *Chevalier*, **24532**! near Diapaga, *Chevalier*, **24438**!

Allied to *L. lanceolatus*, Beauv., from which it differs in the sessile flowers and the longer apical swelling of the corolla. The specific name refers to the snake-like appearance of the corolla when in bud. Described from specimens in Dr. Chevalier's herbarium.

151*a*. **Loranthus crispatulus,** *Sprague in Kew Bulletin*, 1911, 359. Adult branches greyish-brown, finely lenticellate, glabrous, $1\frac{3}{4}$–3 lin. in diam.; branchlets fairly stout, finely striate, minutely and densely puberulous, about $1\frac{3}{4}$ lin. in diam. 9 in. below the apex; internodes 1–$2\frac{1}{2}$ in. long. Leaves opposite, ovate or ovate-lanceolate, acuminate to an acute apex, rounded or (the older ones) subcordate at the base, more rarely obtuse, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{3}{4}$ in. broad, coriaceous (sometimes thinly), glabrous, margin crispate; lateral nerves 2 on each side, very oblique, the upper running subparallel to the midrib, slightly raised on the upper surface, prominent on the lower, veins hardly visible; petiole 2–$3\frac{1}{2}$ lin. long, minutely puberulous or glabrous. Umbels axillary, solitary, or fascicled on the old wood, 4-flowered; peduncle $1\frac{3}{4}$–2 lin. long, stout, thickened at the base, minutely and densely puberulous especially at the apex, sockets of the pedicels saucer-shaped, about $\frac{3}{4}$ lin. in diam., separated by the small flat or concave top of the peduncle; pedicels and bract minutely and densely puberulous; pedicels 1 lin. long; bract shallowly ovate-cupular, obtuse, dorsal margin $\frac{1}{2}$–$\frac{5}{8}$ lin. long, ventral margin $\frac{1}{4}$ lin. long. Receptacle and calyx together campanulate with a wide mouth, $1\frac{3}{4}$ lin. long, minutely puberulous, lower half much narrower than the upper; receptacle nearly 1 lin. long over $\frac{1}{2}$ lin. in diam. Calyx sharply ascending, nearly 1 lin. long, sub truncate, margin shortly and irregularly split. Corolla over $1\frac{3}{4}$ in. long in bud, depressed-truncate, minutely pilose outside; tube split unilaterally about 9 lin. down, basal swelling oblong-ellipsoid, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long; lobes reflexed, spathulate, $3\frac{3}{4}$ lin. long, under 1 lin. broad above, inflexed at a right angle at the apex, produced at the outer angle into an ascending dorsal rim. Filaments inserted about $\frac{1}{8}$ lin. below the base of the corolla-lobes, involute, tapering upwards, $2\frac{1}{2}$ lin. long; tooth $\frac{1}{4}$–$\frac{1}{3}$ lin. long; anthers narrowly oblong, $1\frac{1}{8}$ lin. long. Disc $\frac{1}{4}$ lin. high, hardly lobed. Style skittle-shaped above, thickened part about $3\frac{1}{2}$ lin. long, neck nearly $\frac{7}{8}$ lin. long; stigma ellipsoid, about $\frac{1}{2}$ lin. long, subtruncate.

South Central. Belgian Congo: Nouvelle Anvers, on *Coffea liberica*, Hiern, *De Giorgi*, 5! 6!

Described from specimens in the Brussels Herbarium. The species runs down in the key (p. 270) beside *L. tschintschochensis*, Engl., and *L. Buvumæ*, Rendle. It differs from the former in the ascending calyx, much broader than the receptacle, from the latter in the base of the leaves, and from both species in having only two lateral nerves on each side of the midrib.

159*a*. **Loranthus pubiflorus,** *Sprague in Bull. Soc. Bot. France,* lviii. *Mém.* viii. 201. Branchlets finely grooved and minutely pilose, especially in a young state, $\frac{5}{8}$–$\frac{3}{4}$ lin. in diam. near the apex, 1 lin. in diam. 1 ft. below the apex, the older parts inconspicuously lenticellate; internodes 1–$2\frac{1}{2}$ in. long. Leaves opposite or subopposite, elliptic or ovate-elliptic, usually rounded at the base (the lowest on a branchlet sometimes obtuse at the base, the uppermost sometimes emarginate), rounded or very obtuse at the apex, $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–2 in. broad, thinly coriaceous, glabrous, dull, slightly rough with raised points in a dried state; lateral nerves 3–4 on each side, rather oblique, anastomosing far from the margin, raised on both surfaces; petiole $3\frac{1}{2}$–5 lin. long. Umbels axillary, fascicled, 8–10-flowered, pubescent; peduncle about $1\frac{3}{4}$ lin. long, with a deep apical depression, round which the pedicels are arranged in a circle; pedicels about $\frac{3}{4}$ lin. long; bract ovate from a saucer-shaped base, truncate, dorsal margin $\frac{5}{8}$ lin. long, ventral margin $\frac{1}{5}$ lin. long. Receptacle and calyx together campanulate, nearly 1 lin. long, minutely pilose outside. Calyx ascending, $\frac{3}{8}$ lin. long, subtruncate, shortly and irregularly split. Corolla red or yellow, about $1\frac{1}{2}$ in. long in bud, minutely pilose outside, apical swelling oblong-ellipsoid, $1\frac{1}{2}$ lin. long, nearly 1 lin. in diam., pentagonal, angles not ribbed, faces faintly 3-nerved, basal swelling ellipsoid, $1\frac{3}{4}$ lin. long; tube split unilaterally $7\frac{1}{2}$–$8\frac{1}{2}$ lin. down; lobes reflexed, spathulate, $2\frac{3}{4}$–3 lin. long, upper enlarged part about $1\frac{1}{2}$ lin. long, hardly $\frac{3}{4}$ lin. broad. Filaments inflexed, 2 lin. long, tapering upwards, grooved on the inner surface, tooth stout, obtuse, $\frac{1}{3}$ lin. long; anthers oblong-linear, 1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad. Disc $\frac{1}{8}$ lin. high. Style skittle-shaped above, thickened part $1\frac{3}{4}$–2 lin. long, neck $\frac{1}{2}$ lin. long; stigma pear-shaped with a minute apical depression, $\frac{3}{4}$ lin. long, lower half gradually thickened upwards into the base of the ellipsoid upper half.

Upper Guinea. Ivory Coast: Bingerville, on *Ficus* sp., *Chevalier,* 16047! 16059!

L. pubiflorus has the facies of *L. lanceolatus,* Beauv., from which it may be distinguished by the pilose corolla and branchlets and the large central depression at the apex of the peduncle. Described from specimens in Dr. Chevalier's herbarium.

174*a*. **Loranthus Stolzii,** *Engl. & Krause in Engl. Jahrb.* xlv. 291. Branches terete, rather stout, $2\frac{1}{2}$–3 lin. in diam. 16 in. below the apex, glabrous, slightly wrinkled, slightly striate longitudinally, clear brown. Leaves oblong or ovate-oblong, more rarely ovate-lanceolate, obtuse at the apex, subacute at the base, 2–3 in. long, 1–$1\frac{1}{4}$ in. broad, thinly coriaceous, rigid, glabrous; petiole fairly stout, channelled, 3–6 lin. long. Umbels axillary, 5–9-flowered; peduncle $3\frac{1}{2}$–$5\frac{1}{2}$ lin. long; sockets of the pedicels saucer-shaped; pedicels slender, 3–5 lin. long; bract unilaterally developed from a saucer-shaped base, ventral margin $\frac{1}{6}$ lin. long, dorsal margin over $\frac{1}{2}$ lin. long. Receptacle and calyx together urceolate-obovoid, over $1\frac{1}{4}$ lin. long, 1 lin. in diam. Calyx $\frac{1}{8}$ lin. long. Corolla orange-red, 2 in. long, basal swelling ellipsoid, nearly 3 lin. long; lobes lanceolate-linear, nearly 5 lin. long, sharply incurved at the apex, upper half strongly keeled dorsally, $\frac{3}{8}$ lin. deep, with

a hard inner layer, lower half soft. Filaments deflexed, tapering upwards, $2\frac{1}{4}$–3 lin. long, tooth $\frac{1}{8}$ lin. long; anthers oblong-linear, $1\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: near Kyimbila, 4000 ft., *Stolz*, 113!

Allied to *L. nyasicus*, Baker and Sprague, from which it may be distinguished by the shape of the receptacle and the smaller disc.

179*a*. **Loranthus igneus,** *Sprague in Kew Bulletin*, 1912, 232. Branchlets densely warted, about $1\frac{1}{2}$ lin. in diam. 1 ft. below the apex, the younger parts covered with rusty branched hairs which are easily rubbed off; internodes $\frac{1}{2}$–2 in. long. Leaves opposite or subopposite, ovate-lanceolate, $2\frac{1}{4}$–$2\frac{3}{4}$ in. long, 10-15 lin. broad, subacute at the apex, rounded or obtuse at the base, thinly coriaceous, glabrescent; lateral nerves 4–5 on each side, rather oblique, anastomosing far from the margin, slightly raised on the upper surface, inconspicuous on the lower; midrib inconspicuous on the upper surface, much raised on the lower; petiole 4–5 lin. long. Only detached flowers known. Receptacle and calyx together campanulate, $\frac{3}{4}$ lin. long without the calyx-teeth, clothed with easily-detached rusty hairs. Calyx-teeth triangular, $\frac{1}{8}$–$\frac{1}{4}$ lin. long. Corolla fiery red (*Braun*), $1\frac{1}{3}$ in. long, sparingly clothed outside with easily-detached rusty hairs, apical swelling of the bud oblong, subacute; tube split unilaterally $\frac{1}{2}$ in. down, basal swelling subglobose, $1\frac{1}{2}$ lin. in diam.; lobes erect, lanceolate-spathulate, about $3\frac{1}{4}$ lin. long, upper enlarged part lanceolate, acute, over $1\frac{1}{2}$ lin. long, under $\frac{1}{2}$ lin. broad, with a hard inner layer sharply demarcated below. Filaments inflexed or involute, tapering upwards, about 2 lin. long, curved outwards at the base, thickened in the uppermost $\frac{1}{4}$ lin., tooth narrowly triangular, acute, $\frac{1}{7}$ lin. long; anthers oblong-linear, $\frac{3}{4}$ lin. long, $\frac{1}{7}$ lin. broad. Disc very thick, $\frac{1}{4}$ lin. high, teeth small, acute. Style skittle-shaped above, thickened part about $1\frac{1}{2}$ lin. long, neck nearly 1 lin. long; stigma ovoid or ellipsoid, about $\frac{1}{3}$ lin. long.

Mozamb. Distr. German East Africa: Cheminda-Bakary Rondo, *Braun in Herb. Amani*, 1169!

Described from a specimen in the Berlin herbarium.

Allied to *L. dichrous*, Engl. (Cameroons), from which it differs in the shorter receptacle, the distinctly toothed calyx and the longer corolla.

190. **Loranthus heteromorphus,** *A. Rich.* Add: *L. Sennii*, Mattei in Bol. Ort. Bot. Palermo, ix. 24.

Nile Land. Eritrea: Keren, *Senni*, 626!

12. **Viscum rotundifolium,** *Linn. f.* Add: *V. Zizyphi-mucronati*, Dinter, Deutsch-Südw.-Afr. 56, partly.

13. **Viscum tricostatum,** *E. Mey.* Add: *V. Zizyphi-mucronati*, Dinter, Deutsch-Südw.-Afr. 56, partly.

21*a*. **Monadenium crispum,** *N. E. Br.* Stem or stems probably annual and arising from a tuberous rootstock, $4\frac{1}{2}$–7 (or according to

Sacleux up to 12) in. high, erect, unbranched, apparently fleshy, 1–1⅓ lin. thick when dried, glabrous. Leaves alternate, very spreading or perhaps slightly deflexed, fleshy, shortly petiolate, 1–1¾ in. long, 1½–4½ lin. broad, linear-lanceolate to lanceolate, about equally acute at both ends, crisped at the margins, glabrous on both sides. Peduncles solitary in the axils of the upper leaves and terminal, 1½–2 lin. long, bearing 1–3 involucres. Bracts free to the base, 1¾–2⅓ lin. long, 1–1½ lin. broad, oblong, rounded and apiculate at the apex, slightly keeled down the back, glabrous, probably green. Involucre about 1½ lin. long, open to half-way down in front, truncate at the top, with a slightly thickened entire margin, glabrous. Ovary trigonous, with a slight simple keel down each angle, exserted on a recurved pedicel, glabrous; styles free to the base, ⅓ lin. long, minutely 2-lobed at the apex. Capsule about 2 lin. in diam. and 2½ lin. long, glabrous. Seeds 1½ lin. long, oblong, truncate at each end, minutely tuberculate all over and with a furrow down one side.

Mozamb. Distr. German East Africa: under trees in the forest of Amboni, *Sacleux*, 2320!

Similar to *M. crenatum*, N. E. Br., in appearance, but the leaves are not wing-keeled beneath, the peduncles are much shorter and the involucre is entire at the rim.

21*b*. **Monadenium Chevalieri,** *N. E. Br.* Stem annual from a perennial rootstock, about 3½ in. high and ⅔ lin. thick in the only specimen seen, herbaceous, glabrous. Leaves alternate, ⅔ to probably about 2 in. long, but broken in the type, 1–2 lin. broad, linear, acute, longitudinally folded, glabrous. Peduncles solitary, axillary, 6–7 lin. long, rather slender, with a pair of bracts and 1 involucre at the apex, but possibly ultimately developing more, glabrous. Bracts free to their base, 1½–2 lin. long, 1¼ lin. broad, elliptic, acute, with a slightly prominent keel, glabrous. Involucre 1¾ lin. long, 1¼ lin. in diam., slightly constricted under the entire rim and open to half-way down in front. Pedicel abruptly recurved from the opening of the involucre, bearing the remains of a distinct toothed calyx at its apex. Capsule fallen, not seen.

North Central. Eastern Shari Region: Gouz Amer, near Ndeli, *Chevalier*, 8291!

Allied to *M. crispum*, N. E. Br., but the leaves are narrower, not crisped at the margins and the peduncles are much longer.

5. **Synadenium carinatum,** *Boiss.* Add:

Mozamb. Distr. Zanzibar, *Sacleux*, 369!

9. **Euphorbia zambesiana,** *Benth.* Add:

North Central. Dar Banda: Ndelli, *Chevalier*, 6782!

9*a*. **Euphorbia zeylana,** *N. E. Br.* Perennial. Stems apparently prostrate, 6–12 in. long and 1–1½ lin. thick in the specimens seen, naked, with thickened nodes and more or less woody on the lower ½–¾ of their length, branching and very densely leafy at the terminal

part, densely and shortly pubescent or subtomentose all round, finally glabrous. Leaves opposite, shortly petiolate, 1½–3 lin. long, ½–1 lin. broad, oblong, obtuse, unequal at the base, softly and densely pubescent on both sides. Involucre solitary in the axils of the leaves at the tips of the branches, very shortly pedicellate, including the appendages ¾–1 lin. in diam., cup-shaped, subtomentose or densely puberulous, with 4 appendaged glands and 5 minute deltoid-ovate acute ciliate lobes; glands about ¼ lin. in their greater diam., rather narrowly transversely oblong, very concave, entire, with conspicuous petal-like white appendages twice as broad, more or less toothed on the outer margin. Capsule trigonous, rather more than 1 lin. in diam., subtomentose, exserted on a recurved pedicel about ¾ lin. long; styles minute, about ⅕ lin. long, free to the base, deeply bifid, very spreading. Seeds ¾ lin. long, oblong, slightly angular, somewhat pointed at one end, faintly rugulose, pale bluish-white.

Nile Land. British Somaliland: Zeyla, *Drake-Brockmann*, 736! 737! 738! 739! 740! 741! 742!

11. **Euphorbia granulata,** *Forsk.*, var. **glabrata,** *Boiss.* Add:

North Central. Bagirmi: between Aouni and Redema, *Chevalier*, 10017!

21. **Euphorbia sanguinea,** *Hochst. & Steud.* Add:

Lower Guinea. Angola: Huilla, *Antunes*, 784!

Var. *intermedia*, Boiss. Add:

Nile Land. British East Africa: Taita; Boura Mountains, *Sacleux*, 2544!

24. **Euphorbia prostrata,** *Ait.* Add:

Upper Guinea. French Guinea: Conakry, *Maclaud*, 15! Ivory Coast: Malamalasse, *Chevalier*, 17530!

Lower Guinea. Gaboon: Libreville, *Thollon*, 130!

Mozamb. Distr. Zanzibar, *Sacleux*, 224! 2013!

26*a*. **Euphorbia minutiflora,** *N. E. Br.* Stems radiating from the crown of the root, prostrate, pinnately branched, slender, glabrous all round. Leaves opposite, very shortly petiolate, ¾–1½ lin. long, ¾–1⅓ lin. broad, orbicular-cordate, slightly notched at the very obtuse apex, slightly unequal at the base, entire, subfleshy, glabrous. Stipules on each side of the stem united into a broadly ovate or ovate-subquadrate body, toothed at the rounded or subtruncate apex. Involucres solitary, axillary on very short axillary branchlets, minute (and including the short peduncle) ⅔ lin. long, ⅓ lin. in diam., with 4 glands and 5 minute deltoid acuminate lobes; glands ⅛–⅙ lin. in their greater diam., transversely oblong, apparently dark red, with a minute petal-like white appendage on their outer margin. Capsule ¾ lin. in diam., somewhat acutely 3-angled, glabrous, exserted on a recurved pedicel about ¼ lin. longer than the involucre; styles about ⅕ lin. long, free to the base, spreading, minutely bifid at the apex. Seeds ½ lin. long, obtusely 4-angled, smooth.

Mozamb. Distr. Rhodesia: Victoria Falls, *Schwarz in Herb. Bolus*, 13027!

30*a*. **Euphorbia arabicoides,** *N. E. Br.* Annual, 6–8 in. high, erect, dichotomously branching from the cotyledon-node upwards. Branches slender, at the stoutest parts not more than $\frac{1}{2}$ lin. thick, most of them with a few spreading hairs all round above each node, otherwise glabrous. Leaves opposite, shortly petiolate, 4–11 lin. long, $\frac{3}{4}$–2 lin. broad, linear-oblong or linear-lanceolate, acute, unequal at the base, glabrous on both sides. Stipules free, subulate. Involucre solitary in the forks of the branches and terminal, very shortly pedicellate, $\frac{2}{3}$ lin. in diam., obconic and about 1 lin. long including the pedicel, glabrous, with 4 glands and 5 minute acute sparingly ciliate lobes; glands $\frac{1}{6}$–$\frac{1}{5}$ lin. in their greater diam., transversely oblong, entire, all unappendaged or 2 of them with an obliquely ovate obtuse petal-like white appendage, both kinds often on the same branch. Capsule $1\frac{1}{4}$ lin. in diam., trigonous, thinly sprinkled with rather long spreading hairs; styles $\frac{1}{4}$ lin. long, free to the base, deeply bifid at the apex. Seeds $\frac{2}{3}$ lin. long, oblong, 4-angled, with 2–3 transverse wrinkles on each face, pinkish-white or perhaps pale grey when quite ripe.

Lower Guinea. South Angola: in open forest between Chibia and Quibita, *Pearson*, 2640!

Very similar to *E. arabica*, Hochst. & Steud., but easily recognised by the spreading hairs on the stems above each node, narrower and more obconic involucre, glands often with appendages and the larger hairy capsule.

32*a*. **Euphorbia mossamedensis,** *N. E. Br.* Annual, erect, 4–8 in. high, dichotomously branching from the cotyledon-node upwards, quite glabrous in all parts. Stem below the cotyledon-node less than 1 lin. thick; branches slender. Leaves opposite, shortly petiolate, 2–6 lin. long, 1–$2\frac{1}{2}$ lin. broad, oblong or elliptic-oblong, obtuse, minutely apiculate, unequal at the base. Involucres on pedicels $\frac{1}{3}$–$\frac{1}{2}$ lin. long, solitary in the forks of the branches and terminal, $\frac{2}{3}$–$\frac{3}{4}$ lin. in diam., subglobose-campanulate, with 4 usually appendaged glands and 5 minute fringed lobes; glands $\frac{1}{6}$–$\frac{1}{4}$ lin. in their greater diam., transversely oblong, all without or 2 or all with a small white petaloid appendage. Capsule nearly 1 lin. in diam., somewhat acutely trigonous, glabrous, exserted on a curved pedicel $\frac{3}{4}$ lin. long, which is dilated at its apex into a disk (? perianth); styles free to the base, $\frac{1}{4}$ lin. long, bifid at the apex, rather slender, ascending-spreading. Seeds $\frac{2}{3}$ lin. long, oblong, slightly pointed at one end, 4-angled, irregularly and deeply transversely rugose on the faces, pale brown to whitish.

Lower Guinea. South Angola: dry ground in open forest near the Mossamedes Railway, about kilom. 107–108·5, *Pearson*, 2865! 2909'!

40. **Euphorbia Benthami,** *Hiern.* Add:

Lower Guinea. Angola: Huilla; Mounyino, *Dekindt*, 885! 3047!

43. **Euphorbia systyloides,** *Par.* Add:

Mozamb. Distr. German East Africa: Bagomoyo and Mandera, *Sacleux*, 1078! Pare, *Sacleux*, 1313!

43*a*. **Euphorbia Pearsoni,** *N. E. Br.* A herb, 1 ft. or more high, possibly annual, with the main stem in the specimen seen about 4 in. long and 2 lin. thick, branching at the top. Branches 4–8 in. long, 1–1¼ lin. thick, erect from a curved basal part, terminating in a lax 1–3 times forked dichotomous or trichotomous cyme, glabrous, greyish. Leaves alternate on the undivided part of the branches, 1¾–3½ in. long, ⅙–½ in. broad, linear to lanceolate or narrowly oblong, those on the cyme opposite, very much shorter and mostly lanceolate, all acute or obtuse, apiculate, tapering to a sessile or subsessile base, entire or very minutely toothed on the margins, and some of the leaves, especially the lower, with a small very spreading subulate tooth on each side just above the base, glabrous on both sides, with the midrib slightly prominent and rounded at the base; stipules none. Involucre solitary, sessile at the nodes or forks or at the tips of short branches of the cyme, 1–1¼ lin. in diam., cup-like, glabrous, with 4 glands and 5 small toothed lobes; glands 1½–⅔ lin. in their greater diam., transversely oblong, entire, apparently dark brown. Capsule oblong-trigonous, 1¾–2 lin. long, thinly sprinkled with very minute adpressed hairs or ultimately glabrous, exserted on a curved pedicel about twice as long as the involucre; styles free, ½ lin. long, stout, bifid, erect. Seeds 1½ lin. long, dorsally flattened, oblong, rugulose and longitudinally ribbed, whitish, with a cap-like brown caruncle margined with white.

Lower Guinea. South Angola: in open forest near kilom. 108·5, on the Mossamedes Railway, *Pearson*, 2071!

This is closely allied to *E. pseudoholstii,* Pax, from Somaliland, and has the peculiar teeth at the base of some of the leaves, characteristic of that species, but the habit of the plant is different, the branches divide into more evident cymes, the involucre is larger and glabrous and the seeds rugulose as well as grooved and more or less ribbed.

52. **Euphorbia verticillata.** For the description given on p. 525 of this volume, substitute the two following:

52. **Euphorbia verticillata,** *Pax in Bull. Herb. Boiss.* 1*re sér.* vi. 740. Rootstock a tuber, producing 1 or more annual stems branching into an umbel of 4–5 rays at the top, 2½–12 in. high, minutely puberulous. Leaves alternate on the stem, a whorl of 5 at the base of the umbel and a whorl of 4 (bracts) under each involucre, all sessile; those on the stem smaller than the others and the lowermost often scale-like, ⅙–1 in. long, 1½–5 lin. broad, ovate or ovate-lanceolate, acute; those of the whorls ⅓–1¾ in. long, 1½–5 lin. broad, lanceolate, acute or acuminate, narrowed at the base, with revolute margins, distinctly penniveined, with numerous veins on each side of the midrib, glabrous on both sides. Rays of the umbel simple or once divided into 1–3 smaller rays, minutely puberulous. Involucre solitary, terminal, closely sessile, 2½ lin. in diam., cup-shaped, minutely puberulous, with 5 glands and 5 transversely oblong minutely toothed lobes; glands 1–1¼ lin. in their greater diam., rather narrowly transverse-oblong, entire, with the inner margin raised or rim-like. Ovary ovoid, tapering into the styles, shortly exserted from the involucre, minutely and densely puberulous, erect; styles

$\frac{2}{3}$–1 lin. long, united to the middle or beyond, with slightly spreading minutely bifid or emarginate tips, glabrous. Capsule and seeds not seen.

Lower Guinea. Angola: Huilla; sandy plains in the vicinity of the River Nene, 5900 ft., *Dekindt*, 3088! (*Antunes* 889 according to Pax.)

Although there is disagreement in the name of the collector and number quoted, this is undoubtedly the plant described as *E. verticillata* by Pax, as is clearly evidenced by the remarkable character of having a whorl of 4 bracts around each puberulous involucre as described by him, as well as by being so named in the Paris Herbarium. On the label with the specimens from which the above description is made, the number 88 has been written, crossed out and 3088 substituted, as if it may have been intended to write the number 889 as quoted by Pax and then corrected. Antunes and Dekindt collected together during the Huilla expedition and both would be likely to collect the same plant and so some confusion may have been made in name and number.

52*a*. **Euphorbia parifolia,** *N. E. Br.* Rootstock an elongated tuber, producing 1 or more annual stems branching into a 2–3-rayed umbel at the top and with 1 or 2 pairs of branches or sometimes a solitary branch below the umbel, 4–9 in. high, glabrous. Leaves and bracts all opposite or with a whorl at the base of the umbel, sessile, spreading, subcoriaceous or subfleshy, $\frac{1}{3}$–$1\frac{1}{2}$ in. long, 2–7 lin. broad, with the basal pairs very much reduced or scale-like, lanceolate, elliptic or elliptic-ovate, acute, rounded or slightly narrowed at the base, veins subobsolete, some leaves obscurely 3–5-nerved from the base, glabrous on both sides and probably glaucous. Rays of the umbel and branches below them 2–6 in. long, 1–3 times forked, rather widely diverging, glabrous. Involucres solitary, sessile at the tips and in the forks of the rays, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 4 glands and 5 oblong bifid or toothed lobes; glands apparently erect, $\frac{2}{3}$–$\frac{3}{4}$ lin. in their greater diam., rather narrowly transversely oblong, concave or shallowly crater-like, entire. Ovary exserted on a pedicel twice as long as the involucre, at first recurved, finally erect, glabrous; styles $\frac{2}{3}$ lin. long, free to the base, not spreading, bifid at the apex. Capsule about 2 lin. in diam. and rather longer than broad, oblong, trigonous. Seeds not seen.—*E. verticillata,* N. E. Br., on p. 525 of this volume, partly, not of Pax.

Lower Guinea. Angola: Huilla; on a sandy plain, 5600 ft., *Antunes,* 1047! (*Dekindt* 1047 in the Berlin Herbarium is probably an error as to the collector's name.)

I was misled into describing this plant as *E. verticillata* on p. 525 because the specimen of it in the Berlin Herbarium has evidently been mistaken for that species by Pax himself. But now that I have seen specimens in the Paris Herbarium that are undoubtedly correctly named *E. verticillata,* as well as others of the present plant, there can be no doubt as to the perfect distinctness of the two species. The conspicuous difference in the arrangement, shape, texture and venation of the leaves is at once very apparent, besides the details in floral structure. Concerning the disparity in collectors' names, see note above under *E. verticillata.*

53. **Euphorbia platycephala,** *Pax.* Add:

Upper Guinea. French Guinea, *Paroisse,* 201!

57. **Euphorbia Cervicornu,** *Baill.* Add:

Lower Guinea. French Congo: by the River Alima, *Thollon*, 142! 910!

57. **Euphorbia macrophylla,** *Pax.* Add:

North Central. Eastern Shari: around Gribingui, *Chevalier*, 6513!
Mozamb. Distr. German East Africa: Mandera, *Sacleux*, 928!

61. **Euphorbia Engleri,** *Pax.* Add:

Mozamb. Distr. German East Africa: Mandera, *Sacleux*, 927!

82. **Euphorbia cuneata,** *Vahl.* Add:

Mozamb. Distr. Zanzibar, *Sacleux*, 382!

90. **Euphorbia Scheffleri,** *Pax.* Add:

Nile Land. Gallaland: near Chedan in Aroussi Country, *Brumpt!*
Brumpt notes on his label that this is a tree 15–20 ft. high.

93. **Euphorbia sepium,** *N. E. Br.* Add:

Upper Guinea. Senegal: Cayor & Dakar, *Paroisse*, 43! French Soudan: Danga, *Chevalier*, 1315! Dahomey, *Poisson*, 1!

98. **Euphorbia gossypina,** *Pax.* Add:

Nile Land. British East Africa: Nairobi, *Allaud*, 97!

103. **Euphorbia media**, *N. E. Br.* Add:

Mozamb. Distr. Zanzibar, *Sacleux*, 2014!

I have not seen female flowers of typical *E. media*, but the male plant seems identical with that used as a source of rubber in Natal, which is probably *E. Tirucalli*, Linn. But flowers of the Indian plant have not yet been seen.

115*a*. **Euphorbia darbandensis,** *N.E. Br.* A succulent branching spiny "cactus-like" plant 6–18 in. high (*Chevalier*), subdiœcious; branches cylindric, 1–1½ in. thick, spiny and apparently somewhat tuberculate at the apical part, spineless and apparently without tubercles below, glabrous. Leaves broken, only basal portions 2–3 in. long and about ⅓ in. broad seen, linear, narrowing at the base into an acutely triangular petiole and with a wing-like keel ⅔ lin. broad along the midrib beneath, glabrous, soon deciduous. Spines rather crowded, but confined to the terminal 1–2½ in. of the branches, evidently deciduous, leaving the stem naked below, 4–7 lin. long, dilated and flattened from above at the base, where they end abruptly and do not dilate into a horny shield, dark brown. Peduncles solitary in the axils of the leaf-scars at the tips of the branches, 6–7 lin. long, bearing 3 involucres in the male or submonœcious plant and 1 in the female, glabrous. Bracts scale-like, submembranous, 1½–1¾ lin. long, broadly ovate, usually torn at the rounded apex, glabrous. Involucres 1¾–2 lin. in diam., probably larger when alive, somewhat obconic or subcylindric-campanulate, scaberulous with very minute papillæ, with 5 glands and 5 subquadrate or transversely subrectangular toothed lobes; glands 1–1¼ lin. in their greater diam., transversely oblong, entire, with the inner margin slightly raised, apparently yellow. Ovary subacutely 3-angled, glabrous, exserted on a

recurved pedicel twice as long as the involucre; styles united into a very short cone at the base, those of the submonœcious plant ¾ lin. long, rather stout and bifid at the tips, of the female plant 1 lin. long, rather slender, capitate and minutely bilobed at the apex. Capsule and seeds not seen.

North Central. Dar Banda, *Chevalier*, 6699! 6752! 7162!

Very nearly allied to *E. venenifica* and *E. unispina*, differing from the former by its narrower leaves, longer and rather more slender spines and peduncles and different styles, and from *E. unispina* by its spines being deciduous and not dilated into a persistent horny shield at the base.

152*a*. **Euphorbia strangulata,** *N.E. Br.* A succulent spiny leafless bush, branching at the base. Stems or "branches spreading-ascending, up to 3 ft. high" (*Gossweiler*), 1–1¼ ft. long in the specimens seen, deeply constricted into numerous orbicular-ovate or shortly conic-ovate segments 1–2½ (mostly 1¾) in. long, 1¼–2 in. in diam., 5-angled, light green, apparently not glaucous; angles wing-like, ⅔–⅞ in. broad, ⅛ in. thick, slightly sinuate-toothed, with continuous horny margins. Leaves rudimentary, scale-like, about ⅔ lin. long and broad, broadly deltoid-ovate, reddish-brown, soon deciduous. Spines 1½–3½ lin. long, diverging, in pairs ¼–½ in. apart, with or without very minute or rudimentary prickles at their base, at first (together with the horny margin of the stem-angles) brown, becoming grey. Flowering-eyes 2 lin. above the spine-pairs, each producing a sessile cyme of 3 sessile involucres. Bracts 1–1½ lin. long, rounded, concave, submembranous. Involucres 2½ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 rather short transversely oblong fringed lobes; glands 1–1⅓ lin. in their greater diam., rather narrowly transversely oblong, slightly concave or when dried appearing slightly 2-lipped, entire; central involucre male, lateral hermaphrodite; ovary sessile, included, rather sharply 3-angled, glabrous; styles partly exserted, 1 lin. long, united for a third of their length, with spreading bifid tips.

Lower Guinea. Angola: on the rocks of Pungo Andongo, *Gossweiler!*

Described from a living branch and some dried material sent to Kew by Mr. J. Gossweiler. Apparently allied to *E. bellica*, Hiern, but the stems are 5-angled, not glaucous and the spines are much shorter than in that species.

190*a*. **Euphorbia ambacensis,** *N.E. Br.* A succulent leafless spiny bush, growing to "12 ft. high, branching at the base; stems single or numerous, strictly erect; branches parallel to the stems" (*Gossweiler*), 3–4-angled in the specimen seen, 2–3 (or more?) in. in diam., constricted into subelliptic to more or less conical segments 2–6 (or more?) in. long, grass-green, perhaps slightly glaucous on the younger parts; angles 1½–2 lin. thick, slightly sinuate-toothed; spine-shields not connected by a horny border, suborbicular and 2 lin. in diam., or obovate and 2½–3 lin. long and 2–2½ lin. broad; spines 1–3 lin. long, in pairs ¼–⅔ in. apart, diverging, with deciduous hardened auricles (stipules) at their base when young. Leaves scale-like, 1–1½ lin. long, rounded, soon deciduous. Flowering-eyes contiguous to or ½–1 lin. above the spine shields, pro-

ducing 2–3 ultimately 3-flowered cymes on peduncles $1\frac{1}{2}$–2 lin. long. Bracts suborbicular, about $2\frac{3}{4}$–3 lin. in diam., deeply concave. Involucre (dried and immature) $3\frac{1}{2}$ lin. in diam., cup-shaped, glabrous, with 5 glands and 5 subquadrate deeply fringed lobes; glands $1\frac{1}{4}$–$1\frac{1}{3}$ lin. in their greater diam., rounded-reniform, rather deeply notched on the inner margin, apparently yellowish. Ovary and fruit not seen.

Lower Guinea. Angola: Ambaca, used by the natives for fences in their villages and cattle-yards, *Gossweiler !*

1. **Dichostemma glaucescens,** *Pierre.* Add:

Lower Guinea. Gaboon: Libreville, *Klaine,* 110! 113! 1129!

1. **Anthostema senegalense,** *A. Juss.* Add:

Upper Guinea. Senegambia, *Leprieur ! Perrottet,* 728! *Heudelot,* 40! Guinea: Tanana, *Poisson,* 13! Tristas Island, *Paroisse,* 1! French Soudan: Moussai, *Chevalier,* 406!

2. **Anthostema aubryanum,** *Baill.* Add:

Lower Guinea. Gabocn: Libreville, *Klaine,* 238!

3. **Bridelia scleroneuroides**, *Pax.* Add; Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 450.

Mozamb. Distr. German East Africa: Bukoba district; Itara, *Mildbraed,* 200.

5. **Bridelia angolensis,** *Welw.* Add:

Lower Guinea. Angola: Huilla, *Dekindt,* 652!

10. **Bridelia atroviridis**, *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 450.

South Central. Belgian Congo: Ituri district; Mawambi, *Mildbraed,* 3069.

12*a*. **Bridelia grandis,** *Pierre MSS. ex Hutchinson.* A tree 60–63 ft. high; branchlets pilose, at length becoming nearly glabrous. Leaves oblong-elliptic or oblong-oblanceolate, long-cuspidate-acuminate and obtuse at the apex, mostly cuneate at the base, $2\frac{1}{2}$–4 in. long, 1–$1\frac{3}{4}$ in. broad, rather rigidly chartaceous, shining, glabrous and darker on the upper surface, dull, often somewhat glaucous and thinly pubescent on the lower surface; lateral nerves 8–9 on each side, prominent below, slightly arcuate, extending to the margin; tertiary nerves lax and inconspicuous; petiole 3–$3\frac{1}{2}$ lin. long, rather densely rusty-pubescent; stipules subulate-lanceolate, densely tomentose. Bracts small, hairy. Male flowers: pedicel $\frac{1}{2}$ lin. long, glabrous. Buds ovoid, glabrous. Sepals lanceolate, subacute, scarcely $\frac{2}{3}$ lin. long, glabrous on both sides. Petals spathulate, very small. Disk thick and fleshy, undulately lobed, glabrous. Rudimentary ovary subentire, glabrous. Female flowers subsessile: Sepals ovate-triangular, subcoriaceous, glabrous. Petals elliptic-lanceolate, obtuse, scarcely half the length of the sepals. Disk enclosing the ovary, denticulate, glabrous outside. Ovary narrowly ovoid, glabrous; styles deeply bilobed. Fruits 1-celled, shortly stalked, oblong-ellipsoid, about 3 lin. long and 2 lin. in diam.

Lower Guinea. Gaboon: near Libreville, *Klaine*, 631! *Jolly*, 163! and without precise locality, *Thollon*, 81!

To follow *B. zanzibarensis*, Vatke & Pax, from which it may be distinguished by its narrower cuspidate-acuminate leaves, which are cuneate at the base, and have indistinct tertiary nerves.

13. **Bridelia Neogœtzea**, *Gehrm.* Add; Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 451, t. lvii.

South Central. Belgian Congo: west side of Ruwenzori, *Mildbraed*, 2684, 2696.

1. **Cleistanthus Holtzii,** *Pax.* Add:

Mozamb. Distr. Portuguese East Africa: Pungoue Valley, *Vasse*, 325!

4*a*. **Cleistanthus gabonensis,** *Hutchinson in Kew Bulletin*, 1912, 332. A tree 18–30 ft. high; branches with roughish bark marked with numerous conspicuous lenticels, shortly pubescent; young branchlets spreading, angular, pubescent or at length nearly glabrous. Leaves oblong or oblong-elliptic, caudate-acuminate, acumen about $\frac{1}{2}$ in. long, subacute, rounded at the base, $2\frac{1}{4}$–$4\frac{1}{4}$ in. long, $1\frac{1}{4}$–2 in. broad, chartaceous or thinly coriaceous, often somewhat glaucous-grey on the upper surface, brownish or pale green below, glabrous and dull on both surfaces; lateral nerves 4–6 on each side, arcuate, looped and gradually fading near the margin; tertiary nerves slender, subparallel, rather close, distinct; petiole about 2 lin. long, strongly transversely wrinkled, shortly pubescent; stipules not seen. Flowers monœcious, in axillary fascicles of 3–4, usually one female and the remainder males, all subsessile. Male flowers: Sepals ovate-lanceolate, subobtuse, $2\frac{1}{4}$ lin. long, 1 lin. broad, densely rusty-tomentellous outside, glabrous within. Petals oblanceolate, subacute, about $\frac{2}{3}$ lin. long, fleshy, glabrous. Disk rather small, fleshy, pubescent. Stamens 7–10; filaments very short; anthers $1\frac{1}{4}$ lin. long, glabrous. Rudimentary ovary densely rusty-villous. Female flowers: Sepals and petals as in the male. Disk rather thin, long-villous on the margin and within. Ovary densely rusty-villous; styles tomentose, multifid. Capsule trilobed, nearly $\frac{1}{2}$ in. long and about $\frac{3}{4}$ in. in diam., densely rusty-villous, with an undercoating of shorter crisped hairs. Seeds about $3\frac{1}{2}$ lin. long, slightly shining.

Lower Guinea. Gaboon: around Libreville, *Klaine*, 3422! 3432!

Very similar to *C. bipindensis*, Pax, from which it can scarcely be separated except by dissection and comparison of the flowers. It differs in its subsessile flowers, smaller and thinner male and female disks, more numerous stamens, and larger subsessile anthers.

5*a*. **Cleistanthus racemosus,** *Pierre MSS. ex Hutchinson.* A tree 20–25 ft. high, with a trunk 16 in. in diam.; branches glabrous, except when quite young. Leaves ovate-elliptic, oblong-elliptic or rarely lanceolate, caudate-acuminate, acumen about 4 lin. long, obtuse, rounded and slightly unequal-sided at the base, 2–$4\frac{1}{4}$ in. long, $\frac{1}{2}$–2 in. broad, subcoriaceous, entire, glabrous and distinctly reticulate on both

surfaces; lateral nerves 5–6 on each side, more prominent on the lower surface, looped and branched well within the margin; petiole 1½–2 lin. long, strongly transversely wrinkled, thinly pubescent. Flowers diœcious. Racemes solitary, glabrous, about 1½ in. long, slender, 10- to few-flowered; bracts deciduous; pedicels slender, 1½ lin. long, glabrous. Sepals oblong-lanceolate, subacute, 1⅓ lin. long, submembranous, glabrous. Petals linear-lanceolate, very small. Disk thick, annular, glabrous. Anthers ½ lin. long. Rudimentary ovary shortly trilobed, lobes acute. Female flowers not known.

Lower Guinea. Gaboon: around Libreville, *Klaine*, 764!

To be inserted after *C. polystachyus*, Hook., from which it differs by its rounded leaf-base and the slender glabrous inflorescence.

1. **Oldfieldia africana,** *Benth. & Hook. f.* Add:

Upper Guinea. Ivory Coast: Malamalasso, on the lower Comoe River, *Chevalier*, 16250!

15. **MEGABARIA,** *Pierre ex Hutchinson.*

When the description of this genus was published in the *Kew Bulletin* in 1910, I was quite unaware of the genus *Spondianthus*, described by Engler in *Bot. Jahrb.* xxxvi. 215 (1905), and referred by him to *Anacardiaceæ*. He recognised two species, *S. Preussii*, from the Cameroons, and *S. glaber*, from Angola. Subsequently (in *Notizblatt Königl. Bot. Gart. Berlin*, 1911, *no.* 48, 240) he transferred the genus to *Euphorbiaceæ*, at the same time recognising its identity with specimens distributed by Pierre under the MS. name of *Megabaria Trillesii* and *M. obovatum*, the former of which was published as a name only by De Wildeman; he reduced his *S. glaber* to a variety of *S. Preussii*, and added another species, *S. obovatus*, founded upon *Megabaria obovatum*, Pierre, MS. The last species, however, represents quite a distinct genus, and was described and figured as such by the writer in *Hook. Ic. Pl. t.* 2929 (1911) as *Protomegabaria*. The following corrections and additions are therefore necessary:

Megabaria should be **Spondianthus.**

1. **Megabaria Trillesii,** Pierre ex Hutchinson, becomes **Spondianthus Preussii,** Engl. in Bot. Jahrb. xxxvi. 216 (1905).

Add to synonymy: *Spondianthus Preussii*, forma *oblongifolius* and var. *glaber*, Engl. in Notizbl. Königl. Bot. Gart. Berlin, 1911, no. 48, 242.

Add to geography on page 628:

Upper Guinea. Cameroons: Barombe, *Preuss*, 426; *Staudt*, 778; Victoria, *Winkler*, 521; Duala, *Hückstadt*, 105; various localities, *Ledermann*, 335, 1981, 2066, 2086, 2299, 2977.

Lower Guinea. Lower Congo; Ngombe-Mgama, *Mildbraed*, 2874. Angola, Malanje, *Marques*, 333.

2. **Megabaria ugandensis,** Hutchinson, should be **Spondianthus ugandensis**, Hutchinson.

5. **Uapaca benguelensis,** *Müll. Arg.* Add:

Lower Guinea. Angola: Mounyino, *Dekindt*, 3034!

8. **Uapaca Heudelotii,** *Baill.* Add:

Upper Guinea. Ivory Coast: Aboulaken, *Jolly*, 12! Dobau, *Jolly*, 46!

11. **Uapaca guineensis,** *Müll. Arg.* Add:

Lower Guinea. Gaboon: near Libreville, *Klaine*, 108! 243! *Jolly*, 4! 182!

These specimens were named *U. gabonensis*, Pierre, MSS.

1. **Antidesma laciniatum**, *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 449.

South Central. Belgian Congo: Ituri district; Kifuku, *Mildbraed*, 2886; Agwama, *Mildbraed*, 3026; Abarangu, *Mildbraed*, 3139, 3140.

7. **Antidesma venosum**, *Tul.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 450.

Mozamb. Distr. German East Africa: Bukoba district, *Mildbraed*, 179; Lake Kivu, *Mildbraed*, 1151.

5. **Cyathogyne Preussii**, *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 448.

South Central. Belgian Congo: Ituri district; Scngolo, north of Mawambi, *Mildbraed*, 3010; Kalonda, *Mildbraed*, 3039.

1. **Protomegabaria stapfiana,** *Hutchinson.* Add: *Spondianthus obovatus*, Engl. in Notizblatt Königl. Bot. Gart. Berlin, no. 48 (Dec. 1911), 242. See note under *Megabaria*, above.

3. **Thecacoris lucida**, *Hutchinson.* Add after *Baccaureopsis lucida*, Pax: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 449, t. lvi.

I still believe *Baccaureopsis lucida*, Pax, to be a species of *Thecacoris*.

26A. APODISCUS, Hutchinson in Bull. Soc. Bot. France, 1912, lviii. Mém. viii. 205.

Flowers monœcious. Petals absent. Male flower: Sepals 5, imbricate. Disk-glands 5, fleshy, alternating with the stamens. Stamens 5, opposite the sepals; filaments free; anthers introse, cells distinct, subglobose, diverging from the apex. Rudimentary ovary depressed-globose, hirsute. Female flower: Sepals as in the male. Disk absent. Ovary 4-celled; styles 4, short, thick, swollen towards the apex, incurved; ovules 2 in each cell. Fruit not seen.—A small tree. Leaves alternate, shortly petiolate, rather large, coriaceous, entire, penninerved; stipules caducous, lanceolate. Male flowers small, spicate; spikes in axillary fascicles of 2–5, sometimes with a solitary pedicellate flower towards the base; bracts small, solitary, subtending each flower.

This genus is allied to *Thecacoris* and *Mæsobotrya*; from the former it differs in having the male spikes in fascicles and in the absence of petals, from the latter by the 4-celled fruit, and from both by the absence of a disk from the female flower.

1. **Apodiscus Chevalieri,** *Hutchinson in Bull. Soc. Bot. France,* 1912, lviii. *Mém.* viii. 206. A tree 25-30 ft. high; branchlets sulcate or longitudinally wrinkled, glabrous. Leaves oblong or oblong-elliptic, obtusely or subacutely acuminate, subcuneate at the base, 3–7 in. long, 1¼–3¼ in. broad, entire, coriaceous, slightly shining above, dull and paler below, glabrous on both surfaces; lateral nerves 8–14 on each side, arcuate, branched near the margin, slightly elevated below; veins rather lax, subparallel; petiole 2½–5 lin. long, blackish when dry, with a wide channel on the upper side, finely wrinkled, but otherwise glabrous; stipules fugacious, lanceolate, acute, about 3 lin. long, coriaceous, glabrous. Spikes 2–5 in each fascicle, up to 2½ in. long; axis (rather stout, like the bracts and sepals) fulvous-tomentellous. Flowers all male or rarely one or two pedicellate females towards the base; bract subtending each flower solitary, broadly-ovate, subacute, about ½ lin. long. Male flowers sessile: Sepals ovate, obtuse, about 1 lin. long, ½ lin. broad, coriaceous, tomentellous on both sides. Disk-glands fleshy, rounded, shortly pubescent. Filaments about half as long as the sepals, glabrous; anther-cells distinct, pendulous, free from the filament in the lower half. Rudimentary ovary densely tomentose. Female flowers: pedicel stout, 3 lin. long (seen only in young fruit), shortly pubescent. Sepals as in the male but larger. Ovary (young fruit) 4-celled, 4-lobed, sparingly pubescent; styles thick, swollen towards the apex, papillose outside. Mature fruit not seen.

Upper Guinea. French Guinea: banks of the tributaries of the Boivali, *Caille,* 15057! and without precise locality, *Caille,* 14997!

3. **Mæsobotrya floribunda**, *Benth.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 448.

South Central. Belgian Congo: Ituri district; Mawambi, *Mildbraed,* 3083; Aruwimi; Jambuja, *Mildbraed,* 3305.

10. **Mæsobotrya Barteri**, *Hutchinson.* Add after *Baccaurea Barteri,* Müll. Arg.: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. 448.

South Central. Belgian Congo: Ituri district; near Njiapanda, between Mawambi and Awakubi, *Mildbraed,* 3190; Bafwaitu, *Mildbraed,* 3227.

4. **Drypetes Mildbrædii**, *Hutchinson.* Add to reference of syn.; Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 446.

15*a*. **Drypetes mossambicensis,** *Hutchinson.* A tree 35-45 ft. high; trunk large (*Vasse*); branchlets grey, glabrous, scarred with prominent lenticels. Leaves narrowly elliptic or oblong-elliptic, rounded and often emarginate at the apex, obtuse and slightly unequal-sided at the base, 1½–2½ in. long, ¾–1¼ in. broad, entire, thinly chartaceous, prominently reticulate and glabrous on both surfaces, with about 7 pairs of much-branched lateral nerves; petiole 2 lin. long, slender, very slightly wrinkled, glabrous; stipules small and deciduous, ovate-lanceolate, tomentose within. Male flowers numerous, in axillary fascicles on the young branchlets; pedicel up to 2 lin. long, glabrous.

Sepals 4–5, obovate, rounded at the apex, about $1\frac{1}{3}$ lin. long and 1 lin. broad, rusty-tomentellous outside. Stamens 5–10, usually 8; filaments rather slender, glabrous, inserted outside the folds of the disk; anthers $\frac{3}{4}$ lin. long. Disk large, glabrous and conspicuous, with folded margins, each fold half embracing a filament. Female flowers not known.

Mozamb. Distr. Portuguese East Africa: Mourassa Village, Pungoue Valley, *Vasse*, 319!

Allied to *D. aframensis*, Hutchinson, but easily distinguished by its smaller leaves, which are rounded or emarginate at the apex and obtuse and unequal-sided at the base, and the more slender petioles.

27. **Drypetes ugandensis,** *Hutchinson.* Add to reference of syn.: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 447.

South Central. Belgian Congo: Ituri district; Angalla, south of Irumu, *Mildbraed*, 2846.

1. **Lingelsheimia frutescens,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 447, t. liv.

2. **Lingelsheimia capillipes,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 447, t. lv.

4*a*. **Phyllanthus delpyanus,** *Hutchinson.* A shrub; branches terete, covered with grey glabrous bark; young flowering branchlets fasciculate, with numerous coriaceous glabrous ovate-triangular scales at the base of each cluster, spreading, up to 6 in. long, many-flowered. Leaves ovate, shortly and obtusely pointed, truncate or rounded at the base, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$ to nearly 1 in. broad, thinly and rigidly chartaceous, with recurved margins, glabrous, much darker on the upper surface (when dry), grey or glaucous-green below, with 4–5 pairs of slender looped lateral nerves slightly raised below; veins not visible; petiole 1 lin. long, glabrous; stipules very small. Flowers diœcious. Males numerous, in axillary fascicles: pedicel about 1 lin. long, glabrous. Sepals 4–5, broadly ovate, obtuse, $\frac{1}{2}$ lin. long, glabrous. Disk-glands 4–5, rounded, glabrous. Stamens 4-5; filaments more or less connate nearly their whole length; anthers rounded, dehiscing at the side. Female flowers not seen. Fruits nearly sessile, hard, indehiscent (?), depressed, about 7 lin. in diam., 3–6-lobed, finely wrinkled when dry, glabrous. Seeds flat on one side, rounded on the other, quite smooth, light brown, about $3\frac{1}{2}$ lin. long.

Lower Guinea. Gaboon: borders of forests, without precise locality, *Klaine*, 122! 304! 424! around Libreville, *Klaine*, 637! 639! 694! *Autran!*

A very distinct species, and most closely allied to *P. Engleri*, Pax, from the Mozambique district, differing however by its ovate shortly pointed leaves and less spiny scales at the base of the fascicles of the flowering branchlets.

I have much pleasure in naming this species in compliment to Monsieur E. Delpy, the artist of the Paris Museum, whose beautiful drawings of the analyses of many of the *Euphorbiaceæ* in Pierre's Herbarium have been of great assistance in their determination.

5. **Phyllanthus reticulatus**, *Poir.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 446.

South Central. Belgian Congo: Aruwimi; Panga, *Mildbraed*, 3278.

6. **Phyllanthus floribundus,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 446.

Lower Guinea. Gaboon: near Libreville, *Klaine*, 111! 684! 696! 896! 934! 1163! 1513!

Mozamb. Distr. German East Africa: Ruanda district; Niavarongo, between Lake Mohasi and Niansa, *Mildbraed*, 679. Mugarura Island in Lake Kivu, *Mildbraed*, 1111.

South Central. Belgian Congo: Ituri district; Lenda, *Mildbraed*, 3184.

7. **Phyllanthus Dinklagei,** *Pax.* Add:

Lower Guinea. French Congo: Ogowe, *Leroy!*

9*a*. **Phyllanthus Klainei,** *Hutchinson.* A tree up to 50 ft. high; branches subterete, glabrous; young leafy branchlets fasciculate at the ends of the shoots, flowerless, finely longitudinally sulcate, glabrous. Leaves ovate, ovate-elliptic or rarely oblong-lanceolate, shortly and obtusely pointed, rounded, truncate or rarely slightly cuneate at the base, 2–3 in. long, 1–1½ in. broad, thinly chartaceous, dark-brown above (when dry), paler beneath, glabrous on both surfaces, with about 6 pairs of slender lateral nerves and indistinct veins; petiole 2 lin. long, wrinkled, glabrous; stipules linear-lanceolate, obtuse, about 1¼ lin. long, glabrous. Flowers diœcious. Males in leafless racemes of fascicles produced in clusters on the older wood of the branchlets; racemes about 2 in. long; axis closely longitudinally sulcate, glabrous; pedicels slender, about 2 lin. long, glabrous. Sepals 5, obovate-elliptic, obtuse, about ¾ lin. long, somewhat fleshy, glabrous. Disk-glands 5, rounded, fleshy, glabrous. Stamens 5; filament slender, free; anthers small, dehiscing at the side. Female inflorescences similar to the male. Flowers not seen. Fruiting pedicels about 4 lin. long, thickened at the base, glabrous. Fruits indehiscent, more or less globose, 6–7 lin. in diam., fleshy (?), becoming undulately wrinkled when dry, 3–4-celled, each cell 2-seeded; pericarp crustaceous, brown, ½–¾ lin. thick. Seeds rounded in outline, slightly flattened on two sides, smooth, about 2¾ lin. in diam.

Lower Guinea. Gaboon: around Libreville, *Klaine*, 696! 3063!

Allied to *P. polyanthus*, Pax, an example of which I have not seen, but which is described as having leaves subacute at the base and a 4-celled capsule 1¼ in. in diameter.

19. **Phyllanthus discoideus,** *Müll. Arg.* Add; Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 446.

South Central. Belgian Congo: between Beni and Ruwenzori, *Mildbraed*, 2729.

20. **Phyllanthus graminicola,** *Hutchinson.* Add:

Mozamb. Distr. Portuguese East Africa: Mangota Mountains, *Vasse*, 19!

28. **Phyllanthus glaucophyilus,** *Sond.*, var. **major,** *Müll. Arg.* Add:

Lower Guinea. Angola: Huilla, *Dekindt*, 3239!

Mozamb. Distr. North-west Rhodesia: ant-hills, *Kässner*, 2051!

35. **Phyllanthus microdendron,** *Welw.* Add:

Lower Guinea. Angola: Huilla, *Antunes*, 881! 3042!

51*a*. **Phyllanthus taitensis,** *Hutchinson.* A shrub 3–6 ft. high; branches subterete, glabrous; young branchlets compressed, slightly winged, glabrous. Leaves ovate or ovate-lanceolate, subacute, mucronate, rounded or truncate at the base, 1–2¼ in. long, ½–1¼ in. broad, membranous, glabrous on both surfaces, paler below, with about 8 pairs of distinct lateral nerves and lax venation; petiole 1–1¼ lin. long, glabrous; stipules ovate-triangular or subulate-lanceolate, acute, about 1 lin. long. Flowers monœcious, axillary, one female and one or two males in each leaf-axil. Male flowers: pedicel capillary, about ½ in. long, glabrous. Sepals 6, ovate-lanceolate, obtuse, about ¾ lin. long, glabrous, with distinct midrib and lateral nerves. Disk-glands 6, almost contiguous, rounded, smooth, glabrous. Stamens 3; filaments connate to the apex; anther-cells subparallel. Female flowers: pedicel ¼ in. long, stouter than in the male, thicker towards the apex, glabrous. Sepals 6, ovate, obtuse, 2 lin. long, 1¼ lin. broad, glabrous, with distinct lateral nerves. Disk lobed, lobes crenate, glabrous. Ovary smooth; styles erect, slender, bilobed, the upper part of the lobes recurved. Complete capsule not seen, soon dehiscing.

Nile Land. British East Africa; Taita Hills; Boura Mountain, 3500 ft., *Sacleux*, 2289!

Closely allied to *P. mittenianus*, Hutchinson, from which it differs by its longer pedicels, broader male sepals, relatively smooth male disk-glands, and more slender and more deeply divided styles.

1. **Fluggea microcarpa,** *Blume.* Add: Mildbr, Wiss. Deutsch. Zentr.-Afr. Exped. ii. 446.

Nile Land. Uganda: Kiboroga Steppe, *Mildbraed*, 305.

South Central. Belgian Congo: Rutschurru Steppe, *Mildbraed*, 1900.

Mozamb. Distr. German East Africa: Bukoba district, *Mildbraed*, 115; Lake Kivu, *Mildbraed*, 1133.

Page 737, line 11, *delete* Baill. l.c. ii. 41;

1. **Androstachys Johnsonii,** *Prain.* Add: *Weihea* (?) *subpeltata*, Sim, For. Fl. Port. E. Afr. 66, t. lxi. A.

We are much indebted to Mr. J. Burtt-Davy for kindly calling our attention to the plant described and figured by Sim from imperfect material as *Weihea* (?) *subpeltata*, which is undoubtedly identical. According to Sim it occurs in dense pure thickets in kloofs on the Lebombo Mountains where its timber is well known. Mr. Burtt-Davy has also forwarded to Kew a fruiting specimen collected at Ubombo, Swaziland, by B. H. Warner (7009). Both of these localities are within the area of the *Flora Capensis*. For further particulars see Kew Bulletin, 1912, pp. 307–8.

1. **Microdesmis puberula,** *Hook. f.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 460.

South Central. Belgian Congo: Beni district; between Muera and Pojo, *Mildbraed*, 2792; Ituri district; between Irumu and Mawambi, *Mildbraed*, 2900.

1. **Ricinodendron africanum,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 460.

South Central. Belgian Congo: Beni district; between Beni and Ruwenzori, *Mildbraed*, 915; Pojo, between Beni and Irumu, *Mildbraed*, 2832.

5. **Croton Menyhartii,** *Pax.* Add:

Nile Land. British East Africa: Samburu, *Alluaud*!

13*a*. **Croton leonensis,** *Hutchinson*. Branches sulcate when young, more or less permanently densely covered with orbicular scales. Leaves oblong-lanceolate or elliptic-oblong, acute, rounded or very obtuse at the base, $2\frac{1}{2}$–4 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, entire, rigidly chartaceous, densely clothed with orbicular scales on both surfaces, those below very dense and minutely fringed, with here and there a larger scale; lateral nerves 9–10 on each side, oblique, visible above, prominent below but fading towards the margin; veins not visible; petiole with 2 quite sessile coriaceous glands at the apex, $\frac{1}{2}$–1 in. long, with a narrow deep groove on the upper side, densely scaly; stipules subulate, 2–$2\frac{1}{2}$ lin. long, scaly. Flowers probably diœcious, the males not known. Female racemes terminal, up to 5 in. long; rhachis rather stout, sharply angular, densely covered with scales: bracts subulate, about half the length of the pedicels in the fruiting stage; pedicels $\frac{1}{2}$–1 lin. long, scaly. Sepals 5, lanceolate or oblong-lanceolate, obtuse or subobtuse, $1\frac{1}{4}$ lin. long, $\frac{2}{3}$ lin. broad, densely scaly outside, glabrous within. Petals 0. Ovary densely scaly, slightly trilobed; styles bipartite to near the base, spreading at the base, incurved above, slightly scaly in the lower third. Capsule small, covered with large and smaller scales. Seeds light brown, 2 lin. long.

Upper Guinea. Sierra Leone: without precise locality, *Scott-Elliot*, 5716 (Berlin Herbarium)!

On account of the somewhat imperfect material I am doubtful as to the true affinity of this species. In appearance it resembles *C. amabilis*, Müll. Arg., from which, and indeed from all the other African species known to me, it may be distinguished at once by the orbicular unfringed scales on the upper surface of the leaves.

14. **Croton zambesicus,** *Müll. Arg.* Add:

Lower Guinea. German South-West Africa: Damaraland; various localities, *Rautanen*, 308! 570! *Dinter! Schinz*, 738! *Fleck*, 455a! *Nels*, 89! Great Namaqualand: Rehoboth, *Fleck*, 471a! 445a!

Mozamb. Distr. Rhodesia: near Victoria Falls, *Rogers*, 146!

Extends also into South-East Africa.

14*a*. **Croton subgratissimus,** *Prain in Kew Bulletin*, 1913, 79. A large shrub or small tree, 16–25 ft. high; twigs slender, angled, covered with silvery scales when young. Leaves fragrant, alternate, distinctly

to long petioled, ovate-lanceolate, acuminate, emarginate, base very slightly and narrowly cordate, 1¼–3½ in. long, ½–1¼ in. broad, coriaceous, entire, pale green, dull and uniformly persistently stellate-puberulous above, densely clothed with silvery scales and with a few rusty scales intermixed beneath; lateral nerves 12–14 on each side of the midrib, neither impressed above not raised beneath; petiole ½–1½ in. long, densely silvery and rusty lepidote, with 2 sessile glands underneath at the point of attachment with the leaf-blade; stipules subulate, usually short, occasionally very long, scaly; racemes bisexual, 1–4 in. long, terminal, rhachis densely silvery and rusty scaly; bracts subulate-lanceolate, scaly; male pedicels 1–2 lin. long, densely scaly; sepals ovate, obtuse, 1¼ lin. long, coriaceous, densely scaly outside, closely puberulous within; petals ovate, rather shorter than the sepals, scaly on the outside, margins villous, glabrous within; disk-glands thick, glabrous; stamens 15–20; filaments thinly pubescent below; receptacle pilose; female sepals as in the male; petals oblong-lanceolate, obtuse, scaly outside, hairy within; disk minute; ovary densely clothed with fringed scales; styles spreading, 6–8-partite, glabrous; capsule very slightly 3-lobed, ⅓ in. long, densely scaly; seeds smooth.—*C. gratissimus*, Pax in Engl. Jahrb. x. 35, not of Burch.

Lower Guinea. German South-West Africa: Damaraland; Okahandja, *Höpfner! Dinter*, 229! Kaiser Wilhelms Berg, near Okahandja, *Marloth*, 1354! Otjovazandu, *Rautanen*, 571! Ombika, *Rautanen*, 572!

Mozamb. Distr. Bechuanaland; Oliphants Kloof, *Fleck*, 452a! 453a!

Very similar to *C. gratissimus*, Burch., and *C. zambesicus*, Müll. Arg., but distinguished from both by the leaves being persistently stellate-puberulous on the upper surface.

Occurs also in subtropical Bechuanaland and the Transvaal.

14*b*. **Croton gratissimus,** *Burch. Trav. S. Afr.* ii. 263. A shrub or small tree, 4–20 ft. high; twigs slender, angular, covered with silvery and rusty scales when young; leaves fragrant, alternate, distinctly to long petioled, ovate-lanceolate, acuminate or acute, often emarginate, narrowly cordate at the base, 1¼–2 in. long, ⅓–⅔ in. wide, coriaceous, penninerved, entire, pale green, quite glabrous and shining above, densely clothed with silvery and rusty scales intermixed beneath; lateral nerves 10–12 on each side, neither impressed above nor raised beneath; petiole ¼–1 in. long, densely clothed with silvery and rusty scales, apical glands usually very minute or absent, if distinct then always sessile and attached to the upper portion of the petiole slightly below its attachment to the blade; stipules subulate, very short. Racemes bisexual, up to 2½ in. long, terminal; rhachis densely silvery and rusty scaly; bracts subulate-lanceolate, scaly; male pedicels 1–1½ lin. long, densely scaly. Sepals ovate, obtuse, 1¼ lin. long, coriaceous, densely scaly outside, closely puberulous within. Petals ovate, as large as the sepals, scaly outside, villous on the margin, glabrous; disk-glands thick, glabrous. Stamens 10–15; filaments thinly pubescent below. Receptacle pilose. Female sepals as in the male. Petals oblong-lanceolate, obtuse, scaly outside, hairy within. Disk minute. Ovary densely

clothed with fringed scales. Styles 3, erect, very stout, 2-lobed, glabrous. Capsule very slightly 3-lobed, $\frac{1}{3}$ in. long, densely scaly. Seeds smooth.—Sond. in Linnæa, xxiii. 119; Baill. Adansonia, iii. 154; Müll. Arg. in DC. Prodr. xv. ii. 516; Sim, For. Fl. Cap. Col. 311. *C. microbotryus*, Pax in Engl. Jahrb. x. 35. *Oxydectes gratissima*, O. Kuntze, Rev. Gen. Pl. ii. 611.

Lower Guinea. German South-West Africa: Hereroland; Karabib, *Rautanen*, 514! Nanas, *Fleck*, 463a! and without precise locality, *Fleck*, 443a!

Mozamb. Distr. Bechuanaland: N.E. Kalahari, at Mensouve, about 42 miles north of Serowe, *Schönland*, 1614!

Occurs also in South Africa.

To be inserted near *C. zambesicus*, Müll. Arg., with which it is extremely closely allied, but it may usually be distinguished by its smaller leaves shining on the upper surface and rudimentary or sessile glands at the apex of the petiole.

16. **Croton megalocarpus.** *Hutchinson.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 451.

Mozamb. Distr. German East Africa: Kilimanjaro, *Endlich*, 294!

South Central. Belgian Congo: Beni district; Muera, *Mildbraed*, 2147, 2186; between Beni and Ruwenzori, *Mildbraed*, 2470.

22*a*. **Croton longiracemosus,** *Hutchinson.* Branches terete, glabrous or nearly so. Leaves oblong or oblong-elliptic, long-caudate-acuminate, slightly cuneate and biglandular at the base, $3\frac{1}{2}$–7 in. long, $1\frac{1}{2}$–2 in. broad, very thinly chartaceous or almost membranous, somewhat distantly crenulate with obtusely mucronate teeth, dull and almost glabrous on both surfaces, when young with a few minute stellate hairs on both sides; lateral nerves 5–8 on each side, distinct on both surfaces, prominent below, branched towards the margin; petiole $1\frac{1}{2}$–2 in. long, glabrous or with a few scattered hairs; stipules somewhat foliaceous, linear or linear-lanceolate, obtuse, 4–6 lin. long, glabrous. Flowers diœcious. Male racemes terminal, slender, 10–12 in. long; rhachis sulcate, shortly stellate-pubescent; bracts linear, subacute, about 1 lin. long, glabrous or nearly so. Male flowers numerous, produced on the raceme in fascicles of 5–8; pedicels slightly reflexed at the time of flowering, 2–$3\frac{1}{2}$ lin. long, stellate-tomentellous. Sepals ovate, obtuse, $1\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad, thin, glabrous except for a few short hairs on the margin at the apex. Petals similar to the sepals, glabrous outside, villous within and on the margin. Disk glands large, subulate-linear, glabrous. Stamens 11–12; filaments rather long, glabrous. Receptacle villous. Female flowers not seen.

Upper Guinea. Cameroons: Great Cameroon Mountain, *Reder*, 24!

Probably allied to *C. asperifolius*, Pax, from which it differs in the shape and texture of the leaves.

31*a*. **Croton Lehmbachii,** *Hutchinson.* A small tree about 10 ft. high; branches glabrous, tuberculate; young branchlets slightly stellate-puberulous. Leaves ovate-elliptic or oblong-ovate, obtusely caudate-acuminate, rounded or broadly cuneate at the base, 3–$5\frac{1}{2}$ in. long, crenulate, submembranous, very sparingly and minutely stellate-pubescent on both

surfaces ; lateral nerves 7–9 on each side, prominent on both surfaces, the lowermost pair extending to about the middle of the margin of the blade ; veins lax ; petiole $1\frac{1}{2}$–2 *in. long, with a deep groove on the upper side,* slightly puberulous; stipules linear, subobtuse, 3–$3\frac{1}{2}$ lin. long, 1-nerved, glabrous. Flowers monœcious (always ?). Racemes terminal, about 8 in. long, a few female flowers towards the base, the remainder male ; rhachis sulcate, shortly stellate-puberulous ; bracts linear, subfoliaceous, about 4 lin. long, glabrous, brown ; pedicels clustered, male up to 2 lin. long, puberulous, female stouter, about 1 lin. long, tomentellous. Male flowers : Sepals ovate, obtuse, $1\frac{1}{3}$ lin. long, $\frac{3}{4}$ lin. broad, glabrous. Petals similar to the sepals, glabrous outside, villous within. Disk-glands large, fleshy, subulate, slightly hairy towards the base. Stamens 10–12 ; filaments slender, glabrous. Receptacle villous. Female flowers : Sepals oblong-obovate, rounded at the apex, about 3 lin. long and 2 lin. broad, coriaceous, glabrous. Petals very rudimentary. Disk saucer-shaped, slightly lobed, tomentose on the margin, otherwise glabrous. Ovary tomentose with short stellate hairs ; styles spreading from and bilobed to near the base, segments linear, $2\frac{1}{2}$ lin. long, glabrous.

Upper Guinea. Cameroons : Buea, *Lehmbach*, 19 ! *Deistel !*

Allied to *C. Pynærtii*, De Wild., from which it differs chiefly in the much larger female flowers and the almost free styles.

37. **Croton sylvaticus,** *Hochst.* Add : Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 451.

South Central. Belgian Congo : Ituri district ; Fariala, between Mawambi and Awakubi, *Mildbraed*, 3235.

38. **Croton macrostachys,** *Hochst.* Add : Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 451.

South Central. Belgian Congo : Ituri district ; Kifuku, *Mildbraed*, 2891.

10. **Jatropha prunifolia,** *Pax.* Add :

Mozamb. Distr. Zanzibar : Nyika, *Sacleux*, 2101 !

21. **Jatropha lobata,** *Müll. Arg.* Add at the beginning of the synonymy : *Croton lobatum*, Forsk. Fl. Ægypt.-Arab. 162.

26. **Jatropha pseudoglandulifera,** *Pax*, var. **zanguebarica,** *Hutchinson.* Leaves often 3-lobed, smaller and less deeply lobed and with fewer teeth than in the type ; stipules about 1 lin. long.

Nile Land. Lamu Island, *Sacleux*, 357 !

This may represent a distinct species, but the material at hand is not sufficient to decide the question.

2. **Mildbrædia paniculata**, *Pax.* Add : Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 452, tt. lviii. and lix.

3. **Mildbrædia fallax,** *Hutchinson.* Add :

Mozamb. Distr. Zanzibar, *Sacleux*, 626 ! 1049 ! *Boivin !*

10. **Cluytia abyssinica,** *Jaub. & Spach.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 460.

Mozamb. Distr. German East Africa: Rugege forest, *Mildbraed,* 915; Bugoie, *Mildbraed,* 1485.

3. **Grossera Quintasii,** *Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor.* 108. Shrub (?); twigs glabrous. Leaves distinctly petioled, thinly coriaceous, elliptic, bluntly acuminate, base wide-cuneate or rounded, eglandular, margin entire, 4½–7 in. long, 2–3 in. wide, glabrous; main nerves 5–8 on each side, slender; reticulation distinct; petiole ¾–1¼ in. long, glabrous, thickened at the apex; stipules united in an ochrea, sheathing the bud, caducous, leaving annular scars. Flowers in terminal racemes, 3–3½ in. long; bracts caducous, leaving a scar like the stipular, each enclosing 2–3 male flowers; rhachis finely puberulous; pedicel glabrous or very sparingly puberulous, ⅓ in. long. Male: Calyx ovoid, closed in bud, ⅛ in. across, ⅙ in. long, apiculate, splitting into 2–3 valvate segments, glabrous, thinly membranous. Petals 5, contorted-imbricate, obovate, obtuse. Stamens 4-seriate, 5 to each whorl; base of receptacle surrounded by 5 extra-staminal glands, alternating with stamens of lowest whorl and with the petals. Female flowers and fruit not seen.

Lower Guinea. Island of St. Thomas, *Quintas,* 130!

The absence of glands from the base of the leaf and the existence of connate, ochreate, bud-enclosing stipules, which are very caducous and in falling leave a circular scar, give colour to the suggestion made by the authors of this species, that this may possibly prove not to be a *Grossera,* with which genus the male flowers, however, agree very closely in structure. From the other two species the racemose in place of paniculate male flowers, the eglandular leaves and the ochreate stipules amply distinguish it.

1. **Manniophyton africanum,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 451.

South Central. Belgian Congo: various localities, *Mildbraed,* 2278, 2957, 3004.

1. **Crotonogyne Preussii,** *Pax.*

In *Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor.* 113, this species, in which the male petals are free, is treated as generically distinct from those species in which the male petals are united. In the *Pflanzenreich, C. Preussii* is associated with *C. manniana,* Müll. Arg.; all the other species described in this work at pp. 821–826 being treated as members of a new genus *Neomanniophyton,* Pax, l.c. 115. Since, however, see p. 822 *supra,* the male petals in *C. manniana* are united, the species in question are members of the genus *Crotonogyne,* Müll. Arg.; the proposed genus *Neomanniophyton,* Pax, is invalid; and, if it be necessary, owing to the existence of *C. Preussii,* Pax, to establish a new genus, it is for this last-mentioned plant that a new generic name must be provided. Probably, however, a sectional position is an adequate recognition of the status of *C. Preussii.*

13. **Crotonogyne strigosa,** *Prain.* Add: *Neomanniophyton ledermannianum,* Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor. 116.

Upper Guinea. Cameroons: Lom, *Ledermann,* 6468! 6476.

1. **Tannodia Swynnertonii,** *Prain.*

In *Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor.* 110, this genus is recognised, but in the same work, p. 108, *Holstia* is treated as a genus apart from *Tannodia* and not as a section of *Tannodia.*

1. **Agrostistachys africana,** *Müll. Arg.*

In *Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor.* 96, this plant is treated as the basis of a distinct genus, *Pseudagrostistachys*, Pax. Perhaps a sectional position is an adequate recognition of the status of this species.

4. **Caperonia palustris,** *St. Hil.* Add: *C. macrocarpa*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Acalyp. Chrozophor. 39.

6. **Caperonia serrata,** *Presl.* Add: *C. gallabatensis*, Pax & K. Hoffm. in Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor. 39.

1. **Chrozophora plicata,** *A. Juss.* Add:

Mozamb. Distr. Zambesi River, *Wilde in Herb. Transv.* 9054!

6. **Cephalocroton Pueschelii,** *Pax.* Add:

Mozamb. Distr. Ngamiland; Lake Ngami, *Chapman!*

1. **Hasskarlia didymostemon,** *Baill.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 457.

3. **Hasskarlia minor,** *Prain in Kew Bulletin*, 1912, 234. A glabrous herb 1–2 ft. high, sparingly branched. Leaves of the stem opposite, decussate, of the twigs opposite but anisophyllous below, alternate above, short-petioled, membranous, narrow-oblong, abruptly narrowly caudate-acuminate, base narrow-cuneate, margin below the middle entire, in the anterior half shortly sharply and closely toothed, 1–1¼ in. long, ⅓–½ in. wide; petiole ⅛–⅙ in. long; stipules ovate, membranous, deciduous. Spikes towards the ends of the branches, leaf-opposed, dense-flowered, very short, ⅙–¼ in. long. Male: Calyx thinly membranous, 3-partite; lobes valvate. Disk 0. Stamens 3, sessile on the receptacle; anthers erect, divided to the base into 4 distinct erect globose cells, dehiscing from the apex. Rudimentary ovary short, narrow-columnar, entire. Female flowers and fruit not seen.

Upper Guinea. Sierra Leone: Limba; near Bendembu, *Scott-Elliot*, 5680!

A very distinct species, with the habit of a *Mercurialis* or an *Adenocline*, but with male flowers that, except for the presence of a distinct though small rudimentary ovary, are not distinguishable from the male flowers of the two arborescent species.

3. **Erythrococca bongensis,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 453. *E. mitis*, Mildbr. l.c. partly; not of Pax.

4. **Erythrococca rigidifolia,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 453. *E. mitis*, Mildbr. l.c. partly; not of Pax.

19. **Erythrococca Mildbrædii,** *Prain.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 453.

21. **Erythrococca hirta,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 454.

34. **Erythrococca atrovirens,** *Prain.* Add: *Athroandra atrovirens*, Pax & K. Hoffm., var *Schweinfurthii*, Pax & K. Hoffm. ex Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 452.

38. **Erythrococca macrophylla,** *Prain.* Add: *Athroandra hispida*, Pax & K. Hoffm. ex Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 452; not *E. hispida*, Prain.

3. **Claoxylon hexandrum,** *Müll. Arg.* Add: *Discoclaoxylon hexandrum*, Pax & K. Hoffm. ex Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 452.

1. **Micrococca Volkensii,** *Prain.* Add: Mildbr. Wiss. Deutsch: Zentr.-Afr. Exped. ii. 453.

Mozamb. Distr. German East Africa: Ruanda; Rugege Forest, Rukarasa, *Mildbraed*, 920.

4. **Micrococca Mercurialis,** *Benth.*

Mozamb. Distr. Rhodesia: Victoria Falls, *Flanagan*, 3238!

12. **Acalypha ornata,** *Hochst.* Add:

Extends also to South-east Africa.

21. **Acalypha fruticosa,** *Forsk.* Add:

Occurs also in Arabia, India and Ceylon.

31*a*. **Acalypha Bussei,** *Hutchinson.* Plant erect; stems longitudinally sulcate or ribbed, minutely crisped-puberulous when young, at length glabrous. Leaves long-petioled, ovate, caudate-acuminate, abruptly cuneate at the base, 1–2½ in. long, ¾–1½ in. broad, the acumen entire and about ½ in. long, crenate, membranous, glabrous or nearly so on both surfaces, 5-nerved from the base, remaining lateral nerves about 5 on each side of the midrib, very slender, distinct below; transverse nerves parallel, somewhat lax; petiole 1½–3½ in. long, very slender, sulcate, glabrous; stipules filiform, ¾ lin. long, glabrous or slightly pubescent. Flowers monœcious. Inflorescences very slender, in axillary fascicles, each entirely male or entirely female, rarely the female provided with a few males at the top. Male inflorescences solitary in each fascicle or rarely two, up to 3 in. long; peduncle up to 1¼ in. long, crisped-puberulous; bracts very small. Male flowers very minute, nearly glabrous. Female inflorescences shorter than the males, two or three in each fascicle. Female bracts semiorbicular when spread out, about 1½ lin. long and nearly 3 lin. broad, deeply toothed with about

20 subulate shortly pubescent teeth about $\frac{1}{3}$ lin. long. Sepals 3, lanceolate. Ovary glabrous; style short, laciniate. Capsules very small, smooth. Seeds smooth, about $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Kitanda, *Busse*, 2399!

Allied to *A. ciliata*, Forsk., differing in the more slender inflorescences being entirely or nearly entirely unisexual, and by the smaller female bracts with shorter teeth.

32. **Acalypha glomerata,** *Hutchinson.* Add:

Extends also to South-east Africa.

1. **Mareya brevipes,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 459.

1. **Lepidoturus laxiflorus,** *Benth.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455.

2. **Alchornea floribunda,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455. *A. hirtella*, Mildbr. l.c.; not of Benth.

3. **Alchornea glabrata,** *Prain.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455.

6. **Alchornea yambuyaensis,** *De Wild.* Add: *A. verrucosa*, Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455.

In the description of *A. yambuyaensis* (p. 918, line 20) for "stipules" read "stipels."

7. **Alchornea Schlechteri,** *Pax in Engl. Jahrb.* xliii. 221. Shrub, diœcious, 10–12 ft. high; twigs pubescent. Leaves petioled, thinly membranous, oblong or obovate, acuminate, margin crenulate, base rounded, 4 in. long, 2–$2\frac{1}{4}$ in. wide, glabrous above, at first hirsute with long hairs on the nerves beneath, soon glabrous except for tufts in the angles of main-nerves and midrib, glands at the base on the lower side inconspicuous, with two filiform stipels at the apex of the petiole on the upper side; petiole slender, puberulous, $\frac{3}{4}$–$1\frac{1}{2}$ in. long; stipules filiform, deciduous. Spikes simple, lax; males all lateral, 3–4 in. long, perulate at the base like the leaf-buds, but without leaves below the flowers; rhachis softly pubescent; male buds globose, 1 lin. wide, glomerate; females few-flowered, each flower solitary to its bract or reduced to a subsolitary flower terminating a leafy twig. Ovary usually 3-celled, closely softly adpressed-pubescent. Capsule normally 3-coccous, nearly glabrous, quite smooth, dark brown, $\frac{1}{4}$ in. wide; styles $\frac{1}{4}$–$\frac{1}{3}$ in. long. Seeds globose, slightly 2-sulcate on the inner face, faintly verrucose on the back.

Mozamb. Distr. Portuguese East Africa: Madanda forests, 400 ft., *Swynnerton*, 1537!

Also extends to the south of the tropics.

Most nearly allied to *A. Engleri*, Pax, and *A. yambuyaensis*, De Wild., but differs in being diœcious and in having rather shorter styles.

1. **Neoboutonia macrocalyx,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 456.

3. **Neoboutonia Mannii,** *Benth.* Add:

Lower Guinea. Island of St. Thomas, *Moller*, 128!

7. **Neoboutonia canescens,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455, mainly.

8. **Neoboutonia Melleri,** *Prain.* Add: *N. canescens*, Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 455, partly; not of Pax.

1. **Argomuellera macrophylla,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 454.

2. **Mallotus oppositifolius,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 454.

2. **Macaranga Schweinfurthii,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 456.

7. **Macaranga angolensis,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 456.

9. **Macaranga ruwenzorica,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 456.

10. **Macaranga kilmandscharica,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 456.

Mozamb. Distr. German East Africa: Ruanda; Rugege forest, *Mildbraed*, 1014; Bugoia, *Mildbraed*, 1455.

16. **Macaranga Zenkeri,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped, ii. 456.

South Central. Belgian Congo: Beni; near Muera, *Mildbraed*, 2767; Ituri; near Mokoko, between Irumu and Mawambi, *Mildbraed*, 2955.

Here too Mildbraed doubtfully refers his n. 42 from Bukoba, German East Africa.

24. **Macaranga lancifolia,** *Pax.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 457.

2. **Gelonium procerum,** *Prain.* Add: Pax in Engl. Pflanzenr. Euphorb.-Acalyph. Chrozophor. 128.

1. **Plukenetia conophora,** *Müll. Arg.* Add: Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 459.

1. **Dalechampia ipomœæfolia,** *Benth.* Add: *D. scandens*, Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 459; not of Benth.

3. **Pycnocoma Thonneri,** *Pax.* Add: Mildbr, Wiss. Deutsch. Zentr.-Afr. Exped. ii. 459.

8. **Tragia tenuifolia,** *Benth.* Add: *T. calvescens*, Mildbr. Wiss. Deutsch, Zentr.-Afr. Exped. ii. 459.

20. **Tragia brevipes,** *Pax.* Add: *T. Volkensii*, Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 459.

10. **Sapium mannianum,** *Benth.* Add: *S. ellipticum*, Mildbr. Wiss. Deutsch. Zentr.-Afr. Exped. ii. 460.

SUPPLEMENTARY.

15*a*. **Thesium Rogersii,** *A. W. Hill in Kew Bulletin*, 1913, 78. Stems numerous, erect, 6–8 in. high, arising from rootstock, branching above, deeply grooved and angled, glabrous. Leaves scale-like below, above linear or linear-lanceolate, acute with brown tips, 3–5 lin. long, with a slight keel, erect. Inflorescences racemose, terminal; flowers shortly pedicellate with pedicels adnate to the bracts or subsessile, arranged singly or more rarely in 3-flowered cymes in the bract-axils; bracts narrowly ovate-lanceolate, acute, keeled, 2 lin. long, rather fleshy, about equal in length to the flower; bracteoles 2, about $1\frac{1}{2}$ lin. long. Perianth $1\frac{3}{4}$ lin. long, globose; lobes erect, 1 lin. long, elliptic-lanceolate, hooded, with a dense apical beard. Anthers $\frac{3}{8}$ lin. long. Style $\frac{5}{8}$ lin. long, reaching nearly to the middle of the anthers. Fruit ovoid, $1\frac{1}{2}$–2 lin. long, with ten prominent ribs and delicate reticulations.

Mozamb. Distr. Rhodesia: Candahar Island at Victoria Falls, 3000 ft., *Rogers*, 5467 !

Allied to *T. gracile*, A. W. Hill, but differs in its stout stems, large flowers arranged in solitary racemes and in the longer anthers and styles.

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ERRATA

Page 41, line 16 from bottom, for *Cyphiocarpa* read *Cyphocarpa*
„ 57, „ 10, for *biflorum*, read *biflora*
„ 170, „ 11 from bottom, *for* Baill. *read* Pierre
„ 187, „ 11 from bottom, *for* Hutchinson *read* Hutchins
„ 206, „ 2, for **Dekindtii** read **dekindtiana**
„ 443, „ 6, for ANTHOSTEMMA *read* ANTHOSTEMA.
„ 446, „ 25, *for* HOLSTIA *read* TANNODIA.
„ 448, „ 14, from bottom, *for* valvate *read* imbricate
„ 620, „ 12 from bottom, for *gambicola* read *gambecola*
„ 841, bottom line, *for* Schindl, *read* Schindl.
„ 847, line 6 from bottom, *for* 4 *read* 54
„ 918, „ 20, *for* stipules *read* stipels
„ 1004, „ 12 from bottom, for *Encœcaria* read *Excœcaria*