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FLORA OF TROPICAL AFRICA.

FLORA
OF
TROPICAL AFRICA.

EDITED BY
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VOL. VI.—SECTION 2.
ULMACEÆ TO CYCADACEÆ.

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PREFACE.

IT was found necessary in 1904, for reasons then explained by the editor, to divide Volume IV. of the "Flora of Tropical Africa" into two sections. The same expedient has had to be adopted in the case of the present volume.

The preparation of two-fifths of this final section of Volume VI. has been due to the kind collaboration of Dr. A. B. Rendle, F.R.S., Keeper of Botany, British Museum. Members of the Kew staff have supplied the rest of the text, with the exception of the account of the *Gnetaceæ*. A melancholy interest attaches to that account; it is one of the last contributions to botanical knowledge made by its gifted author, the late Professor H. H. W. Pearson, F.R.S., of Cape Town, who had bestowed especial attention on this group of plants.

The results of recent study have created a difficulty with regard to the position the *Gnetaceæ* should occupy in a conspectus of natural orders. In other floras of the series to which this work belongs, that order, which includes the living representatives of the class *Gnetales*, has been placed among the *Gymnospermæ*. The *Gnetales*, however, exhibit characters that do not wholly conform with the conception of the *Gymnospermæ* which is usually accepted. In 1908 Arber and Parkin expressed the opinion that the *Gnetales* are "gymnosperms nearly related to angiosperms," derived from a common ancestral stock, the *Hemianqiospermæ*. In 1912 Lignier and Tyson advanced arguments in favour of the treatment of the *Gnetales* as an early, highly specialised branch of the *Angiospermæ*, which has retained many features inherited from pre-angiospermous ancestors.

The attempt to resolve this and other cognate difficulties has been materially assisted by the valuable advice and practical help of Dr. O. Stapf, F.R.S., Keeper of the Herbarium, Kew. The

circumstance that in the *Gnetaceæ* the character of "nakedness of the ovule" is manifest, admits the formal retention of the order in the *Gymnospermæ*, and allows the accordance to it, in our ordinal conspectus, of a serial position which conforms with the practice adopted in other floras of the series in which the "Flora of Tropical Africa" finds a place. In the definition of the *Gnetales*, prepared for this conspectus by Dr. Stapf, due allowance is, however, made for the peculiar and ambiguous position of the class. The terminology employed in describing the organs of reproduction is intended to reflect our belief that, in spite of the nakedness of the ovule, the affinities of the *Gnetales* are with the angiospermous rather than with the gymnospermous phylum.

Associated with this difficulty as to the position of the *Gnetales* is the more serious one created by the modern view as to the relationship which these two great phyla bear to each other. The phenomenon of gymnospermy, first pointed out by R. Brown in 1826, was turned to taxonomic account by Brongniart as early as 1828. But when Brongniart recognised in the *Gymnospermæ* a distinct natural group, he regarded that group as an integral part of the *Dicotyledones*. It was not until 1864 that A. Braun proposed the treatment of the *Gymnospermæ* as a division of the *Phanerogamæ* equal in status to the *Dicotyledones* and the *Monocotyledones* taken in conjunction. The evidence in favour of the view, adopted by Hooker in 1876, that the two primary phanerogamous divisions, *Angiospermæ* and *Gymnospermæ*, represent quite distinct lines of evolution, is so strong that this disposition is now generally accepted.

The series of Colonial Floras was initiated in 1859, and the first work in this series was issued in 1861, while the view expressed by Brongniart in 1828 was still generally accepted. In that flora the *Gymnospermæ* were accordingly regarded as a subclass of the *Dicotyledones*, and were assigned a serial position immediately after the really dicotyledonous subclasses and immediately before the monocotyledonous ones. The view that the *Gymnospermæ* are a subclass of the *Dicotyledones* has not been maintained in every Colonial Flora completed since 1861. In one instance the *Gymnospermæ* have been regarded as a group, within the *Dicotyledones*, equal in status to the whole of the angiospermous subclasses of that class. In other cases the *Gymnospermæ* have been advanced to the rank of a distinct class, comparable in status with the *Monocotyledones* on the one hand, the *Dicotyledones* on the other. Neither of these two modifications of the original view necessitates a change in the

serial position assigned to the *Gymnospermæ* in 1861, which has persisted in those Colonial Floras published since that year.

The acceptance of the modern view as to the relationships of the *Gymnospermæ* no doubt justifies the action of those who would modify that serial position. But what may be lawful is not necessarily expedient. Considerations of practical convenience render it desirable to adhere in this work to the serial arrangement adopted in 1861. The maintenance of that arrangement derives considerable support from the action taken by Bentham and Hooker in the "Genera Plantarum" in 1880. These authors, while presenting the *Gymnospermæ* in such a fashion as to indicate that this group is not to be regarded as similar in status to the *Dicotyledones* and the *Monocotyledones*, have nevertheless accorded it a serial position between the two classes of *Angiospermæ*. In following that example here, an adequate safeguard against any possible misunderstanding is provided by the subjoined synoptic statement, prepared by Dr. Stapf, wherein the natural position and the divisions, according to modern views, of the *Gymnospermæ* that occur in tropical Africa, are clearly indicated :—

Division	PHANEROGAMÆ (Siphonogamæ).
Subdivision A.	ANGIOSPERMÆ.
Class I.	Dicotyledones.
Class II.	Monocotyledones.
Subdivision B.	GYMNOSPERMÆ.
Class I.	Gnetales.
Order i.	GNETACEÆ.
Class II.	Coniferales.
Order i.	PINACEÆ.
Order ii.	TAXACEÆ.
Class III.	Cycadales.
Order i.	CYCADACEÆ.

The admission of the *Gymnospermæ* to the rank of a phylum distinct from that to which the rest of the *Phanerogamæ* belong, creates another difficulty which is harder to settle than the one disposed of above. This difficulty is concerned with the applicability to the *Gymnospermæ* of the conventional terminology applied to the "flower." Attempts to maintain the old uniformity of terms have been frequent; these attempts have proved far from successful. Those who lay most stress upon function have found

themselves impelled to extend the incidence of the term "flower," and of the terms for various parts of the flower, so as to render these applicable to all the phyla that are connected by homologies within the sexual sphere of reproduction. As a logical consequence even the sporangiophore of a horsetail and the fertile frond of a fern, thus become "flowers."

The value of this procedure as a means of correlating what might otherwise appear wholly unrelated is doubtless great. But, even where considerations of a practical nature may be neglected, we soon come to realise that such endeavours to attain uniformity are attended by a double disadvantage. They blunt the perception of the very divergent lines along which the great plant-phyla have been evolved; they obscure the appreciation of the correspondingly different structures in which the evolution of these phyla has resulted.

Those practical considerations which condition the preparation of a technical work like the present flora cannot, however, be disregarded here. For purposes of discrimination and of classification it is of the utmost consequence that fundamental differentiations of structure be expressed in suitable and distinctive terms.

Here, therefore, the term "flower" and all that this word connotes is confined, as it has been by Arber and Parkin, to the *Angiospermæ*, a phylum characterised by the evolution of that definite collection of organs with its normally cyclic structure, its varied and specialised envelopes, its stamens, closed carpels, styles and stigmas, and its peculiar type of fertilisation. The ambiguous position of the *Gnetales*, and the eclectic treatment consequently accorded to them in this work, have already been explained. Leaving that class out of account, we recognise in the *Gymnospermæ* a phylum within which the development of the reproductive system has not gone beyond the evolution of structures, termed here cones or strobiles, with usually scale-like leaves, abaxial (dorsal) pollen-sacs, adaxial (ventral or marginal) openly exposed ovules, and a corresponding mode of fertilisation.

These features are more fully brought out in the definitions of the *Gymnospermæ*, and of the classes which that division includes, prepared by Dr. Stapf for the conspectus of the orders contained in this section of the "Flora of Tropical Africa." The definitions of these gymnospermous classes, of necessity somewhat fuller than the corresponding definitions of the classes of the *Angiospermæ*, are as condensed as the special circumstances permit; in each case,

some of the more commonly employed alternative terms applied to particular organs have been added in brackets after those adopted in this work, so as to assist the student in correlating them correctly.

The account of the *Cycadaceæ* calls for a word of explanation. It was hoped that this might have been prepared by Sir W. T. Thiselton-Dyer, F.R.S. Circumstances have unfortunately frustrated the hope that his exact and extensive knowledge and his practised judgment in dealing with the members of this interesting and important order could be utilised in full. The work, none the less, is still largely his. The material in the herbarium at Kew, on which the account here printed is mainly based, has been arranged and annotated by him with such care and critical insight that the task of preparing that account has involved little more than the drafting of co-ordinated descriptions of the various genera and species.

In addition to those whose assistance has been acknowledged in previous volumes of this work and whose collections have been made use of in the preparation of the present section, thanks are due to the following for material from the areas mentioned in each case :—

I. UPPER GUINEA.—M. Pobéguin, French Guinea; N. W. Thomas, Sierra Leone; A. C. Miles, Gold Coast; C. O. Farquharson, Southern Nigeria; E. W. Foster, P. H. Lamb, A. J. Richardson, and T. Thornton, Northern Nigeria.

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The regions into which the area of this Flora is divided are defined in the preface to Volume VII. For the detailed topography the third edition the "Spezial-Karte von Africa," published at Gotha

by J. Perthes in 1893, has again been used. The geographical distribution of the species described in this section has been worked out by Mr. N. E. Brown, A.L.S. The manuscript has been prepared for the press and the proofs have been checked by Mr. C. H. Wright, A.L.S., Assistant in the Herbarium, Royal Botanic Gardens, Kew.

D. P.

Kew,
August 20, 1917.

CONTENTS.



	Page
CONSPECTUS OF THE ORDERS	xiii
Order CXXIII. Ulmaceæ	1
CXXIII A. Barbeyaceæ	14
CXXIII B. Cannabinaceæ	16
CXXIII C. Moraceæ	17
CXXIII D. Urticaceæ	240
CXXIV. Myricaceæ	307
CXXV. Casuarineæ	315
CXXVI. Salicineæ	316
CXXVII. Ceratophylleæ	326
CXXVIII. Gnetaceæ	328
CXXIX. Pinaceæ	333
CXXIX A. Taxaceæ	338
CXXX. Cycadaceæ	341
Addenda	355

CONSPECTUS OF THE ORDERS CONTAINED IN
THE SIXTH VOLUME.—SECTION 2.

CLASS I.—DICOTYLEDONES.

SUBCLASS III.—MONOCHLAMYDEÆ.

Series VII.—Unisexuales (continued).—*Flowers unisexual. Ovary syncarpous or monocarpous; styles as many as the carpels, often 2-partite; ovules solitary or 2 collateral. Seed albuminous or exalbuminous. Herbs, shrubs or trees. Perianth calycine, small or none.*

CXXIII. **ULMACEÆ.** Flowers polygamous. Perianth 4-5-merous. Stamens as many as the perianth-lobes and opposite to them, or more; filaments not inflexed. Ovule pendulous. Fruit a samara or drupe. Trees or shrubs. Leaves alternate. Style 2-partite.

CXXIIIa. **BARBEYACEÆ.** Flowers diœcious. Perianth 3-4-merous. Stamens 6-9; filaments not inflexed. Style simple; stigma linear-oblong, flattened. Ovule pendulous. Fruit dry, indehiscent. Seed exalbuminous. Tree. Leaves opposite.

CXXIIIb. **CANNABINACEÆ.** Flowers diœcious, rarely monœcious. Male perianth 5-partite; female small, cup-like. Stamens 5, opposite the perianth-segments. Stigmas 2, filiform. Ovule pendulous. Fruit an achene; albumen scanty. An aromatic herb. Leaves alternate or the lowest opposite.

CXXIIIc. **MORACEÆ.** Flowers monœcious or diœcious. Perianth usually 4-merous. Stamens usually as many as and opposite to the perianth-segments; filaments inflexed or straight in bud. Carpels 2, the posterior rarely developed or represented by an empty chamber; styles 2 or 1. Ovule pendulous. Fruit an achene, nut or drupe. Albumen present or absent. Trees or shrubs, more rarely herbs. Leaves alternate, rarely opposite.

CXXIIIId. **URTICACEÆ.** Flowers monœcious or diœcious (polygamous in *Parietaria*). Male perianth 4-5-partite, rarely monophyllous. Stamens generally as many as and opposite to the perianth-segments; filaments inflexed in bud. Female perianth 3-5-lobed or -partite. Style (when present) simple; stigma capitate or penicillate. Ovule erect or ascending. Fruit an achene. Albumen scanty or none. Herbs or shrubs, more rarely trees, sometimes with stinging hairs. Leaves alternate or opposite, generally penninerved, often with cystoliths.

CXXIV. **MYRICACEÆ.** Flowers unisexual, in spikes, without perianth. Stamens 2-16; filaments short, free or more or less united; anthers erect. Ovary 1-celled;

style short. Ovule solitary, erect, orthotropous. Fruit a small drupe. Albumen 0. Shrubs or trees, usually aromatic. Leaves alternate, penniveined.

CXXV. CASUARINÆ. Flowers unisexual, in spikes or strobiles. Male flower: Perianth-segments 1 or 2, circumscissile. Stamen 1; filament inflexed in bud. Female flower: Perianth 0. Ovary 1-celled; style short. Ovules 2. Fruit a nut enclosed by the persistent woody bracts. Albumen 0. Leafless trees or shrubs. Branches articulated at the nodes where they bear 4 to many scales in a whorl.

Series VIII.—Ordines anomali. *Orders nearest allied to those of Series VII., Uniscruales, but not sufficiently closely so to be joined to any one of them.*

CXXVI. SALICINÆ. Flowers diœcious, solitary under each bract of cylindrical catkins, more rarely in ebracteolate racemes. Perianth 0. Disc of 1-2 glands, or cup-shaped. Stamens 2 to many. Ovary 1-celled, with 2-4 parietal placentas, 2- to many-ovuled. Fruit a 2-4-valved capsule. Seeds small or minute, with silky hairs from the funicle, exalbuminous. Trees or shrubs. Leaves alternate; stipules small and deciduous, or leafy and persistent.

CXXVII. CERATOPHYLLÆ. Flowers unisexual, axillary. Perianth thinly herbaceous, multipartite. Stamens many. Ovary 1-celled, 1-ovuled. Fruit a nutlet. Seed pendulous, exalbuminous; embryo straight. Submerged aquatic herbs. Stems elongated, leafy all over. Leaves verticillate, 2-fid or dichotomously divided into filiform or linear segments. Flowers solitary at each leaf-whorl.

SUBDIVISION GYMNOSPERMÆ.

Pollen-sacs and ovules borne on modified leaves (scales: sporophylls), which are grouped spirally or in whorls or pairs—or the ovules cauline, terminal and solitary—on separate axes of the same or of different individuals (monocermial and diœcious species); the groups of sexual leaves forming, or the solitary terminal ovules entering into the formation of—(1) “cones” (strobiles: flowers) without any specialized envelope, although frequently subtended and in the earliest stages covered by squamiform cataphylls [*Coniferales: Cycadales*], or (2) “florets” (flowers of most authors) with a perianth-like envelope in the ♂ and an ovary-like envelope in the ♀ sex [*Gnetales*]. Pollen-sacs (microsporangia: anther-cells) 2-∞ on the under-side of the ♂ scales (microsporophylls) or around the scale-stalk or grouped into “anthers” borne on free or more or less fused filaments (stamens, *Gnetales*). Pollen-grains (microspores) on germination producing 1-3 vegetative cells (prothallium) and a very rudimentary antheridium which gives rise to 2 usually immotile, more rarely motile [*Cycadales: Ginkgoales*] male cells. Ovules (macro- or megasporangia) sessile or subsessile and borne directly or indirectly (by the intercalation of a scale-, ligule-, or aril-like appendage), on the upper side [most *Coniferæ*] of the expanded ♀ scales (macro- or megasporophylls: carpels) or in direct continuation of the axis of the cone [some *Coniferæ*] or the floret [*Gnetales*], never enclosed in a mono- or polycarpellary ovary with a style and stigma (hence termed “naked”). Integument 1, sometimes with an accessory outer perfect or imperfect envelope (outer integument: aril: epimatium). Nucellus large, free from the integument only in the upper region. Endosperm formed before fertilization (prothallium), filling the whole embryo-sac or only a portion of it [*Gnetum* sometimes] and apically bearing rudimentary archegonia whose egg-cells after fertilization undergo embryonic divisions

which, however, lead normally to the development of only one perfect embryo. Fruiting "cones" usually much enlarged, either with the seeds more or less covered by the indurated scales (or their appendages) or enclosed among the fused and fleshy scales, the fruit finally resembling a berry or drupe; or reduced to 1 or 2 (rarely more) exposed seeds borne on the dry or fleshy axis of the cone; fruiting "florets" nut- or drupe-like, according to the coriaceous or half-fleshy, half-bony structure of the mature envelope. Seeds, if wholly covered or enclosed, with a crustaceous to woody testa—if partly or wholly exposed, with an externally fleshy and internally woody testa or enveloped in a more or less fleshy aril. Embryo axile in the copious fleshy or oily, rarely starchy endosperm, straight; cotyledons 2-∞. Woody plants, mostly trees, sometimes with short, tuberous stems. Leaves mostly coriaceous, usually simple (often linear or much reduced and squamiform), or pinnate to bipinnate [*Cycadales*]. "Cones" terminal or axillary, solitary or clustered (rarely spicate or paniculate), inconspicuous at the time of pollination or more or less vividly coloured; "florets" in spikes. Pollination mostly by wind; pollen deposited directly on the micropyle or nucellus.

CLASS I.—GNETALES.

Diclinous, dioecious or monoecious. Male floret (pseudo-bisexual in *Welwitschia*): envelope formed of one pair or two decussating pairs of scales, free or united; stamens 1-8 with the anthers sessile or subsessile on the summit of a stout central axis or [*Welwitschia*] 6 with the filaments connate at the base around a central superior barren ovule. Female floret: envelope an ovary-like utricle with the ovule naked, erect, orthotropous; ovule with a single integument produced into an elongated tubular micropyle which protrudes through the orifice of the utricle and with or without an aril. Seed albuminous, enclosed at maturity in the hardened utricle which is either differentiated into a fleshy outer and a hard inner layer or entirely coriaceous and sometimes [*Welwitschia*] produced laterally into 2 wings. Embryo straight with 2, rarely 3, cotyledons. Erect or scandent, virgate or leafy shrubs, trees or woody climbers or [*Welwitschia*] a woody plant of unique form consisting of a stout tuberous hypocotyl and an early arrested depressed stem-apex, with true vessels in the secondary wood, without resin canals. Foliage-leaves two or more, rarely in whorls of 3, opposite, simple. Florets (flowers) few or many, in axillary, rarely terminal, unisexual or bisexual spikes; spikes at the time of pollination greenish or yellowish, rarely vividly coloured [*Welwitschia*]. Seeds with their envelopes more or less enclosed in the dry or fleshy spikes or exposed and drupe-like [*Gnetum*].

CXXXVIII. GNETALES. Only order.

CLASS II.—CONIFERALES.

Diclinous (normally), monoecious or dioecious. Male cones (male strobiles: male flowers) mostly catkin-shaped, made up of verticillate or spirally arranged scales (stamens: microsporophylls), bearing dorsally, or rarely around the scale-stalk, 2-15 pollen-sacs (microsporangia); pollen-sacs dehiscing variously; pollen-grains roundish, with or without vesicular appendages; generative cell producing 2 immotile male cells. Female cones (female strobiles: female flowers: female inflorescences) usually catkin-shaped, subsessile or peduncled, made up of verticillate or spirally

arranged scales (carpels: macrosporophylls) bearing 1 to many ovules at or above the base either directly or on an interposed usually scale-, ligule- or aril-like appendage (ovuliferous scale: placeuta: aril: epimatium); or the cone reduced to a few subterminal or 1 truly terminal ovule, supported by a number of barren scales; scales variously shaped, usually much larger than the ovules and covering them, or smaller and the ovules more or less exerted. Ovules (macrosporangia) erect or reversed, usually orthotropous, rarely anatropous; integument 1, sometimes with an outer covering more or less surrounding the seed, or completely enclosing it except at the micropyle and even fused with it (outer integument: aril: epimatium); micropyle widely open or only a minute perforation; nucellus free upwards from the integument, sometimes protruding through the micropyle; pollen-chamber 0. Mature cones formed of the more or less enlarged and indurated scales (and their appendages) enclosing the seeds (typical cones), or of more or less fleshy scales fused into berry-like structures (galbules); or (if much reduced) with the seeds exerted from the unchanged or modified subtending scales. Seeds erect or recurved, ovoid or ellipsoid, often compressed and winged by the adhesion of a portion of the ovuliferous appendage or by outgrowths of the testa: testa membranous, coriaceous, crustaceous, wingless or winged or partly (inner layer) crustaceous or woody and partly (outer layer) fleshy or coriaceous and the seed then drupe-like; nucellary membrane thin, free from the testa except at the base. Endosperm fleshy and oily, rarely starchy. Embryo 1 (rarely 2 or 3), axile, erect, cylindric-clavate, usually slender; cotyledons 2 to many in a whorl; radicle superior or inferior. Trees or shrubs, mostly evergreen and coriaceous. Leaves opposite, verticillate or spirally arranged, scale-like or needle-shaped, or linear, rarely lanceolate to ovate, entire, rarely serrulate or lobed, very often heteromorphous. Male cones terminal on short leafy shoots, or axillary, sessile or peduncled, usually subtended by small imbricate cataphylls, solitary or gathered in heads, spikes or umbels. Female cones terminal or axillary, solitary, rarely in clusters or spikes.

CXXIX. PINACEÆ. Female cones of very numerous or few simple or appendaged scales, all or a part of them bearing 1-8 ovules which are always shorter than their scales and covered by them, when mature representing typical "cones" or berry-like galbules. Seeds enclosed, without an aril or arilloid covering.

CXXIXA. TAXACEÆ. Female cones usually much reduced, consisting of some barren and 1 to few (uppermost) fertile simple scales, the latter bearing 1 (very rarely 2) ovules, or the ovule solitary and terminal, supported by barren scales; ovule usually more or less exceeding its scale; mature cone little altered or its axis and scales becoming more or less fleshy. Seeds usually exerted, with or without an arilloid covering.

CLASS III.—CYCADALES.

Diœcious. Male cones (male strobiles: male flowers) typical cones; scales (stamens: microsporophylls) flat or more often thickened upwards and up to cuneate-peltate, coriaceous, close, bearing on their underside numerous (often over 100-700) pollen-sacs (microsporangia), scattered or more often arranged in small substellate groups of 3 or 4, dehiscing longitudinally. Pollen-grains ellipsoid or subglobose; generative cell producing 2 ciliate motile male cells (spermatozoids). Female cones (female strobiles: female flowers) similar to the male, but usually larger; lower and uppermost scales (carpels: macrosporophylls) usually barren, the others fertile, either representing flat, toothed to pinnatifid stalked blades, bearing

the ovules (usually more than 2) in slightly hollowed-out notches on each side of the stalk up to and including the base of the blade [*Cycas*] or more often unguiculate-peltate with only 1 ovule from near each of the inner angles of the base of the head. Ovules (macrosporangia) orthotropous, sessile or subsessile, obliquely erect [*Cycas*] or reversed and parallel to the claw, directed towards the axis of the cone; integument 1, stout, perforated at the apex by the micropyle; nucellus free upwards from the integument, produced into a beak and passing into the micropyle, its apical tissues breaking down and forming a pollen-chamber in the mucilaginous liquid of which fertilization takes place. Mature cones little changed except for the harder texture of the more or less spreading scales. Seeds large, globose to oblong, drupe-like; testa of a fleshy, variously coloured outer coat and a hard inner layer, inside which there is a membrane containing the vascular system of the ovule and formed of the innermost strata of the integument together with portions of the nucellus. Endosperm fleshy. Embryo 1, axile, subcylindrical, borne on a filiform, spirally coiled up suspensor; cotyledons 2, rarely 1 (by suppression) or 3-6; radicle superior, surrounded by a cap-like coleorrhiza. Woody plants with a stunted, tuber-shaped stem or a columnar trunk of varying height, usually simple, rarely forked and always densely covered upwards with the scars or persistent bases of the cataphylls. Leaves mostly of 2 kinds, namely scale-like cataphylls acting as bud-scales and exstipulate fronds, both produced in alternating series; the cataphylls ovate to subulate, mostly woolly; the fronds gathered in dense terminal crowns, pinnatisect or pinnate, rarely 2-pinnate, often very long, coriaceous, usually disarticulating at the base; rhachis generally straight, rarely involute in veneration; pinnae straight or involute. Strobiles subsessile or borne on ebracteate or bracteate peduncles, solitary or in clusters below and often close to the apex of the stem or [*Cycas*] the female cones truly apical, their axis continuing growth after maturation and producing a series of cataphylls, followed by one of fronds, a process which may be repeated many times at varying intervals during the life of the plant.

CXXX. CYCADACEÆ. Only order.

FLORA OF TROPICAL AFRICA.

ORDER CXXIII. **ULMACEÆ.**

(By A. B. RENDLE.)

Flowers (in tropical African genera) polygamous, regular, apetalous. Leaves of the perianth free or more or less united, calycine, generally 4 or 5 in number, segments imbricate or valvate. Stamens as many as and opposite to the perianth-lobes rarely more; filaments not inflexed; anthers erect in bud, 2-celled, dehiscence longitudinal. Ovary superior, 1-celled; ovule solitary, pendulous from or below the apex of the cell, anatropous, with two integuments; style (in African genera) central, 2-partite, branches stigmatose on the upper face. Fruit a flattened samara or an ovoid to globose drupe. Endosperm wanting or scanty. Embryo straight or curved.—Trees or shrubs. Leaves alternate, in two rows, simple, often unequal at the base. Stipules lateral, free, generally small, caducous. Flowers small, in axillary branched cymes, the fertile sometimes solitary.

Species about 130; widely distributed in both temperate and tropical regions.

SUB-ORDER I. **Ulmoideæ.**—*Flowers in the axils of scars of previous year's shoots; fruit a samara; embryo straight* 1. HOLOPTELEA.

SUB-ORDER II. **Celtidioideæ.**—*Flowers in the axils of foliage-leaves of the same season; fruit a drupe; embryo curved.*

Branchlets unarmed (in African species):

Leaf-margin entire or weakly or irregularly toothed (serrate in *C. kraussiana*); fruit 2½–9 lin. long; cotyledons broad ... 2. CELTIS.

Leaf-margin minutely toothed or crenulate; fruit about 1 lin. long; cotyledons narrow 3. TREMA.

Branchlets armed with axillary spines ... 4. CHÆTACME.

1. HOLOPTELEA, Planch.; Benth. et Hook. f. Gen. Pl. iii. 352.

Flowers hermaphrodite with a few male. Perianth simple, calycine, divided nearly to the base into 3–8, often unequal lobes. Stamens as many as the lobes but generally more, up to 12. Filaments erect, long, free, ultimately exerted; anthers roundish, 2-celled. Ovary rudimentary or absent in male flowers, in the fertile stalked, compressed, passing above into a pair of short spreading style-arms,

which are densely stigmatose on the upper face; ovule solitary, pendulous from the apex of the cell. Fruit dry, indehiscent, forming a roundish flat samara with a broad membranous veined wing.—A tree. Leaves alternate, distichous, short-stalked, penniveined, 1-nerved, punctulate on the lower face with small round cystoliths. Stipules lateral, small, scarious, caducous.

Species: one, in India, Ceylon, and Cochin-China, hitherto not recorded from Tropical Africa.

1. *H. integrifolia*, *Planch. in Ann. Sci. Nat. 3me. sér. x. 266*. A large spreading deciduous tree 50–60 ft. high, with ash-grey (brown-violet, according to *von Doering*) pustular bark; shoots glabrous. Leaves elliptic, acuminate, base rounded or cordate, margin entire (often serrate on seedlings and shoots), 3–5 in. long, $1\frac{1}{4}$ – $2\frac{1}{2}$ in. wide, glabrous, upper face shining, midrib prominent beneath, veins 5–7 on each side, ascending and uniting below the margin. Flowers in short branched inflorescences at the scars of fallen leaves, usually male and hermaphrodite, the latter above. Sepals concave, obovate, about $\frac{3}{4}$ lin. long, puberulous on back. Filaments glabrous; anthers puberulous. Ovary compressed, pubescent, the stalk lengthening as the fruit ripens. Samara $\frac{2}{3}$ –1 in. broad, notched at the top, the broad wings beautifully veined; stalk $\frac{1}{4}$ – $\frac{1}{2}$ in. long, jointed in the middle.—*Planch. in DC. Prodr. xvii. 164*; *Hook. f. Fl. Brit. Ind. v. 481. Ulmus integrifolia, Roxb. Corom. Pl. t. 78*.

Upper Guinea. Togo; Atakama, in a mountain wood at 1200 ft., *Doering, 347!*

An interesting addition to the flora of tropical Africa. Based on a single specimen with flower kindly lent for determination by the Director of the Royal Botanic Gardens, Berlin.

2. *CELTIS*, Linn.; Benth. et Hook. f. Gen. Pl. iii. 354.

Flowers polygamous, the fertile generally hermaphrodite. Male: Calyx membranous, deeply divided, sometimes to the base, into 5, rarely 4, concave imbricate segments. Stamens as many as the sepals; filaments free, not incurved; anthers bluntly and shortly ovate. Torus densely hairy. Fertile: Calyx and torus as in male; stamens smaller than in male. Ovary sessile; ovule pendulous from the apex, anatropous; style central, 2-partite, branches undivided or 2-fid, densely papillose-stigmatose on the upper face and margins. Drupe fleshy, ovoid to globose, sometimes slightly keeled; endocarp bony, rough, sometimes keeled. Embryo curved; cotyledons very broad, applied face to face.—Trees or shrubs, deciduous or evergreen, unarmed in tropical African species. Leaves alternate, short-stalked, generally more or less coriaceous, often with acuminate apex, and unequal at the base, margin entire or serrate, penniveined, 1- or 3-nerved. Stipules lateral, free, caducous. Inflorescences male or androgynous, in laxly paniced cymes or fascicled, axillary or at the lower leafless nodes of young shoots;

fertile flowers with longer stalks, solitary or few in the higher axils.—
Mertensia, H. B. et K., Nov. Gen. et Sp. ii. 30. *Momisia*, F. G. Dietr. Vollst. Lex. Gaertn. Nachtr. v. 122. *Solenostigma*, Endl. Prodr. Fl. Norfolk. 41.

Species about 60, widely dispersed in temperate and tropical regions, especially in the northern hemisphere.

Stigmas undivided :

- Leaves with serrate margin 1. *C. kraussiana*.
- Leaves with entire margin or with a few weak teeth above 2. *C. Durandii*.

Stigmas divided :

Leaves not conspicuously 3-nerved :

Leaves oblong-elliptic or elliptic :

Petiole 2 or more lin. long ; stipules lanceolate :

- Drupe nearly $\frac{1}{2}$ in. long 3. *C. Soyauzii*.
- Drupe 3-4 lin. long 4. *C. Zenkeri*.

Petiole 1 lin. or less in length ; stipules subulate 5. *C. Tessmannii*.

Leaves obliquely ovate 6. *C. integrifolia*.

Leaves oblong, grossly sinuate-dentate 7. *C. ilicifolia*.

Leaves conspicuously 3-nerved :

Stigmas broadly dilated :

Drupe roundish-ovoid, 4 lin. long ; ovary glabrate :

- Central and West Africa 8. *C. Prantlii*.
- East Africa 9. *C. mauritiana*.

Drupe ellipsoid, 7 lin. long ; ovary glabrate or sparsely puberulous 10. *C. insularis*.

Drupe large, ovoid-globose, 9 lin. long ; ovary densely hairy 11. *C. Adolphi-Friderici*.

Stigmas linear 12. *C. Brownii*.

1. *C. kraussiana*, Bernh. in *Flora*, 1845, 87. A deciduous shrub or tree to 70 ft. high ; twigs reddish, more or less ferruginously pubescent when young. Leaves shortly petioled, ultimately thinly coriaceous, elliptic-ovate, or ovate to ovate-lanceolate, acuminate, base unequally rounded, margin serrate but often entire below the apex and in the lower portion, $1\frac{1}{2}$ -3 in. long, $\frac{1}{2}$ - $1\frac{1}{2}$ in. wide, 3-nerved, lateral nerves ascending, nerves prominent below ; indumentum varying, ferruginously pubescent especially on the veins when young, generally becoming glabrous except on the veins beneath, and scabridulous, but sometimes pubescent on both faces ; petiole 1-3 lin. long, puberulous. Stipules caducous, linear-lanceolate to broadly-oblancoelate, $1\frac{1}{2}$ -3 lin. long. Male flowers in subsessile or stalked fascicles of 4-7 flowers at lower leafless nodes (2-4) of branchlets ; fertile ($\text{\textcircled{f}}$ or $\text{\textcircled{m}}$) flowers 2-4 at the upper nodes, generally in the axil of a young leaf, intermediate inflorescences sometimes polygamous ; pedicels densely clothed with short soft spreading hairs, male $1\frac{1}{2}$ -2 lin. long, fertile to 4 lin. long. Sepals reddish, oblong-elliptic, subacute, concave, softly hairy on the

back, about 1 lin. long. Ovary and long linear-lanceolate stigmas ($1\frac{1}{2}$ lin.) densely hairy, Drupe subglobose, smooth, $2\frac{1}{2}$ lin. long, slender stalk to nearly 1 in. long.—Planch. in Ann. Sci. Nat. 3me sér. x. 295 and in DC. Prodr. xvii. 173; Engl. Hochgebirgsfl. Trop. Afr. 190; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 115; Sim. For. Fl. Port. E. Afr. 97; Almaga in Ann. R. Istit. Bot. Roma, viii. 119 (var. *flavescens* Engl. (nomen)); Fiori, Boschi e Piant. Legn. Eritrea, 111. *C. vesiculosa*, Hochst. ex Planch. in Ann. Sci. Nat. 3me sér. x. 295. *C. australis*, A. Rich. Tent. Fl. Abyss. ii. 257 (not of Linn.). *C. Burmanni*, Planch. l.c. 296. *C. Henriquesii*, Engl. Notizbl. königl. Bot. Gart. Berlin, iii. 22; Hiern in Cat. Afr. Pl. Welw. i. 1027. *Celtis* sp., Ficalho, Pl. Uteis, 260. *C. rhamnifolia*, Presl in Abhandl. K. Böhm. Ges. Wiss. ser. 5, iii. (1845) 467, nóm. abort. *C. (?) lactea*, Sim. For. Fl. Port. E. Afr. 97. t. xcvi B.—*Celtis foliis subrotundis, etc.*, Burm. Rar. Afr. Plant. 242, t. 88; Rendle in Journ. Bot. 1915, 298.

Nile Land. Abyssinia: Gunnia and Serriro, at about 4000 ft., *Schimper*, 889! Semen, on mountains, *Schimper*, 1162! Abbena, *Steudner*, 1364! Shireh, *Petit*! and without precise locality, *Quartin Dillon & Petit*, 91! Eritrea: various localities, *Schweinfurth* and *Riva*, 1697! *Schweinfurth*, *Terracciano & Pappi*, 646, 745! Fiori, Harar, *Robecchi Bricchetti*, 151! British East Africa: Kipayo, forest at 4000 ft., *Dümmer*, 513! Mau escarpment, *Baker*! Mau forests, *Hutchins*, 601! Uganda: Usoga, *Scott Elliot*, 7211: Toro, 5000 ft., *Dawe*, 485! Budongo and Bugoma forests, *Dawe*, 785! 1023! Mabira forest, 4000 ft., *Dawe*, 176!

Lower Guinea. Angola: Cazengo; Granja de S. Luiz, *Gossweiler*, 4364! 4507! 4521! 4527! 4530! 4687! 4688! 4815! 4857! Golungo Alto; Quibolo, *Welwitsch*, 6263! Sange, *Welwitsch*, 6264! Luinha, *Welwitsch*, 6283! River Coango near Cacarambola, *Welwitsch*, 6306! Queta Mountains, *Welwitsch*, 6286! Bumbo; Chella Mountains, *Welwitsch*, 6307! 6308! *Dekindt*, 1049!

Mozamb. Distr. Portuguese East Africa: M'Chopes, *Sim*, 5299! German East Africa: Lake Victoria; Kome Islands, *Holtz*, 1591! British Central Africa: Nyasaland; without precise locality, *Buchanan*, 85! Rhodesia: near Chirinda, at 3800 ft., *Swynnerton*, 1402! Victoria, *Monro*, 394!

Also in South Africa and Arabia.

C. (?) lactea, Sim, judging from the specimen in Kew Herbarium, apparently represents large-leaved sterile sucker-shoots of this species; the leaves reach as much as $4\frac{3}{4}$ in. in length by $2\frac{1}{2}$ in. in width. Similar specimens have been sent by *Welwitsch* from Angola (6283) and by *Dawe* from Uganda (785, 1023).

2. *C. Durandii*, Engl. Notizbl. königl. Bot. Gart. Berlin, iii. 22. A tall deciduous tree; diœcious; branchlets sparsely whitish-pubescent when young, soon becoming glabrous. Leaves shortly petioled, ultimately thinly coriaceous, oblong-lanceolate to elliptic-oblong, long-acuminate, base unequal, acute to rounded, margin entire or sometimes with a few weak teeth above, $3\frac{1}{2}$ –6 in. long, $1\frac{1}{4}$ – $2\frac{1}{4}$ or 3 in. wide, glabrous, 1-nerved with 3 to 5 ascending lateral nerves on either side, nerves prominent beneath, cross-veins prominulous; petiole slender, 3–6 lin. long, glabrous. Stipules lanceolate, acute, subscarious, straw-coloured, about 2 lin. long. Flowers preceding the leaves; male flowers in small branched clusters at the lower leafless

nodes of small branchlets (which end in an opening leaf-bud) and forming inflorescences of $\frac{1}{2}$ in. or less in length; pedicels about 1 lin. long, puberulous; fertile (♀ or ♂) flowers 2 to 3 together in the axils of young branchlets, stalks at first about 1 lin. long, increasing to 3 or 4 lin. Sepals elliptic, about 1 lin. long. Stigmas long, linear, undivided; drupe ovoid, bright yellow, $3\text{--}3\frac{1}{2}$ lin. long, containing a black trigonous stone.—Engl. in *Mildbraed*, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907–8, ii. 179. *C. dioica*, S. Moore in *Journ. Linn. Soc.* xl. 204.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 4586!

Lower Guinea. Congo: near Bingila, *Dupuis*! Angola: Cazengo; Granja de S. Luiz, *Gossweiler*, 4536! 5174! 5235! 5370! 5395!

South Central. Irumu: Kifuku, *Mildbraed*, 2887! Lumengo, *Mildbraed*, 2468! 2468a!

Mozamb. Distr. German East Africa: Usagara, *Trotha*, 171! Amani, to 3000 ft., *Warnecke*, 235! 240! 350! *Braun*, 1083! *Zimmermann*, 851! foot of Nguru Mountain, *Holtz*, 1763! Gazaland: Chirinda, 3700–4000 ft., *Swynnerton*, 108! Lower Buzi River at 100 ft., *Swynnerton*, 1105!

Var. *ugandensis*, Rendle. Leaves narrowly elliptic to lanceolate, margin entire, $2\text{--}4\frac{3}{4}$ in. long, $\frac{2}{3}\text{--}1\frac{1}{4}$ in. wide.—*C. ugandensis*, Rendle in *Journ. Bot.* 1906, 341.

Nile Land. Uganda: Entebbe, *Bagshawe*, 669! Toro; Mpanga forest, *Bagshawe*, 1001! Mabira forest, *Ussher*, 65! Semliki Valley, 2600 ft., *Dawe*, 639! Kipayo, forest at 4000 ft., *Dümmer*, 584!

The Rhodesian specimens are stated by Swynnerton to be diœcious; the female flowers contain no trace of stamens. The single specimen from Angola bears fertile hermaphrodite flowers but no trace of male flowers. Of the other specimens only fruit is known.

The dead wood has a peculiar fetid smell.

3. C. Soyauxii, *Engl. Notizbl. königl. Bot. Gart. Berlin*, iii. 23, *partly*. An evergreen tree 50 to 100 ft. high; branchlets ferruginously pubescent when young. Leaves shortly petioled, dark green, stiff and thinly coriaceous, elliptic, oblong-elliptic or elliptic-obovate, acuminate, mucronulate, narrowing at the unequal base, margin weakly serrate in the upper portion, $2\frac{3}{4}\text{--}5\frac{1}{4}$ in. long, $1\frac{1}{4}\text{--}2\frac{1}{2}$ in. wide, 1-nerved, lateral nerves 3–5 on each side, the lowest pair springing from the base ascending and prominent for about half the length of the leaf, the others patent-ascending, nerves prominent below; with adpressed ferruginous hairs when young, ultimately glabrous; petiole 3–4 lin. long, puberulous. Stipules lanceolate, 2 lin. long. Inflorescences axillary on young leafy shoots, densely ferruginously hairy. Male flowers almost sessile, crowded in a few many-flowered clusters below; fertile (♂) one or two above, stalked; flowers pentamerous. Sepals elliptic-oblong, about 1 lin. long. Ovary densely ferruginously hairy. Stigmas long, linear, 2-fid, branches bilobed at the apex; drupe ovoid attenuated towards the apex, glabrous, green, with 4 narrow keels when immature, scarlet and succulent when ripe, with a 4-ribbed stone (*Welwitsch*), nearly $\frac{1}{2}$ in. long.—Hiern in *Cat. Afr. Pl. Welw.* i. 1028. *C.*

usumbarensis, Engl. in Engl. Jahrb. xliii. 309; *C. Mildbraedii*, Engl. l.c. and in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8, ii. 180, t. xvi. C. *Trema sp.*, Ficalho, Pl. Uteis 260.

Upper Guinea. Ivory Coast: Bouroukrou, *Chevalier*, 16152! Cameroons: Molundu, *Mildbraed*, 4224! 3986!

Nile Land. Uganda: Bugoma forest, *Dawe*, 1029! Ungoro, at 3800 ft., *Dawe*, 755! *Dümmer*, 299!

Lower Guinea. Spanish Guinea: Bebai, *Tessmann*, 677! Angola: Cazengo; woods of Cacula, *Welwitsch*, 6284! *Gossweiler*, 613! Granja de S. Luiz, *Gossweiler*, 4529! 5224! 5233! 5233a! 5394! Golungo Alto; Bumba and mountains of Bango and Queta, *Welwitsch*, 6298! and without precise locality, *Welwitsch*, 6299! 6711!

South Central. Belgian Congo: Wambutti, *Mildbraed*, 2897! Mokoko, *Mildbraed*, 2934! Muera, north-west of Beni, *Mildbraed*, 2150!

Mozamb. Distr. German East Africa: Amani, *Zimmermann*, 853! 2935!

Also in Natal.

Native name Cabende (*Gossweiler*).

4. **C. Zenkeri**, *Engl. Notizbl. königl. Bot. Gart. Berlin*, iii. 22.

A large deciduous tree, 40-100 ft. or more high; young shoots and inflorescence densely ferruginously hairy. Leaves shortly petioled, ultimately thinly coriaceous, elliptic-oblong, often oblique, shortly acuminate, base unequal, margin entire or inconspicuously toothed above, to $4\frac{1}{2}$ in. long, $1\frac{1}{4}$ - $2\frac{1}{2}$ in. wide, sparsely and shortly pilose or glabrate above, shortly ferruginously pilose beneath especially on the nerves, with 3-4 ascending lateral nerves on each side, nerves somewhat depressed above, somewhat prominent beneath, transverse cross-veins subparallel, prominulous; petiole 2-3 lin. long, pubescent. Stipules large, lanceolate-acuminate, 3-6 lin. long. Flowers in dense paniced cymes, the lower (in the axils of scale-leaves or the lower leaves) male, the upper fertile, bisexual or female. Sepals concave, in the male flower oblong-spathulate, in the fertile elliptic to ovate-elliptic, about $\frac{3}{4}$ lin. long. Ovary ovoid, densely ferruginously hairy. Stigmas twice 2-fid. Drupe red, roundish-ovoid, sparsely covered with short adpressed brown hairs, about 3 lin. long, mesocarp watery.—*C. Stuhlmannii*, *Engl. Notizbl. königl. Bot. Gart. Berlin*, iii. 23. *C. Soyauxii*, *Engl. l.c.* partly (specimens from Loango, *Soyaux*, 202, and Angola, *Welwitsch*, 6285).

Upper Guinea. Togo: Bogu, *Kersting*, 163! Atakama, *Doering*, 184! Southern Nigeria: Aladin, *Foster*, 194! Lagos, *Punch*, 108! Idah district, at Adoro, *Kilson*! Cameroons: Yaunde, 2500 ft., *Zenker & Staudt*, 9! Molundu, *Mildbraed*, 408! 4273! 4536! between Garua and Golombe, *Talbot*!

Nile Land. Uganda: *Dawe*, 981! Budongo forest, *Dawe*, 833! 1030! Mabira forest, 4000 ft., *Dawe*, 173!

Lower Guinea. Loango: Chondrosho; mountain forest of Nuzala, *Soyaux*, 202! Angola: Cazengo; Granja de S. Luiz, *Gossweiler*, 4691! 4840! 4855! 4858! 5167! 5237! Amboim, *Gossweiler*, 4683! Golungo Alto; primary woods of Cabunga at Cacalunga, *Welwitsch*, 6285! Luinha, *Gossweiler*, 4389!

South Central. Belgian Congo: Beni forest near Muera, *Mildbraed*, 2170! Beni to Ruenzori, Lumengo, *Mildbraed*, 2726!

Mozamb. Distr. German East Africa : Uluguru ; Tununguo, 660 ft. *Stuhlmann*, 8671 ! 8968 ! Mojaba, 1200 ft., *Stuhlmann*, 8703 ! Usambara ; Muhera, *Zimmermann*, 29 ! Mombo, *Engler*, 3255 ! Kilosa, *Holtz*, 1768 !

“ Timber whitish throughout, not durable. Native name Cabende ” (*Gossweiler*).

5. *C. Tessmannii*, *Rendle in Journ. Bot.* 1915, 297. Apparently a deciduous tree ; shoots woody, slender, hirtellous with brown hairs, ultimate shoots $\frac{3}{4}$ lin. or less in thickness, with internodes 6–10 lin. long. Leaves shortly petioled, thin and papery when dry, oblong-elliptic, oblique, acuminate, apex mucronate, base very unequal, margin entire, 2–4 $\frac{1}{2}$ in. long, $\frac{3}{4}$ –1 $\frac{3}{4}$ in. wide, upper face glabrous except on the shortly hirtellous midrib, lower face scabridulous with short whitish hairs and hirtellous on the nerves, with 3–5 ascending lateral nerves on each side, somewhat prominent beneath, cross-veins prominulous ; petiole 1 lin. or less in length, hirtellous like the stem. Stipules narrowly subulate, hirtellous, 2 lin. or less in length. Sepals of fertile flowers with very short hairs on back, about $\frac{1}{2}$ lin. long. Ovary ovoid, densely clothed with greyish-brown hairs. Stigmas deeply 2-fid, with spreading branches.

Lower Guinea. Spanish Guinea : Mabungo, 1500 ft., *Tessmann*, B. 25 ! in Herb. Berlin.

Distinguished from *C. Zenkeri* by the almost sessile unequal-sided leaves and very slender stipules.

6. *C. integrifolia*, *Lam. Encycl.* iv. 140. A large tree ; branchlets greyish, shortly hairy. Leaves shortly petioled, olive-green when dry, thinly coriaceous, ovate, acute to shortly acuminate, base unequally rounded to subcordate, margin entire, 1 $\frac{3}{4}$ –3 $\frac{1}{4}$ in. long, 1–2 in. wide, 3-nerved, lateral nerves ascending, nerves prominent below, cross-veins subparallel, prominulous, scabridulous, glabrous or sometimes sparsely pilosulose on the nerves beneath ; petioles 2–3 lin. long, sparsely hairy. Inflorescences axillary, reaching to about half the length of the leaf, or shorter. Male flowers numerous, shortly stalked ; fertile (♂) above, few, with longer stalks. Sepals concave, elliptic, puberulous on back, about $\frac{3}{4}$ lin. long in the male, 1 lin. long in the fertile flower. Ovary bearing a dense grey pubescence. Stigmas linear, 2-fid, sometimes again divided. Drupe ovoid-globose, glabrate, 4–5 lin. long, on axillary stalks $\frac{3}{4}$ in. long. Planch. in *Ann. Sci. Nat.* 3me sér. x. 308, and in DC. *Prodr.* xvii. 192 ; Benth. in *Hook. Niger Fl.* 525 ; Fiori, *Bosche e Piant. Legn. Eritrea*, 111. *Mertensia integrifolia*, *Roem. & Schult. Syst.* vi. 313. *Momisia Lamarckii*, *Bl. Mus. Bot. Lugd.-Bat.* ii. 69.

Upper Guinea. Senegambia : Richard Tol, *Lelievre ! Perrotet*, 298 ! and without precise locality, *Adanson ! Kunth ! Roger ! Dupuis !* Gambia : Albuda, *Perrotet*, 711 ! Dogana Oualla, *Prieux ! Bathurst, Don !* French Guinea : Niassa, near Djenne, *Chevalier*, 1136 ! between Daliba and Lungano, *Chevalier*, 263 ! Ivory Coast : Mangu, *Mellin*, 15 ! Gold Coast : Salaga, *Krause !* Togo : Tshadu, *Kersting*, 12 ! Ssiu, *Kersting*, 201 ! 375 ! 376 ! Southern Nigeria : Abeokuta, *Irving*, 150 ! Northern Nigeria : Borgu, *Barter*, 772 ! Yola, *Dalziel*,

152 ! Gurara River, *Dalziel*, 173 ! Katagum District, *Dalziel*, 213 ! Chari River *Chevalier*, 8275 ! 8469 !

Nile Land. Eritrea : Bogos, *Beccari*, 112 ! Sudan : Blue Nile, near Bunzuga, *Muriel*, 71 ! Kordofan ; near Singukai, *Muriel*, 143 ! Duemme, *Pfund*, 770 ! Dinka : Dinka River, near Marial, *Schweinfurth*, 101 ! Mittu : near Mvolo, *Schweinfurth*, 2817 ! 2837 ! Uganda : Madi, *Speke & Grant*, 753 !

Also in Arabia.

7. *C. ilicifolia*, *Engl. Pfl. Ost-Afr. C.* 160. A tall tree of willow-like habit with pendulous branches ; branchlets slender, glabrous when young. Leaves distant, oblong or elongate-oblong, acute or long-acuminate, base cuneate, margin grossly sinuate-dentate with 4-5 very sharp teeth on each side, lateral nerves 4-5 on each side ascending, prominent as are the oblique cross-veins. Racemes terminal in fruit, pubescent. Pedicels equal in length to or shorter than the oblong-ovoid acute fruit. Stigmas 4-fid, equal in length to the fruit.

Mozamb. Distr. German East Africa : Kilimanjaro ; Tsaydo River, *Hildebrandt*, 2608.

8. *C. Prantlii*, *Priemer ex Engl. Notizbl. köniql. Bot. Gart. Berlin*, iii. 23. A large or small evergreen (*Gossweiler*) tree, sometimes shrubby ; young branchlets with a sparse whitish pubescence, ultimately glabrous. Leaves shortly petioled, elliptic-oblong to elliptic-ovate, apex acuminate, mucronulate, base obtuse, generally equal, margin entire or more or less irregularly toothed above, rarely to near the base, $2\frac{1}{2}$ -5 (sometimes 8) in. long, $1\frac{1}{4}$ -3 in. wide, coriaceous, glabrous, upper face minutely punctulate with cystoliths, 3-nerved to the apex, nerves generally depressed above, prominent beneath, connecting cross-veins prominulous ; petiole $2\frac{1}{2}$ -5 lin. long, glabrescent. Stipules ovate-triangular, acuminate, produced below the point of attachment. 2- $2\frac{1}{2}$ lin. long, pubescent. Inflorescences axillary or the lower at scale-bearing nodes ; the lower paniculate with male flowers clustered on the branchlets and a few longer-stalked fertile flowers above, the upper with fewer or no males and 3-5 fertile (♂) flowers. Sepals concave, broadly elliptic-oblong, 1- $1\frac{1}{2}$ lin. long, puberulous on the back. Ovary surrounded at the base by a dense ring of whitish hairs, otherwise glabrate. Stigmas fleshy, densely papillose, broadly dilated and 2-lobed. Drupe green, roundish-ovoid, glabrous, dark brown when dry, about 4 lin. long, on a shortish pedicel, 3- $4\frac{1}{2}$ lin. long.—Hiern in *Cat. Afr. Pl. Welw. i.* 1028 ; *Engl. in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8, ii.* 179 ; *De Wild. & Durand, Reliq. Dewevr.* 213 ; *Th. & Hél. Durand, Syll. Fl. Congol.* 501.

Upper Guinea. Togo : *Busse*, 3318 ! 3321 ! Sokode Basari, *Kersting*, 734 ! Southern Nigeria : Lagos, *Rowland ! Foster*, 79 ! Yoruba forests, *Barter*, 3413 ! Cameroons : Molundu, *Mildbraed*, 4418 ! 4090 ! Fernando Po, *Mann*, 276 !

Lower Guinea. Annobon Island, *Mildbraed*, 6516 ! 6772 ! Angola : Libongo ; River Lifune, *Welwitsch*, 6302 ! Cazengo ; Cacula, *Welwitsch*, 6287 ! Granja de

S. Luiz, *Gossweiler*, 5057! 5508! Belgian Congo: Bingila, *Dupuis*; Boma, *Dewèvre*, 429!

South Central. Belgian Congo: Fort Beni to Ruwenzori, *Mildbraed*, 2463! 2464! Beni to Irumu, *Mildbraed*, 2833! Irumu, *Mildbraed*, 2881! Ituri, *Mildbraed*, 2967!

9. *C. mauritiana*, *Planch.* in *Ann. Sci. Nat.* 3me sér. x. 307. Youngest parts of branchlets minutely puberulous, soon becoming glabrous. Leaves shortly petioled, elliptic-oblong to ovate, apex acuminate, mucronulate, base obtuse to roundish, generally equal, margin entire, 2–3½ in. long, 1–1¾ in. wide, stiffly chartaceous when dry, glabrous, upper surface minutely punctulate, 3-nerved, nerves prominent beneath, cross-veins prominulous; petiole 3–4 lin. long. Stipules ovate-acuminate, produced below the point of attachment, barely 2 lin. long, sparsely puberulous. Inflorescences axillary, much shorter than the leaves; fertile flowers stalked, few among the sessile male flowers in the upper cymes; sepals concave, broadly obovate-elliptic with ciliolate margin, 1 lin. long. Ovary glabrate, with a ring of whitish hairs round the base. Stigmas broadly dilated at the apex. Drupe ovoid-acuminate, obscurely strigillose at the apex, otherwise glabrous, obscurely keeled, dark brown when dry, about 4 lin. long; pedicels 3–5 lin. long.—*Planch.* in *DC. Prodr.* xvii. 184; *Engl. Pfl. Ost-Afr.* C. 160.

Mozamb. Distr. Zanzibar: Kokotoni, *Stuhlmann*!

Also in Mauritius and Bourbon. Scarcely distinguishable from *C. Prantlii*.

10. *C. insularis*, *Rendle* in *Journ. Bot.* 1915, 297. A fine tree with straight stem and white wood (*Welwitsch*); branchlets slender, glabrous when young. Leaves elliptic, acute to acuminate, base rounded to subacute, sometimes unequal, margin entire, 3–6 in. long, 1–3 in. wide, thinly coriaceous, glabrous, upper face minutely punctulate with cystoliths especially when young, 3-nerved to the apex, nerves prominent beneath, cross-veins subparallel, prominulous; petiole about ½ in. long, glabrous. Flowers not seen. Drupe ellipsoid, narrowing at the apex, about 7 lin. long, ribbed and reticulately wrinkled when dry and pale brown.—*C. sp.* *Planch.* in *Ann. Sci. Nat.* 3me sér. 307, and in *DC. Prodr.* xvii. 186; *Benth.* in *Hook. Niger Fl.* 525. *C. Prantlii*, *Priemer* ex *Engl. Notizbl. k. Bot. Gart. Berlin*, iii. 23, as regards specimens from St. Thomas and Princes Islands.

Lower Guinea. St. Thomas Island, *Don*, 35! *Welwitsch*, 6304! *Quintas*, 144! Princes Island, *Mann*, 1113!

As *Planchon* has suggested, this is near the Indian *C. Wightii*, *Planch.*

11. *C. Adolphi-Friderici*, *Engl.* in *Engl. Jahrb.* xliii. 308. A tall tree; branchlets sparsely whitish puberulous when young, shortly becoming glabrous and reddish. Leaves large, petioled, elliptic to elliptic-oblong, apex somewhat abruptly acuminate; base obtuse,

more or less oblique, margin entire, 6-7 in. long, up to 3 in. wide, smaller on fruit-bearing branches, coriaceous, glabrous, 3-nerved, nerves slightly depressed above, prominent beneath, veins prominulous; petiole stout, 4-9 lin. long, channelled above, glabrate. Inflorescence minutely puberulous, axillary, several times longer than the petiole, paniculate, many-flowered; fertile flowers few, intermixed with the male. Sepals concave, broadly elliptic to elliptic-obovate, about 1 lin. long in the fertile ($\bar{\sigma}$) flower, slightly shorter in the male, sparsely puberulous on back and margin. Ovary densely hairy. Stigmas fleshy, dilated, 2-lobed. Drupe large, ovoid-globose, glabrate, to 9 lin. long, $5\frac{1}{2}$ -7 lin. broad, bearing the hardened persistent remains of the styles.—Engl. in *Mildbraed*, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 179, t. xvi A-D'.

Nile Land. Uganda: Budongo; Bugoma forest, *Dawe*, 1022!

Upper Guinea. Cameroons: Ebolaira, *Mildbraed*, 5654! Molundu, *Mildbraed*, 3961! 3973! 4239!

South Central. Belgian Congo: Semliki plain; Lumengo, about 4000 ft., *Mildbraed*, 2725! Muera forest, *Mildbraed*, 2169! 2242!

12. *C. Brownii*, *Rendle in Journ. Bot.* 1915, 298. A small tree, monoecious; branchlets glabrescent. Leaves shortly petioled, ultimately thinly coriaceous, oblong-elliptic to broadly elliptic, apex more or less acuminate, base unequal, blunt to rounded, margin entire or with a few short irregular teeth in the upper portion, $2\frac{3}{4}$ - $5\frac{1}{2}$ in. long, $1\frac{1}{4}$ -3 in. wide, glabrous, upper face hard, 3-nerved, nerves somewhat depressed above, prominent below, cross-veins more or less parallel, prominulous; petioles $\frac{1}{4}$ - $\frac{1}{2}$ (rarely $\frac{3}{4}$) in. long. Inflorescences much shorter than the leaves, barely exceeding the length of the petiole to about one-third the length of the leaf; male flowers numerous, sessile or shortly stalked; fertile flowers above, few, with longer stalks. Sepals concave, elliptic, puberulous on the back, barely 1 lin. long. Ovary glabrous, with a dense ring of white hairs at the base. Stigmas broadly linear, fleshy, somewhat flattened, shortly 2-lobed at the apex; drupe ellipsoid, pale brown, 5 lin. long.

Nile Land. Uganda: Mabira forest, at Nsagelene, 4000 ft., *Brown*, 462! Chagwe, *Ussher*, 57! Mabira forest, *Ussher*, 81!

3. *TREMA*, Lour.; Benth. et Hook. f. *Gen. Pl.* iii. 355.

Flowers polygamous. Male: Calyx membranous, deeply 5- (more rarely 4-) partite; segments concave, induplicate-valvate in bud. Stamens equal in number to the sepals; filaments short, erect, subulate; anthers attached dorsally, ultimately exerted. Pistil rudimentary. Fertile: Calyx as in the male in the $\bar{\sigma}$ flowers, but with the segments nearly flat when stamens are absent. Ovary sessile; ovule pendulous a little below the apex; style central, divided deeply or to the base

into a pair of spreading, fleshy, linear, stigmatose branches. Torus generally hairy in all the flowers. Drupe more or less fleshy, ovoid or subglobose, often crowned by the inrolled branches of the style; endocarp hard; albumen sparse, fleshy; embryo curved; cotyledons narrow, applied face to face.—Trees or high shrubs, unarmed. Leaves alternate, short-stalked, minutely toothed, penninerved. Stipules lateral, free, caducous. Inflorescences in subsessile axillary cymes, male and fertile generally distinct.—*Sponia*, Decne, Herb. Timor. Descr. 170.

Species 30 or fewer, widely dispersed in tropical and subtropical regions.

1. *T. guineensis*, Ficalho, *Pl. Uteis*, 261. A shrub or tree; branchlets densely and shortly hairy, sometimes silky or strigillose. Leaves shortly petioled, membranous, ovate-oblong, acute to acuminate or cuspidate, base generally unequally cordate, sometimes retuse or rounded, margin denticulate or sometimes subcrenulate or serrulate, generally from $2\frac{1}{2}$ to 4 in. long, and 1–2 in. wide, sometimes larger to 6 in. long, or smaller, with a median nerve and generally 4 (sometimes 5 or 6) pairs of ascending lateral nerves, the lowest pair springing from the base of the median nerve, prominent on the lower face, somewhat depressed above, scabridulous and sparsely hairy on the upper face, more or less densely and softly hairy below, especially on the nerves and veins, sometimes the older ones glabrescent; petiole 2–4 lin. long, hairy like the branchlet. Stipules caducous, lanceolate or ovate-lanceolate, acuminate. Inflorescences numerous, short, axillary, dense-flowered, sometimes glomerate; flowers 5-merous. Sepals greenish or reddish, persistent, broadly elliptic, concave, sometimes bluntly keeled, pilosulose on the back and margin, flatter and sometimes ovate-elliptic or ovate in female flowers, 1 lin. or less in length. Filaments equal in length to the sepals. Ovary ovoid, 1 lin. long, with a pair of horizontally spreading linear stigmas. Drupe globose-ovoid, about $1-1\frac{1}{2}$ lin. long; pedicel short, rarely exceeding the drupe in length.—Büttn. in Mitth. Afr. Gesellsch. v. 257, incl. forma *strigosa*, Büttn.; Durand & Schinz, *Études Fl. Congo*, 247; De Wild. & Durand in *Bull. Herb. Boiss.* 2me sér. i. 49, *Contrib. Fl. Cong.* ii. 58, *Reliq. Dewevr.* 213 and *Pl. Thonner. Congol.* i. 10, ii. 298; De Wild. *Miss É. Laurent.* 68 and *Fl. Bas-et Moyen-Congo*, iii. 62; Th. & Hél. Durand, *Syll. Fl. Congol.* 501; S. Moore in *Journ. Linn. Soc.* xl. 205; Engl. *Pfl. Ost-Afr. C.* 160 and in Schlechter, *Westafr. Kautsch.-Expéd.* 286. *T. affinis*, Bl. *Mus. Bot. Lugd.-Bat.* ii. 58; Hiern in *Cat. Afr. Pl. Welw.* i. 1029; Rendle in *Journ. Linn. Soc.* xxxvii. 214. *T. africana*, Bl. l.c. *T. bracteolata*, Bl. l.c.; Sim, *For. Fl. Port. E. Afr.* 96. *T. glomerata*, Bl. l.c. *T. strigosa*, Bl. l.c. *T. nitens*, Bl. l.c. *Celtis guineensis*, Schumach. in Schumach. & Thonn. *Beskr. Guin. Pl.* 160, incl. var. *parvifolia*; Planch. in DC. *Prodr.* xvii. 197. *S. affinis*, Planch. in *Ann. Sci. Nat.* 3me sér. x. 329, and in DC. *Prodr.* xvii. 198;

Benth. in Hook. Niger Fl. 525. *S. africana*, Planch. in Ann. Sci. Nat. 3mè sér. x. 320; Benth. l.c. *S. bracteolata*, Hochst. in Flora, 1845, 87; Planch. l.c. 321. *S. glomerata*, Hochst. l.c.; Planch. l.c. *S. nitens*, Planch. l.c. 325; Benth. l.c. *S. strigosa*, Planch. l.c. 320; Benth. l.c.

Upper Guinea. Senegal, *Heudelot!* Leprieur! Gambia: banks of the River Gambia, *Leprieur!* French Guinea: Kona Kry, *Chevalier*, 12143! Sierra Leone: various localities; *Don!* *Scott Elliot*, 4100! 4974 a and b! *Kirk*, 16! *Unwin & Smythe*, 41! *Vogel*, 2! 135! 136! 138! *Barter!* *Dalziel*, 967! Rotomba Island, *Kirk*, 16! Gold Coast: Shai Plains, *Johnson*, 577! Tanosu, *Chipp*, 369! Togo: near Lome, *Warnecke*, 184! 334! Aponapon, *Chipp*, 241! Southern Nigeria: Quorra, *Vogel*, 33! Lagos, *Punch*, 56! 57! *Moloney!* various localities, *Moloney!* *Talbot*, 634! 688! *Kitson!* *Schlechter*, 13019! *Foster*, 330! 337! Northern Nigeria: River Benue, *Talbot!* Katagum District, *Dalziel*, 330! 337! Nupe, *Barter*, 1499! Lokoja, *Elliott*, 232! *Dalziel*, 156! Cameroons: Batanga, *Bates*, 63! Barombi, *Preuss*. 271! Yaunde, *Zenker & Staudt*, 65! Bipinde, *Zenker*, 886! Fernando Po, *Vogel*, 47! *Mann*, 204!

Nile Land. Niam-niam: Diamvonu River, *Schweinfurth*, 3212! Turu, *Schweinfurth*, 3339! Uganda: various localities; 2200-6700 ft., *Dawe*, 199! *Dümmer*, 569! *Bagshawe*, 1003! 1338! 1521! *Mildbraed*, 1953! 2698.

Lower Guinea. St. Thomas Island, *Mann*, 1057! *Welwitsch*, 6282! *Don*, 38! Lower Congo: Boma; Zenze, *Laurent*, and without precise locality, *Smith*, 11! Angola: Golungo Alto, *Welwitsch*, 6280b! near Trombeta, *Welwitsch*, 6257! Menha Lula, *Welwitsch*, 6262! near Sangc, *Welwitsch*, 6293! Cazengo, *Welwitsch*, 6280! Granja de S. Luiz, *Gossweiler*, 5010! Ambaca; *Welwitsch*, 6281! Bumbo, *Welwitsch*, 6288! Malange, *Gossweiler*, 1000!

South Central. Belgian Congo; various localities; *Mildbraed*, 2954! *Büttner*, 249, *Gillet*, 81, 809; *Laurent*, 114! *Krekels!* *Dewèvre*, 758; *Thonner*, 8; *Malchair*, 447; *Vanderyst*, 1085! *Pynaert*, 98, 120, 1102, 1766; *Flamigni*, 92; *Sapin*.

Mozamb. Distr. Zanzibar, *Kirk*, 91! German East Africa: various localities, *Goetze*, 163! *Kässner*, 77! *Stuhlmann*, 28! *Buchwald*, 381! *Mildbraed*, 49; *Holst*, 2608a! British Central Africa: Nyasaland; various localities, *Buchanan*, 182! 296! 566! 618! 1211! *Scott Elliot*, 8529! *Whyte!* *Whyte & McClounie!* *Purves*, 42! *Kirk!* *Meller!* Portuguese East Africa: Beira, *Swynnerton*, 1106! Gazaland: Mount Maruma, 3500 ft., *Swynnerton*, 1103! near Chirinda, 3800 ft., *Swynnerton*, 129! Kurumadzi, 2000 ft., *Swynnerton*, 1104! 1388! Rhodesia: Matopo Hills, 5000 ft., *Gibbs*, 238! Ndola, 4500 ft., *Rogers*, 8363!

Occurs also in Natal and Madagascar.

Var. *Hochstetteri*, Engl. Pfl. Ost-Afr. C. 160. A coarser-looking plant with generally larger leaves, 3-6 in. long, 1½-2½ in. wide, scabrous on the upper face and pubescent beneath.—*Trema Hochstetteri*, Engl. Hochgebirgsfl. Trop. Afr. 190; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 116; Fiori, Bosche e Piant. Legn. Eritrea, 112. *Sponia Hochstetteri*, Buching. ex Planch. in DC. Prodr. xvii. 198. *S. orientalis*, Planch., var. *asperata*, Solms-Laub. in Schweinf. Beitr. Fl. Aethiop. 192.

Nile Land. Abyssinia: banks of River Ussla near Delhi-Dikens, 4400 ft., *Schimper*, 195! 2182! Eritrea: Ghinda, 3000-3400 ft., *Schweinfurth & Riva*, 2234! Cheren, *Penzig*. British East Africa: Kibidesi, 3300 ft., *Scheffler*, 191! N'di Mountain, *Hildebrandt*, 2534! Melindi, *Kirk!* Lanjora, 2000 ft., *Johnston!* Uganda: Lake Victoria; Island of Buvuma, *Bagshawe*, 631! West Ankole, 5000 ft., *Dawe*, 416! Kipayo, 4000 ft., *Dümmer*, 798! Toro, *Dawe*, 488!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 1234! 2092! Uluguru, 3300 ft., *Goetze*, 163! between Magu and

Kageyi, on the west bank of Lake Victoria, Fischer, 543 ! Nyasaland, Buchanan, 1235 !

Also in Arabia.

4. **CHÆTACME**, Planch. ; Benth. et Hook. f. Gen. Pl. iii. 356.

Flowers unisexual, monœcious. Male: Calyx deeply 5-partite; segments induplicate-valvate, concave, obtuse. Stamens 5; filaments erect; anthers dorsifixed above the base, ovate-oblong. Pistil rudimentary, surrounded by stiffish hairs at the base. Female: Calyx-segments flatter than in the male. Ovary sessile; ovule pendulous from the apex; style central, divided to the base into a pair of long, slender, stigmatose branches. Drupe globose; exocarp thick, hard when dry; endocarp thin, bony. Embryo bent double; radicle short; cotyledons applied face to face, the outer much thicker than the inner.—Lofty shrubs or small trees, much branched, the branchlets armed with short axillary spines. Leaves alternate, short-stalked, entire or serrate, coriaceous, one-nerved and penni-veined. Stipules connate along one margin enveloping the terminal bud, caducous. Male flowers in dense axillary cymes; female solitary or few.

Species 2, in Tropical and South Africa, and Madagascar.

Margin of leaf entire 1. *C. microcarpa*.

Margin of leaf serrate 2. *C. serrata*.

1. *C. microcarpa*, Rendle. A stiff shrub or a small tree (up to 25 ft. high); much branched; branchlets more or less hirtellous when young, becoming glabrous and ashen grey in colour and armed with solitary or geminate axillary spines. Leaves distichous, shortly petioled, stiffly coriaceous, oblong-elliptic to ovate-elliptic, acute or obtuse, often apiculate with an awn-like prolongation of the mid-vein; base obtuse to rounded, generally slightly unequal; margin entire, reflexed in dried specimens, $1\frac{3}{4}$ to 4 in. long, rarely shorter or longer, $1-1\frac{1}{2}$ in. wide, with a median nerve prominent on the lower face, and numerous weakly prominent spreading-ascending lateral nerves with a conspicuous intervening reticulation, generally glabrous, rarely pubescent on the lower face; petiole 2-4 lin. long. Male flowers greenish, in dense short bracteate cymes in the leaf-axils or at the lower leafless nodes of young shoots; pedicel stout, scarcely exceeding the flower, enveloped at the base by the ovate bract and bracteoles. Sepals concave, $1\frac{1}{2}$ lin. long, puberulous on the back. Filaments equal to the sepals; pistil-rudiment 1 lin. long, with a pair of abortive stigmas. Drupe ellipsoid-globose, beaked with the persistent style-bases, about $\frac{1}{2}$ in. long.—*C. aristata*, Engl. Pf. Ost-Afr. C. 160, not of Planch.; Hiern in Cat. Afr. Pl. Welw. 1030; Sim, For. Fl. Port. E. Afr. 96; var. *kamerunensis*, Engl. Notizbl.

königl. Bot. Gart. Berlin, iii. 24. *Bosqueia spinosa*, Engl. in Engl. Jahrb. xl. 548 and li. 439.

Upper Guinea. Gold Coast: Kwase, *Chipp*, 575! Cameroons: Yaunde, 2500 ft., *Zenker*, 551! *Zenker & Staudt*, 430! Sanaga, *Zenker*, 1450!

Nile Land. Niamniam, *Schweinfurth*, 2828! Uganda: Entebbe, *Bagshawe*, 747! British East Africa: Myny, *Elliott*, 347!

Lower Guinea. Annobon Island, *Mildbraed*, 6527! 6750! Angola: Cazengo; Granja de S. Luiz, *Gossweiler*, 4701! 4763! 5156! 5161! Ambaca; by streams near Cabinda, *Welwitsch*, 474! Pungo Andongo; Cabondo and near Luxillo, *Welwitsch*, 473! Bumbo; Chella Mountains at about 3000 ft., *Welwitsch*, 472!

South Central. Belgian Congo: bank of the Lualaba near Nyangwe, *Pogge*, 692!

Mozamb. Distr. Kilimanjaro: Majame, 3300 ft., *Volkens*, 2042! German East Africa: West Ukerewe, *Uhlig*, V. 73.

(?) Var. *longifolia*, Engl. ex De Wild. & Durand, Reliq. Dewevr. 214 (sub *C. aristata*, Planch.). "Leaves longer, oblique oblong-lanceolate."—Th. & Hél. Durand, Syll. Fl. Congol. 501.

South Central. Belgian Congo: near Nyangwe, *Dewèvre*, 903! 965!

Distinguished from the South African *C. aristata*, Planch., by the much smaller somewhat ellipsoidal fruit. That of *C. aristata* is depressed-globose and $\frac{1}{2}$ - $\frac{3}{4}$ in. in diameter.

2. *C. serrata*, Engl. Notizbl. königl. Bot. Gart. Berlin, iii. 24. A shrub, sometimes becoming arborescent; branchlets flexuous, spinose as in the previous species, hirtellous when young, ultimately glabrous, somewhat densely leaved. Leaves very shortly petioled, coriaceous, oblong-elliptic, mucronulate, margin acutely serrate, pale green and shining above, 2-3 in. long, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. wide; lateral nerves several, thin, prominulous beneath as are the reticulate veins; petiole densely hairy.

Lower Guinea. Annobon Island, *Mildbraed*, 6559!

Mozamb. Distr. German East Africa: Usambara, on dry hills, *Holst*, 505!

Also in South Africa.

Described from barren leaf-shoots.

ORDER CXXIII. BARBEYACEÆ.

(By A. B. RENDLE.)

Flowers diœcious, regular, apetalous. Male flower: Perianth deeply 3-4-fid; segments valvate, calycine. Stamens 6 to 9; filaments very short; anthers erect in bud, oblong-linear, 2-celled, cells parallel, dehiscing longitudinally, connective apiculate; pollen-grains round, smooth; no rudiment of an ovary present. Female flower:

Sepals united only at the base, slightly imbricate, accrescent. Staminodes absent. Ovary superior, of one carpel. shortly stalked, 1-celled; ovule solitary, pendulous from just below the apex of the cell, anatropous, apparently with a single integument; style short, terminal, expanding into a flattened linear-oblong stigma, papillose on the ventral face. Fruit shortly stalked, dry, indehiscent, ellipsoid; pericarp thinly leathery. Seed with a membranous testa conforming to the pericarp, and a longitudinal dorsal raphe; embryo straight; cotyledons equal, flattened face to face, fleshy, oily; radicle short, superior; plumule very small.—A tree; leaves shortly stalked, opposite-decussate, simple, entire, somewhat leathery, penninerved, exstipulate. Flowers small, in axillary, generally ebracteate cymes.

A single genus, *Barbeya*, with one species, in the middle and upper regions of the mountains of Arabia Felix, and North Abyssinia.

1. BARBEYA, Schweinf.

1. *B. oleoides*, *Schweinf. in Malpighia*, v. 332, tt. 24–25. A small tree, 17–26 ft. high, with a trunk 10 in. in diam., bark thick, dull red; branches slender, somewhat pendulous, greyish brown, young shoots bearing a dense whitish pubescence which becomes ferruginous towards the tips. Leaves distichous through twisting of the internodes, lanceolate or linear-lanceolate, apex acute, apiculate, sometimes cuspidate, base blunt to rounded, margin slightly revolute, 1–2½ in. long, 3–7 lin. wide, green, glabrous and somewhat polished above, clothed beneath with a grey-white tomentum which is rufescent in the young leaf; midrib prominent beneath; veins 6–7 on each side, spreading, obscure. Male flowers in small few-flowered subsessile cymes about ¼ in. long and densely ferruginously pubescent; pedicel 1½–2½ lin. long; perianth divided for three-quarters of its length or more, 1½ lin. long; segments 3–4, ovate or elliptic, 3-nerved; female flowers generally in sessile simple 3-flowered cymes; pedicels slender, 3½–4 lin. long, densely pubescent like the back of the perianth; segments 3–4, as long as the pedicel, narrowly oval or oval-oblong, 3-nerved and reticulately veined on the inner face. Ovary 1 lin. long; stigma equal to or exceeding the ovary in length. Sepals in fruit thinly membranous, oblong-elliptic, delicately veined, glabrescent, 5–8 lin. long. Fruit glabrous, somewhat antero-posteriorly compressed, apex obliquely acute, 4–4½ lin. long, with a dorsal line and a well-marked ventral suture.—*Schweinf. in Bull. Herb. Boiss. iv. App. ii. 117; Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 119; Almagia in Ann. R. Istit. Bot. Roma, viii. 119; Fiori, Boschi e Piant. Legn. Eritrea, 112.*

Nile Land. Eritrea: various localities, *Schweinfurth*, 171, 172! 621, 622! 1189! 1190! 1671! 2157! *Pappi*, 183, 3750; *Terracciano & Pappi*, 224, 380, 645, 744, 1743.

Also in Arabia.

ORDER CXXIIIb. CANNABINACEÆ.

(By A. B. RENDLE.)

Flowers diœcious, rarely monœcious, regular, apetalous. Male: Perianth deeply 5-partite, calycine; segments imbricate. Stamens 5, opposite to the sepals. Filaments short, not inflexed; anthers erect in bud, 2-celled, dehiscence longitudinal. Female: Calyx small, cup-like, loosely investing the ovary, entire; staminodes absent. Ovary superior, 1-celled, bearing at the apex a pair of long filiform stigmas; ovule solitary, pendulous from the apex of the cell, anatropous, with two integuments. Fruit dry, indehiscent. Endosperm scanty, oily. Embryo rolled or curved.—Aromatic herbs, perennial and twining, or annual, without latex. Leaves opposite or alternate, long-stalked, palminerved; stipules lateral, free, persistent. Flowers small, in axillary cymes, many-flowered in the male, few-flowered in the female.

Species 3, in the temperate parts of the northern hemisphere, introduced elsewhere.

1. **CANNABIS**, Tourn.; Benth. et Hook. f. Gen. Pl. iii. 357.

Flowers: Male numerous, shortly stalked, in lax drooping terminal and axillary panicles. Sepals free, spreading or reflexed, oblong. Anthers large, pendulous. Female fewer, in erect short spikes leafy below, each flower sessile in the axil of a small enveloping bract. Calyx inconspicuous, very thin, closely applied to and shorter than the ovary. Ovary ovoid; stigmas long, protruding. Fruit small, indehiscent, enclosed in the persistent bract, compressed-ovoid; seed conforming to the thin crustaceous pericarp. Embryo strongly curved; cotyledons fleshy.—An aromatic annual herb. Leaves alternate, or the lower opposite, palmately divided into narrow spreading leaflets; stipules linear, acute.

1. **C. sativa**, Linn. *Sp. Pl. ed. i.* 1027. A densely leaved plant; stem erect, 3–10 ft. or more high, simple or slightly branched, slender, somewhat rough with short stiffish hairs, greyish-green. Leaves long-stalked, leaflets 5–7 or more, reduced to 3 in the upper leaves, linear-lanceolate, attenuate at apex and base, margin sharply serrate, the middle one the longest, from 3–6 in. in length, the lateral successively shorter, scabridulous and dark green above, pale and finely pubescent beneath; petiole slender, hirtellous. Male flowers yellowish-green. Sepals puberulous on the back, $\frac{1}{8}$ in. long; female flower sheathed by a hirsute bract from which protrude the long filiform stigmas. Fruit $1\frac{1}{2}$ –2 lin. long, smooth, pale greyish-brown.—Welw. Apont. 547 and Synops. Explic. 45; Alph. DC.

Prodr. xvi. i. 30; Monteiro, Angola, ii. 256; Ficalho, Pl. Uteis, 261; Engl. Pfl. Ost-Afr. C. 162 and Monogr. Morac. Afr. 44; Hiern in Cat. Afr. Pl. Welw. i. 994; Durand & Schinz, Études Fl. Congo, 248; De Wild. & Durand, Reliq. Dewevr. 214; De Wild. Miss Laurent. 72; Th. & Hél. Durand, Syll. Fl. Congol. 501; Fries, Wiss. Ergebn. Schwed. Rhodes.-Kong.-Exped. 1911-12, i. 18; Bentley & Trimen, Medic. Pl. iv. 231.

Hemp. Native of Asia; widely cultivated. Recorded from the following localities in tropical Africa.

Upper Guinea. Sierra Leone: *Welwitsch*, 6275d!

Nile Land. Uganda: Nandi Country, *James*! British East Africa: Kavirondo, *Scott Elliot*, 7051!

Lower Guinea. Island of St. Thomas, *Moller*, 148! French Congo: Loango, Chinchosho, *Soyaux*, 198! Gaboon: Gaboon River, *Mann*, 1050! Angola: Pungo Andongo, *Welwitsch*, 6275c! Golungo Alto; *Sange*, *Welwitsch*, 6275! (a specimen with both male and female flowers); Mukenge, *Pogge*, 1333. Lower Congo: Stanley Pool, *Büttner*, 293; Bingila, *Dupuis*.

South Central. Belgian Congo: Welle River, *Dewèvre*; Kasai, Manghe and Butala, *Laurent*.

Mozamb. Distr. German East Africa: Amboni, *Holst*, 2685! Usaramo, *Stuhlmann*, 6389; Ussukuma, *Stuhlmann*, 4671; Karagwe near Kafuro, *Stuhlmann*, 1724; Mininga, *Speke and Grant*, 75! Portuguese East Africa: Quilimane, *Stuhlmann*; Shamo, *Kirk*! Luabo River, *Kirk*! Rhodesia: Victoria, *Monro*, 960! Bangwecolo, *Fries*, 723.

ORDER CXXIIIc. MORACEÆ.

(By J. HUTCHINSON AND A. B. RENDLE.)

Flowers unisexual, monœcious or diœcious, regular; perianth-segments typically 4, calycine, persistent, free or more or less united and representing two dimerous whorls, sometimes much reduced or absent, valvate or imbricate. Male flower: Stamens generally equal in number and opposite to the sepals, sometimes fewer; filaments inflexed in the bud or straight; anthers opening longitudinally; rudiment of ovary present or absent. Female flower: Ovary superior or more or less inferior; carpels 2, the posterior rarely developed or represented by an empty chamber, generally 1-celled; ovule solitary, pendulous from the apex of the cell with an upwardly directed micropyle, more rarely basal and erect; styles 2, or only the anterior one developed, filiform and stigmatose on the inner face, more rarely peltate. Fruit small, an achene, nut or drupe, enveloped by the accrescent perianth or buried in the succulent receptacle; endosperm present or absent; embryo

often curved, with generally thick flat or folded, often very unequal cotyledons.—Trees or shrubs, more rarely perennial or annual herbs, with a milky juice. Leaves alternate, rarely opposite, simple, generally penninerved, in the *Artocarpeæ* sometimes palminerved; stipules 2, lateral and persistent or caducous, or axillary, leaving a scar encircling the stem. Flowers small, in dense cymes which often through union of the axis form heads, discs or hollow receptacles; female flower sometimes solitary.

Species about 1000, widely distributed in temperate and tropical regions.

The Bread-fruit tree, *Artocarpus incisa*, Linn. f. [*A. communis*, Forst.], is according to Welwitsch cultivated in gardens at Freetown, Sierra Leone. Engler records it also from Zanzibar, the Cameroons and Loango, where it is usually planted in the streets. Welwitsch (cf. *Hiern in Cat. Afr. Pl. Welw. i. 1022*) also records *A. integrifolia*, Linn. f., from the island of St. Thomas, where it is "wild here and there, and cultivated in both the coast and mountain regions of the island. . . . The inhabitants call the tree 'Jaca' or 'Jacca.'" Engler records the same species from Zanzibar and German East Africa. The name "Bread-fruit" is also applied in Africa to *Treculia africana*.

Artocarpus differs from *Treculia* in its usually monœcious flowers, and its receptacles devoid of an involucre of bracts at the base. The fruits of both genera are used as food.

TRIBE I. MOREÆ.—*Stamens reflexed in the bud with reversed anthers, becoming elastically exerted with anthers erect in the open flower; style often obliquely inserted, generally 2-fid; ovule pendulous from the apex or just below the apex of the cell, anatropous or amphitropous. Herbs, shrubs or trees with leaves folded in the bud; stipules generally small and not leaving a circular scar; inflorescence various.*

*Flowers in dense spicate or capitate inflorescences, the male often catkin-like.

Sub-tribe i. EUMOREÆ.—Flowers in solitary axillary unisexual spikes; style dividing at the base into a pair of linear-subulate stigmas. Trees.

Doubtfully native in tropical Africa 1. MORUS.

Sub-tribe ii. BROUSSONETIÆ.—Flowers in spikes or globose heads; style simple, filiform, sometimes with a small second branch. Trees or shrubs, often spiny.

Male flowers catkin-like; calyx in female flower deeply divided 2. CHLOROPHORA.

Male flowers in dense spherical heads; calyx in female flower tubular, 4-lobed 3. CARDIOGYNE.

**Male flowers densely crowded on a flattened or concave, generally dorsiventral receptacle; female flowers 1 to many on the same receptacle, or distinct and solitary.

Sub-tribe iii. DORSTENIÆ.—Characters as in the preceding paragraph.

Inflorescence bisexual (also male in *Sloetiopsis*).

Bracts forming a ring round the edge of the receptacle.

Receptacle with several female flowers (rarely only one); endocarp crustaceous; plants generally herbs, rarely shrubby 4. DORSTENIA.

Receptacle with a solitary central female flower; pericarp thin, membranous; shrubs or trees 5. TRYMATOCOCCUS.

Bracts orbicular, peltate, subtending the flowers 6. SLOETIOPSIS.

Inflorescence unisexual; male flower subtended by a peltate bract; female flower solitary; trees or shrubs 7. NEOSLOETIOPSIS.

TRIBE II. ARTOCARPEÆ.—*Anthers erect in bud; style often obliquely inserted, undivided or 2-fid or 2-lobed; stigma various; ovule pendulous from the apex or just below the apex of the cell, anatropous or slightly amphitropous; fruit sometimes buried in the receptacle. Trees or shrubs; leaves inrolled in bud; stipules leaving a scar encircling or nearly encircling the stem; flowers crowded on the inside or outside of a fleshy unisexual or bisexual receptacle, or the female solitary.*

*Flowers arranged on the inside of a hollow and nearly closed or campanulate and open at the top, usually bisexual receptacle; female flowers solitary in each receptacle except in *Ficus*.

Sub-tribe i. FICEÆ.—Receptacle mostly fleshy, hollow, globose or obovoid, closed at the top except for a small ostiole (mouth), bracteate on the inside; peduncle with a whorl of 2-3 bracts at the apex, rarely bracts corresponding to these more than 3 and scattered on the peduncle; flowers numerous, hidden within the receptacle.

Only Tropical African genus 8. *FICUS*.

Sub-tribe ii. BROSIMEÆ.—Receptacles campanulate or obconic, wide open at the top with the flowers exerted, bisexual or rarely subunisexual; basal bracts none or few.

Fruit inferior, adnate to the inside of the receptacle.

Bracts among the male flowers peltate ... 9. *BOSQUEIOPSIS*.

Bracts among the male flowers not peltate ... 10. *BOSQUEIA*.

Fruit superior, free from the receptacle ... 11. *SCYPHOSYCE*.

Sub-tribe iii. OLMEDIEÆ.—Receptacles unisexual, in the male with a basal involucre of numerous or few bracts; female flowers solitary.

Male involucre bracts few, in a single series 12. *MESOGYNE*.

Male involucre bracts numerous, in several series 13. *ANTIARIS*.

**Flowers arranged on the outside of (but often sunk in) the fleshy receptacle, the latter globose or ellipsoid and unisexual; female flowers numerous in each female receptacle.

Sub-tribe iv. EUARTOCARPEÆ.—Receptacle with a few bracts at the base, the floral bracts often peltate at the apex, rarely conical; fruits buried in the fleshy part of the receptacle and forming a syncarp.

Only Tropical African genus 14. *TRECVLIA*.

TRIBE III. CONOCEPHALEÆ.—*Stamens not inflexed in the bud, anthers erect; style simple; ovule erect from the base of the cell. Trees or shrubs; leaves folded in bud; stipules generally large and united leaving a ring-like scar.*

Male flowers 2-4-androus; sepals distinct; style short; stigma broad, lanceolate 15. *MYRIANTHUS*.

Male flowers 1-androus; sepals united; style long, filiform; stigma brush-like 16. *MUSANGA*.

1. **MORUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 364.

Flowers monœcious or diœcious. Male: Calyx membranous, divided into 4 imbricate segments. Stamens 4; filaments free, inflexed in bud. Female: Sepals 4, decussate and imbricate,

becoming succulent in the fruit. Ovary enclosed within the calyx, ovoid or subglobose; ovule solitary, pendulous from the apex of the cell; stigmas 2, linear-subulate, borne on a central style or sessile. Fruit included in the generally succulent persistent calyx forming a syncarp; exocarp more or less succulent; endocarp crustaceous. Seed with a thin membranous testa; embryo curved in the thick fleshy albumen; cotyledons oblong, equal; radicle ascending.—Trees or shrubs with a thick milky juice. Leaves petioled, alternate, entire or lobed; stipules lateral, small, caducous. Flowers in solitary axillary unisexual spikes; male catkin-like; female (in African species) short, densely flowered.

Species 6 or 7, in the warm temperate regions of the northern hemisphere and elevated regions in the tropics. Doubtfully native in tropical Africa.

Leaves ovate or cordate, not 3-nerved:

Leaves shortly acuminate; stigmas sessile 1. *M. nigra*.

Leaves caudate-acuminate; stigmas borne on an evident style 2. *M. indica*.

Leaves more or less elliptic 3. *M. mesozygia*.

1. *M. nigra*, *Linn. Sp. Pl. ed. i.* 986. A tree of moderate height with much-branched spreading crown; branchlets terete, reddish-brown, pubescent when young. Leaves petioled, broadly cordate (rarely lobed), shortly acuminate, base subequal, margin somewhat unequally serrate-dentate, $3\frac{1}{2}$ – $5\frac{1}{2}$ in. long, $2\frac{3}{4}$ – $3\frac{3}{4}$ in. wide, firm, upper surface deep green and scabrous, paler and sparsely pubescent beneath; lateral nerves 4–5 on each side, somewhat raised beneath, ascending; petiole slender, almost terete, pubescent, 1– $1\frac{1}{2}$ in. long. Male and female flowers on distinct branches, sometimes diœcious. Male inflorescence cylindrical, $\frac{3}{4}$ – $1\frac{1}{2}$ in. long; female shortly ellipsoidal, $\frac{1}{3}$ – $\frac{1}{2}$ in. long. Male flowers: sepals 4, broadly elliptic, concave, woolly on the back, 1 lin. long; stamens slightly exceeding the sepals. Female flowers: sepals woolly at the apex; stigmas sessile, densely hairy, 1– $1\frac{1}{3}$ lin. long; syncarp deep purple, about $\frac{3}{4}$ in. long, very succulent.—Bureau in DC. Prodr. xvii. 238; Ficalho, Pl. Uteis, 269; Engl. Monogr. Morac. Afr. 3; Hiern in Cat. Afr. Pl. Welw. i. 1027.

Lower Guinea. Angola: Mossamedes; cultivated in gardens at Cavalheiros, *Welwitsch*, 1652!

Leaves somewhat smoother than usual. The black mulberry. Supposed to be a native of North Persia. Widely cultivated.

2. *M. indica*, *Linn. Sp. Pl. ed. i.* 986. A shrub or small tree; branchlets terete, greyish to brown, puberulous when young, otherwise glabrous. Leaves petioled, ovate, sometimes lobed, caudate-acuminate, base retuse to shallowly cordate, margin serrate, teeth shortly apiculate, $1\frac{1}{2}$ –5 in. long, 1–3 in. wide, membranous, upper surface deep green and scabrous, paler and sparsely puberulous on the nerves beneath; lateral nerves 3, sometimes 4–5 on each

side, ascending; petiole slender, almost terete, thinly puberulous, to 1 in. long. Flowers monœcious, male and female often on distinct branches. Male inflorescence narrowly oblong, 4-5 lin. long, puberulous; peduncle very slender, 2-3 lin. long; female inflorescence ellipsoidal to subglobose, 3-4 lin. long; peduncle very slender, 3 lin. or less. Flowers similar to those of *M. nigra*, but stigmas $1\frac{1}{2}$ lin. long, slender, densely and shortly hairy, borne on a glabrous style about $\frac{3}{4}$ lin. long. Syncarp ellipsoidal to subglobose, black when ripe.—Brandis, Forest Fl. 408; Hook. f. Fl. Brit. Ind. v. 492; Engl. Pf. Ost-Afr. 160 and Monogr. Morac. Afr. 3. *M. alba*, var. *indica*, Bureau in DC. Prodr. xvii. 243.

Nile Land. British East Africa: route to Kilimanjaro; 40-60 miles from coast, *Johnston!* *Volgens*, 33! Rabai Hills, near Mombassa, *Taylor!*

Mozamb. Distr. Zanzibar: *Stuhlmann*, 685. German East Africa: Usambara, especially on formerly cultivated areas, *Holst.* Portuguese East Africa: Zambesi Delta; Mavuvu near Mazzaro, cultivated, *Kirk!* between Tette and the sea-coast, *Kirk!*

Native in the temperate and sub-tropical Himalayan region; cultivated in India, China, Japan and East Africa.

3. *M. mesozygia*, Stapf in Journ. de Bot. xxii. 99. A small tree; branchlets a warm reddish-brown, glabrous. Leaves broadly or obovately elliptic, narrowly acuminate, base shallowly cordate, margin crenate-serrate, 2-4 $\frac{1}{2}$ in. long, 1 $\frac{1}{4}$ -2 $\frac{3}{4}$ in. wide, membranous, glabrous or sometimes shortly hairy on the nerves on the lower face; 3-nerved, nerves subparallel connected by thin transverse veins, the lateral emitting a series of spreading-ascendent branch nerves; petiole slender, about $\frac{1}{2}$ in. long. Male inflorescence unknown. Female inflorescences solitary or two or three together on arrested shoots, globose; peduncle slender, grey-pubescent, 4-8 lin. long. Sepals orbicular with ciliolate margin, barely 2 lin. long; stigmas sessile, subulate, densely papillose, up to about 2 $\frac{1}{2}$ lin. long. Syncarp about $\frac{1}{2}$ in. in diam., scarcely succulent; fruit projecting shortly from the perianth, broader than long, to about 2 $\frac{1}{2}$ lin. broad.

Upper Guinea. Senegal, *Leprieur!* Ivory Coast: Indénie; Zaranou, *Chevalier*, 16267. Gold Coast: Oduamase, *Thompson!* Togo: near Lome, *Warnecke*, 347! Southern Nigeria: Western Lagos; interior, *Rowland!* Aye, *Dodd*, 394!

According to Thompson this tree is cultivated by the Ashantis for its shade; he regards it as a species introduced from the north.

2. CHLOROPHORA, Gaudich.; Benth. et Hook. f. Gen.

Pl. iii. 363.

Flowers diœcious. Male: Calyx membranous, divided into 4 broad slightly imbricate segments. Stamens 4; filaments free, inflexed in the bud. Rudiment of ovary small. Female: Calyx more or less deeply divided; segments 4, concave, thickened at the apex, imbricate. Ovary enclosed within the calyx, oblique; ovule

attached laterally, descending; style inserted at the side of the apex, filiform, stigmatic in the upper portion, simple or with a shorter branch. Calyx becoming somewhat fleshy in the fruiting stage; flowers closely crowded (but separable) to form a globose or oblong syncarp. Achene much compressed, oblique at the apex; pericarp leathery. Seed with a thin membranous testa; albumen absent; embryo bent double; cotyledons ovate, equal; radicle incumbent, ascending.—Trees with a copious milky juice, sometimes spiny. Leaves petioled, alternate, entire or toothed; stipules lateral, caducous. Flowers in solitary shortly stalked spikes; male catkin-like, dense, slender; female globose or oblong-cylindrical, thick.—*Milicia*, Sim, For. Fl. Port. E. Afr. 97, partly.

Species 3, one widely distributed in tropical America; and (?) 2 in tropical Africa.

1. *C. excelsa*, *Benth. et Hook. f. l.c.* A handsome lofty tree, copiously lactescent, reaching 130 ft. or more in height, with a straight cylindrical trunk 20–30 ft. in circumference, in older specimens bare of branches for 40–60 ft. of its height and with a widely spreading crown; twigs purplish when young, becoming greyish later, more or less puberulous, marked with the semicircular scars of the fallen stipules. Leaves deciduous but falling late, thinly coriaceous, more or less elliptic, on the young tree, according to Welwitsch, much larger than in the adult, especially longer but with shorter petioles (about $\frac{1}{2}$ in.), apex with an abrupt acumens $\frac{1}{2}$ in. long, base more or less cordate, margin closely serrate-dentate, 6–7 in. long, 3–5 in. wide, with scattered stiffish hairs above and more or less densely tomentose beneath; on older trees longer stalked (petioles 1–1 $\frac{1}{2}$ in.), shortly acuminate, base rounded or retuse, margin slightly undulating, sometimes shortly denticulate above the middle, 4–5 in. long, 2–3 in. broad, deep green and glabrous on the upper face, pale green beneath and thinly puberulous on the nerves or with a minute denser pubescence visible under a lens; lateral nerves 13 to 17, generally 15, on each side, alternate, somewhat ascending, connected by a close network of veinlets; stipules acuminate from a broad base, 8–10 lin. long, puberulous on back and margin, very caducous. Flowers diœcious, according to Welwitsch borne only on trees at least 15–20 years old, at the base of the young shoots; spikes cylindrical, dense-flowered, pendulous; the male slender, 2 $\frac{1}{2}$ –7 in. long. 3–4 lin. broad, peduncle 3–6 lin. long, pubescent; the female stout, 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in. long, 7–9 lin. in diam. Male flowers: calyx whitish, with 4 deltoid-ovate teeth, or somewhat deeply 4-lobed. Stamens white, long-exserted. Rudimentary ovary squamiform. Female: calyx surrounded at the base by a circlet of short hairs, segments almost free, fleshy, narrow, concave, broadening and thickening upwards to an obtuse hooded apex, covered with short stiff hairs; surrounding the ovary, the obliquely placed style of which projects far beyond

the calyx; a short aborted branch is present at the base of the style. Syncarp oblong-cylindrical, greenish to yellowish, but little juicy. Achene strongly compressed, lenticular, a little over 1 lin. long, bearing the withered style.—Ficalho, Pl. Uteis, 268; Engl. Pfl. Ost-Afr. C. 160, Monogr. Morac. Afr. 3 and in Mildbraed Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1907-8, ii. 181; Hiern in Cat. Afr. Pl. Welw. i. 1026; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 49 and Reliq. Dewevr. 214; De Wild. Études Fl. Bas- et Moyen-Congo, iii. 63; Pl. Thonner. Congol. ii. 298, and Compagn. Kasai, 278. *C. tenuifolia*, Engl. in Engl. Jahrb. xx. 139 and Monogr. Morac. Afr. 4; Hiern in Cat. Afr. Pl. Welw. i. 1026. *C. alba*, A. Chev. in Bull. Soc. Bot. Fr. lviii. Mém. viii. 209. *Morus sp.*, Welw. Synopse Explic. 8 and 9. *M. excelsa*, Welw. in Trans. Linn. Soc. xxvii. 69, t. 23. *Maclura (?) excelsa*, Bureau in DC. Prodr. xvii. 231. *Milicia africana*, Sim, For. Fl. Port. E. Afr. 97, t. 72.

Upper Guinea. Sierra Leone: Freetown, Dalziel, 966! Gold Coast: Kwaha Hills, Johnson, 910! Ivory Coast: Sassandra, Chevalier, 17942! Togo: near Lome, Warnecke, 471! Bismarckburg, Büttner, 697. Dahomey: Kowandé, Chevalier, 24236; Savalou between Gouka and Banté, Chevalier, 23728. Northern Nigeria: Agaie, Yates, 20! Southern Nigeria: Lagos; Igayo, Barter, 3330! *Moloney!* Camerouns: Ambas Bay, Mann, 705! Johann Albrechtshöhe, about 1300 ft., Staudt, 743; Bipinde, Zenker, 3297!

Nile Land. Niamniam: on the Assika River, Schweinfurth, 3244! British East Africa: Coast region, Webber, 433! Rodungs district on the Tana about 2300 ft., Stuhlmann, 8916. Uganda: various localities, Dümmer, 862! Brown, 354! Bagshawe, 734! Dave, 476! 689! Stuhlmann, 1246, 1247, 1337.

Lower Guinea. Island of St. Thomas: Fazenda do Monte Caffé, Welwitsch, 1560! 1561! Quintas 154! Gaboon, Klaine, 1339! Angola: Golungo Alto; Queta Mountains, and near Sange, Welwitsch, 1559!

South Central. Belgian Congo: Kifuku near Irumu, Mildbraed, 2889! Nala, Seret, 763; Madibi, Sapin; Kisantu, Gillet, 231. Bolobo, Lukolela, Dewèvre, 755; Bumba, Dewèvre, 890a.

Mozamb. Distr. Zanzibar, Lyne, 6! German East Africa: Neuwied, Conradi, 356! Usambara; Nderema, 3000 ft., Volkens; Amani, Warnecke, 325! Uluguru, Stuhlmann, 8685!

A valuable timber tree; the wood is whitish, soon becoming pale bay in colour, durable and easy to work.

The specimens on which Chevalier bases his new species *C. alba* are, according to his description, young trees without flower or fruit; the description of the leaves suggests young plants of *C. excelsa*.

Doubtful Species.

2. *C. regia*, A. Chev. in Bull. Soc. Bot. Fr. lviii. Mém. viii. 209. A very large tree, 100 to 150 ft. high, with a trunk 5-6½ ft. in diam., with the habit of *C. excelsa*, from which it differs in having broadly cordate leaves with a deeply cordate base, spreading auricles, and 6-8 secondary nerves on each side of the midrib. Flowers and fruit are not described.

Upper Guinea. French Guinea: Fouta-Djalou, between Mamou and Timbo, Chevalier, 12464 bis, 12505 bis. Ivory Coast: Zaranou, Chevalier, 17627. Dahomey: Somba, Koubougou, Chevalier, 24161; Kouandé, Chevalier, 24235.

No specimen seen.

3. **CARDIOGYNE**, Bureau in DC. Prodr. xvii. 232.

Flowers diœcious. Male: Calyx deeply divided into 4 fleshy imbricate segments. Stamens 4; filaments free, inflexed in the bud. Female: Calyx obpyramidal by compression, 4-lobed; lobes very thick and blunt, imbricate. Ovary enclosed within the calyx, ellipsoid; ovule solitary, pendulous from the apex of the cell; style terminal, simple, filiform, protruding above the calyx as a long subulate papillose stigma. Fruit included in the persistent calyx; pericarp crustaceous. Seed with a papery testa; endosperm absent; embryo bent double; cotyledons large, folded and twisted, enveloping the ascending radicle.—A shrub or sometimes climbing, spiny. Leaves petiolod, alternate, entire. Stipules small, caducous. Flowers in small dense axillary spherical heads. Fruiting head succulent when fresh, becoming woody when dry.—*Milicia*, Sim, For. Fl. Port. E. Afr. 97, partly.

Species one, in Tropical and South Africa.

1. *C. africana*, Bureau, l.c. 233. Generally a bush about 7 ft. high, sometimes a climbing shrub with thick woody stems; branches when young thickly covered with red-brown spreading hairs; branchlets horizontally spreading, ending in a spine and bearing leaves and short branch spines. Leaves subcoriaceous, elliptic, obtuse or obsoletely emarginate, base obtuse to rounded, margin entire, $1\frac{1}{2}$ – $3\frac{1}{2}$ in. long, 10–15 lin. wide, dark green above, greyish-yellow-green below except on the nerves and veins; lateral nerves 6–8 on each side, thin, sunk, somewhat ascending; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. long. Flowerheads solitary or geminate, rarely ternate, to about $\frac{1}{2}$ in. in diam.; peduncles 2–3 lin. long; bracts short, obovate or broadly oblong, slightly thickened at the obtuse apex, with a short whitish indumentum. Calyx similarly tomentulose, thick especially above and very blunt, in the male flowers broadly obovate, in the female somewhat narrower. Fruiting heads 8–9 lin. in diam., edible, “the size of a walnut, of a yellowish-cream colour with seeds imbedded in an agreeable pulp” (*Kirk*), woody when dry.—Baill. Hist. Nat. Pl. Madag. t. 294; Hook. Ic. Pl. t. 2473; Engl. Pf. Ost-Afr. C. 161 and Monogr. Morac. Afr. 5. *Cudranea* sp., *Kirk* in Journ. Linn. Soc. ix. 229. *Milicia spinosa*, Sim, For. Fl. Port. E. Afr. 98, t. 74, B.

Mozamb. Distr. Zanzibar: *Boivin*, *Hildebrandt*, 1290; near Tschukuani, *Stuhlmann*, 1003, 1004. German East Africa: Kilwa, *Kirk*! Amboni, *Holst*, 2724! Usambara, *Holst*, 2626; Dar-es-Salaam, *Stuhlmann*, 7772; Rovuma River, *Kirk*! Portuguese East Africa: Beira, *Schlechter*; Senna, *Kirk*! *Peters*; Shupanga and Tette, *Kirk*! Morambala Marsh, *Scott*! British Central Africa: Nyasaland; Elephant Marsh, *Kirk*! Chiromo, *Scott Elliot*, 8811!

The inner bark and white wood abound in a yellowish milky juice; the heart wood is of different shades of red, very heavy and full of pores, and as

much as 5 in. in diameter; it yields a colouring matter somewhat resembling fustic (Kirk *l.c.*).

Occurs also in South Africa (Delagoa Bay).

4. **DORSTENIA**, Linn. ; Benth. et Hook. f. Gen. Pl. iii. 366.

Flowers monœcious, densely crowded on the surface of a more or less flattened stalked receptacle. Perianths very short, more or less connate, forming a fleshy layer covering the surface of the receptacle and leaving pits in which the unisexual flowers are buried. Male : Perianth bluntly 2-3-lobed. Stamens 1-3; filaments free, inflexed in the bud. Ovary generally absent, sometimes rudimentary. Female pits much deeper than the male, terminating in a projecting entire narrow mouth. Ovary completely buried; style lateral, projecting through the mouth of the perianth above which it is more or less deeply 2-fid, simple in section *Kosaria*. Ovule pendulous. Fruit subglobose, with a thin somewhat fleshy exocarp, and a crustaceous smooth or warted endocarp, which is ejected elastically when ripe by splitting and contraction of the exocarp or remains embedded in the receptacle. Seed with a thin testa; albumen absent; cotyledons contortuplicate.—Generally low-growing herbs, sometimes shrubby below, with ascending or erect leafy stems growing from a slender perennial rhizome which in some species is thick and tuber-like; stem sometimes fleshy or much thickened, with leaves at the lower nodes reduced to scales; occasionally stemless, with long-stalked leaves springing from a thick tuber; rarely shrubs. Leaves petioled, rarely sessile, alternate, entire or with an irregularly toothed margin, rarely lobed, often more or less acuminate; stipules lateral, narrow, generally caducous, sometimes persistent. Inflorescence solitary, rarely two or three together and then unequally developed, on a reduced or suppressed lateral shoot borne in the upper leaf-axils. Peduncle generally much shorter than the leaves except in acaulescent species where it is elongated and may exceed the leaves. Receptacle flattened, or shallowly saucer-shaped, or becoming convex below, or sometimes turbinate, of very various outlines, suborbicular, stellate, oblong, rhomboid, or angular, and bearing few or many marginal bracts which vary in length from small teeth to long arms (a few small bracts rarely present on the sides of the receptacle), or several to many times longer than broad, in which case the two terminal bracts are much longer than the lateral or the lateral are absent; rarely ebracteate.

Species about 150, numerous in Tropical Africa and Tropical America, with a few in Madagascar, Socotra and Arabia, and 1 in India.

A. Style dividing into two longer or shorter arms.

Receptacle with small scattered bracts on the convex sides (section *Nothodorstenia*) :

- | | |
|---|---------------------------|
| Leaves broadly oblanceolate to obovate | 1. <i>D. frutescens</i> . |
| Leaves elliptic | 2. <i>D. elliptica</i> . |

Receptacle without bracts on the sides (section *Eudorstenia*):

a. Stems generally herbaceous, sometimes woody below, more rarely suffruticose; female flowers distributed over the greater part of the receptacle:

*Receptacle more or less orbicular or stellate, floriferous nearly to the edge of the disc, bearing slender marginal bract-arms:

Receptacle with crowded very unequal bract-arms 3. *D. ciliata*.

Receptacle with bract-arms spaced round the margin:

Bract-arms fairly equal, longer than the diameter of the receptacle:

Leaves very broadly elliptic; receptacle suborbicular or irregularly stellate ... 4. *D. Mannii*.

Leaves elliptic, obovate-elliptic or oblong-lanceolate; receptacle with regular stellate margin:

Leaf-base obtuse:

Stipules 2 lin. or less in length ... 5. *D. ophiocoma*.

Stipules 4-6 lin. long 6. *D. stipulata*.

Leaf-base acute 7. *D. kribensis*.

Bract-arms very unequal:

Leaf-base acute 8. *D. alternans*.

Leaf-base blunt:

Leaves small, $1\frac{1}{2}$ -4 in. long:

Receptacle stellate 9. *D. ophiocomoides*.

Receptacle suborbicular:

Bracts reaching 1 in. or more in length:

Leaves blunt 10. *D. laikipiensis*.

Leaves acuminate 11. *D. mungensis*.

Bracts not exceeding 2 lin. in length 12. *D. variifolia*.

Leaves $3\frac{1}{2}$ -9 in. long:

Receptacle 4 lin. in diameter ... 13. *D. tenera*.

Receptacle 5-8 lin. in diameter:

Longer bract-arms reaching $1\frac{1}{4}$ in. 14. *D. Holstii*.

Longer bract-arms reaching 5 lin.... 15. *D. asteriscus*.

**Receptacle orbicular with toothed margin:

Stem erect:

Rhizome slender 16. *D. Brownii*.

Rhizome fleshy, tuber-like 17. *D. quercifolia*.

Stem weak, more or less decumbent, growing from a small pea-like tuber 18. *D. vivipara*.

Stem creeping 19. *D. picta*.

**Receptacle rhombic to oblong or oval or 3-5-angular:

†Some of the bract-arms exceeding the diameter of the receptacle:

Receptacle with a long bract-arm at each end and intervening shorter ones:

Long bract-arms to 5 lin. long 20. *D. lotziana*.

Long bract-arms to 1 in. long 21. *D. gabunensis*.

Long bract-arms $1\frac{1}{4}$ - $2\frac{3}{4}$ in. long. 22. *D. Tessmannii*.

- Receptacle subrhomboid with a varying number of very unequal bract-arms :
- Receptacle $\frac{1}{2}$ in. wide ; a few bracts very long, to 4 in. ... 23. *D. Zenkeri*.
- Receptacle 4 lin. wide ; bract-arms not exceeding 5 lin. in length ... 24. *D. usambarensis*.
- Receptacle with long bract-arms from the angles :
- Receptacle rhomboid ... 25. *D. Solheidii*.
- Receptacle 3-5-angular ... 26. *D. Laurentii*.
- Receptacle 5-angular, with longer bract-arms from the angles and intervening shorter ones ... 27. *D. obtusibracteata*.
- †† Bract-arms not exceeding the diameter of the receptacle :
- Leaves entire ; longer bract-arms 5 to 6, about $\frac{1}{2}$ - $\frac{3}{4}$ in. long ... 28. *D. Staudtii*.
- Leaves entire or grossly dentate ; longer bract-arms 7-10, about 5 lin. long ... 29. *D. jabassensis*.
- Leaves unequally pinnatifid ... 30. *D. ulugurensis*.
- *** Receptacle elongated, at least twice as long as broad (? 34, *D. Brieyi*) :
- † Bract-arms on sides as well as ends of receptacle, sometimes very short or uniting to form a toothed margin on the sides :
- Terminal bract-arms longer than receptacle :
- Terminal bract-arms to 2 in. long :
- Lateral margin strongly toothed ... 31. *D. tayloriana*.
- Lateral margin weakly toothed ... 32. *D. equatorialis*.
- Terminal bract-arms to 4 in. long ... 33. *D. longicauda*.
- Terminal bract-arms to 8 in. long ... 34. *D. Brieyi*.
- Terminal bract-arms barely as long as the receptacle ... 35. *D. poinsettiiifolia*.
- Terminal bract-arms less than half as long as the receptacle :
- Receptacle more than twice as long as broad :
- Receptacle more than $\frac{1}{2}$ in. long :
- Bracts slender, 1 lin. or less in length 36. *D. Dinklagei*.
- Bracts triangular, tooth-like ... 37. *D. proropens*.
- Receptacle less than $\frac{1}{2}$ in. long ... 38. *D. dionga*.
- Receptacle not more than twice as long as broad ; bracts very short.
- Bracts 4, symmetrical, triangular ... 39. *D. paucidentata*.
- Bracts forming a grossly dentate margin ... 40. *D. Goetzii*.
- Bracts numerous, very short, linear ... 41. *D. convexa*.
- †† One bract-arm at each end of the oblong or elliptic receptacle :
- Receptacle $\frac{1}{2}$ in. long ; bract-arms 7 lin. long ... 42. *D. angusta*.
- Receptacle $\frac{3}{4}$ in. long ; upper bract-arms 2 in. long. ... 43. *D. Buchanani*.
- ††† Bract-arms from upper end only of the oval receptacle ... 44. *D. unicaudata*.
- †††† Margin of receptacle entire ; no bracts obvious 45. *D. scaphigera*.

- *****Receptacle much elongated, narrowly linear-lanceolate, with no lateral bract-arms (but see 48, *D. lukafuensis*).
- Male flowers 1-androus :
- Receptacle about 1 in. long, lunately curved 46. *D. bicornis*.
- Receptacle not lunate :
- Lateral margin entire throughout ... 47. *D. psilurus*.
- Lateral margin with a few short bract-arms just above the base ... 48. *D. lukafuensis*.
- Male flowers 2-androus (or sometimes also 1-androus) (not seen in 50, *D. tenuifolia*)
- Receptacle exceeding 1 in. in length ; leaves oblong-elliptic ... 49. *D. scabra*.
- Receptacle less than 1 in. in length ; leaves oblong-lanceolate :
- Apical bract-arm not exceeding the receptacle ... 50. *D. tenuifolia*.
- Apical bract-arm exceeding the receptacle 51. *D. Stolzii*.
- Male flowers 2-androus with a central columnar pistillodium ... 52. *D. Klainei*.
- *****Receptacle orbicular or 3- to multi-angular, with an obvious margin (1-4 lin. broad), and bract-arms varying greatly in length, generally a few are long and the intervening ones range from inconspicuous teeth to moderately long, linear arms :
- Bract-arms not or barely exceeding the diameter of the receptacle :
- Margin of receptacle 3 or more lin. wide :
- Stipules 2-2½ lin. long ... 53. *D. Barteri*.
- Stipules 6-7 lin. long ... 54. *D. multiradiata*.
- Margin of receptacle about 1 lin. wide ... 55. *D. Lujœ*.
- Some bract-arms exceeding the diameter of the receptacle :
- Bract-arms few, with intervening projections :
- Receptacle four-sided with 4 long bract-arms ... 56. *D. mogandjensis*.
- Receptacle subtriangular with 3 long bract-arms ... 57. *D. subtriangularis*.
- Bract-arms many :
- Longer arms not exceeding ½ in. ... 58. *D. Talbotii*.
- Longer arms ¾-1½ in. ... 59. *D. Batesii*.
- Longer arms 2-4 in., with pectinate margin ... 60. *D. yambuyaensis*.
- b. Stems woody; female flowers solitary and central or few in number.
- *Receptacle turbinate with orbicular or lobed disc bearing a few long slender bract-arms :
- Receptacle with orbicular disc ... 61. *D. turbinata*.
- Receptacle with lobed disc (sometimes oblong in 62, *D. Ledermanni*) :
- Receptacle 4-lobed :
- Leaves obovate-lanceolate ... 62. *D. Ledermanni*.
- Leaves oblong ... 63. *D. edcensis*.
- Receptacle 3-lobed ... 64. *D. aspera*.
- Receptacle 5-6-toothed ... 65. *D. Buesgenii*.

- **Receptacle cuneiform-triangular, without bract-arms 66. *D. amœna*.
- ***Receptacle elongated, with a bract-arm at each end:
- Receptacle boat-shaped:
- Margin of receptacle 2-2½ lin. wide ... 67. *D. alta*.
- Margin of receptacle less than ½ lin. wide ... 68. *D. Smythci*.
- Receptacle linear 69. *D. angusticornis*.
- c. Stems succulent, marked at the nodes with roundish seal-like leaf-scars; male flowers 2-3-androus; female numerous; style 2-fid at the apex.
- Receptacle orbicular; bract-arms equal or exceeding its diameter 70. *D. Schlechteri*.
- Receptacle broadly elliptic; bract-arms about half its diameter 71. *D. Warneckii*.
- d. Stems succulent, one or few from a basal generally depressed-globose (placentiform) tuber, leafy only in the upper part, scale-bearing below; leaves attaining full development after flowering. Receptacle orbicular or elliptic; bract attached below the serrate or crenate margin; style 2-fid at the apex only.
- Receptacle orbicular:
- Leaves narrowly linear-lanceolate, 1 lin. wide ... 72. *D. katangensis*.
- Leaves not less than 4 lin. wide:
- Bract-arms few, 2-5 (rarely up to 8)
- Margin of receptacle crenulate 73. *D. Deccersti*.
- Margin of receptacle ciliate 79. *D. mirabilis*.
- Bract-arms numerous, 7-15:
- Disc of receptacle in flower not exceeding ½ in. in diameter:
- Longer bract-arms exceeding the diameter of the receptacle:
- Leaves oblong-lanceolate to elliptic 74. *D. benguelensis*.
- Leaves linear-lanceolate 75. *D. rhodesiana*.
- Leaves lanceolate-acuminate ... 76. *D. Verdickiei*.
- Longer bract-arms about equal to the diameter of the receptacle ... 77. *D. Hildebrandtii*.
- Disc of receptacle in flower ½-¾ in. in diameter 78. *D. Homblei*.
- Receptacle elliptic (boat-shaped in 83, *D. caudata*).
- Bract-arms many, radiating:
- Leaves lanceolate; bract-arms 1 in. long ... 80. *D. Wellmannii*.
- Leaves narrowly spatulate; bract-arms ½ in. long. 81. *D. Braunii*.
- Bract-arms 1 or 2:
- Receptacle sessile or subsessile:
- One bract-arm from each end ... 82. *D. sessilis*.
- A bract-arm only from the upper end ... 83. *D. caudata*.
- Receptacle stalked; bract-arms 2 ... 84. *D. ruahensis*.

- B. Style simple. Plants persisting by means of a tuber or short thick rhizome, sometimes acaulescent or with a thick fleshy stem (section *Kosaria*).
- Stem springing from a tuber or short thick rhizome :
- Receptacle triangular or 4-6-rayed :
- Bract-arms about twice as long as the diameter of the disc... .. 85. *D. Walleri*.
- Bract-arms not exceeding the diameter of the disc 86. *D. cuspidata*.
- Bracts short and blunt, much shorter than the diameter of the disc :
- Bracts 2-5 lin. long 87. *D. zanzibarica*.
- Bracts not exceeding 1 lin. 88. *D. holtziana*.
- Receptacle 3-lobed, with finely denticulate margin 89. *D. Preussii*.
- Acaulescent plants with a fleshy tuber :
- Receptacle oblong to linear with terminal and lateral bract-arms 90. *D. barnimiana*.
- Receptacle narrowly triangular with bract-arms from apex and base only 91. *D. palmata*.
- Receptacle orbicular 92. *D. ellenbeckiana*.
- Stem thick and fleshy :
- Leaves elliptic to obovate, entire 93. *D. fœtida*.
- Leaves with crisped or toothed margin 94. *D. crispa*.

1. *D. frutescens*, *Engl. Monogr. Morac. Afr.* 12, t. ii. B. Shrubby with a slender horizontal rhizome 1-1 $\frac{3}{4}$ lin. thick and an erect slender terete, generally simple, stem 1 $\frac{1}{2}$ -3 ft. high, and 1 $\frac{1}{2}$ -2 lin. thick below and 1 lin. in the upper younger portion; rhizome attached near the base of the stem by a strong tapering branching root, and also bearing fibrous roots. Young shoot shortly and densely pilose, later glabrous. Leaves papery, broadly oblanceolate to obovate, shortly acuminate, tapering to an acute base, and passing into the petiole, margin entire, 6-10 in. long, 2-2 $\frac{3}{4}$ in. wide, glabrous, shining and dull green above, paler beneath; lateral nerves 10-13 on each side; curving slightly upwards and connected by a loose reticulation, depressed on the upper face, prominent beneath; petiole slender, hairy like the stem, $\frac{1}{4}$ - $\frac{3}{4}$ in. long. Stipules conspicuous, linear-tapering, glabrous, persistent, 3-6 lin. long. Inflorescence solitary; stalk 3-5 lin. long; receptacle turbinate, upper face orbicular to elliptic, slightly 2-lobed, yellowish, 5-6 lin. in diam., reaching 10 lin. when ripe, outside brownish-green with a few small scattered bracts on the sides and base and numerous small marginal bracts. Male flowers 2-3-androus; perianth 3-leaved; female few; ovary ovoid; style long, thin, 2-branched for the greater part of its length. Fruit subglobose, slightly compressed, smooth, 2 $\frac{1}{2}$ -3 lin. thick, completely sunk in the receptacle; endocarp light brown.—*Engl. in Schlechter, Westaf. Kautsch.-Exped.* 286.

Upper Guinea. French Guinea: Louesse, Sibakala, *Baudon*, 724! Cameroons: Barombi, *Preuss*, 374, 318, 384! between Ninga-dorf and Kake, *Preuss*, 373! Johann-Albrechtsböhe, *Staudt*, 461! Eko-Keyake, 1000-1300 ft., *Schlechter*, 12890!

Lower Guinea. Gaboon: Mfoa, 85 miles east of Gaboon, *Bates*, 517!

2. *D. elliptica*, Bureau in *DC. Prodr.* xvii. 271. Stem slender, woody in the lower portion from which the leaves have fallen, herbaceous and leafy above, youngest portion shortly and densely pilose, otherwise glabrous. Leaves papery when dry, elliptic, apex shortly acuminate, tapering to the base and passing into the short petiole, margin entire or subrepand, $7\frac{1}{2}$ –8 in. long, $2\frac{1}{3}$ in. wide, smooth and bright green above, paler beneath; lateral nerves as in *D. frutescens*; petiole $2\frac{1}{2}$ –5 lin. long. Stipules as in *D. frutescens*. Inflorescence solitary in the upper leaf-axils; stalk $\frac{1}{2}$ in. long; receptacle closely resembling that of *D. frutescens* and bearing a few small scattered bracts on the unequally ribbed convex surface.—*Engl. Monogr. Morac. Afr.* 16.

Upper Guinea. Fernando Po; *Mann*, 64!

Engler does not appear to have seen this plant and bases his description on the original one of Bureau, who has overlooked the small bracts on the convex surface of the receptacle, and has thus led Engler to place the species in his section *Eudorstenia*, while *D. frutescens* constitutes his section *Nothodorstenia*. The two species might perhaps be regarded as conspecific; there is, however, a difference in the general shape of the leaves, those of *D. elliptica* being narrower with much less tendency to broaden above the middle than in *D. frutescens*.

3. *D. ciliata*, *Engl. in Schlechter, Westaf. Kautsch.-Exped.* 286 (name only) and in *Engl. Jahrb.* xxxiii. 114. A herb 20 in. high; stem and petioles pubescent, the former reaching 2 lin. in diam. in the lower part. Leaves membranous when dry, oblong-elliptic to broadly elliptic, apex shortly acuminate, more or less tapering to the narrow rounded base, margin entire or obscurely crenate, $3\frac{1}{2}$ –9 in. long, $1\frac{3}{4}$ –4 in. wide, glabrous and dark green above, pale beneath and minutely punctulate and sparsely pubescent on the nerves; lateral nerves 8–10 on each side, ascending, then curving upwards and uniting within the margin, prominent beneath as also the connecting cross unions; petiole $\frac{3}{4}$ –1 in. long (rarely more). Stipules inconspicuous, 1 – $1\frac{1}{2}$ lin. long. Inflorescence in the upper leaf-axils; stalk puberulous, generally exceeding the petiole, $1\frac{1}{4}$ in. or less in length; receptacle suborbicular, 6–8 lin. in diam., brown, the margin bearing numerous closely arranged very unequal linear puberulous green bract-arms clavate and spatulately dilated above and varying in length from 1–6 lin. Male flowers 3-androus; perianth with 3 broad lobes; female numerous, distributed; style projecting and carrying the two recurved branches above the tubular perianth.—*D. harmsiana*, *Engl. in Schlechter, Westaf. Kautsch.-Exped.* 286 (name only) and in *Engl. Jahrb.* xxxiii. 115.

Upper Guinea. Cameroons: between Mundame and Otam, 700–1000 ft., *Schlechter*, 12888; Eko Keyake, 1000–1300 ft., *Schlechter*, 12891; Bare, 2800 ft., *Ledermann*, 1442! Ndonge, 3300–4000 ft., *Ledermann*, 6210a!

4. *D. Mannii*, *Hook. f. in Bot. Mag. t.* 5908. A herb 1–2 ft. high; stem unbranched, erect, terete, somewhat flexuous, subnodose,

hirtellous. Leaves somewhat membranous, broadly elliptic, shortly acuminate, narrowing below to an obtuse or subcordate base, entire or obscurely sinuate-toothed, 4–8 in. long, $2\frac{1}{2}$ –4 in. wide, glabrous, dark green, paler beneath; lateral nerves about 7 on each side, somewhat ascending, ultimately upwardly curving and uniting within the margin; petioles $\frac{1}{4}$ –1 in. long, hirtellous. Stipules minute, subulate, persistent. Inflorescence solitary in the axils of the fallen leaves; stalk $\frac{1}{2}$ in. long, pubescent; receptacle suborbicular or irregularly stellate, $\frac{1}{2}$ –1 in. in diam., green, pubescent on the back, very convex, margin narrow with 10–15 slender stiff recurving unequal sparsely pubescent bract-arms, $\frac{1}{2}$ –2 in. long, thickened towards the tip; peduncle $\frac{1}{2}$ in. long, pubescent. Male flowers 3-androus; female scattered throughout the disc; style slender, dividing just above the surface of the disc into two spreading linear stigmas.—Bureau in DC. Prodr. xvii. 271; Engl. Monogr. Morac. Afr. 18.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann*, 2316! *Thomson*, 10! and cultivated specimen!

5. *D. ophiocoma*, *K. Schum. & Engl. in Engl. Jahrb.* xx. 145. Suffruticose; stem erect from a creeping lower portion which bears long slender tapering roots with fibrous branches, apparently about a foot high; younger portion of stem and petioles hirtellous. Leaves stalked, elliptic, apex more or less acuminate, tapering below to a narrow more or less obscurely cordate base, margin undulate, sometimes more or less coarsely toothed in the upper portion, $4\frac{1}{2}$ –7 in. long, $2\frac{1}{4}$ – $3\frac{1}{4}$ in. wide, glabrous or sparsely pubescent on the nerves and veins on the paler lower face; lateral nerves 9–12 on each side spreading, curving upwards and uniting within the margin; petioles $\frac{1}{3}$ – $1\frac{1}{4}$ in. long. Stipules triangular-subulate, 2 lin. long or less, subpersistent. Inflorescence solitary; stalk slender, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, increasing to 14 lin. in fruit, like the outside of the receptacle and bract-arms more or less puberulous; receptacle convex, surface suborbicular, $\frac{1}{2}$ – $\frac{3}{4}$ in. in diam., dark purple, with a narrow margin, the edge bearing 10–12 triangular projections each running out into a slender linear bract-arm from $\frac{3}{4}$ – $2\frac{1}{4}$ in. long, rarely with a few shorter intermediate arms. Male flowers 3-androus; female scattered over the more central portion of the disc. Endocarp subglobose, obscurely 3-gonous, whitish-brown, smooth, $1\frac{1}{3}$ lin. in diam.—Engl. Monogr. Morac. Afr. 17, t. iv. C. (incl. var. *longipes*).

Upper Guinea. Southern Nigeria: Oban District, *Talbot*, 673! 2319! Cameroons: Batanga, *Braun*, *Dinklage*, 633; Victoria; between Jongo and Bakingele, *Preuss*, 1381!

Var. *minor*, Rendle. A smaller plant about 6–7 in. high with leaves $1\frac{1}{2}$ –4 in. long and 1– $1\frac{3}{4}$ in. wide, margin undulate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long. Receptacle about $\frac{1}{2}$ in. in diam. with 6–10 bract-arms $\frac{1}{4}$ to $1\frac{1}{2}$ in. long, and occasionally a few very short intermediate arms.—*D. intermedia*, Engl. Monogr. Morac. Afr. 17, t. iv. D, and in Schlechter, Westafr. Kautsch.-Exped. 286.

Upper Guinea. Cameroons: Victoria, *Preuss*, 1107! *Schlechter*, 12368! Efulen, *Bates*, 313!

6. *D. stipulata*, Rendle in *Journ. Bot.* 1915, 298. Stem leafy, erect from a creeping rooting lower portion, woody below becoming herbaceous above, about 10 in. high and $1\frac{1}{2}$ lin. thick, the soft wood impregnated with a yellow resin, internodes generally $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrate. Leaves obovate-elliptic, apex obsolete acuminate, blunt, base cuneate, very blunt or obscurely cordate, margin slightly undulate, $4\frac{1}{2}$ –5 in. long, $1\frac{3}{4}$ – $2\frac{1}{4}$ in. wide, glabrous; lateral nerves 8 or 9 on each side, ascending, upcurving and uniting somewhat within the margin, impressed on upper face, prominent below, reticulation prominent; petioles stout, 5–9 lin. long. Stipules linear-subulate from a narrow triangular base, 4–6 lin. long, persistent. Inflorescences solitary or paired in the leaf-axils, young, flowers not opened; stalk $\frac{3}{4}$ in. long; receptacle $\frac{1}{3}$ in. in diam., resembling that of *D. ophiocoma* and bearing 8 long slender arms, $1\frac{1}{2}$ in. long.

Lower Guinea. Gaboon: Mfoa, 85 miles east of Gaboon, in forest, Bates, 518!

7. *D. kribensis*, Engl. in *Engl. Jahrb.* xlvi. 271. A glabrous herb with an erect stem about $1\frac{1}{2}$ ft. high, internodes $\frac{3}{4}$ in. long. Leaves oblong-lanceolate, apex subobtusate, base acute, 4–6 in. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. wide, pale yellowish-green beneath; lateral nerves 5–7 on each side, curving upwards and uniting within the margin; petioles 5–7 lin. long. Stipules narrowly triangular, about 3 lin. long, persistent. Stalk of receptacle slender, up to $1\frac{1}{2}$ in. long; receptacle irregularly and slightly 6-lobed, about 5 lin. in diam., with 6 linear bract-arms twice as long as the diameter, sometimes with 2–3 shorter ones also.

Upper Guinea. Cameroons: Kribi, 3–7 ft. above sea-level, Ledermann, 700.

8. *D. alternans*, Engl. in *Engl. Jahrb.* xlvi. 273. Glabrous; stem herbaceous, woody below, ascending from a creeping rooting base, about 8–12 in. high; internodes short, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sometimes less. Leaves oblong-elliptic to narrowly elliptic, apex shortly and obtusely acuminate, narrowing cuneately below to an acute base, margin slightly undulate, 4– $5\frac{1}{2}$ in. long, $1\frac{1}{3}$ – $1\frac{3}{4}$ in. wide; lateral nerves 6–8 on each side, curving upwards and uniting within the margin, subprominent on the paler lower face; petioles slender, 5–7 lin. long. Stipules small, narrowly triangular, acute, 1– $1\frac{1}{2}$ lin. long, persistent. Inflorescence solitary in the upper leaf-axils; stalk slender, $1\frac{1}{3}$ – $1\frac{1}{4}$ in. long; receptacle orbicular, shortly 8-lobed, about 5 lin. in diam., each lobe bearing a slender bract-arm, 1– $1\frac{1}{4}$ in. long, slightly dilated at the apex, short intervening arms, about $\frac{1}{4}$ in. long, are also sometimes present. Flowers as in *D. ophiocoma*.

Upper Guinea. Cameroons: Elabi, marshy places in the alluvial forest, 30–50 ft. above sea-level, Ledermann, 537!

9. *D. ophiocomoides*, *Engl. in Engl. Jahrb.* xl. 545. Suffruticose; stem from a long creeping rooting portion, densely hirtellous as are the petioles. Leaves short-stalked, narrowly elliptic to oblanceolate-elliptic, apex acuminate, tapering below to a narrow obscurely cordate base, margin undulate, 3-4 in. long, a little over 1 in. wide, glabrous except for a few sparse short hairs on the veins on the paler lower face; lateral nerves 6-7 on each side, ascending, uniting a little within the margin; petioles 2-3 lin. long. Stipules as in *D. ophiocoma*. Inflorescence solitary; stalk slender, $\frac{3}{4}$ in. long (or more), sparsely hirtellous as are the outside of the receptacle and the bract-arms. Receptacle similar to that of *D. ophiocoma* but smaller (4 lin. in diam.), with a few (4) longer bract-arms $\frac{3}{4}$ -1 in. long, and about the same number of shorter intermediate. Male flowers 3-androus.

Upper Guinea. Cameroons: Lundi, near Bipinde, 500 ft., *Zenker*, 2709!

Very near *D. ophiocoma* but distinguished by its smaller narrower leaves and smaller receptacle with unequal bract-arms.

10. *D. laikipiensis*, *Rendle in Journ. Bot.* 1915, 299. A small herb becoming woody below; stem and petioles densely hirtellous. Leaves shortly stalked, obovate, apex blunt to rounded, base blunt to obscurely cordate, margin obscurely undulate, 3-3½ in. long, 1½-1¾ in. wide, upper face glabrous, lower sparsely hairy mainly on the nerves; lateral nerves about 5 on each side, curving upwards and uniting within the margin; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. long. Stipules as in *D. mungensis*, persistent. Inflorescence solitary, receptacle broadly convex, hirtellous, surface orbicular about 4 lin. in diam., the margin prolonged into about 15 very unequal bract-arms, varying from triangular projections 1 lin. in length, to slender arms nearly $\frac{3}{4}$ in. long. Endocarp crustaceous, warted, about 1 lin. in diam.

Nile Land. British East Africa: Laikipia Plains, 6000-6500 ft., *Battiscombe*, 61!

11. *D. mungensis*, *Engl. in Engl. Jahrb.* xx. 145. Suffruticose; stem 6-8 in. high, ascending, rooting below, roots fibrous, stem and petioles densely hirtellous. Leaves shortly stalked, elliptic to obovately elliptic, tapering to a shortly acuminate apex and an obtuse obscurely cordate base, margin undulate or sometimes with a few large irregular teeth in the upper part, 1½-3¼ in. long, $\frac{3}{4}$ -1¼ in. wide, glabrous, under surface paler; lateral nerves 5-7 on each side, curving upwards and uniting within the margin; petiole about $\frac{1}{4}$ in. long. Stipules triangular-subulate, 1-2 lin. long, persisting as long as the leaf. Inflorescence solitary; stalk slender, generally about 1 in. long, sometimes more, puberulous; receptacle almost hemispherical, surface suborbicular, 3-7 lin. across, dark purple or greenish, with a very narrow margin and generally 4-7 narrow linear glabrous bracts $\frac{1}{4}$ -1 in. long (or more) and intermediate irregularly arranged

shorter ones $\frac{1}{2}$ lin. or more in length. Male flowers 2-androus; female scattered sparsely on the more central portions of the disc; projecting stigmas reddish when dried. Endocarp globose, smooth, about 1 lin. in diameter.—Engl. Monogr. Morac. Afr. 16. *D. mundamensis*, Engl. in Schlechter, Westafr. Kautsch.-Exped. 286 (name only), and in Engl. Jahrb. xxxiii. 115.

Upper Guinea. Cameroons: Mungo and Abo, *Buchholz!* Bipinde, 1100-2200 ft., *Zenker*, 986! 4397! 4733! Between Mundame and Otam, 600-1000 ft., *Schlechter*, 12883!

Var. *bipindensis*, Engl. Monogr. Morac. Afr. 17, t. iv. B. Leaves with 1-2 large teeth on each side, sometimes becoming pinnatifid.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 985! 2708!

12. *D. variifolia*, Engl. in Engl. Jahrb. xxviii. 376. Stem decumbent, with ascending branches about 6 in. long, and like the petioles densely strigose; internodes 3-8 lin. long. Leaves membranous, very variable in shape, ovate, oblong or linear-oblong, entire or irregularly 1- to 2-lobed on each side, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, 5-10 lin. wide, lobes 1-4 lin. long, 3-6 lin. broad; lateral nerves few, slender, passing into the lobes; petiole 3-7 lin. long. Stipules small, linear-lanceolate. Inflorescences solitary or in pairs; stalk slender, 2-4 times as long as the petiole, minutely pilose; receptacle suborbicular, 2 lin. in diam.; bracts numerous, very narrow-linear, purplish, the longer about $1\frac{1}{2}$ -2 lin. long, the shorter alternating with these, scarcely 1 lin. long. Flowers very small, dark violet.

Mozamb. Distr. German East Africa: Uhehe; Utschungwe mountains near Pongolo, in forest at about 6000 ft., *Goetze*, 613.

Not seen. There is some confusion in the description as to the size of the receptacle.

13. *D. tenera*, Bureau in DC. Prodr. xvii. 271. A herb 2 ft. high (*Mann*), represented in the herbarium only by the herbaceous upper portion of the shoot; stem slender, flexuous, glabrous except at the slightly pubescent apex. Leaves membranous, elliptic, narrowing above to an obtuse acumen, cuneate at the base and narrowing into the petiole, margin somewhat undulate, 7-9 in. long, $2\frac{1}{2}$ - $3\frac{1}{2}$ in. wide, glabrous; lateral nerves 11-13 on each side, curving obliquely upwards and uniting within the margin; petiole about 1 in. long. Stipules lanceolate-subulate, persistent, $1\frac{1}{2}$ -2 lin. long. Inflorescence in the axils of the upper leaves; stalk slender, puberulous, 6-7 lin. long; receptacle orbicular, upper face very convex, 4 lin. in diam., without a membranous margin but prolonged at the edge into about 10 linear, very unequal reflexed rigid bract-arms $1\frac{1}{2}$ -8 lin. long. Male and female flowers interspersed.—Engl. Monogr. Morac. Afr. 12.

Lower Guinea. Spanish Guinea: Corisco Bay, Mount John, on the River Kongui, *Mann*, 1776!

14. *D. Holstii*, *Engl. in Engl. Jahrb.* xx. 145. Suffruticose, with a slender horizontal rhizome $1\frac{1}{2}$ lin. thick bearing much branched fibrous roots at the nodes, passing into an erect slender stem 8 in. high; upper portion sparsely puberulous, as are the petioles and peduncles. Leaves papery, oblanceolate to obovately elliptic, apex blunt to shortly acuminate, base cuneate, blunt, margin slightly undulate, $3\frac{1}{2}$ –5 in. long, 1 – $2\frac{1}{4}$ in. wide, shining above, paler beneath; lateral nerves 4–6 on each side, curving upwards at an angle of about 60° with the midrib; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long. Stipules linear-subulate, caducous, 1 lin. long. Inflorescence solitary; stalk $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long, over 1 lin. thick; receptacle suborbicular, dark reddish-brown, 7–9 lin. long, 5–7 lin. broad, bearing a number of linear obtuse radiating bract-arms, $2\frac{1}{2}$ lin. to $1\frac{1}{4}$ in. long, and $\frac{1}{2}$ lin. wide. Male flowers 2–3-androus; female numerous, dispersed over the more central portion of the disc; style projecting, 2-fid. Fruit subglobose, $1\frac{1}{2}$ –2 lin. in diam.; endocarp crustaceous, keeled on the back, sides tuberculate.—*Engl. Pfl. Ost-Afr. C.* 161, and *Monogr. Morac. Afr.* 13, t. iv. A.

Mozamb. Distr. German East Africa: Usambara; Mlalo, about 4800 ft., *Holst*, 3766; Amani, 3000 ft., *Warnecke*, 225!

Var. *grandifolia*, *Engl. Monogr. Morac. Afr.* 13. Stem $1\frac{1}{2}$ –2 ft. high; leaves generally 8 in. long, $2\frac{1}{4}$ – $2\frac{3}{4}$ in. wide; petiole $\frac{3}{4}$ –1 in. long.

Mozamb. Distr. German East Africa: Usambara; Handei Mountains, near Kombola-Kosila, 3700 ft., *Buchwald*, 241; Gondja Mountains, 6400 ft., *Buchwald*, 236!

15. *D. asteriscus*, *Engl. in Engl. Jahrb.* li. 428. Stems reaching 3 ft. in height, closely covered, as are also the petioles, leaf-veins, peduncles and receptacles, with short hairs between which are solitary short whitish bristles. Leaves membranous, broadly oblong-elliptic, apex shortly and obtusely acuminate, base blunt, margin coarsely crenate, $4\frac{1}{4}$ – $6\frac{1}{2}$ in. long, 2– $2\frac{3}{4}$ in. wide, paler beneath, midrib thick; lateral nerves about 10 on each side, spreading, prominent on the lower face; petiole about $\frac{3}{4}$ in. long. Stipules small, subulate, glabrous. Peduncle $\frac{1}{2}$ in. long. Receptacle orbicular, greyish-brown, nearly 8 lin. in diam., bearing numerous unequal obtuse bract-arms, the longest reaching 5 lin., several shorter ones between the longer. Male flowers 3–4-androus, with a 3–4-lobed perianth; female distributed throughout the disc; style 2-fid.

Upper Guinea. Cameroons: Mbo, in the Kongoa Mountains, 5300 to 6000 ft., *Ledermann*, 6044.

16. *D. Brownii*, *Rendle in Journ. Bot.* 1915, 299. Herbaceous shoots 9–12 in. high, springing from a slender woody branching rhizome about 1 lin. thick, simple or branched, leafy nearly to the base; internodes $\frac{1}{2}$ – $\frac{3}{4}$ in. long, puberulous, interspersed with stiffer longer hairs on the young parts. Leaves thin and papery when dry, narrowly obovate

to cuneate, apex rounded to shortly acuminate, mucronulate, base blunt, margin sinuate above the middle, 2-3½ in. long, 1-1½ in. wide, dark green and sparsely strigose above, paler and more hairy beneath, especially on the veins; lateral nerves 4-6 on each side, ascending, somewhat prominent on the lower face; petiole hairy like the young shoot, ½-1¼ in. long. Stipules narrow linear-subulate, persistent, to 2 lin. long. Inflorescences small, 1-3 in each leaf-axil in the upper part of the stem; stalk slender, shorter than the petiole, 4-5 lin. long, somewhat hirsute, as is also the convex back of the orbicular receptacle; receptacle about ¼ in. in diam., bordered with numerous (about 18) triangular acute teeth ⅔-¾ lin. long. Male flowers 2-androus; perianth-segments 2, fleshy, somewhat lunate; anthers brown-purple; female distributed throughout the disc which is strongly protogynous; style shortly 2-fid; fruit subglobose; endocarp slightly verruculose, ¾ lin. in diam.

Nile Land. Uganda: Mabira forest at 4000 ft., *Brown*, 460!

17. *D. quercifolia*, *R. E. Fries in Arkiv. Bot.* xiii. no. 1, 8, t. 1, figs. 1-3. A fleshy herb with one or more shoots ascending from a short thick fleshy rhizome 1¼-2 in. long and 4-8 lin. thick; stems 6-8 in. high, 2½-3 lin. thick at the base, and about 1½ lin. towards the apex, laxly clothed with short spreading hairs, leafy at the apex with short internodes, naked below and marked with the dark scars of the fallen leaves. Leaves somewhat fleshy, somewhat narrowly obovate, obtuse, narrowing below and passing into the petiole, margin sinuate above, becoming entire below, 1½-2½ in. long, 1-1¼ in. wide, glabrous above, sparsely hirtellous below; lateral nerves 6-8 on each side, prominent on the lower face; petiole 2½-5 lin. long. Stipules very small, triangular, acute, caducous, ¼ lin. long. Inflorescence solitary in the leaf-axils; stalk ¼-½ in. long; receptacle depressed-turbinate; disc orbicular, 3½-5 lin. broad, with a margin of numerous triangular teeth ¼-½ lin. long and a few (8-10) larger narrowly triangular acute bract-arms up to 3 lin. long. Female flowers numerous, distributed throughout the disc; style about ¼ lin. long, 2-fid at the apex. Fruit subglobose, ½ lin. in diam.; endocarp verruculose.—*R. E. Fries in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Expéd.* 1911-12, i. 13.

South Central. Congo: Kasindi; Lake Albert Edward, *Fries*, 1799.

Not seen; described from the good figure.

18. *D. vivipara*, *Welw. in Trans. Linn. Soc.* xxvii. 70. Stem weak, slender, herbaceous, from a globose tuber the size of a pea or hazel-nut, erect at first then decumbent or ascending, rooting at the lower nodes at which small axillary tubercles are borne, 6-8 in. high, simple, pubescent above. Leaves long-stalked, thinly membranous, apex obtuse to subacute, base abruptly narrowed,

acute, margin undulate-dentate, $1\frac{1}{2}$ -2 in. long, $\frac{2}{3}$ -1 in. wide, glabrate or sparsely puberulous especially on the nerves beneath; lateral nerves 5-6 on each side, arcuately ascending; petiole $\frac{3}{4}$ in. in the lower leaves, becoming much shorter (less than $\frac{1}{4}$ in.) in the uppermost. Stipules obsolete. Receptacle solitary, many-flowered, on a long slender stalk, scarcely succulent, green, pubescent when young, broadly turbinate, 3-4 lin. in diam., surface elliptic, the margin produced into 5-8 (rarely 9) narrow tapering bract-arms, 1-3 lin. long, with sometimes short teeth between; bract-arms more or less spreading or suberect, puberulous with ciliolate margin; stalk pubescent, shorter than the petioles, but becoming longer in the fruit. Male flowers 2-androus; perianth broadly 2-lobed; female dispersed among the male. Style projecting above the level of the stamens, then shortly 2-fid. Endocarp globose-trigonus, whitish, about $\frac{1}{2}$ lin. in diam., tuberculate.—Bureau in DC. Prodr. xvii. 273; Engl. Monogr. Morac. Afr. 21; Hiern in Cat. Afr. Pl. Welw. i. 1025.

Lower Guinea. Angola: Pungo Andongo; shady places at the sides of the rivulet Candange Camatuta and in the Praesidium, *Welwitsch*, 1565!

19. *D. picta*, Bureau in DC. Prodr. xvii. 277. A herb with a creeping horizontal rhizome about 2 lin. thick, sparsely hairy, hairs very short, bearing fibrous roots at the nodes and erect leaves; internodes $\frac{3}{4}$ -1 in. long, sometimes much shortened. Leaves thinly parchment-like when dry, varying in shape on the same plant, orbicular-cordate, broadly ovate or elliptic, apex rounded, blunt or bluntly acuminate, generally more or less emarginate, base more or less cordate, margin repand or more or less undulate, 3-8 in. long, $2\frac{1}{4}$ - $3\frac{1}{2}$ in. wide, shining, dull green and glabrous above, paler and obscurely puberulous on the veins beneath; venation conspicuous beneath; lateral nerves 4-6 each side, ascending somewhat and united by a continuous vein well within the leaf-margin to apparently glandular depressions in which run short veins; reticulation conspicuous; petiole stout, more or less densely covered with short hairs, 3-9 in. long. Stipules large, triangular-ovate with a midrib prolonged into an acumen, $\frac{1}{4}$ - $\frac{1}{3}$ in. long, sometimes persisting after the fall of the leaf. Inflorescence solitary, axillary; stalk generally shorter than the petiole, puberulous as is the outside of the open cup-shaped orbicular receptacle; disc about $\frac{1}{2}$ in. in diam., with a regular margin of short inflexed bluntly triangular teeth. Male flowers typically 2-androus; perianth broadly 2-lobed. Female flowers distributed through the receptacle; style 2-branched.—Engl. Monogr. Morac. Afr. 16. *D. variegata*, Engl. l.c. t. vi. A.

Upper Guinea. Cameroons: Yaunde; creeping in loose leaf-soil in damp shady places at 2500 ft., *Zenker & Staudt*, 518!

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1626!

20. *D. lotziana*, *Engl. in Engl. Jahrb.* li. 431. A herb with ascending somewhat curved densely hispid stems to 20 in. long, with internodes up to $\frac{3}{4}$ in. long. Leaves membranous, glabrous, elliptic, apex subobtuse, narrowing cuneately below the middle to a subobtuse base, with 2-3 coarse blunt teeth near the apex, 2-3½ in. long, 1-1½ in. wide; lateral nerves 3 on each side, curving upwards, with the remotely reticulate veins subprominent beneath; petiole hispid, 2½ lin. or less in length. Stipules subulate, 1 lin. or less in length. Inflorescences 2-4, axillary; stalk hispid, 2½ lin. long; receptacle green, subturbinate, about 3 lin. high, face broadly oval, 3 lin. long, 2½ lin. broad, with two linear bracts 5 lin. long and ½ lin. broad dilating at the end to 1 lin., and several lateral deltoid blunt bracts ½ lin. long. Male flowers numerous, brownish; female distributed throughout the disc; style 2-fid. Fruits subglobose, 1 lin. in diam.; endocarp smooth.

Upper Guinea. Cameroons: Mongorube, Lotz, 2.

21. *D. gabunensis*, *Engl. Monogr. Morac. Afr.* 14. Stem woody below, glabrous, herbaceous above and like the petioles densely clothed with uncinata hairs; upper internodes about ½ in. long and 1½-2 lin. thick. Leaves thinly membranous, oblong-lanceolate, apex abruptly acuminate, narrowing below to a cuneate base, 4-5 in. long, 1½ in. wide in the upper third; bright green above, paler beneath; lateral nerves about 7-9 on each side, curving upwards; petiole broadly channelled, about ¼ in. long. Stipules triangular-acute, about ¼ in. long, persistent. Inflorescence solitary in the upper leaf-axils, very shortly hairy; stalk a little longer than the petiole; receptacle face subrhomboid, dark purple, about 7 lin. long, 4 lin. broad, with a narrow margin, bearing a long linear apical bract-arm 1 in. long, a linear obtuse basal arm, and about 7 linear-lanceolate arms on each side about ¼ in. long, with intervening narrow teeth. Male flowers generally 2-androus. Ovary ovoid, contracted above into a projecting 2-fid style. Fruit subglobose, about ¼ in. in diam.; endocarp smooth.

Upper Guinea. Cameroons: Efulen, 2300 ft., Bates, 242!

Lower Guinea. Gaboon: banks of streams in open woods near Sibange-Farm, Munda, Soyaux, 26!

The above description is drawn up from Engler's original one. There is in Kew Herbarium a sheet of Soyaux, 26, the label of which gives the locality and date cited by Engler, but the two specimens on the sheet represent different species. One specimen may be referable to *D. gabunensis*, but has shorter stipules (about 1½ lin. long), larger petioles, and broader blades with a shorter broader apex; with this Bates's plant from the Cameroons agrees.

22. *D. Tessmannii*, *Engl. in Engl. Jahrb.* xlvii. 274. Stem herbaceous and like the petioles densely clothed with short hairs, about 1 ft. high; internodes about 5 lin. long. Leaves oblong-lanceolate,

apex obtuse, base somewhat obtuse, about 4 in. long and $1\frac{1}{4}$ – $1\frac{3}{4}$ in. wide; lateral nerves 8 on each side, curving upwards and uniting within the margin; petiole barely $\frac{1}{2}$ in. long. Receptacle oblong, with a margin 1 lin. broad, $\frac{1}{2}$ in. long, 5 lin. broad, bearing a filiform bract-arm at each end, the apical $2\frac{3}{4}$ in., the basal $1\frac{1}{4}$ in. long, and numerous intervening linear bracts about 4 lin. long; peduncle about $\frac{3}{4}$ in. long.

Lower Guinea. Spanish Guinea: Bebai, *Tessman*, 701.

23. *D. Zenkeri*, *Engl. Monogr. Morac. Afr.*, 14. t. vii. C. Stem woody below, herbaceous above, 9–16 in. high, bearing in the upper part a dense short pubescence mixed with longer hairs; internodes rather long, $1\frac{1}{2}$ to nearly 2 in. below and $\frac{3}{4}$ – $1\frac{1}{4}$ in. in the upper portion of the stem. Leaves papery when dry, elliptic to obovate-elliptic, tapering more or less to the acuminate apex and to the subobtuse base, margin undulate, 5– $6\frac{1}{2}$ in. long, $1\frac{3}{4}$ – $2\frac{3}{4}$ in. wide, glabrous, dull green above, paler beneath; lateral nerves generally 7–8 on each side, curving gently upwards and uniting near the margin; petiole $\frac{3}{4}$ – $1\frac{3}{4}$ in. long. Stipules triangular, acute, deciduous, 1– $1\frac{1}{2}$ lin. long. Inflorescence solitary, sometimes in pairs; stalk slender, varying in length from $\frac{1}{2}$ –3 in.; receptacle face subrhomboid to oblong, deep-purple, about $\frac{1}{2}$ in. in its longest diam., with a narrow margin passing into a varying number of very unequal linear bracts, including 2–4 very long (up to 4 in.). Male flowers 2–3-androus; female scattered through the receptacle; ovary ovoid, passing into a long 2-fid style.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1042! 3171! 3956! 4486!

24. *D. usambarensis*, *Engl. in Engl. Jahrb.* xxxiii. 114. Stem herbaceous, 8–16 in. high, in the upper part very shortly puberulous, as are the petioles, peduncles and receptacles; internodes $\frac{3}{4}$ – $1\frac{1}{4}$ in. long below, $1\frac{1}{2}$ –4 lin. above. Leaves membranous, oblong with an acute base, margin entire or remotely undulate or with a few large teeth, $2\frac{1}{3}$ –4 in. long, $1\frac{1}{4}$ –2 in. wide; lateral nerves 5 on each side, ascending and passing into the teeth; petiole barely $\frac{1}{2}$ in. long. Receptacle bright green, subrhomboid, about 4 lin. in diam.; bract-arms linear, generally 4, the longer barely $\frac{1}{2}$ in. long, 4 smaller $2\frac{1}{2}$ – $3\frac{1}{2}$ lin. long, and 8 very short and tooth-like scarcely $\frac{1}{2}$ lin. long; peduncle barely $\frac{1}{2}$ in. long. Fruit with a crustaceous warted endocarp.

Mozamb. Distr. German East Africa: Usambara; Nquelo, on the Ngambroad in primitive forest, *Scheffler*, 43.

25. *D. Solheidi*, *De Wild. Études Fl. Bas- et Moyen-Congo*, iii. 65. Stems herbaceous, 6–12 in. high, ascending from a cylindrical woody creeping rhizome $1\frac{1}{2}$ lin. thick; stem, rhizome and petiole densely hirtellous, hairs brownish, short, intermixed with longer. Leaves

short-stalked, obovate-elliptic, apex blunt or shortly acuminate, base sometimes cuneate, ultimately subcordate, margin slightly undulate, obscurely crenate, or irregularly grossly dentate. $1\frac{1}{4}$ –4 in. long, $\frac{3}{4}$ –2 in. wide, glabrous except for a few hairs on the median nerve beneath, dull green above when dry, pale beneath; lateral nerves about 7 on each side, curving upwards and uniting within the margin, somewhat impressed above, prominent beneath; petiole $1\frac{1}{2}$ –6 lin. long. Stipules narrowly linear-subulate, hairy, 2–2 $\frac{3}{4}$ lin. long, persistent. Inflorescence solitary in the upper leaf-axils; stalk glabrous, up to 2 $\frac{3}{4}$ in. long; receptacle glabrous, rhomboid, with a narrow margin, short diam. 3 $\frac{1}{2}$ lin., long diam. 5 $\frac{1}{2}$ lin. in the flowering stage, the 4 angles prolonged each into a long slender bract-arm $1\frac{1}{2}$ –2 in. long, which is enlarged and 2-lobulate at the tip. Male flowers 2-androus (*De Wildeman*); female numerous, with 2-fid style. Fruit subglobose, obscurely trigonous; endocarp smooth.

South Central. Belgian Congo: Yambuya, *Laurent*, 2051! *Solheid*, 108!

26. *D. Laurentii*, *De Wild. Miss. É. Laurent*, 69, t. 32. Stems erect, herbaceous, densely hirtellous, as are the petioles, with long and short hairs intermixed, borne on a long woody creeping rhizome $1\frac{1}{2}$ –2 lin. in diam. and swollen at the nodes. Leaves oblong-elliptic, narrowing to a cuneate base, apex shortly acuminate, base acute or narrowly subcordate, margin entire, undulate, or with a few irregular teeth above, $5\frac{1}{4}$ –8 $\frac{1}{2}$ in. long, $1\frac{3}{4}$ –2 $\frac{3}{4}$ in. wide, glabrous above, paler and with a few scattered hairs on the nerves beneath; lateral nerves 8–11 on each side, curving upwards and uniting within the margin; petiole 3–5 lin. long. Stipules short, triangular-subulate, hairy, $1\frac{1}{2}$ lin. long, deciduous. Inflorescence solitary, axillary; stalk glabrous, 3 $\frac{1}{2}$ in. long; receptacle 4–5-angular, flowering portion about 5 lin. in diam., with a narrow margin $\frac{1}{2}$ –1 lin. wide, angles prolonged into long slender bract-arms broadening spatulately at the tip, $1\frac{3}{4}$ –4 in. long, with sometimes a few inconspicuous intermediate teeth. Male flowers 2-androus (*De Wildeman*); female flowers with 2-fid style.—*Th. & Hél. Durand*, *Syll. Fl. Congol.* 502; *De Wild. Études Fl. Bas- et Moyen-Congo*, iii. 64. and in *Comp. Kasai Miss. Étud. Sci.* 278.

South Central. Belgian Congo: Kondue, *Laurent*! Munungu, *Sapin*; Bena-Dibele, *Flamigni*!

Var. *brevipedicellata*, *De Wild. Pl. Nov. Hort. Thenen.* i. 225, t. li. Leaves smaller than in the type, narrowing to a subcordate base, $1\frac{1}{2}$ –4 $\frac{1}{2}$ in. long, 1–2 $\frac{3}{4}$ in. wide. Inflorescence solitary or geminate; stalk $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. long; receptacle 3–4-angular, angles prolonged into narrow-linear subobtuse bract-arms up to 2 $\frac{3}{4}$ in. long.

South Central. Belgian Congo: Forests of the Sankuru, *Luja*, 54.

27. *D. obtusibracteata*, *Engl. in Engl. Jahrb.* xlv. 271. Stems erect, slightly woody; internodes $1\frac{1}{4}$ –1 $\frac{1}{2}$ in. long, glabrous

except in the upper portion, which is very minutely hairy. Leaves oblong-lanceolate, somewhat obtusely acuminate, with a cuneate base narrowed into the petiole, $5\frac{1}{4}$ – $5\frac{1}{2}$ in. long, $1\frac{3}{4}$ –2 in. wide; lateral nerves 6 on each side, curving upwards and uniting near the margin; petiole minutely hairy, slightly channelled above, 5–7 lin. long. Stipules very narrow, about 5 lin. long, deciduous. Peduncle $1\frac{1}{4}$ in. long; receptacle pentagonal, margined, about 5 lin. in diam.; bracts linear, slightly dilated at the apex, one from each angle about 7 lin. long, one from the middle of each side about 4 lin. long, and a tooth-like outgrowth 1 lin. or less in length by the side of the longer bracts.

Upper Guinea. Cameroons, *Büsgen*.

28. *D. Staudtii*, *Engl. Monogr. Morac. Afr.* 13. Stem 6–9 in. high, herbaceous, decumbent and rooting below, upper portion pubescent like the petioles. Leaves thinly membranous when dry, elliptic to elliptic-lanceolate, acuminate, narrowing below to the slightly emarginate base, margin entire or slightly undulate, sometimes with one or two teeth above the middle, 4–6 in. long, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. wide; lateral nerves 7–9 on each side, spreading upwards and uniting near the margin; petiole 7–10 lin. long. Stipules small, subulate, deciduous, about 1– $1\frac{1}{2}$ lin. long. Inflorescence solitary in the upper leaf-axils; stalk puberulous, $\frac{1}{2}$ in. long; receptacle convex, disc broadly oblong, dark purple, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with a somewhat broad (1– $1\frac{1}{2}$ lin.) margin passing into 5–6 linear bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. or less in length and widening suddenly at the tip, and numerous intervening short blunt or irregularly triangular outgrowths. Male flowers 2–3-anded; perianth shortly 2–3-lobed; female numerous, scattered through the receptacle, the 2-fid style projecting above the tubular mouth of the perianth; endocarp subglobose, crustaceous, 1 lin. or more in diam.—*D. subrhombiformis*, *Engl. in Engl. Jahrb.* li. 428.

Upper Guinea. Cameroons: Lolodorf, *Staudt*, 148! Bipinde, *Zenker*, 4091! 4117! 4290! 4306! 4647!

29. *D. jabassensis*, *Engl. in Engl. Jahrb.* xlvii. 270. Stem herbaceous, erect, up to 2 ft. high, 2 lin. thick below, like the petioles densely covered above with short hairs; internodes $\frac{2}{3}$ – $\frac{3}{4}$ in. long. Leaves elliptic or elliptic-lanceolate, more or less acuminate, base obtuse, 4– $5\frac{1}{2}$ in. long, 2– $2\frac{1}{2}$ in. wide; lateral nerves 7–8 on each side, spreading with an upward curve and turning upwards near the margin; petiole 7–9 lin. long. Stipules narrowly triangular, deciduous. Peduncle puberulous, about $\frac{3}{4}$ in. long; receptacle subrhombiform, yellow, $\frac{3}{4}$ in. in diam., with a narrow herbaceous margin passing into 7–10 linear bract-arms, broadening at the tip, barely $\frac{1}{2}$ in. long, with several $1\frac{1}{2}$ –2 lin. long and others only 1 lin. long.

Upper Guinea. Cameroons: Jabassi, rain-forest, 330 ft., *Ledermann*, 1072.

Var. *subcuneata*, *Engl. l.c.* 271. Leaves narrowing below to a wedge-shaped base, margin sometimes grossly dentate.

Upper Guinea. Cameroons : Bave, 2800 ft., *Ledermann*, 1286.

Specimens not seen ; evidently very near *D. Staudtii*, Engl., and perhaps to be included under that species.

30. *D. ulugurensis*, *Engl. Pfl. Ost-Afr. A.* 92 (name only), and *Monogr. Morac. Afr.* 13, t. v. B. Stem about $2\frac{1}{2}$ lin. thick, like the petioles very shortly and densely hairy with longer hairs intermixed ; internodes short, 7–10 lin. long. Leaves oblong-elliptic in outline, obtuse at apex and base, unequally pinnatifid, 4–6 in. long, $2\frac{1}{2}$ – $2\frac{3}{4}$ in. wide at the broadest part, in the long narrow upper portion about $\frac{1}{2}$ in. wide, grey-green above, paler beneath, lobes spreading, narrow, blunt, a few in the lower part of the blade up to $1\frac{1}{4}$ in. long, the rest much shorter, $\frac{1}{4}$ – $\frac{1}{2}$ in. ; petiole semiterete, about $\frac{1}{2}$ in. long. Stipules very narrowly subulate, about 5 lin. long. Inflorescence solitary, axillary ; stalk $\frac{1}{2}$ – $\frac{3}{4}$ in. long ; receptacle broadly oblong or rhombiform, dark purple, 5 lin. in diam., with a narrow margin and 2–4 larger bract-arms up to $2\frac{1}{2}$ lin. long and $\frac{1}{2}$ lin. broad, obtuse or the two larger emarginate, several short tooth-like arms between the longer. Female flowers distributed throughout the disc ; ovary contracted into a 2-fid projecting style.—Engl. in *Engl. Jahrb.* xxviii. 376.

Mozamb. Distr. German East Africa : East Uluguru ; mountain forest of Nghwenn, 5300 ft., *Stuhlmann*, 8800 ! South Uluguru ; ascent to Lugwangule Plateau, 4500–6500 ft., *Goetze*, 239.

31. *D. tayloriana*, *Rendle in Journ. Bot.* 1915, 300. Suffruticose ; stem creeping and rooting below, erect portion about 5 in. high, younger part and petioles densely hirtellous. Leaves shortly stalked, membranous when dry, oblanceolate, apex obtuse to rounded, apiculate, narrowing to an obtuse or obscurely cordate base, margin undulate, $3\frac{1}{4}$ – $3\frac{3}{4}$ in. long, about 1 in. wide, scabridulous on both faces ; lateral nerves about 6 on each side, somewhat prominent, ascending and uniting within the margin ; petioles about 2 lin. long. Stipules linear-subulate, deciduous, about 1 lin. long. Inflorescences solitary in the upper leaf-axils ; stalk $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sparsely hairy, as is the back of the receptacle ; receptacle narrowly oval, 10 lin. long by $3\frac{1}{2}$ lin. in greatest width including the narrow margin, narrowing at each end and bearing a narrow linear terminal bract about 2 in. long, the margin bearing a fringe of irregular teeth 1–3 lin. long. Male flowers 3-androus, with a central rudimentary pistil ; female flowers along the middle line of the disc ; style 2-fid, projecting from the narrow tubular mouth of the perianth.

Nile Land. British East Africa : Rabai Hills, at Mtoni, *Taylor* !

32. *D. equatorialis*, *Rendle in Journ. Bot.* 1915, 300. Suffruticose ; stem leafy in the upper portion, where it is sparsely covered with very short sticky hairs, as are the petioles. Leaves shortly stalked, membranous when dry, obovate-elliptic, shortly acuminate, tapering

below the middle to a narrow obtuse base, margin slightly undulate, 5-5½ in. long, 1½-2¼ in. wide, glabrous, lower face pale with veins and midrib prominent; lateral veins 7-10 on each side, curving upwards and uniting within the margin; petiole ¼-⅓ in. long. Stipules long, linear-tapering, 4-5 lin. long, persistent. Inflorescences solitary in the upper leaf-axils; stalk exceeding the petiole; receptacle (young) elliptic, barely ½ in. long, ¼ in. broad, with a narrow margin about ½ lin. broad, bearing short blunt teeth and passing at each end into a bract-arm, at least one of which is 1¼ in. long (the second broken in specimen). Male flowers 3-androus; perianth 3-lobed; female few in the central part of the disc; style 2-lobed, projecting from the short tubular perianth.

Lower Guinea. Gaboon: Lat. 1° N., *Mann*.

Near *D. tayloriana* from which it differs in the long slender persistent stipules and the weakly toothed margin of the receptacle.

33. *D. longicauda*, *Engl. in Engl. Jahrb.* li. 429. Branches prostrate, ascending, closely covered like the petioles with stiff hairs. Leaves membranous, ovate to elliptic, more or less acute, cuneately narrowed at the base and slightly cordate, margin entire or undulately repand-crenate or grossly dentate, 4¾-6¾ in. long, 1½-2½ in. wide, glabrous except on the midrib and veins beneath; midrib thick; lateral nerves about 10 on each side, spreading, curving upwards and uniting near the margin; petiole 5-7 lin. long. Stipules subulate, persistent. Inflorescences solitary; peduncle 1 in. long, setulose. Receptacle oval or subtriangular, longest diameter 7 lin., shortest barely 3½ lin., the margin provided with numerous linear green bracts, two of which reach 4 in. in length, the remainder are shorter, the shortest being 5 lin. long. Male flowers 3-4-androus, with a 3-4-lobed perianth; female scattered throughout the receptacle; style 2-fid.

Upper Guinea. Cameroons: Ebolowa, 2100 to 3000 ft., *Mildbraed*, 5625; Ekuk, 2300 ft., *Mildbraed*, 5582.

34. *D. Brieyi*, *De Wild. in Fedde, Repert.* xiii. 373. Branches creeping at the base, about 10 in. long, densely velvety. Leaves stalked, membranous, more or less abruptly acuminate, rounded at the base, margin entire or sparsely and shallowly dentate, 1¼-3¾ in. long, 7 lin. to 1½ in. wide, glabrous on both faces; lateral nerves 5-8 on each side, curving upwards and uniting within the margin; petioles velvety, up to ½ in. long. Stipules linear-lanceolate, 2½-4 lin. long, more or less caducous. Stalk of inflorescence up to 3½ lin. long; receptacle oblong, about 5 lin. long, margin crenulate-dentate, teeth about ½ lin. long, with 2 linear bract-arms slightly inflated at the tips, about 8 lin. long and ½ lin. broad.

South Central. Belgian Congo: Ganda-Sundi, *Comte de Briey*, 2019.

Allied to *D. poinsettiiifolia*, *Engl.*, but readily distinguished by the smaller receptacle with longer teeth. Not seen.

35. *D. poinsettiifolia*, *Engl. in Engl. Jahrb.* xx. 142. Suffruticose; stems and petioles densely hirtellous, stems (or branches) in specimens seen up to 12 in. long. Leaves shortly stalked, membranous, elliptic, more or less acuminate, narrowing below to an obscurely cordate base, margin undulate with a few broad teeth, or coarsely 2-3-toothed in the upper part, 4-6 in. long, $1\frac{1}{2}$ -2 in. wide, upper face glabrous, lower face paler, more or less hirtellous on the midrib and slightly prominent veins; lateral nerves 7-9 on each side, somewhat ascending then upwardly curving and uniting within the margin; petioles $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Stipules small, linear-subulate, deciduous, about 1 lin. long. Inflorescences in pairs; stalks scarcely exceeding the petiole; receptacle transversely oblong, hirtellous on back and arms, 1 in. long, by about 7 lin. broad including the 2-3 lin. broad irregularly toothed or crenate margin which is extended at each end into a linear bract-arm $\frac{3}{4}$ in. or more long and 1 lin. broad with a slightly expanded bluntly 2-lobulate tip. Male flowers 2-3-androus. Style in the female flowers long, projecting and dividing at the surface of the receptacle into 2 short arms. Fruits subglobose, $1\frac{1}{2}$ lin. in diam.—*Engl. Monogr. Morac. Afr.* 18, t. ii. A. (incl. vars. *grossedentata*, *subdentata* and *undulata*).

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2710! 3700! 981; Yaunde, *Zenker & Staudt*, 582; Jenessoki, *Buchholz*; Buea, *Deistel*, 435! Lokundje, *Dinklage*, 206.

36. *D. Dinklagei*, *Engl. in Engl. Jahrb.* xx. 143. A low-growing herb; stem creeping below, then ascending for about 4 in., densely hirtellous as are the petioles. Leaves shortly stalked, membranous, elliptic-oblong, obtuse, narrowing to an obtuse base, margin undulate or with a few large obtuse teeth, 1- $1\frac{1}{4}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, paler on lower face; lateral nerves 3-4 on each side, spreading, prominent beneath; petioles about $\frac{1}{4}$ in. long. Stipules linear-subulate, about half as long as the petioles, persistent. Inflorescences solitary in the upper leaf-axils; stalks about $\frac{1}{2}$ - $\frac{3}{4}$ in. long; receptacle narrow, acute at each end, dark purple, 7-9 lin. long and less than 1 lin. broad, with a thread-like bract at each end barely $\frac{1}{4}$ in. long, and a fringe of similar bracts 1 lin. or less in length along the sides. Male flowers 2-3-androus; female few, distributed along the middle of the disc.—*Engl. Monogr. Morac. Afr.* 19, t. viii. C.

Upper Guinea. Cameroons: near Batanga, *Dinklage*, 792.

37. *D. prorepens*, *Engl. in Engl. Jahrb.* xx. 144. Suffruticose; stem procumbent and rooting, then ascending for about 6 in., covered with very short hairs, as are the petioles and peduncles. Leaves stalked, membranous when dry, elliptic, apex and base obtuse, margin undulate or with a few broad obtuse teeth above

the middle, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long, $\frac{3}{4}$ - $1\frac{1}{4}$ in. wide, glabrous but veins sparsely puberulous on the lower face; lateral nerves 3-4 on each side, curving upwards and uniting within the margin; petioles $\frac{1}{2}$ in. or less in length. Stipules linear-subulate, persistent, 2-5 lin. long. Inflorescences few, solitary in the upper leaf-axils; stalk about 2 lin. long; receptacle narrowly elliptic, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, puberulous on the back, the very narrow margin bearing numerous rather fleshy triangular deep purple bracts about 1 lin. long, the two terminal bracts slightly larger, somewhat cuneate and denticulate at the apex. Male flowers with a 3-lobed perianth; female few, as in *D. tayloriana*.—Engl. Monogr. Morac. Afr. 18, t. i. A, iii. A.

Upper Guinea. Cameroons: near Buea, about 5000 ft., *Preuss*, 852; Cameroon Mountains, 3000 ft., *Mann*, 1956!

Var. *robustior*, Rendle in Journ. Bot. 1915, 300. A larger stronger growing plant with stouter leaves, $2\frac{1}{2}$ -4 in. long, $1-1\frac{1}{2}$ in. wide, narrowing to a shortly acuminate apex and below to a cuneate base; lateral nerves 4-5 on each side; petioles $\frac{1}{2}$ -1 in. long; fruit spheroidal, $1\frac{1}{4}$ lin. in diam., endocarp smooth.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 2316!

38. *D. dionga*, Engl. in Engl. Jahrb. xxviii. 377. Stem erect, about $1\frac{1}{2}$ ft. high and $\frac{1}{4}$ in. thick, like the petioles densely strigose. Leaves elliptic, wedge-shaped in the lower third then grossly and irregularly toothed, 6-7 in. long, $4\frac{1}{2}$ - $4\frac{3}{4}$ in. wide, teeth to $\frac{3}{4}$ in. long and 5 lin. broad, glabrous, green, paler on the lower face; lateral nerves 6-8 on each side, spreading, with the secondary nerves and veins somewhat prominent on the lower face; petioles about $\frac{3}{4}$ in. long. Stipules minute, subulate. Inflorescences generally in pairs, sparsely pilose like the boat-shaped receptacle; stalk $2\frac{1}{2}$ lin. long; receptacle 3-4 lin. long, $1-1\frac{1}{2}$ lin. broad and $2\frac{1}{2}$ lin. high, with two very concave oblong bracts at each end turned upwards and downwards, about $1\frac{1}{2}$ lin. long and $\frac{3}{4}$ lin. broad, and short broadly triangular lateral bracts $\frac{1}{2}$ lin. long. Female flowers few in the median plane of the receptacle; style 2-fid.

Mozamb. Distr. German East Africa: South Uluguru; in forest, 4000-6000 ft., *Goetze*, 177.

39. *D. paucidentata*, Rendle in Journ. Bot. 1915, 300. Plant 1-2 ft. high; stem herbaceous above, glabrous; upper internodes $\frac{3}{8}$ -1 in. long, $\frac{3}{8}$ -1 lin. thick. Leaves membranous, elliptic, apex shortly acuminate, base cuneate, obtuse, 4-8 in. long, $1\frac{1}{2}$ -3 in. wide, glabrous, dull green above when dry, brighter green and paler beneath; lateral nerves 11-13 on each side, somewhat ascending, curving upwards and uniting within the margin, impressed on the upper face, somewhat prominent beneath; petiole somewhat slender, $\frac{1}{2}$ - $\frac{3}{8}$ in. long. Stipules subulate, 2 lin. long, falling before the leaf. Inflorescences solitary in the upper leaf-axils, glabrous; stalk slender, shorter than

or equal to the petiole; receptacle very broadly and shortly obconical; disc elliptic, 4 lin. long, 2 lin. broad, the very narrow margin passing into four large spreading fleshy triangular teeth about 1 lin. long and 4 shorter very blunt teeth barely $\frac{1}{2}$ lin. long. Male flowers 3-androus; female few, each with a pair of style-arms projecting from the narrow mouth; style axis about equal in length to the branches.

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1692!

40. *D. Gœtzei*, *Engl. in Engl. Jahrb.* xxviii. 378. A creeping plant; stem about a foot high, juicy, glabrous, decumbent in the lower third, ascending and leafy above, internodes about $\frac{1}{2}$ in. long. Leaves shortly stalked, elongate-lanceolate, narrowing to the apex and base, apex acuminate, subobtuse, base acute, anterior margin with a few broadly triangular obtuse teeth, about $2\frac{3}{4}$ in. long and $\frac{3}{4}$ in. wide, upper face sparsely pilose, densely and shortly hairy on the midrib; lateral nerves 4-6 on each side, curving upwards towards the teeth, slightly prominent; petiole shortly hairy like the midrib. Stipules small, elongate-triangular, shortly hairy. Inflorescences usually solitary; stalk slender, several times longer than the petiole, about $\frac{3}{4}$ in. long; receptacle oval, about 4 lin. in diam., including the 1 lin. broad grossly dentate margin formed by the union of the very unequal triangular green bracts. Female flowers few; style simple.

Mozamb. Distr. German East Africa: South Uluguru; in forest, 4000-6000 ft., *Goetze*, 176.

Var. *angustibracteata*, *Engl. l.c.* Leaves shorter, more oblong, $1\frac{1}{2}$ -2 in. long, $1-1\frac{1}{4}$ in. wide; bracts of receptacle narrower, linear.

Mozamb. Distr. German East Africa: South Uluguru; with the above, *Goetze*, 182.

I have seen no specimen of the species or variety; the general description suggests a position near *D. paucidentata*, Rendle, but the style is described as simple.

41. *D. convexa*, *De Wild. Études Fl. Bas- et Moyen-Congo*, iii. 63, t. iv. Stem ascending from a horizontal base, a foot or more in height, shortly hairy as are the petioles. Leaves obovate-elliptic, shortly acuminate, narrowing below to the base and sometimes obscurely cordate, margin slightly undulate or irregularly furnished with short broad teeth, $1\frac{1}{2}$ -5 in. long, $1-2\frac{1}{2}$ in. wide, glabrous; lateral nerves about 7 on each side, depressed on the upper face, prominent below, ascending; petioles $\frac{1}{4}$ - $\frac{3}{8}$ in. long. Stipules linear-tapering, persistent, 5 lin. long. Inflorescences solitary in the upper leaf-axils; stalk glabrous, up to $\frac{1}{4}$ in. long; receptacle elliptic-oblong, convex, up to $1\frac{1}{2}$ in. long and 7-9 lin. wide, with numerous small fleshy linear greenish-yellow marginal bracts about 1 lin. long, the terminal slightly longer and often irregularly

2-lobulate. Male flowers 2-3-androus; female with 2-fid style.—
De Wild. Pl. Thonner. Congol. ii. 299.

South Central. Belgian Congo: Mongala; Mongende, near Dundusana, at 1500 ft., *Thonner*, 177!

42. *D. angusta*, *Engl. in Engl. Jahrb.* li. 430. Stems herbaceous, about 20 in. high, densely hairy, as are also the petioles. Leaves thinly membranous, elliptic, apex shortly acuminate, narrowed at the base, entire or slightly undulate, about 4 in. long, $1\frac{1}{2}$ in. wide, glabrous; midrib thick; lateral nerves about 8 on each side, curving upwards to unite within the margin, coarsely reticulate between the nerves; petiole 7 lin. long. Stipules small, subulate. Inflorescences in twos or threes in the upper leaf-axils; stalk $2\frac{1}{2}$ lin. long; receptacle narrowly elliptic, 6 lin. long by 2 lin. wide, with a setulose bract from each end 7 lin. long. Male flowers 3-4-androus; perianth 3-4-lobed; female flowers distributed throughout the disc; style 2-fid. Endocarp crustaceous, smooth.

Upper Guinea. Cameroons: Eduduma-Bidue, about 15 miles east of Batanga, *Mildbraed*, 6110.

43. *D. Buchanani*, *Engl. in Engl. Jahrb.* xx. 142. Stem erect, flexuous, succulent, a foot long, bearing minute whitish hairs, as do the petioles and (when young) the leaves, especially on the back and nerves. Leaves probably succulent, elliptic, apex and base acute, margin obscurely sinuate-dentate, 2-4 in. long, $\frac{3}{4}$ - $1\frac{3}{4}$ in. wide; lateral nerves 8-12 on each side, spreading-ascending; petiole varying much in length from barely 2 up to 9 lin. long. Stipules small, linear-subulate, barely 1 lin. long, deciduous. Inflorescence solitary in the leaf-axils; stalk attached somewhat below the middle, generally $\frac{1}{4}$ - $\frac{1}{2}$ in. long; receptacle narrowly oblong, about $\frac{3}{4}$ in. long, by $\frac{1}{4}$ in. broad with a crenate margin and at each end a linear bract-arm originating below the margin, the upper 2 in. long, the lower narrower and much shorter. Male flowers 2-androus; perianth with two blunt rounded lobes; female distributed throughout the disc; style projecting and dividing into two long crimson arms. Endocarp angularly subglobose, with a dorsal crest and minutely tuberculate sides.—*Engl. Monogr. Morac. Afr.* 23, t. viii., fig. B.

Mozamb. Distr. German East Africa: Mpwapwa, *Kirk*! British Central Africa: Nyasaland, *Buchanan*, 505!

Var. *longipedunculata*, Rendle in *Journ. Bot.* 1915, 300. Apparently a smaller plant, about 6 in. high, with peduncles 2 in. or more in length; receptacle about $\frac{1}{2}$ in. long; upper bract-arm 2-3 in. long, lower about 1 in.

Mozamb. Distr. Portuguese East Africa: near Lake Nyasa, *Johnson*, 494!

44. *D. unicaudata*, *Engl. in Engl. Jahrb.* li. 432. A herb with fleshy smooth branches which are leafless below. Leaves thin, elliptic, acute, abruptly narrowing at the base or decurrent into a

very short petiole, margin entire or repand-crenate, about $5\frac{1}{2}$ in. long and 2 in. wide, bearing on both faces small stiff scattered hairs; midrib fleshy; lateral nerves 5-6 on each side, fleshy, curving upwards and uniting; petiole 7 lin. long, winged, glabrous. Inflorescences solitary; stalk $1\frac{1}{2}$ lin. long, attached near the base of the receptacle; receptacle narrowly oblong, 9-6 lin. long, $2-2\frac{1}{2}$ lin. broad, with a single bract from the upper end, $2\frac{3}{4}$ in. long and springing from beneath the edge of the receptacle, rounded at the base. Male flowers 3-4-androus, with 3-4-lobed perianth; female distributed throughout the disc; style 2-fid. Fruit 4-hedral; endocarp thinly crustaceous, warted.

Mozamb. Distr. German East Africa: Eastern Usambara; near Kifalufalu, *Amani*, 2544.

45. *D. scaphigera*, *Bureau in Bull. Mus. Hist. Nat. Paris*, i. 60. A small shrub with erect woody stems reaching 3 ft. in height, pubescent when young, soon becoming glabrous. Leaves shortly stalked, membranous, narrowly obovate-elliptic or elliptic, acuminate, base wedge-shaped, margin undulate, $2\frac{1}{2}-6\frac{1}{2}$ in. long, 1-3 in. wide, upper face glabrous, shining, puberulous on the stronger nerves on the lower face; lateral nerves 6-9 on each side, arcuately ascending and uniting near the margin; petiole $2\frac{1}{2}-5$ lin. long. Stipules setaceous, about 1 lin. long, caducous. Inflorescence solitary; receptacle narrow, boat-shaped, $1\frac{1}{4}-1\frac{3}{4}$ in. long, relatively few-flowered, with a broad (3 lin.) membranous sinuate veined margin which is not prolonged into teeth or arms; stalk slender, pubescent, 5-6 lin. long. Male flowers 2-androus; perianth obscurely 2-lobed; female few (2 or 3) deeply sunk in the median line of the receptacle; ovary deeply sunk; style very short, dividing into 2 linear spreading recurved stigmas on reaching the surface.—*Engl. Monogr. Morac. Afr.* 19; *De Wild. Pl. Nov. Hort. Thenen.* i. 227, t. 52; *De Wild. & Durand, Pl. Thonner. Congol.* 11 and *Contrib. Fl. Congo*, i. fasc. ii. 58; *Th. & Hël. Durand, Syll. Fl. Congol.* 503; *De Wild. Pl. Thonner. Congol.* ii. 299.

North Central. French Congo: Upper Kemo River, *Dykowski*.

South Central. Belgian Congo: Bena Dibela, *Luja*; Kondue (Sankuru) and vicinity, *Luja*, 1, 32, 81; Bangala; Bobi, near Gali, *Thonner*, 45.

46. *D. bicornis*, *Schweinf. in Bot. Zeit.* 1871, 332. Stems herbaceous, a foot high, 2 or 3 rising erect from a creeping cylindrical much-branched fleshy rhizome, which is $\frac{1}{4}$ in. or less in thickness, pubescent as are the petioles, densely leaved towards the apex. Leaves, lower long-stalked, thinly membranous, elliptic to obovate or obcuneate, apex acute to acuminate, mucronulate, narrowing below to a somewhat obtuse or acute base, margin rarely entire, generally undulate or more or less grossly dentate to deeply cut in the upper part, 4-5 in. long, $1\frac{1}{2}-2\frac{1}{4}$ in. wide, glabrescent or with scattered adpressed hairs on the upper face, nerves beneath sparsely

pubescent; lateral nerves about 6 on each side, ascending, slightly prominent beneath; petiole 1-1 $\frac{1}{4}$ in. long in the lower leaves, the uppermost less than $\frac{1}{2}$ in. Stipules small, linear-tapering, deciduous. Inflorescence solitary, as in *D. psilurus* but smaller and lunately curved, about 1 in. long, upper process almost filiform, 1-1 $\frac{1}{4}$ in., lower filiform 2 lin. long. Flowers as in *D. psilurus*. Endocarp globose, whitish brown, 1 $\frac{1}{4}$ lin. in diam.—Bureau in DC. Prodr. xvii. 276; Engl. Monogr. Morac. Afr. 19, t. viii. A.

Nile Land. Niarniam: Tukami's Seriba, *Schweinfurth*, 3788!

47. *D. psilurus*, *Welw. in Trans. Linn. Soc.* xxvii. 71. A herb persisting by a creeping cylindrical knotted fleshy rhizome bearing long slender root-fibres; stem erect, simple, 1-2 $\frac{1}{2}$ ft. high, somewhat succulent, laxly leaved and glabrescent below, towards the apex densely leaved and pubescent. Leaves long-stalked, membranous, polymorphic often on the same specimen, cuneate and entire below, rarely obtuse, sometimes ovate-elliptic or oblong-elliptic and acuminate with a weakly toothed margin, sometimes obovate or obcuneate and more or less deeply cut towards the apex or 3- to several-lobed; lobes unequal, erect or spreading, narrow triangular, acuminate, 4-6 in. long, 1 $\frac{1}{2}$ -3 in. wide, with a few scattered adpressed hairs on the upper face, paler and hirtellous along the nerves beneath; lateral nerves 6-7 on each side, rather prominent beneath, ascending; petiole slender, sparsely pubescent, 2 in. long in the lower leaves, becoming shorter above. Stipules small, narrowly lanceolate or linear-acuminate, 1-1 $\frac{1}{2}$ lin. long, pubescent, subsistent. Inflorescence solitary, long-stalked, vertical; receptacle linear-lanceolate, green, scarcely fleshy, to 1 $\frac{1}{2}$ in. long, passing above into a long erect linear tapering appendage, 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. long, which is slightly dilated at the apex, base shortly prolonged beyond the stalk and passing into a short upwardly curving appendage, $\frac{1}{2}$ in. long or less; peduncle 1-2 in. long. Male flowers 1-androus, limb of the very thin perianth shortly and irregularly 3-4-dentate or almost obsolete; female flowers fewer, inserted in a row on either side of the middle line; style dividing above the level of the disc into two linear spreading stigmas. Fruit globose, about 1 lin. in diam.—Bureau in DC. Prodr. xvii. 272; Ficalho, Pl. Uteis, 269; Engl. Monogr. Morac. Afr. 20; Hiern in Cat. Afr. Pl. Welw. i. 1025; De Wild. Études Fl. Katanga, i. 29, ii. 31, Études Fl. Bas-et Moyen-Congo, i. 119, ii. 123, t. lx., iii. 64, Pl. Nov. Herb. Hort. Thenen, i. 229, t. liii, Miss. É. Laurent. 70 and Pl. Thonner. Congol. ii. 298; De Wild. & Th. Durand, Pl. Thonner. 10; Th. & Hël. Durand, Syll. Fl. Congol. 503. *D. psiluroides*, Engl. in Engl. Jahrb. xlvii. 274.

Nile Land. Uganda: Unyoro, 3000 ft., *Brown*, 387!

Lower Guinea. Angola: Pungo Andongo; in shady valleys, especially in the forest "Mata de Pungo," 3200 ft., *Welwitsch*, 1564!

South Central. Belgian Congo : Forest of Sankuru, *Luja*, 82 ; Lutsolela, Ikongo, Bobangi, Konduc, Mukunsi and Pangu, *Laurent* ; Eala, *Laurent*, 192, 1220 ; *Pynaert*, 1246 ; Bobi, *Thonner*, 49 ; Lukafu, *Verdick*, 319 ; Yambuya, *Solheid*, 113 ; Elisabethville, *Homble*, 190 ; Kwa Muera, *Mildbraed*, 2142 ! forest of Abarangu, *Mildbraed*, 3117.

Mozamb. Distr. Portuguese East Africa : Uhaconhanha, *Companhie de Mocambique* !

Var. *brevicaudata*, Rendle in Journ. Bot. 1915, 301. A plant with the characteristic cuneately based grossly dentate leaves of the type, but smaller receptacles not exceeding 1 in. long, with basal bract barely exceeding 1 lin. long, and apical bract up to 1½ in., stalk 4-5 lin. long.

Nile Land. Uganda : Unyoro ; Budongo forest, 3000 ft., *Bagshawe*, 931 !

Var. *compacta*, De Wild. Pl. Nov. Hort. Thenen. i. 233, t. 54. Stem much branched ; branches short, crowded, densely leaved in the upper part. Leaves short-stalked, narrowly elliptic, tapering to an acuminate apex, margin acutely toothed throughout, with small teeth between the prominent ones, 3 in. long by 1 in. wide. Receptacle about 1 in. long, with a slightly longer apical bract, and a short basal bract.

Mozamb. Distr. Portuguese East Africa : in coffee plantations at Morambala, *Luja*, 372, 382.

Perhaps a distinct species.

48. *D. lukafuensis*, De Wild. *Études Fl. Katanga*, 28. A herb ; stem apparently erect, upper part only seen, pubescent with rather longer hairs intermixed ; upper internodes (except the few youngest) 2¼ in. to 14 lin. long, apex densely leaved. Leaves membranous when dry, obovate or elliptic-obovate, apex acuminate, ultimately blunt and mucronulate, tapering to the blunt more or less subcordate base, margin irregularly shallowly toothed, sometimes 3-lobed above, 5-6 in. long, 2-2½ in. wide, upper face scabridulous, with a few short adpressed hairs, shortly hairy on the veins beneath ; lateral nerves 7-8 on each side, ascending, prominent beneath ; petiole 7-10 in. long, pubescent like the stem. Stipules linear-tapering, pubescent, 2½ lin. long, persistent. Inflorescence solitary, axillary, receptacle long-stalked, as in *D. psilurus*, but generally with one or two pairs of short bracts above the base, basal and lateral bracts about 2 lin. long, apical bract slender, about 2 in. long ; peduncle 1¾ in. long.—Th. & Hél. Durand, Syll. Fl. Congol. 502.

South Central. Belgian Congo : Katanga ; Lukafu, *Verdick*, 319 !

49. *D. scabra*, *Engl. in Engl. Jahrb*, xx. 142. A herb 3 ft. high ; branches pubescent in the younger portions. Leaves oblong-elliptic, shortly acuminate, apex blunt with a minute mucro, base obtuse, margin weakly undulate, sometimes with an indication of gross toothing in the upper part, 5-6½ in. long, 1¾-2½ in. wide, scabridulous on the upper face, obscurely and finely pilose on the veins beneath ; lateral nerves 7-9 on each side, somewhat prominent beneath, curving upwards ; petiole pubescent, 5-9 lin. long. Stipules minute,

subulate, subsistent. Inflorescence solitary; stalk about $\frac{1}{3}$ in. long; receptacle narrowly elongate-triangular, becoming almost linear above the middle, keeled, finely pilose on the stalk and keel, about $1\frac{1}{2}$ in. long, produced above into a slender awn $1\frac{1}{4}$ in. long, base shortly produced beyond the stalk, mucronate. Male flowers 2-androus, apparently sometimes 1-androus; perianth broadly 2-lobed, lobes obscurely toothed; female flowers few in the median line in the lower half, absent from the narrower linear-tapering upper portion; style projecting from the tubular perianth. 2-fid.—Engl. Monogr. Morac. Afr. 20 and in Schlechter, Westafr. Kautsch.-Exped. 286; Th. & Hél. Durand, Syll. Fl. Congol. 503. *D. psilurus*, Welw., var. *scabra*, Bureau in DC. Prodr. xvii. 273.

Upper Guinea. Southern Nigeria: Nun River, *Barter*, 2089!

South Central. Belgian Congo: Coquilhatville, *Schlechter*, 12607.

Var. *subintegrifolia*, Rendle. A plant apparently of laxer growth with longer stalked, narrowly elliptic to obovately elliptic leaves narrowing to the base, up to 7 in. long and $2\frac{1}{2}$ in. wide, with petioles up to $1\frac{3}{4}$ in. long. Receptacle $1\frac{3}{4}$ – $2\frac{1}{2}$ in. long; stalk $\frac{2}{3}$ – $\frac{3}{4}$ in. long; apical bract slender, up to $3\frac{1}{2}$ in. long, the prominent basal portion produced into a bract $\frac{1}{2}$ in. long.—*D. psilurus*, var. *subintegrifolia*, De Wild. Etudes Fl. Bas- et Moyen-Congo, iii. 64. *D. scabra*, var. *longicaudata*, Engl. in Engl. Jahrb. li. 431.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1526! 4492!

North Central. French Congo: Infondo, on the River Ubangi, *Baudon*, 976!

South Central. Belgian Congo: Mogandjo, *Laurent*, 1999!

50. *D. tenuifolia*, Engl. in *Schlechter*, Westafr. Kautsch.-Exped. 286 (name only), and in Engl. Jahrb. xxxiii. 116. A herb about 10 in. high; stem covered with short hairs, more densely so in the upper part; internodes numerous, short, barely $\frac{1}{4}$ in. long. Leaves membranous, oblong-lanceolate, apex obtuse, base acute, about 3 in. long, 1 in. wide, upper face sparsely pilose, pale beneath and glabrous except on the midrib; lateral nerves 6–7 on each side, slender, spreading, uniting near the margin; petiole 5 lin. long. Receptacle resembling that of *D. scabra*, about $\frac{3}{4}$ in. long, barely $\frac{1}{4}$ in. wide above the base; apical bract somewhat shorter than, or as long as the receptacle; basal bract barely $\frac{1}{4}$ in. long; peduncle about $\frac{1}{4}$ in. long. Male flower not known; fruit about 1 lin. in diam.; endocarp minutely warted.

Upper Guinea. Cameroons: between Mafura and Mundame at about 1000 ft., *Schlechter*, 12920.

51. *D. Stolzii*, Engl. in Engl. Jahrb. li. 432. A strong-growing erect herb, with pale rhizome and shoots 12–16 in. long, $2\frac{1}{2}$ –3 lin. thick, smooth, shining and violet below, densely leaved and densely hairy above with internodes $1\frac{1}{2}$ – $2\frac{1}{2}$ lin. long. Leaves herbaceous, lanceolate or oblong, margin grossly and broadly dentate, 3– $4\frac{1}{4}$ in. long, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. wide, upper face sparsely pilose, the lower pilose

especially on the nerves; lateral nerves 4-5 on each side, curving upwards; petiole densely hairy, 5 lin. long. Stipules subacute, soon falling, 1-1½ lin. long. Inflorescences generally solitary in the leaf-axils; stalk slender, ¾ in. long; receptacle narrow-linear, rather broadly margined, 7-9 lin. long and ¾-1 lin. broad, bearing a slender apical bract-arm about 1½ in. long and a very short basal one only 2½ lin. long. Male flowers 2-3-androus; perianth 2-3-lobed; female distributed throughout the receptacle; style 2-fid.

Mozamb. Distr. German East Africa: North Nyasa; Kyimbila, 4500 ft., *Stolz*, 769.

Allied to *D. psilurus*, Welw.

52. D. Klainei, *Pierre ex Heckel in Bull. Soc. Bot. France*, xvii. 260. A small shrub with an aromatic root; stem becoming herbaceous above, terete, 1½ lin. thick, sparsely pubescent in the young portion, soon becoming glabrous; internodes varying very much in length, from more than 2 to less than ½ in. long. Leaves membranaceous, elliptic, oblong- or ovate-elliptic, narrowing somewhat above to a shortly acuminate apex, base rounded to obtuse, rarely subacute, margin subentire to denticulate, 4½-6½ in. long, 2-2¾ in. wide, smooth or slightly scabrous above, paler beneath, sparsely and finely pilose on the veins; lateral nerves 7-10 on each side, upcurving and uniting within the margin, prominent on the lower face; petiole pubescent, ½-1½ in. long. Stipules linear-tapering, soon deciduous, about 1½ lin. long. Inflorescence solitary in the leaf-axils; receptacle linear-lanceolate, green, 1¾-2 in. long, produced above into a linear appendage, with a slightly thickened apex, 1¾-1½ in. long, basal appendage obsolete, up to ½ in. long; stalk inserted at one-fifth to one-quarter of the distance above the base, to 11 lin. long. Male flowers 2-androus, with a central pistillodium, which is columnar with a swollen apex; perianth-limb with eroded margin. Female flowers fewer, in the central line of the receptacle; style protruding above the tubular perianth and forking into a pair of spreading stigmas.—*De Wild. Miss. É. Laurent*, 69. *D. Gilletii*, *De Wild. in Bull. Herb. Boiss. 2me sér. i. 838, Études Fl. Bas- et Moyen-Congo*, i. 26, t. xi. and *Études Fl. Katanga*, 28.

Lower Guinea. Gaboon, *Klaine*, 661! **Lower Congo:** Kisantu, *Gillet*, 1801!
South Central. Belgian Congo: Eala, *Laurent*.

53. D. Barteri, *Bureau in DC. Prodr.* xvii. 272. A herb 2 ft. high; stem erect from a creeping rooting base, somewhat fleshy, subflexuous, pubescent to tomentose in the upper portion, up to 2 lin. thick in the lower portion. Leaves papery when dry, obovate-elliptic to elliptic, shortly acuminate, narrowing to an obtuse base, margin entire or wavy, 5½-7 in. long, 2-3 in. wide, glabrous, paler

green beneath; lateral nerves 8-10 on each side, curving upwards and uniting within the margin, prominent beneath; petiole more or less pubescent, about $\frac{1}{2}$ in. or less in length. Stipules subulate, 2-2 $\frac{1}{2}$ lin. or less in length, generally falling before the leaves. Inflorescence solitary in the upper leaf-axils; stalk $\frac{1}{2}$ - $\frac{3}{4}$ in. long, puberulous; receptacle flattened or somewhat convex, orbicular, 1-1 $\frac{3}{4}$ in. in diam., including the broad membranous margin (3-4 lin. wide), which is prolonged into numerous (about 15) very unequal bract-arms, a few from $\frac{1}{2}$ - $\frac{3}{4}$ in. long, the remainder short, from 1-3 lin. long. Flowers very distinct. Male flowers 3-merous, the 3 bluntly rounded perianth-lobes depressed on the surface of the disc. Female perianth ring-like, raised above the disc-surface, the deeply 2-fid style projecting from the mouth. Endocarp of fruit subglobose, smooth, whitish brown, 1 $\frac{1}{2}$ in. in diam.—Engl. Monogr. Morac. Afr. 14.

Upper Guinea. Southern Nigeria: Old Calabar, *Robb!* Ifunkpa to Atakom, *Holland*, 215! Oban, *Talbot*, 656! 672! 674! Fernando Po, *Barter!* *Mann*, 152!

54. *D. multiradiata*, *Engl. Monogr. Morac. Afr.* 15, *tt. i. D.* iii. *C.* Stem 2 ft. or more long, erect, often from a creeping or rooting base, woody and glabrous below, often branched, herbaceous above and shortly puberulous like the petioles with scattered longer hairs. Leaves narrowly elliptic, narrowing below to the rather blunt base, apex shortly acuminate, margin slightly undulate, 6-8 in. long, 2-3 in. wide, glabrous, paler green beneath; lateral nerves 7-10 on each side, arcuately spreading, prominent beneath; petiole about $\frac{1}{2}$ in. long. Stipules linear-subulate, 5-7 lin. long, persistent. Inflorescence solitary, axillary; stalk up to 1 $\frac{1}{4}$ in. long, glabrous; receptacle grey-green, many-angled, irregularly many-lobed, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. in diam., margin green, leaf-like, 2 $\frac{1}{2}$ -4 lin. broad, prolonged into about 30 radiating linear bract-arms of very unequal length, 9-13 of the first rank are $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long and at their base and between them are shorter arms. Flowers very distinct, fragrant. Male perianth broadly and obtusely 2-3-lobed, 2-3-androus; female as in *D. Barteri*.

Upper Guinea. Cameroons: Barombi, *Preuss*, 204!

55. *D. Lujæ*, *De Wild. Pl. Nov. Herb. Hort. Thenen.* i. 221, *t.* 50. Herbaceous stem, leaf-stalks and peduncles shortly and densely hairy. Leaves papery when dry, obovate, sometimes narrowly so, apex shortly acuminate, narrowing towards the subcordate base, margin slightly undulate, 3 $\frac{3}{4}$ -5 in. long, 1 $\frac{1}{2}$ -2 $\frac{1}{4}$ in. wide, glabrous except for a few short scattered hairs on the nerves on the lower surface; lateral nerves 7-8 on each side, curving upwards and uniting within the margin; petiole $\frac{1}{4}$ in. long. Stipules small, triangular, caducous. Inflorescences solitary in the upper leaf-axils; stalk about 10 lin. long; receptacle polygonal to orbicular,

$\frac{3}{4}$ in. broad, including the narrow margin (about 1 lin. wide), which is prolonged into numerous bract-arms of very variable length, from triangular tooth-like projections to narrow-linear and 6-7 lin. long. Male flowers 2-3-androus; female with the deeply 2-fid style projecting from the tubular mouth of the perianth.—De Wild. *Études Fl. Bas- et Moyen-Congo*, ii. 123, t. 59.

South Central. Belgian Congo: Sankuru, *Luja*, 177!

56. *D. mogandjensis*, *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 241. Stem woody below, herbaceous above, densely covered in the younger part with short, rather stiff, spreading hairs. Leaves papery when dry, somewhat oblong-elliptic, apex acuminate, narrowing somewhat abruptly to a cuneiform, blunt base, margin entire or slightly wavy, $4\frac{1}{2}$ - $5\frac{1}{2}$ in. long, $1\frac{1}{2}$ -2 in. wide, glabrous except for a few hairs on the veins on the lower surface; lateral nerves about 7 on each side, curving upwards and uniting within the margin, prominent beneath; petiole hairy like the stem, 4-5 lin. long. Stipules small, triangular, acuminate, deciduous. Inflorescences solitary in the upper leaf-axils; stalk $1\frac{1}{2}$ -2 in. long, with scattered hairs; receptacle somewhat square, about $\frac{3}{4}$ in. in diam., with a membranous margin 2 lin. broad, produced at the four corners into a bract-arm which is linear from a triangular base, $\frac{3}{4}$ -2 in. long, and enlarged at the apex, with short triangular projections between the long arms and on the base of the latter.—Th. & Hél. Durand, *Syll. Fl. Congol.* 502.

South Central. Belgian Congo: Mogandjo, on the Aruwimi River, *Laurent*, 1996!

57. *D. subtriangularis*, *Engl. Monogr. Morac. Afr.* 15. t. v. A. Stem erect, apparently from a creeping horizontal rooting base, woody below, herbaceous above, 6 in. to 2 ft. high, simple or sometimes branched; young stem and petioles shortly hairy. Leaves papery when dry, elliptic, apex shortly acuminate, tapering to the subobtusate base, margin obscurely undulate or with a few large teeth above, $3\frac{1}{2}$ -6 in. long, $1\frac{1}{4}$ - $3\frac{1}{2}$ in. wide, glabrous, bright green above, paler beneath; lateral nerves 6-8 on each side, curving upwards and uniting near the margin; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Stipules small, triangular-subulate, 1- $1\frac{1}{2}$ lin. long, persisting as long as the leaves. Inflorescence solitary or paired; stalk slender, 1- $1\frac{1}{2}$ in. long, puberulous or glabrescent; receptacle disciform, subtriangular to trapezoidal, purplish-green, 4-5 lin. wide, with a broad green margin 3-5 lin. broad, passing at three of the angles into long linear bracts 1- $1\frac{1}{2}$ in. long, with a much shorter bract at the fourth corner and sometimes a few short teeth between.—Engl. in Schlechter, *Westaf. Kautsch.-Exped.* 286.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 2315! Cameroons: between Victoria and Bimbia, *Preuss*, 1135! 1347! Victoria, *Schlechter*, 12375! Bipindi, *Schlechter*, 12424; Amba Bay, *Mann*, XIII!

58. *D. Talbotii*, *Rendle in Journ. Bot.* 1915, 301. Stem herbaceous; younger portion densely covered with rather stiff whitish brown hairs, as also are the petioles. Leaves elliptic to obovate-elliptic, shortly acuminate, narrowing below to a blunt obscurely cordate base, margin entire, about 4 in. long, and $1\frac{3}{4}$ in. wide, glabrous except for a few small hairs on the prominent veins on the lower face; lateral nerves 7-8 on each side, curving upwards and uniting in a marginal nerve; petiole 2- $3\frac{1}{2}$ lin. long. Stipules linear-tapering, 2 lin. or less in length, somewhat persistent. Inflorescence solitary in the upper leaf-axils; stalk slender, pubescent, much longer than the petioles, 1 in. long; receptacle suborbicular, convex, about 4 lin. in diam., with a membranous margin barely 1 lin. wide, bearing about 10 radiating somewhat unequal linear bract-arms to $\frac{1}{2}$ in. long, and intervening triangular teeth or very short linear arms. Male flowers 3-androus; perianth 3-lobed; female flowers dispersed through the more central portion of the disc; style 2-lobed, projecting from the tubular mouth of the perianth.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 2314!

Belongs to the *D. Barteri* group, in which it is distinguished by its narrow-margined receptacle with numerous rather short subequal arms.

59. *D. Batesii*, *Rendle in Journ. Bot.* 1915, 301. Stem erect, herbaceous, shortly hirsute, as are the petioles; internodes $1\frac{1}{2}$ in. long and $1\frac{1}{2}$ lin. in diam. below, becoming shorter upwards to $\frac{1}{2}$ or $\frac{3}{8}$ in. Leaves obovately oblong-elliptic with a cuneate base, apex shortly and abruptly acuminate, base obtuse, margin obscurely crenate or slightly undulate, $3\frac{1}{4}$ - $6\frac{1}{2}$ in. long, $1\frac{2}{3}$ - $2\frac{1}{2}$ in. wide, glabrous and dark green above, paler beneath and sparsely pubescent on and near the nerves; lateral nerves 10-12 on each side, ascending, then upcurving and uniting below the margin, somewhat prominent beneath; petiole stout, 11-7 lin. long. Stipules minute, shortly narrowly triangular, $\frac{3}{4}$ lin. long. Inflorescences few, solitary in the upper leaf-axils; stalk stout, puberulous, about as long as the petiole; receptacle flat, orbicular, disc $\frac{3}{4}$ in. in diam., with a narrow margin about $\frac{1}{2}$ lin. wide, produced into numerous very unequal flat linear bracts with a blunt or 2-lobulate apex, about 10 ranging from $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, the intermediate shorter ones sometimes reduced to mere teeth. Male flowers 3-androus; perianth 3-lobed; female distributed through the disc, with 2-fid projecting style.

Upper Guinea. Cameroons: Efulen, *Bates*, 386!

Near *D. Lujæ*, De Wild., but distinguished by the proportionately longer narrower leaves with obtuse base, and the receptacle with many bracts exceeding its diameter in length.

60. *D. yambuyaensis*, *De Wild. Études Fl. Bas- et Moyen-Congo*, ii. 241, and iii. 66, figs. 2 and 3, t. v. Stem erect, 1-2 ft. high, herbaceous above, becoming woody below, pubescent in the younger

portion. Leaves obovate-elliptic to elliptic, shortly acuminate, wedge-shaped below or narrowing towards the base, which may be subcordate, margin entire or wavy, sometimes grossly dentate, 3-6 in. long, $1\frac{1}{2}$ - $2\frac{3}{4}$ in. wide, glabrous, paler green beneath; lateral nerves about 7 on each side uniting within the margin, impressed above, prominent beneath; petiole pubescent, 2-6 lin. long. Stipules subulate, 2-3 lin. long, persistent or caducous (*Mann*, 1691). Inflorescence green, solitary in the upper leaf-axils; stalk 1- $1\frac{3}{4}$ in. long, shortly pubescent or glabrescent (*Mann*, 1691); receptacle lozenge-shaped or irregularly polygonal, with scattered hairs on the back, flowering disc up to $\frac{3}{4}$ in. long, margin 1-2 lin. wide, continued into numerous narrow-linear glabrous bracts, a few (6 or fewer) of which much exceed the others and are 2-4 in. long, broadening below, with a pectinate margin. Male flowers 2-3- androus; female flowers with projecting 2-fid style. Fruits globular, glabrous, about $1\frac{1}{2}$ lin. in diam.—Th. & Hél. Durand, Syll. Fl. Congol. 503; N. E. Br. in Bot. Mag. t. 8616.

Upper Guinea. Cameroons: between Ebolowa and Kampo, *Mildbraed*, 6200!

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1691!

South Central. Belgian Congo: Yambuya, *Laurent*, 1997! Eala, *Brixhe*; *Pynaert*, 448! Mogandjo, *Laurent*, 2000; Injolo, *Seret*, 797; between Ikua and Bouguma, *Laurent*, 931.

61. *D. turbinata*, *Engl. in Schlechter, Westafr. Kautsch.-Expéd.* 286 (name only), and in *Engl. Jahrb.* xxxiii. 115. A small shrub with short branchlets. Leaves shortly stalked, oblanceolate, somewhat abruptly acuminate with the extreme apex obtuse, base more or less cuneate, margin entire, 3-5 in. long, $1-1\frac{1}{2}$ in. wide, glabrous or with a few short scattered hairs on the lower face; lateral nerves 5-7 on each side, arcuately ascending; petiole puberulous when young, 1-2 lin. long. Receptacle shortly stalked, turbinate, puberulous as are the bracts, surface round, $2\frac{1}{2}$ lin. in diam., with 4 narrowly lanceolate obtuse bract-arms $\frac{3}{4}$ in. long and $\frac{3}{4}$ lin. wide, and 4 alternating shorter bract-arms 5 lin. long and $\frac{1}{2}$ lin. wide. Flowers not seen.

Upper Guinea. Cameroons: between Njoke and Malende, 650 ft., *Schlechter*, 12871!

62. *D. Ledermannii*, *Engl. in Engl. Jahrb.* xlvi. 272. A shrub more than 6 ft. high with branchlets spreading at an acute angle, the internodes of which are 2 in. or less in length; cortex a dirty brown; young shoots, petioles, peduncles and receptacles very shortly hairy. Leaves shortly stalked, somewhat papery when dry, obovate to obovate-oblong, abruptly long-acuminate, base cuneate, margin entire or sometimes shortly toothed in the uppermost portion, 4-8 in. long, $1\frac{3}{4}$ - $2\frac{3}{8}$ in. wide, glabrous; lateral nerves 7-10 on each

side, curving upwards and uniting below the margin, prominent beneath; petiole 2-4 lin. long. Stipules narrowly triangular-acuminate, barely 2 lin. long, caducous. Inflorescences solitary, axillary; peduncle $\frac{1}{2}$ in. or less in length; receptacle turbinate, stellately 4-lobed, 4-5 lin. in diam., with a linear to linear-spathulate bract-arm from each lobe about 8 lin. long. Male flowers 2-androus; female flower solitary, central, the exerted style dividing into 2 recurving branches.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 675! Cameroons: Ndonge in dense mountain rain forest, 2700-3300 ft., *Ledermann*, 6229!

63. *D. edeensis*, *Engl. in Engl. Jahrb.* xlvii. 272. A shrub; internodes on branches about 10 lin. long. Leaves very shortly stalked, elliptic, with a long acuminate apex and a subacute base, 4-5 $\frac{1}{2}$ in. long, 1 $\frac{1}{2}$ -2 in. wide in the middle, apex $\frac{2}{3}$ in. long, margin entire; lateral nerves 6-7 on each side, curving upwards and uniting near the margin; petiole 1 lin. long. Stipules short, elongated-triangular. Peduncle about $\frac{2}{3}$ in. long, shortly puberulous as is also the receptacle with its bracts; receptacle turbinate, 4-lobed, barely 5 lin. in diam., with 4 narrowly spathulate bract-arms each 1 in. long.

Upper Guinea. Cameroons: in rain forest at Edea, near Sende, *Büsgen*, 465.

It is possible that this is only a form of *D. Ledermannii* with more elliptic leaves and somewhat longer bract-arms. I have not seen a specimen.

64. *D. aspera*, *A. Chev. in Bull. Soc. Bot. France*, lviii. *Mém.* viii. 207. A shrub 3-6 ft. high; branchlets 1-1 $\frac{1}{2}$ lin. thick with internodes $\frac{3}{4}$ -2 in. long; young shoots, petioles, peduncles and receptacles puberulous. Leaves shortly stalked, polymorphic, oblanceolate or oblong or deltoid to narrowly obovate, abruptly acuminate with the extreme apex obtuse, base wedge-shaped, more or less acute, margin undulate, sometimes becoming more or less dentate above, 2-9 in. long, $\frac{3}{4}$ -2 in. wide, apex 3-5 lin. long, in the lower part of the shoots oblong-triangular or subdeltoid, abruptly acuminate; upper face glabrous, with sparse short adpressed hairs on the lower face; lateral nerves 6-8 on each side, curving upwards and uniting below the margin; petiole 1 $\frac{1}{2}$ -5 lin. long. Stipules acutely triangular, 2-3 lin. long, caducous. Inflorescences solitary in the upper leaf-axils. Peduncle 2 $\frac{1}{2}$ -7 lin. long, much dilated above and rugose. Receptacle small, oblong or 3-lobed, 5-7 lin. long, 2 $\frac{1}{2}$ -3 lin. broad, with a narrow entire margin and bearing 2 or 3 linear-spathulate bract-arms $\frac{1}{2}$ - $\frac{3}{4}$ in. long and $\frac{1}{2}$ lin. broad. Male flowers numerous, 2-3-androus; perianth shortly 3-lobed, lobes obtusely rounded, puberulous; female flower solitary, central; ovary deeply sunk, passing abruptly into a deeply 2-fid style, enveloped by the pulverulent tubular perianth, which divides at the apex into 3 small

rounded lobes.—*D. Dinklagei*, Engl. in Engl. Jahrb. xlv. 273, not in Engl. Jahrb. xx. 143. *D. spathulibracteata*, Engl. l.c. li. 429.

Upper Guinea. Liberia: in forest between Jenneh and Cabolia, 900 ft., *Dinklage*, 2573! Ivory Coast: Dyola country, *Chevalier*, 21162, 21197, 21288, 21288 bis. (var. *delloidea*, A. Chev.).

Although I have not seen a specimen from Chevalier, I have little doubt but that *Dinklage's* Liberian plant is conspecific.

65. *D. Buesgenii*, Engl. in Engl. Jahrb. xlv. 272. A shrub, the woody branches with internodes 8–10 lin. long. Leaves oblong-lanceolate, narrowed from the upper third towards the base in a slightly curved line, apex narrowly and obtusely acuminate, base obtuse, margin very shortly dentate towards the apex, $3\frac{1}{2}$ – $4\frac{3}{4}$ in. long, $1\frac{1}{3}$ –2 in. wide, apex 5 lin. long by $1-1\frac{1}{2}$ lin. wide; lateral nerves about 5 on each side, curving upwards and uniting near the margin; petiole very minutely pilose, 1 lin. long. Stipules short, narrowly triangular, caducous. Peduncle about $\frac{1}{4}$ in. long; receptacle turbinate, 6-toothed, about 4 lin. broad, in ripe fruit 5 lin. long and broad; bracts linear-spathulate, 5 lin. long. Female flowers few, male numerous.

Upper Guinea. Cameroons: forest between Edea and the River Kelle, *Büsgen*, 429.

I have not seen the specimen on which this species was founded and therefore only tentatively include specimens collected by Talbot at Oban, S. Nigeria (626! 628! 2320!), the leaves of which vary from $4\frac{3}{4}$ –7 in. long, including the acuminate apex (5–9 lin. long), and $1\frac{1}{2}$ – $2\frac{1}{2}$ in. wide; the lateral nerves are from 6–12 on each side, and the margin is entire or shortly toothed in the broader upper portion of the leaf. The peduncle is 5–6 lin. long and the 5–6-toothed receptacle about 4 lin. broad, with 5–6 tapering bract-arms $\frac{1}{4}$ in. long. There is a solitary central female flower.

66. *D. amœna*, A. Chev. in Bull. Soc. Bot. France, lviii. Mém. viii. 208. A shrub 3– $4\frac{1}{2}$ ft. high; branches puberulous. Leaves thinly leathery, oblong, obtuse, and long-acuminate, base wedge-shaped, margin undulate and in the upper half closely runcinately toothed, glabrous or with a few hairs on the midrib, reticulate and shining above; petioles puberulous or hirsute, $2-2\frac{1}{2}$ lin. long. Stipules lanceolate, acuminate, 3–4 lin. long, persistent. Inflorescences solitary in the upper leaf-axils; stalk very short, $1-1\frac{1}{2}$ lin. long, pubescent; receptacle greenish-white, cuneiform-triangular, convex, flat above, margin sublobate, bearing no bract-arms, the whole surface delicately puberulous. Male flowers few, 2–3-androus; female solitary and central; ovary deeply sunk.

Upper Guinea. Ivory Coast: Dyola country, between Dioandougon and Niangouépleu, *Chevalier*, 21528.

67. *D. alta*, Engl. in Engl. Jahrb. xl. 545. A shrub 5– $6\frac{1}{2}$ ft. high with slender branches 6–8 in. long, becoming glabrescent but with

a short grey pubescence in the youngest stage. Leaves shortly stalked, stiff, obovate-elliptic to oblong, shortly and abruptly acuminate, base cuneate to rounded, margin undulate, sometimes coarsely and irregularly dentate in the upper third, $3\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $1\frac{1}{2}$ – $2\frac{3}{4}$ in. wide, glabrous; lateral nerves 5–7 on each side, ascending, then upwardly curving and uniting within the margin, impressed on the upper, slightly prominent, as also are the veins, on the lower surface; petioles $1\frac{1}{2}$ –4 lin. long. Stipules acutely tapering from a triangular base, subpersistent, 3 lin. long. Inflorescence solitary in the upper leaf-axils; stalks 3–4 lin. long; receptacle boat-shaped, ultimately $\frac{3}{4}$ in. long and $2\frac{1}{2}$ lin. broad, with a margin 2– $2\frac{1}{2}$ lin. wide passing at the base and apex into a densely and shortly hairy bract-arm $\frac{1}{2}$ in. long.

Mozamb. Distr. German East Africa: Usambara; Amani, 1600 ft., *Warnecke*, 310!

68. *D. Smythei*, *Sprague in Kew Bulletin*, 1908, 299. A shrub $6\frac{1}{2}$ –8 ft. high, with slender branches $\frac{3}{4}$ lin. thick, puberulous above, glabrescent below, young shoots pubescent; internodes $\frac{2}{3}$ – $1\frac{1}{4}$ in. long. Leaves oblanceolate or obovate-oblong, somewhat abruptly acuminate at the obtuse or subacute apex, base cuneate, slightly undulate-dentate above, 3 – $5\frac{1}{2}$ in. long, 1–2 in. wide, sparsely lepidote on the upper face and sparsely puberulous beneath; lateral nerves 8–10 on each side, prominent beneath; petioles puberulous, $1\frac{1}{2}$ –5 lin. long. Stipules narrowly triangular, $1\frac{1}{2}$ lin. long, acute, sparsely puberulous on the outside, deciduous. Inflorescences solitary in the upper leaf-axils; stalks puberulous, barely $\frac{1}{2}$ in. long; receptacle boat-shaped, up to $\frac{1}{2}$ in. long, 2 lin. broad and 2 lin. deep in the centre, puberulous, with an entire margin less than $\frac{1}{2}$ lin. broad, passing at each end into a straight ascending linear glabrous bract barely $\frac{2}{3}$ in. long. Male flowers numerous, 2-androus; perianth 2-partite, papillose outside; female flower solitary in the centre of the disc, a pair of recurving stigmas protruding from the tubular perianth; style about 1 lin. long.

Upper Guinea. Sierra Leone: Jepihun, *Smythe*, 237! Yolo forest, *Unwin & Smythe*, 52!

69. *D. angusticornis*, *Engl. in Engl. Jahrb.* xlv. 274. A low shrub with slender leafy branches $\frac{3}{4}$ –1 lin. thick; internodes $\frac{1}{2}$ –1 in. long, minutely puberulous like the petioles. Leaves shortly stalked, papery when dry, broadly oblanceolate with a tendency to oblong, apex very abruptly and narrowly acuminate, extreme tip rounded and mucronate, base generally cuneate, margin weakly undulate, 4–6 in. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. wide, acumen $\frac{1}{2}$ in. long, glabrous; lateral nerves 6–8 on each side, curving upwards and uniting below the margin, prominent beneath; petiole 2–3 lin. long. Stipules slender,

tapering from a narrow triangular base, about 2 lin. long, somewhat persistent. Inflorescence solitary or in pairs in the leaf-axils, minutely puberulous; stalk slender, 2-2½ lin. long; receptacle greenish-brown, slender, attached about the middle and forked, the 2 linear limbs spreading at about a right angle, limb keeled beneath, 5-7 lin. long, about 1½ lin. broad including the narrow margin (½ lin.), passing at each end into a flat narrow-linear bract about 5 lin. long and ½ lin. broad. Male flowers in 3 rows, 2 marginal rows 1-androus, and a central row 2-androus; perianth short, tubular with erose margin, produced in the marginal series into a rounded limb incurved over the anther and in the central series into a similar incurved limb at each end. Female flower solitary in the centre of the disc or one at the base of each limb, with a pair of short stigmas (¼ lin. long) projecting from the mouth of the narrow-tubular perianth, and a short stout style about the same length.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3584! Johann-Albrechtshöhe, *Büsgen*, 185.

70. *D. Schlechteri*, *Engl. Monogr. Morac. Afr.* 23, t. iv. fig. E. A herb, 6-12 or more in. high; stem succulent, from a short thickened rootstock which is densely covered with fibrous roots, 2-4 lin. thick at the base, glabrous, or sparsely hirtellous in younger parts, branching; shoots leafy. Leaves somewhat fleshy, obovate-cuneate, sometimes elliptic, apex blunt to subacute, base passing gradually into the very short petiole, margin obscurely and remotely dentate above the base, 2-3 in. long, 10-16 lin. wide, glabrous or dorsally hirtellous on the nerves when young; lateral nerves 4-6 on each side, somewhat ascending; petiole barely 3 lin. long or less. Stipules small, linear, deciduous. Inflorescences solitary, axillary; stalk 5 lin. or less in length; receptacle orbicular, 4 lin. or less in diam., with a narrowly somewhat irregularly denticulate margin and generally 9 linear bract-arms springing from the back of the disc and about equal to or a little exceeding its diameter, 4-6 lin. long. Male flowers 2-3-androus; perianth 2-3-lobed; female numerous; ovary stalked; style shortly 2-fid, the style-arms falling as the fruit ripens, so that the style appears simple. Endocarp subglobose-triquetrous, ½ lin. in diam., pale brown, finely warted on two sides.

Nile Land. British East Africa: Mombassa, *Kirk*!

Mozamb. Distr. German East Africa: Dar-es-Salaam, *Kirk*! Portuguese East Africa: Beira, *Schlechter* (in Herb. Berlin)!

71. *D. Warneckeii*, *Engl. in Engl. Jahrb.* xlv. 275. A perennial herb, 1-2½ ft. high; stems stout, succulent, simple or slightly branched, leafy, internodes 2½-10 lin. long, very sparsely glandular-hairy as are the petioles and peduncles. Leaves becoming crowded at the top of the stem, fleshy, narrowly obovate-oblong, subacute, narrowing cuneately at the base and passing gradually into the short petiole,

upper portion more or less grossly and irregularly dentate, 2-6 in. long, $1\frac{1}{4}$ - $2\frac{1}{2}$ in. wide, glabrescent; lateral nerves 4-7 on each side, irregular, ascending, and passing into the teeth; petiole $2\frac{1}{2}$ -7 lin. long. Stipules inconspicuous. Inflorescences solitary, axillary; stalk 5-9 lin. long; receptacle broadly elliptic, 5-7 by $4-5\frac{1}{2}$ lin., with a whorl of 8-12, short blunt linear-triangular bract-arms about equal to half the breadth of the disc, with sometimes intermediate shorter arms or a minute tooth. Male flowers 3-androus; perianth 3-lobed; female numerous and scattered; ovary shortly stalked; style 2-fid at the apex. Endocarp globose-triquetrous, verruculose.—*D. latibracteata*, Engl. l.c.

Mozamb. Distr. Pemba Island, 400 ft., *Küssner*, 388! German East Africa: Amami, at 1500-2500 ft., *Engler*, 3390; *Warnecke*, 509!

72. *D. katangensis*, *De Wild. in Fedde, Repert.* xi. 519, and in *Études Fl. Katanga*, ii. 30, t. ix. fig. 3. Stem herbaceous, solitary, 8 in. high, from a depressed-globose tuber $\frac{3}{4}$ in. in diam. and $\frac{1}{3}$ in. high, terete, reddish, pubescent especially in the younger part, lower portion bearing reduced leaf-like scales at the nodes, upper $4\frac{1}{2}$ in., leafy. Leaves subsessile, erect, narrowly linear-lanceolate, apex bluntly mucronate, margin denticulate, 13-14 lin. long, 1 lin. wide, hirtellous on both surfaces. Stipules lanceolate, 1 lin. long. Inflorescence solitary in the upper leaf-axils; stalk stout, about 1 lin. long; disc orbicular, about 3 lin. in diam.; bract-arms springing from beneath a narrow obscurely crenate margin, spreading, 6-10, unequal, linear, tapering slightly and thickening upwards, hirtellous, 2-5 lin. long, about $\frac{1}{4}$ lin. wide. Male flowers 2-androus, the two broad perianth-lobes with denticulate margin; female scattered; style shortly 2-fid. Endocarp triquetrous-globose, verruculose.

South Central. Belgian Congo: Upper Katanga; *Ruwe, Hock!*

Described from a single specimen.

73. *D. Debeerstii*, *De Wild. & Durand in Bull. Soc. Bot. Belg.* xxxix. 75. Stems herbaceous, solitary or in pairs, springing from the centre of a depressed disc-shaped tuber, which is concave above, 2- $2\frac{3}{4}$ in. in diam., and 7-10 lin. high, erect or somewhat spreading, 6-14 in. high, densely shortly tomentose, leafy at the apex or in the upper third, below bearing at the nodes stipulate scale-leaves. Leaves subsessile, erecto-patent, obovate-lanceolate, acute or sub-obtuse, narrowing gradually to the base, margin except at the base closely and minutely denticulate, $1\frac{3}{4}$ -2 in. long, 5-7 lin. broad, upper surface scabrous and densely strigillose, more softly and laxly hirsute beneath; median nerve and 6-8 lateral nerves on each side somewhat prominent and paler on the lower face. Stipules linear-oblong, acute, $1\frac{1}{2}$ -2 lin. long, persistent. Inflorescences appearing before the leaves, solitary in the axils of the upper scales

and young leaves; stalk $\frac{1}{4}$ - $\frac{3}{4}$ in. long, stout, becoming thicker above, shortly tomentose as is the convex back of the receptacle; disc flat, orbicular, 6-9 lin. in diam.; bract-arms springing from beneath a narrow closely crenate margin, spreading, 2-5, subequal, linear-spathulate, obtuse, shortly tomentose, 3-5 lin. long, $\frac{1}{2}$ -1 lin. broad towards the apex. Male flowers 2-3-androus, with a corresponding number of broad perianth-lobes; female numerous; style $\frac{1}{2}$ lin. long, minutely 2-fid at the apex. Fruit subglobose, endocarp verruculose.—Th. & Hél. Durand, Syll. Fl. Congol. 502. *D. Rosenii*, R. E. Fries in Arkiv. Bot. xiii. no. 1. 14, t. 2, fig. 5, and in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911-12, i. 13.

South Central. Belgian Congo: Upper Marungu; Lake Tanganyika, *Debeerst!*

Mozamb. Distr. Rhodesia: Mukanshi River, between Lakes Bangweolo and Tanganyika, *Fries*, 1125.

Var. *multibracteata*, Rendle. Bract-arms generally 8 in number, often 6-8 lin. long.—*D. Rosenii*, var. *multibracteata*, R. E. Fries, ll. cc. 15 and 13.

Mozamb. Distr. German East Africa: Urundi, 4000-5000 ft., *Scott Elliot*. 8207! Rhodesia: Abercorn, *Fries*, 1125a.

74. *D. benguelensis*, *Welw. in Trans. Linn. Soc.* xxvii. 71. Perennial by means of a fleshy depressed-globose or placentiform tuber 1-1 $\frac{1}{2}$ in. in diam., rich in latex; surface warty and emitting fibrous roots; stem solitary, erect, succulent, cylindrical, unbranched or with a few short leafy branchlets, $\frac{1}{2}$ -1 $\frac{1}{2}$ ft. high, covered when young with dense whitish pubescence, bearing short scale-leaves below, leafy above; internodes $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, becoming shorter towards the densely leaved apex. Leaves when fully developed subsessile or very shortly stalked, oblong-lanceolate to elliptic, apex blunt to subacute, more or less tapering to the base, margin shortly toothed, 1-2 $\frac{1}{2}$ in. long, 4-9 lin. wide, shortly and softly hirtellous, especially on the nerves; lateral nerves 7-10 on each side, ascending. Stipules linear-lanceolate, generally deciduous, rarely exceeding 1 lin. in length. Inflorescences solitary, axillary; stalk firm, varying in length from 2-6 lin., increasing sometimes to 10 lin. in the fruit, like the convex outside of the yellowish-green receptacle glabrescent or sparsely puberulous; disc orbicular, 3-6 lin. in diam., increasing in the fruit, with a narrow shortly toothed margin and bearing from below (outside) the margin a whorl of slender linear bract-arms, varying considerably in number and length in different specimens, from 7-15 in number and from 3-8 (rarely to 10) lin. in length, sometimes slightly dilated at the tip. Male flowers 2-androus; perianth with two broadly truncate opposite lobes; female scattered over the disc; style shortly 2-fid. Pericarp after expulsion of the endocarp elongating and forming a stalked 2-valved fleshy structure projecting above the male flowers; endocarp grey-white, globose-triquetrous, finely warty, $\frac{1}{2}$ - $\frac{3}{4}$ lin. in diam.—Bureau in

DC. Prodr. xvii. 274 ; Engl. Hochgebirgsfl. Trop. Afr. 191 and Monogr. Morac. Afr. 24 ; Hiern in Cat. Afr. Pl. Welw. i. 1025. *D. Poggei*, Engl. in Engl. Jahrb. xx. 146, xxx. 292, and Monogr. Morac. Afr. 24, t. vi., fig. C ; Th. & H el. Durand, Syll. Fl. Congol. 503. *D. Poggei*, var. *Meyeri-Johannis*, Engl. in Engl. Jahrb. li. 434. *D. Hockii*, De Wild. in Bull. Jard. Bot. Brux. iii. 278 (1911), and in  tudes Fl. Katanga, ii. 31 (1913). *D. stenophylla*, R. E. Fries in Arkiv. Bot. xiii. no. 1. 9 (1913), t. 2, fig. 4, and in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911-12, i. 13.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 1566 ! Kubango, Colui valley and Ganguellas, *Gossweiler*, 2115 ! Cutato valley, south of Andulo and Upper Cutato, *Gregory* ! on the Kwango at 10½° S. lat., *Pogge*, 294 !

South Central. Belgian Congo: Katanga; valley of the Little Luebe, *Hock* !

Mozamb. Distr. German East Africa: Uschirombo, *Meyer* ; Unyika : Miwura, 5700 ft., *Goetze*, 1376. Rhodesia : Kalambo, *Fries*, 1332.

75. *D. rhodesiana*, R. E. Fries in Arkiv. Bot. xiii. no. i. 11, t. 2, figs. 1, 2. Habit of *D. benguellensis* ; tuber placentiform, about 2 in. in diam., 5-7 lin. high ; central stem slightly fleshy, reddish at the base, 8-10 in. high, densely covered with very short greyish hairs towards the apex, bearing leaves and inflorescences in the upper third, and below lanceolate-ovate acute shortly tomentose scales about 2 lin. long. Leaves sessile, linear-lanceolate, apex subacute, margin closely crenulate, 2-3 in. long, 4-5 lin. wide, hirtellous especially on the nerves on the lower face. Stipules oblong-lanceolate, persistent, 1-1½ lin. long. Inflorescences solitary ; stalk 2½-5 lin. long ; receptacle orbicular, 5-6 lin. in diam., the margin bearing a ring of minute dark purple teeth ½ lin. long or less ; bract-arms 8-10, springing from a little below the margin, linear, unequal, to ½ lin. broad, the upper 7-10 lin. long, the lower decreasing to half the length. Female flowers numerous ; style shortly 2-fid. Fruit subglobose with warted endocarp, about ½ lin. in diam.—R. E. Fries in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911-12, i. 13.

Mozamb. Distr. Rhodesia : Msisi, near Abercorn, *Fries*, 1302.

Specimen not seen ; should perhaps be included under *D. benguellensis*.

76. *D. Verdickii*, De Wild. & Durand in Bull. Soc. Bot. Belg. xl. 26. Stem erect, herbaceous, hirtellous, leafy, internodes 1 in. long or less. Leaves sessile, thin and papery when dry, lanceolate, more or less acuminate, apex blunt and obscurely mucronate, margin obscurely denticulate, 2-3 in. long, 7-8 lin. wide, scaberulous, sparsely hirtellous especially on the nerves ; lateral nerves 8-12 on each side, ascending. Stipules linear-tapering to linear-lanceolate, 1¼-1½ lin. long. Inflorescences solitary in each leaf-axil ; stalk stout, about 2½ lin. long ; receptacle glabrescent, disc flat, orbicular, 3½-4 lin. in diam., margin denticulate, bract-arms springing from

below the margin, 11-15, spreading in a whorl, subequal, linear, blunt, thickening and sparsely puberulous towards the apex, 7-11 lin. long, about $\frac{1}{2}$ lin. wide. Male flowers 2-androus with a bluntly 2-lobed perianth; female numerous; style deeply 2-lobed.—Th. & Hél. Durand, Syll. Fl. Congol. 503.

South Central. Belgian Congo: Katanga; Lukafu, *Verdick*, 294!

Plant known only from three cut off shoots about 4 in. long.

77. *D. Hildebrandtii*, *Engl. in Engl. Jahrb.* xx. 146. Stem erect, 6-8 in. long, about $2\frac{1}{2}$ lin. thick, succulent, slightly branched, very minutely puberulous below the leaves, otherwise glabrous. Leaves sessile, fleshy, lanceolate, acute, narrowing cuneately to the base, anterior margin shortly sinuate-dentate, $1\frac{1}{2}$ in. long, 5 lin. wide; lateral nerves not prominent. Stipules subulate, 1 lin. long. Peduncle $2\frac{1}{2}$ -5 lin. long, minutely and densely puberulous; receptacle dark purple, suborbicular, $2\frac{1}{2}$ lin. in diam.; bracts 5-7, linear-tapering, very unequal, 2- $2\frac{1}{2}$ lin. or less, with intervening unequal triangular teeth, minutely puberulous. Female flowers numerous; style 2-fid. Endocarp ovate, about $\frac{1}{2}$ lin. long, verruculose except on the ventral aspect.—*Engl. Pfl. Ost-Afr. C.* 161 and *Monogr. Morac. Afr.* 23. t. vi. B.

Nile Land. British East Africa: Taita; Buityuma, *Hildebrandt*, 2050.

78. *D. Homblei*, *De Wild. in Fedde, Repert.* xiii. 195. Perennial by means of a fleshy rounded or depressed concave tuber 2- $2\frac{1}{2}$ in. wide. Stem solitary, erect, apparently succulent, cylindrical, unbranched, up to 1 ft. high, leafy in the upper third and pubescent, bearing stipulate leaf-scales at the lower nodes. Leaves aggregated at the apex, very shortly stalked, oblanceolate-elliptic, apex blunt, base cuneate, margin irregularly denticulate, up to $2\frac{1}{2}$ in. long by 11 lin. wide, softly hirtellous especially on the nerves; lateral nerves about 10 on each side, ascending. Stipules linear, blunt, up to $2\frac{1}{2}$ lin. long. Petiole 1 lin. long or less. Inflorescence solitary, axillary; stalk 7-9 lin. long, hirtellous; receptacle as in *D. benguellensis*, but larger, 8-9 lin. in diam., with 14-16 slender linear bract-arms, $\frac{1}{2}$ -1 in. long. Flowers and fruit as in *D. benguellensis*. Endocarp about $\frac{1}{2}$ lin. in diam.

South Central. Belgian Congo: Katanga; Katentania, *Hombk.*, 730!

79. *D. mirabilis*, *R. E. Fries in Arkiv. Bot.* xiii. no. i. 13, t. 2, fig. 3. Tuber large, 3- $4\frac{3}{4}$ in. in diam., $\frac{3}{4}$ - $1\frac{1}{4}$ in. high, depressed-globose, concave above, surface verrucose, with fibrous roots springing from the warts. Stems erect, solitary or 2 or 3, from the centre of the tuber, succulent, 6-8 in. high, densely clothed with very short spreading whitish hairs, leafy in the upper third with internodes $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, below bearing ovate- or narrowly-triangular acute

fleshy scales, 2-4 lin. long. Leaves, from the figure evidently young in the specimen described, subsessile, narrowly lanceolate, apex blunt, margin serrulate, about $1\frac{1}{2}$ in. long, $3\frac{1}{2}$ -5 lin. wide in the lower third, hirtellous especially beneath; lateral nerves about 8 on each side, ascending, prominent beneath. Stipules lanceolate or subtriangular, acute, 1-2 lin. long, persistent. Inflorescences solitary in each leaf-axil; stalk stout, about $\frac{1}{2}$ in. long, shortly tomentose; receptacle orbicular or irregularly rotund-polygonal, $\frac{1}{2}$ - $\frac{3}{4}$ in. in diam., disc convex, dark purple, margin narrow, bearing numerous dark purple setæ; bract-arms 4-5, more rarely 6, springing from below the margin, linear, narrowing gradually to an obtuse apex, strigose, the upper 7-9 lin. long, the lower 5-7 lin. Male flowers 2-androus; female flowers numerous; style deeply 2-lobed.—R. E. Fries in *Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911-12*, i. 13.

Mozamb. Distr. Rhodesia: Kuta, north of Lake Bangweolo, *Fries*, 1082.

80. *D. Wellmannii*, *Engl. in Engl. Jahrb.* xlvi. 276. A little-branched somewhat densely leaved herb; stem 8 in. high, with internodes 7-9 lin. long, covered, as are the leaves, with very short grey hairs. Leaves almost sessile, lanceolate, narrowed at each end, serrate-dentate, $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, 5 lin. wide in the middle. Stipules shortly triangular. An inflorescence in each leaf-axil; stalk about 4 lin. long; receptacle elliptic, 6 lin. long, about 4 lin. broad, bearing about 12 linear unequal green bract-arms, $\frac{1}{2}$ -1 in. long, $\frac{1}{2}$ lin. broad below, becoming almost filiform above. Female flowers numerous.

Lower Guinea. Angola: open places in bushy country at Liyaka, *Wellmann*, 1539.

Near *D. Poggei*, *Engl.*, from which it is easily distinguished by the characters of the leaf-margin and receptacle.

81. *D. Braunii*, *Engl. in Engl. Jahrb.* xlvi. 276. A succulent herb, probably tuberous; stem somewhat succulent below and about 4-5 lin. thick, slender above (only $2\frac{1}{2}$ lin. thick), and somewhat densely leaved, with a few branches; young parts sparsely covered with very short hairs. Leaves narrowly spatulate, with very short broad teeth at intervals, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long, 2-3 lin. wide; petiole bearing very short hairs, $1\frac{1}{2}$ - $2\frac{1}{2}$ lin. long. Stipules shortly triangular. Inflorescences numerous; stalk slender, $3\frac{1}{2}$ lin. long; receptacle purplish below, elliptic, long diameter 5 lin., short diameter 4 lin., with 7-8 elongate-triangular obtuse green bract-arms, 5-6 lin. long and 1 lin. broad in the lower part, and numerous intervening triangular teeth about $1\frac{1}{2}$ lin. long and $\frac{3}{4}$ lin. broad. Female flowers numerous.

Mozamb. Distr. German East Africa: Usambara; Schume-Ukurubara, *Braun*, 2887.

Recalls *D. Poggei*, *Engl.*, somewhat in habit, but differs widely from this in leaf-character and inflorescence.

82. *D. sessilis*, R. E. Fries in *Arkiv. Bot.* xiii. no. i. 16, t. 2, figs. 6-8. Tuber placentiform, $1-1\frac{1}{4}$ in. in diam., 7-9 lin. high, pale yellowish, convex surface smooth, upper surface and margin warty and emitting fibrous roots. Stem solitary, erect from the centre of the depression, rather succulent, terete, 8-12 in. high, bearing a dense short strigose pubescence, becoming glabrous near the base; leafy above, with internodes up to $1\frac{1}{4}$ in. long, and bearing in the lower half a linear-oblong acute ciliate scale at each node. Leaves, from the figure evidently very young, sessile, erect, linear, narrowing gradually from the base to the somewhat obtuse apex, margin revolute and closely denticulate, up to $1\frac{1}{4}$ in. long and $\frac{3}{4}-1\frac{1}{4}$ lin. broad, covered with short grey stiffish hairs. Stipules linear-oblong, acute, ciliate, $1-1\frac{1}{2}$ lin. long, persistent. Receptacle sessile in each leaf-axil, rounded-elliptic, fixed at or a little below the middle, about 3 lin. long and 2 lin. wide, yellowish-green, disc convex, dark purple, with an entire or obscurely sinuate margin; bract-arms 2 (very rarely 3) one at each end, springing from below the margin, linear, $\frac{1}{4}-\frac{1}{2}$ lin. wide, becoming densely and shortly strigose-hirsute above the base, apical arm 7-9 lin. long, basal $2\frac{1}{2}-4$ lin. Male flowers 2-(or 3-)androus, with 2 (or 3) rounded fimbriate perianth-lobes; female numerous; style minutely 2-fid at the apex.—R. E. Fries in *Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped.* 1911-12, i. 13.

Mozamb. Distr. Rhodesia: between Lakes Bangweolo and Tanganyika, Fries, 1133.

83. *D. caudata*, *Engl. in Engl. Jahrb.* xxviii. 377. Stem erect from a depressed tuber about 2 in. in diam. and 1 in. high, thick, fleshy, about 16 in. long and 3 lin. thick, rather densely leaved. Leaves thin, lanceolate, acute, base cuneate narrowing to the short petiole, margin serrulate, $2\frac{1}{2}-5$ in. long, $1-1\frac{1}{4}$ in. wide, very shortly and sparsely hairy beneath. Receptacle subsessile (stalk 1 lin. long), much curved, boat-shaped, 4-5 lin. long, and 2 lin. broad, with a slightly lobed margin $\frac{1}{2}$ lin. broad and a narrow tail-like bract-arm from the upper end about 2 in. long. Flowers very small; style 2-fid.

Mozamb. Distr. German East Africa: Uhehe; on the Ruaha River, 2000 ft., Goetze, 459.

84. *D. ruahensis*, *Engl. in Engl. Jahrb.* xxviii. 377. Stem erect from a depressed-globose tuber about $\frac{3}{4}$ in. in diam., fleshy, 12 in. long, $2\frac{1}{2}$ lin. thick, very shortly hairy, laxly leaved above. Leaves thin, oblong, broadly and minutely dentate, 4-5 in. long, $1\frac{1}{4}-2$ in. wide, sparsely pilose on both faces; lateral nerves about 8 on each side, spreading; petiole and midrib very shortly hairy. Peduncle about 3 in. long; receptacle flat, oblong, obtuse, 6-9 lin. long, 4-5 lin. broad, with a narrow obtusely crenate violet margin about

$\frac{1}{2}$ lin. broad, and a bract-arm at each end, narrowly linear, obtuse. about $2\frac{1}{2}$ in. long and $\frac{3}{4}$ lin. broad. Flowers numerous, very small.

Mozamb. Distr. German East Africa : Uhehe ; on the Ruaha River, *Goetze*, 429.

85. *D. Walleri*, *Hemsl. in Gard. Chron.* 1893, xiv. 178. A fleshy plant ; stem simple, succulent, with very short hairs, erect from a depressed almost disciform tuber about $1\frac{1}{2}$ in. in diam., 8–16 in. high, bearing minute reduced leaves at the lower nodes. Leaves aggregated in the upper part of the stem, elliptic, obtuse, with a cuneate unequal base passing into the petiole, margin slightly undulate, scabridulous, $2\frac{1}{2}$ – $5\frac{1}{2}$ in. long, 1–2 in. wide, glabrous ; lateral nerves 6–9 on each side, curving upwards ; petiole of the lower leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long, of the upper ones shorter. Stipules linear-ligulate, 1–3 lin. long, often persistent. Inflorescence solitary ; stalk up to 1–2 in. long ; receptacle stellate, 4–7-rayed, longest diameter $\frac{1}{2}$ –1 in., surface (especially round the female flowers) bearing minute white hairs, margin crenulate, passing at each ray into a bract-arm, which is narrowly triangular below, becoming filiform above, slightly dilated at the tip, $\frac{3}{4}$ –3 in. long, with scabridulous margin. Male flowers 1–3-androus ; female numerous and distributed ; ovary shortly stalked, the stalk lengthening after fertilisation ; style slender, undivided. Endocarp angularly ovoid, about $\frac{1}{2}$ lin. in diam., brownish, sides verruculose, with a narrow dorsal crest.—*D. caulescens*, Schweinf. ex Engl. in Engl. Jahrb. xx. 144 ; Engl. Monogr. Morac. Afr. 22, t. v. fig. C. ; Durand & Schinz, Études Fl. Congo, 248. *D. gourmønsis*, A. Chev. in Bull. Soc. Bot. France, lviii. Mém. viii. 207, with var. *floribunda*.

Upper Guinea. Province of Gurma, *Chevalier*, 24335, 24468, 24528.

Nile Land. Niamniam : Nabambisso River, *Schweinfurth*, 3775 !

Mozamb. Distr. German East Africa : Usagara ; Mpwapwa, *Last* ! British Central Africa : Nyasaland ; Uvera, *Kenyon*, 39 ! Shire Highlands, *Buchanan*, 190 ! Manganja Hills, *Waller* ! Namasi River, Zomba, *Cameron*, 72 !

Var. *minor*, Rendle. Smaller slender-stemmed plants 4–6 in. high with elliptic to narrowly ovate leaves, generally about 2 in. long, and smaller inflorescences 2–5 lin. in diam.—*D. unyikæ*, Engl. & Warb. in Engl. Jahrb. xxx. 291 ; R. E. Fries, Arkiv. f. Bot. xiii, no. 1, 17, t. 1, fig. 4, and in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911–12, i. 13 (under *D. Walleri*).

North Central. French Congo : River Bamingui, *Chevalier*, 1991 ! Trena, on the River Gribingui, *Chevalier*, 1959 !

Mozamb. Distr. German East Africa : Unyika, near Piseki, 4600 ft., *Goetze*, 1422. Portuguese East Africa : near Lake Nyasa, *Johnson*, 495 ! Rhodesia : Kalambo, *Fries*, 1333.

I have not seen specimens of *D. gourmønsis*, Chev., but except for the slightly smaller receptacle the description agrees with that of *D. Walleri*.

86. *D. cuspidata*, *Hochst. in Flora*, 1844, 103 (name only) ; *A. Rich. Tent. Fl. Abyss.* ii. 272. Rhizome with thick tubercle-like joints from which the aerial stems spring. Stems herbaceous, erect,

4-12 in. high, single, rarely two together, at the ends of the rhizome-branches, slender, simple or little branched, puberulous as are the petiole and inflorescence. Leaves varying in shape, obovate and obtuse or elliptic and acute, sometimes rhomboid, base acute, passing into the longer or shorter petiole, margin repand or shortly broadly and obtusely dentate, 2-2 $\frac{3}{4}$ in. long, $\frac{3}{4}$ -1 $\frac{3}{4}$ in. wide, with a few scattered adpressed hairs on each surface; lateral nerves 4-5 on each side, curving upwards, shortly hairy like the midrib; petiole slender, 5-7 lin. long. Inflorescences solitary; peduncle equal to the petiole; lower receptacles narrowly elliptic, 5 lin. long and 1 $\frac{1}{2}$ lin. broad with a bract-arm at each end, the upper star-shaped 7 lin. in diam., with 3-5 rays passing into linear bract arms 3 $\frac{1}{2}$ -7 lin. long and $\frac{1}{2}$ lin. broad; disc and arms shortly hairy as in *D. caulescens*. Flowers and fruit as in *D. caulescens*.—Bureau in DC. Prodr. xvii. 275; Engl. Monogr. Morac. Afr. 21, t. vii. fig. B.

Nile Land. Abyssinia: near Jelajeranne in the valley of the Tacazze River, *Schimper*, 1727!

87. *D. zanzibarica*, *Oliv. in Hook. Ic. Pl. t.* 1581. A herb with a succulent branched stem, up to 3 ft. high, accumbent below then erect, growing from a fleshy tuber, glabrous or very shortly hairy, densely leaved above. Leaves elliptic, tapering to an acute apex, base cuneate, sometimes unequal, passing into the distinct sometimes long petiole, margin dentate above the cuneate base, the teeth sometimes denticulate, 2-4 in. long, 1-1 $\frac{1}{4}$ in. wide, glabrous; lateral nerves 8-10, curving upwards, prominent beneath; petiole slender, channelled above and densely hairy in the groove, $\frac{1}{2}$ -1 in. long, rarely longer. Stipules narrow, minute, $\frac{1}{2}$ -1 lin. long, caducous. Inflorescence solitary or in pairs, one being much the younger; stalk slender, up to 1 $\frac{1}{2}$ in. long, puberulous; receptacle triangular, more rarely 4- or 5-sided, 7 lin. or less in greatest diameter, with a narrow margin, bearing a short blunt linear bract, 2-5 lin. long, at each angle and sometimes one or more short bluntly triangular teeth on the sides. Male flowers 2- or generally 3-androus, with a 2- or 3-lobed perianth; female distributed over the disc; style long-projecting, simple, with a thickened inconspicuously 2-lobulate stigma. Endocarp ovoid, with a dorsal crest, verruculose but glabrous ventrally, $\frac{1}{2}$ lin. long.—*D. Volkensii*, Engl. in Engl. Jahrb. xx. 143, Pfl. Ost-Afr. C. 161 and Monogr. Morac. Afr. 22, t. vii. fig. A.

Mozamb. Distr. Zanzibar, *Kirk!* German East Africa: Kilimanjaro, at Marangu, 5000 ft., *Volkens*, 228! and Rombo Mku, *Volkens*, 393. Usambara: near Muafa, 4300 ft., *Buchwald*, 121, 588. Usagara Mountains, *Hannington!*

88. *D. holtziana*, *Engl. in Engl. Jahrb.* li. 433. Stem erect, 3-4 $\frac{1}{2}$ ft. long, the longer stems hanging down from the rocks, leafless below the branches, younger branches minutely grey-puberulous.

Leaves thinly succulent, broadly elliptic, obtuse, cuneately narrowed at the base, margin irregularly broadly and obtusely dentate, up to $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide, minutely and densely puberulous on each surface; the thick midrib and upwardly curving lateral nerves (4-6 on each side) very prominent beneath; petiole about $\frac{1}{4}$ in. long. Stipules slender, subulate, grey-puberulous. Inflorescences solitary; stalk as long as the petiole; receptacle quadrangular or triangular, $2\frac{1}{2}$ lin. in diam., with a margin $\frac{1}{4}$ lin. broad, a linear bract 1 lin. long from each angle and a shorter bract (barely $\frac{1}{2}$ lin. long) from the middle of each side. Male flowers 1-3-androus; perianth very short, 3-4-lobed; female distributed throughout the receptacle; ovary ovoid; style slender; stigma capitate. Fruit laterally compressed, lenticular; endocarp thinly crustaceous, warty.

Mozamb. Distr. German East Africa: Usambara; Mbalu, 4300 to 5000 ft., Engler, 1512.

89. D. Preussii, *Schweinf. ex Engl. in Engl. Jahrb.* xx. 143. A small plant 4-6 in. high; stem slender, erect from a horizontal rhizome, leafy at the apex, pubescent as are the petioles. Leaves ovate or elliptic, apex subobtuse, base acute or obtuse; margin undulate, $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, 5-10 lin. wide, sparsely hairy; petiole 1- $1\frac{1}{2}$ lin. long. Stipules minute, deciduous. Inflorescence solitary in the axils of a few of the upper leaves; stalk very slender, $\frac{3}{4}$ in. long; receptacle trilobed, scarcely 5 lin. broad, margin denticulate, each lobe passing into a linear bract-arm $2\frac{1}{2}$ -6 lin. long. Male flowers 1-3-androus; female few in the middle of the receptacle; style simple. Endocarp pale green, subglobose, keeled on the back and with tuberculate sides, $\frac{3}{4}$ lin. in diam.—*Engl. Monogr. Morac. Afr.* 21, t. viii., fig. D.

Upper Guinea. Sierra Leone: Sugar Loaf, *Preuss.*

Var. *latedentata*, *Engl. in Engl. Jahrb.* li. 432. Leaves ovate, shortly acuminate, $1\frac{1}{4}$ - $3\frac{1}{4}$ in. long, 1 to nearly 2 in. broad, margin broadly dentate; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. long. Slender arms of receptacle $\frac{3}{4}$ - $1\frac{1}{4}$ in. long.

Upper Guinea. Cameroons; Bipinde, *Zenker*, 4598!

90. D. barnimiana, *Schweinf. Pl. Nilot.* 36, t. 12. Acaulescent, leaves and peduncles springing from a depressed globose tuber, $1\frac{1}{2}$ -2 in. in diam., and about 1 in. thick, bearing on its surface numerous fibrous roots. Leaves long-petioled, somewhat fleshy, the earlier ones shortly cordate, the later cordate-ovate, blunt, with margin undulate or obtusely dentate, sometimes denticulate in the early leaves, 2-3 in. long, 2- $2\frac{1}{2}$ in. wide, puberulous when young, ultimately glabrous, palmately nerved, generally with a sharper median and a pair of lateral branching nerves springing from the base; ultimate leaf sometimes 3-sect, the lateral segments

2-partite, the median 3-fid, divisions linear-lanceolate, many-toothed, teeth becoming shorter towards the apex; petiole stout, 6 in. or more in length. Peduncles about as long as or longer than the petiole, but only half as thick; receptacle attached just above the base, green, vertical, oblong or narrowly oblong, sometimes linear, with a narrow margin passing into linear-tapering bracts, the terminal generally longer and broader, $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, 1 lin. or less in width, the lateral, 3-6 on each side, $\frac{1}{2}$ - $\frac{3}{4}$ in. long and $\frac{1}{2}$ lin. or less in width. Male flowers 2-androus, with an indistinctly 2-lobed perianth; female distributed throughout the disc; ovary stalked, ovoid; style simple. Endocarp globose, tuberculate, about $\frac{3}{4}$ lin. in diam.—Bureau in DC. Prodr. xvii. 276; Engl. Monogr. Morac. Afr. 25 and Hochgebirgsfl. Trop. Afr. 190; R. E. Fries in Wiss. Ergebn. Schwed. Rhodes.-Kongo-Exped. 1911-12, i. 14. *Kosaria barnimiana*, Schweinf. Beitr. Fl. Aethiop. 189, t. ii.

Nile Land. Abyssinia: Jenneja, near Magdala, *Stuedner*, 1359. Gallabat; on the right bank of the Chor Koki, near Matamma, *Schweinfurth*, 560! 561! 563! Sennar: Jebel Fazoke, on the Blue Nile, *Hartmann*; Famaka in Fazokl, *Cienkowsky*.

South Central. Belgian Congo: Kasindi, Lake Albert Edward, *Fries*, 1873.

Var. *ophioglossoides*, Engl. Monogr. Morac. Afr. 25. A smaller plant with cordate-ovate or peltate leaves about 1 in. long and wide; petioles $\frac{2}{3}$ - $1\frac{1}{4}$ in. long. Peduncles 2-2 $\frac{1}{2}$ in. long; bracts linear-tapering, 3 $\frac{1}{2}$ -4 lin. long, acute.—*D. ophioglossoides*, Bureau in DC. Prodr. xvii. 276.

Nile Land. Abyssinia: Plain of Dembea, 6000 ft., *Schimper*, 1208! *Stuedner*, 1358; Debra-Eski, 9000-11,000 ft., *Schimper*, 402! Gallabat: by the Gendua River, *Stuedner*, 1357!

Var. *tropæolifolia*, Rendle. Resembles var. *ophioglossoides*. Tuber small, roundish, $\frac{1}{3}$ - $\frac{2}{3}$ in. in diam. Leaf solitary, suborbicular, peltate, 1-1 $\frac{1}{4}$ in. in greatest diameter; petiole $\frac{2}{3}$ -1 $\frac{1}{4}$ in. long. Peduncle 2-4 $\frac{1}{2}$ in. long; bracts 3 $\frac{1}{4}$ -7 $\frac{1}{2}$ lin. long, generally acute.—*D. tropæolifolia*, Bureau in DC. Prodr. xvii. 276; Engl. Monogr. Morac. Afr. 26. *D. peltata*, Engl. in Engl. Jahrb. xlvii. 277. *Kosaria tropæolifolia*, Schweinf. in Verhandl. Zool.-Bot. Gesell. Wien, 1868, 687.

Nile Land. Gallabat: left bank of the River Gendua, *Schweinfurth*, 564! British East Africa: Unyoro, 3900 ft., *Brown*, 407!

North Central. Adamawa: Ssagadje; Korowal Plateau, 2400 ft., *Ledermann*, 3854.

Var. *angustior*, Engl. in Engl. Jahrb. xxx. 292. A small plant 4-6 in. high, with cordate leaves $\frac{2}{3}$ -1 in. long and wide; petiole about 1 in. long. Peduncle 4-6 in. long; receptacle narrow, 1 $\frac{1}{4}$ in. or less in length, about 2 lin. broad; lateral bracts $\frac{2}{3}$ -1 $\frac{1}{4}$ in. long, terminal 1 $\frac{1}{4}$ -2 in.

Mozamb. Distr. German East Africa: Unyika; near Toola, 4000 ft., *Goetze*, 1415!

Var. *Telekii*, Engl. Monogr. Morac. Afr. 25. A small plant with reniform-suborbicular leaves, $\frac{2}{3}$ in. long and wide, with crenate-repand margin; petiole about 1 $\frac{1}{4}$ in. long. Peduncle 1 $\frac{1}{2}$ in. long; receptacle oblong; bracts linear, obtuse, 2 $\frac{1}{2}$ -3 lin. long, the terminal longer than the lateral.—*D. Telekii*, Schweinf. in Engl. Hochgebirgsfl. Trop. Afr. 190 (name only) and in Höhnel, Zum Rudolph-See u. Stephanie-See, Sonderabdr. 856; Engl. Pfl. Ost-Afr. C. 161.

Nile Land. British East Africa: Kikuyu, 5300-6600 ft., *Höhnel*, 28.

I have not seen the specimen of *D. peltata*, Engl. (*Ledermann*, 3854), but cannot by the description distinguish it from *tropæolifolia*, to which Engler states it is "extraordinarily near."

91. *D. palmata*, *Engl. in Engl. Jahrb.* xx. 146. A small acaulescent herb; tuber roundish when young, becoming broadly conical, sometimes with a stout cylindrical neck, and reaching 1-1¼ in. in diam., surface dark brown, bearing fibrous roots. Leaves long-petioled, glabrous, thinly papery when dry, 3-4 in. long, about 3 in. wide, either ovate-cordate, obtuse, with entire or dentate margin, and 7-9 nerves spreading palmately from the base, or 3-lobed, 3-partite or palmatisect, with 5-7 linear or linear-oblong obtuse segments, sometimes with a few remote teeth or blunt spreading pinnæ; petiole 2½-4 in. long. Peduncle 2-4½ in. long; receptacle erect, narrowly elongate-triangular, ¾-1½ in. long, 1½-5 lin. broad, with an apical bract ½-¾ in. long, 1 lin. or less in breadth, and generally a pair of shorter bracts spreading from the corners of the base, sometimes two pairs. Male flowers 2-androus, enveloping perianth faintly lobed; female flowers distributed; style simple, projecting from the narrow tubular perianth. Endocarp ovoid, verruculose except on the vertical side, barely 1 lin. in diam.—*Engl. Monogr. Morac. Afr.* 25, t. ix. fig. D. *Kosaria palmata*, Schweinf. ex *Engl. l.c.*

Nile Land. Jur: Wau, *Schweinfurth*, 1669! 1881! Jur Ghattas, *Schweinfurth*, 1880! near Mangob, *Schweinfurth*, 1830!

92. *D. ellenbeckiana*, *Engl. in Engl. Jahrb.* xxxiii. 116. Leaves springing from an underground stem, somewhat fleshy, ovate or elliptic, with subcordate base, margin undulate, closely beset with minute obtuse teeth, about 2¼ in. long, 1¼-1½ in. wide, above very shortly hairy, below with longer white hairs especially on the midrib and nerves; petiole somewhat fleshy, about 1 in. long, very shortly hairy like the peduncles and receptacles. Peduncle 2¾ in. long; receptacle orbicular, ferruginous, about 1 in. in diam., bearing numerous very unequal bracts, those of the first grade about 10, linear, 3½ lin. long and ½ lin. wide, of the second grade 4-5, between the primary, linear-spathulate, 1½-2 lin. long and barely ½ lin. wide, also 1-2 very small ones, less than 1 lin. long between the secondary. Flowers very numerous; filaments 5-6 times longer than the orbicular anthers.

Nile Land. Galla Highlands: Arussi-Galla; near Burkar, 4000 ft., *Ellenbeck*, 2018.

93. *D. fœtida*, *Schweinf. in Bull. Herb. Boiss.* iv. *App.* ii. 120, var. *obovata*, *Engl. Monogr. Morac. Afr.* 27. Tuber thick and fleshy, bearing several diverging short fleshy stems ½-2 in. high, much wrinkled when dry and ¼-½ in. thick. Leaves borne at the apex of the stem and short branches, deciduous, on long slender petioles, elliptic, ovate or obovate, ¾-1½ in. long, ¾-1¼ in. wide, apex rounded sometimes emarginate, upper surface scabridulous, lower sparsely puberulous as is the petiole; petiole ¾-1½ in. long. Peduncle ½-¾ in.

long, sparsely puberulous as is the roundish receptacle, which is 5-7 lin. in diam., with 8-10 linear unequal bract-arms $2\frac{1}{2}$ lin. or less in length. Male flowers 2-3-androus; female generally distributed; style simple.—Almagia in Ann. R. Istit. Bot. Roma, viii. 115. *D. obovata*, Hochst. in Flora, 1844, 103 (name only); A. Rich. Tent. Fl. Abyss. ii. 273; Bureau in DC. Prodr. xvii. 275. *Kosaria obovata*, Schweinf. Beitr. Fl. Aethiop. 190 (name only).

Nile Land. Abyssinia; on the Deban, 5000-6000 ft., *Beccari*, 133; near Jelajeranne, *Schimper*, 1675! near Mawerr, at about 3700 ft., *Schimper*, 171. Eritrea: Habab, 4500-6300 ft., *Hildebrandt*, 386; Roret Mountain, *Terracciano & Pappi*, 2362; Amba Mountains, *Terracciano & Pappi*, 2361; Keren, *Stuedner*, 1360.

Also in Arabia.

94. *D. crispa*, *Engl. Monogr. Morac. Afr.* 27. t. ix. A. Stem succulent, up to $4\frac{1}{2}$ in. high, erect from a swollen base which may reach $1\frac{1}{2}$ in. in diam., cylindrical tapering upwards to $\frac{1}{2}$ in. in diam., unbranched or ending in short thick spreading branches with leafy tips, surface of stem pale brown, marked with the roundish tubercle-like leaf-scars. Leaves narrowly oblong to linear-lanceolate, subobtuse to acute; base acute or obtuse, margin crisped and toothed, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, dark green, paler beneath, with very short scattered hairs when young, ultimately glabrous; nerves 8-11 on each side, spreading; petiole $\frac{1}{3}$ - $\frac{3}{4}$ in. long. Stipules small, subulate from a tubercle-base, 1-2 lin. long, ciliolate, persisting for a time on either side of the leaf-scar. Inflorescences solitary in the leaf-axils, sometimes less than 1 in. long, but sometimes ultimately lengthening to 4 in. Receptacle orbicular-stellate, somewhat concave when young, puberulous, disc ultimately flattened, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, the thickened margin passing into 6-10 subulate spreading unequal bract-arms, $\frac{1}{4}$ -1 in. long, with short intervening teeth. Male flowers 2-androus, with broadly 2-lobed papillose perianth; female numerous, generally dispersed; style simple. Endocarp pale brown, orbicular-tetrahedral, dorsally crested, sides minutely tuberculate, $\frac{1}{2}$ - $\frac{3}{4}$ lin. in diam.—*D. Phillipsia*, Hook. f. in Bot. Mag. t. 7676.

Nile Land. Somaliland: Foot of Ruggar Pass, in the Waggat Mountains, and Soksoda, *Lort Phillips*! Galla Highlands: Gerima; by the river Daua, *Riva*, 441!

Var. lancifolia, Rendle in Journ. Bot. 1915. 302. Leaves linear-lanceolate, acute at the base and apex, margin obscurely denticulate, 2- $2\frac{1}{2}$ in. long, 4-6 lin. wide.

Nile Land. British East Africa: Ngomeni, *Scott Elliot*, 6279!

Imperfectly known species.

95. *D. liebuschiana*, *Engl. in Engl. Jahrb.* xlvi. 275. A small juicy herb 6 in. high, with stem and petioles shortly hairy; lower internodes 7 lin. long, upper 5- $2\frac{1}{2}$ lin. Leaves oblong-lanceolate

with cuneate base, margin broadly and obtusely dentate, $1\frac{3}{4}$ – $2\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. wide; lateral nerves curving upwards and passing into the teeth; petiole 5–7 lin. long. Peduncle slender, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long; receptacle ovate, $2\frac{1}{2}$ – $3\frac{1}{2}$ lin. long, with a broad green shallowly toothed margin, $1\frac{1}{2}$ –2 lin. broad, passing above into a linear bract 5 lin. long and below into two narrowly triangular teeth, $2\frac{1}{2}$ lin. long. Female flowers about 5.

Mozamb. Distr. German East Africa: Usambara; Lutindi, *Liebusch*.

I have not seen a specimen. Engler includes the species in his section *Kosaria*, and says that it somewhat recalls *D. Gatztei*; he does not, however, state whether the style is simple or branched.

5. **TRYMATOCOCCUS** Poepp. & Endl.; Benth. et Hook. f.
Gen. Pl. iii. 366.

Flowers monœcious. Male: perianth 2-lobed; segments concave. Stamens 2 (in African species), opposite the perianth-lobes; filaments exceeding the perianth, free, inflexed in bud; anther-cells contiguous or slightly separated on a broad connective. Female flower embedded in the receptacle. Perianth very thin around the ovary but forming a thicker projecting tube around the style. Ovary ovoid, passing above into a long excentrically attached style which divides into a pair of narrow style-arms spreading from the mouth of the perianth; ovule solitary, pendulous, anatropous. Fruit occupying the interior of the enlarged subglobose receptacle which bears on its somewhat flattened top the remains of the male flowers. Pericarp thin above, becoming thickened below. Seed subglobose or transversely ellipsoid; testa chartaceous, filled with the embryo which consists of a small superior radicle, a minute undeveloped cotyledon and a second much enlarged cotyledon which occupies almost the whole of the interior.—Shrubs or small trees. Leaves alternate, generally oblong-elliptic, acuminate, with unequal base; petioles very short. Stipules narrowly triangular, deciduous or somewhat persistent. Inflorescences small, solitary or several on a reduced branch in the leaf-axils, consisting of a peduncle which generally exceeds the petiole, and passes above into a small top-shaped receptacle bearing numerous minute male flowers and a single central female flower; bracts forming generally inconspicuous lobes round the margin of the receptacle, and occurring occasionally on the peduncle.

One species in the Amazon district, 4 in tropical Africa.

Margin of receptacle bearing minute obtuse lobes:

Stalk of receptacle not exceeding 6–7 lin. long:

Stalk of receptacle 6–7 lin. long; anther-cells contiguous

1. *T. africanus*.

Stalk of receptacle 2–3 lin. long; anther-cells distant

3. *T. kamerunensis*.

Stalk of receptacle 7–14 lin. long

4. *T. conrauanus*.

Margin of receptacle bearing 10 triangular bracts alternately 1 or 2 lin. long

2. *T. dorstenioides*.

1. *T. africanus*, *Baill. in Adansonia*, xi. 300. A shrub from 3–10 ft. high; branchlets reaching about 1 lin. in thickness with internodes generally $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, the young portions more or less densely covered with very short sometimes hooked hairs. Leaves elliptic-oblong, generally narrowing to the base, apex passing abruptly into a slender tip $\frac{1}{2}$ to $\frac{2}{3}$ in. long, extreme apex obtuse, base obtuse, generally unequal, margin entire or slightly undulate, 4–6 in. long, $1\frac{1}{2}$ – $2\frac{3}{4}$ in. wide, membranous, somewhat shining above, minutely scabrous beneath; lateral nerves 8–12 on each side, ascending and uniting within the margin, prominent beneath; petiole 2–3 lin. long. Stipules narrowly triangular, acute, 3–4 lin. long, soon falling. Inflorescences several (2–5) of different ages on a short axillary branch, more or less densely covered with minute hooked hairs; peduncles arising each in the axil of a short blunt bract, 6–9 lin. long, becoming dilated above into a broadly top-shaped receptacle. Receptacle $\frac{1}{3}$ in. across, yellow, margin bearing numerous very short obtuse lobes. Male flowers 2-androus, the two perianth-lobes concave, obtuse; filaments thickened below, tapering above, about $\frac{1}{2}$ lin. long; anthers didymous, rounded. Perianth of female flower very thin below, forming above round the style a stouter projecting tube, from the mouth of which spread the style-arms. Receptacle in fruit subglobose or ellipsoid, to 5 lin. long and about 4 lin. in diam., filled with the fruit.—*Engl. Monogr. Morac. Afr.* 28, t. xi. fig. A.

Upper Guinea. Southern Nigeria: Oban, *Talbot* 631! 2327! Cameroons: Cameroon River, *Mann*, 723! 2228! Bipinde, *Zenker*, 875! 3092! 3506! 4169! between Bipinde and Mamiaca, *Zenker*, 1032! between Ediki and Backundu, *Winkler*, 1058! Bell Town, *Buchholz*! Barombi, *Preuss*, 201! Mundane near Johann-Albrechtshöhe, 400 ft., *Staudt*, 611! between Nyoke and Mundane, *Schlechter*, 12870!

Lower Guinea. Spanish Guinea: Nkolentangan, 1500 ft., *Tessman*, 54!

2. *T. dorstenioides*, *Engl. in Engl. Jahrb.* li. 434. A small shrub about 5 ft. high, with round branches and pubescent young shoots. Leaves oblanceolate-oblong, apex abruptly long-acuminate, base somewhat obtuse, margin entire, $3\frac{3}{4}$ –5 in. long, $1\frac{1}{4}$ –2 in. wide, thinly membranous, glabrous, midrib stout; lateral nerves 6–8 on each side, spreading and curving upwards to unite near the margin; petiole channelled above, $2\frac{1}{2}$ lin. long. Stipules ovate, acute, soon falling. Inflorescences solitary in the leaf-axils, stalk $\frac{3}{4}$ in. long, finely-hairy, pendulous when young; receptacle top-shaped, $3\frac{1}{2}$ lin. high, 4 lin. in diam., shortly hairy throughout, surrounded by 10 triangular bracts alternately 2 and 1 lin. long. Male flowers 2-androus; perianth 2-lobed; perianth of female flower shortly 2-lobed; style elongated, 2-fid.

Upper Guinea. Cameroons: in hilly country near Fenda, 6700 ft., *Mildbraed*, 5988.

Described by Engler as allied to *T. africanus* but distinguished from other known species of the genus by the development of the marginal bracts.

3. *T. kamerunianus*, *Engl. Monogr. Morac. Afr.* 29, t. xi. fig. B (incl. var.). A shrub or small tree reaching 18 ft. in height, slightly branched; branchlets slender, ultimate branchlets about 1 lin. thick with internodes varying very much in length ($\frac{3}{4}$ –2½ in.), surface grey or reddish-brown, the younger parts and petioles bearing short whitish hooked hairs. Leaves varying considerably in size and shape, oblong-elliptic to elliptic, more rarely oblanceolate-oblong, apex more or less abruptly acuminate, generally more or less grossly dentate below the cusp the toothing extending sometimes half-way down the leaf, base unequal, obtuse to rounded, 2½–10 in. long, 1¼–4 in. wide, membranous, shining above, paler beneath, glabrous; lateral nerves 7–12 on each side, ascending and uniting within the margin, impressed above, prominent beneath; petiole 2–5 lin. long. Stipules triangular-acuminate, 3–5½ lin. long, somewhat persistent. Inflorescences 1–4 on a short axillary branch, densely covered with short whitish hooked hairs; peduncles 2 lin. or less in length, becoming dilated above into a top-shaped receptacle. Receptacle 3–4 lin. in diam., bordered with numerous short bluntly rounded lobes. Male flowers 2-androus, the 2 short blunt perianth-lobes densely pubescent on the outside; filaments dilated above into a broad suborbicular connective on the inner face of which the separate broadly oval anther-halves are borne. Perianth-tube of female flower similar in pubescence to the male perianth; projecting style-arms 1 lin. long, linear, recurved. Receptacle with ripe fruit subglobose, 5 lin. in diam.—*Engl. Pflanzenwelt Afr.* i. ii. 647; Hiern in *Cat. Afr. Pl. Welw.* i. 1024; De Wild. *Études Fl. Bas- et Moyen-Congo*, i. 119, Pl. Nov. Hort. Then. i. 235, t. lv. and Pl. Thonner. *Congol.* ii. 299; Th. & Hël. Durand, *Syll. Fl. Congol.* 503, 656. *T. usambarensis*, *Engl.* in *Engl. Jahrb.* xxxiii. 117. *T. Gilletii*, De Wild. *Études Fl. Bas- et Moyen-Congo*, i. 119, t. xxvi.; Th. & Hël. Durand, *Syll. Fl. Congol.* 503. *T. sp.*, Welw. in *Trans. Linn. Soc.* xxvii. 61. *Dorstenia kameruniana*, *Engl.* in *Engl. Jahrb.* xx. 142.

Upper Guinea. Cameroons: forest near the Ebea-falls on the Lokundje River, *Dinklage*, 232; forest on the Sanaga River at Tinatistadt (Banjong), 2650 ft., *Zenker*, 1446! Efulen, *Bates*, 303! 440!

Lower Guinea. Belgian Congo: Kimuenza, *Gillet*, 2194. Angola: Golungo Alto; forest at Capopa cataract, between Sange and Ndelle, *Welwitsch*, 2594!

South Central. Belgian Congo: Forests of the Sankuru, *Luja*, 11; Valley of the Djuma, *Gillet*, 2841, *Gentil*; Bangala, Mobwasa and Abumombazi, *Thonner*; Likimi, *Malchair*, 17, 400.

Mozamb. Distr. German East Africa: Useguhu; in thick shady damp coast-wood at Makingumbi, *Scheffler*, 251; on shady rocks at Amani, 1700 ft., *Warnecke*, 309!

The Mozambique plants, which are *T. usambarensis*, *Engl.*, differ in the glabrescent character of the young shoots and inflorescences. The more marked toothing of the leaf on which Engler relies as a distinction from *T. kamerunensis* occurs in a still greater degree among the variable leaves of that species.

4. **T. conrauanus**, *Engl. in Engl. Jahrb.* xxxiii. 117. A low shrub; branchlets to $1\frac{1}{2}$ lin. in thickness with internodes $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long, very shortly hairy when young as are the petioles. Leaves with very short petioles, oblong or oblong-lanceolate, apex narrowly and obtusely acuminate, base acute, margin entire or undulate, 9–11 in. long, $2\frac{3}{4}$ – $3\frac{1}{2}$ in. wide, tip 5 lin. long, 1 lin. broad, membranous, shining above, paler beneath; lateral nerves about 10–12 on each side, spreading, slightly curving towards the margin, like the nerves of the next order and the widely netted pale reddish veins prominent on the lower surface; petiole $1\frac{1}{2}$ – $2\frac{1}{2}$ lin. long. Stipules elongated-triangular, falling early. Inflorescences solitary, axillary; stalk 7–14 lin. long; receptacle top-shaped, $2\frac{1}{2}$ lin. broad; marginal bracts minute; flowers very small. Male flowers 2-androus; perianthlobes broad, enveloping the inflexed stamen; style-arms finely filiform, $\frac{1}{2}$ lin. long.

Upper Guinea. Cameroons: Tinto; Banyang, *Conrau*, 130.

The length of the stalk of the inflorescence is remarkable.

6. **SLOETIOPSIS**, *Engl. in Engl. Jahrb.* xxxix. 573.

Flowers monœcious. Male: sepals 4, of equal length. Stamens 4; filaments nearly twice as long as the sepals, free, inflexed in bud, swollen at the apex forming a globular insertion for the broadly oval introrse anther; a central rudimentary pistillodium is present. Female: sepals 4, oblong, the outer shorter than the inner, closely imbricate round the ovary. Ovary ovoid, contracted above into a short columnar style which projects beyond the calyx and bears a pair of long linear-subulate stigmas; ovule solitary, pendulous from the apex of the cell. Fruit unknown.—A small tree. Leaves shortly petioled, alternate in two rows, simple, acuminate. Stipules caducous. Flowers borne in the axils of orbicular peltate bracts in a somewhat dorsiventral spike-like axillary inflorescence which is either male or androgynous.

Species one, endemic.

1. **S. usambarensis**, *Engl. l.c. with fig.* A small tree 10–13 ft. high; twigs slender, slightly flexuous, minutely puberulous as are also the petioles. Leaves stiff, subcoriaceous, narrowly elliptic, apex acuminate, base obtuse, margin remotely and shortly dentate above the middle, $2\frac{1}{2}$ – $4\frac{3}{4}$ in. long, $\frac{3}{4}$ – $1\frac{1}{2}$ in. wide; lateral nerves about 10 on each side, spreading, connected a little within the margin; petiole about 2 lin. long. Male inflorescences up to 14 lin. long, the androgynous ones 5 lin. Bracts about $1\frac{1}{2}$ lin. in diam. Male flowers: sepals broadly elliptic, about $\frac{3}{4}$ lin. long, minutely puberulous on back and margin. Female flowers: sepals oblong to ovate, 1 and

1½ lin. long, puberulous as in the male. Ovary with style 1½ lin. long; stigmas 1½ lin. long.

Mozamb. Distr. German East Africa: Usambara; in deep shade of forest at Mombo, about 2100 ft., *Engler*, 3263.

7. NEOSLOETIOPSIS, Engl. in Engl. Jahrb. li. 426.

Flowers dioecious. Male: sepals 4, concave or the two outer hooded. Stamens 4; filaments longer than the sepals, free, inflexed in bud; anthers shortly ovate, dehiscing laterally; a central rudimentary pistillodium is present. Female: sepals 4 (?), closely imbricate round the ovary. Ovary ovoid, contracted above into a short columnar style which projects above the perianth and bears a pair of filiform subulate stigmas; ovule solitary, pendulous from the apex. Fruit unknown.—A shrub, with slender branchlets which are very minutely hairy when young but soon become glabrous, and bear a thin bark when mature. Leaves shortly petioled, alternate, simple, somewhat stiff and leathery, oblong, acuminate. Stipules caducous. Male flowers borne on both sides of a linear compressed receptacle subtended by orbicular peltate bracts. Female flower solitary on a short receptacle, which is covered with scale-like ovate bracts.

Species one, endemic.

Scarcely separable from *Sloetiopsis* from which it differs in having the male and female flowers on distinct plants and in the reduction of the female inflorescence to a single flower.

1. *N. kamerunensis*, *Engl. l.c. fig 1*. A shrub with the habit of a young *Mesogyne* or *Tryphostemma*, with twigs 1 lin. or less in thickness and internodes 1½–2 in. long. Leaves 4–4¾ in. long, 1¼–1½ in. wide, abruptly acuminate with a bluntish point, 7 lin. long and 1 lin. wide; lateral nerves 6–7 on each side, spreading, uniting within the margin, prominent on the lower surface, venation remotely reticulate, somewhat prominent; petiole 2–2½ lin. long. Stipules somewhat stiff, about equal in length to the petiole, puberulous. Male inflorescence sessile, many-flowered, 7–10 lin. long, 1½–2 lin. thick. Peltate bract about ½ lin. in diam.; sepals about ½ lin. long. Female inflorescence very short; ovary about 2½ lin. long; style with the 2 arms about 5 lin. long.

Upper Guinea. Cameroons: Molundu; forest between Lokomo, Bumba and Bange at about 15° 15' E. long., and 2° 50' N. lat., *Mildbraed*, 4331.

8. FICUS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 367.

Flowers monœcious or very rarely dioecious, enclosed in a variously shaped fleshy or somewhat woody receptacle (*fig*). Male flower: perianth 2–6-lobed or -partite, lobes or segments imbricate, usually

membranous and hyaline; stamens 1-2, or rarely 3-6, with straight short filaments; anthers more or less oblong or ovoid, exerted or included; rudimentary ovary 0 or very rarely present. Female flower: perianth-segments often fewer and narrower than in the male or rarely minute; ovary mostly obliquely ellipsoid or ovoid; style almost invariably lateral, short or slender and rather long; stigma usually oblong; ovule laterally attached and pendulous from near the apex of the cell. Achene partially enclosed within the persistent perianth; pericarp crustaceous and dry or rarely succulent. Seed pendulous, with a membranous testa; albumen often scanty; embryo curved, with often plicate and subequal or equal cotyledons with the radicle incumbent.—Trees, shrubs or rarely climbers, with milky juice. Leaves alternate or very rarely opposite, entire, dentate or variously lobed, very variable in shape and venation; stipules enveloping the terminal bud, caducous at the unfolding of the leaves or more rarely persistent. Receptacles (*figs*) sessile or pedunculate, mostly paired when axillary or sometimes solitary, when borne on the trunk or main branches remote from the leaves then in leafless panicles or more usually in fascicles, 2-3-bracteate at the base with the bracts in a whorl or more rarely several bracts scattered on the peduncle and over the receptacle. Bracts at the mouth (*ostiole*) of the receptacle in several series, small, spreading horizontally across the mouth and then visible from outside or all descending abruptly into the interior of the receptacle and not visible from outside, the ostiole in the latter case being pore-like. Male flowers in the African species usually very few and near the ostiole, rarely mixed amongst the female and gall flowers; female flowers usually numerous and sessile; gall flowers mostly numerous and long-pedicellate. Bracteoles among the flowers usually small and inconspicuous or absent.

About 700 species, spread throughout the tropics and subtropics of both hemispheres.

Ficus elastica, Linn., the india-rubber fig, and *F. Carica*, Linn., the common edible fig, are both cultivated in Tropical Africa. The latter species, according to Welwitsch (cf. Hiern in Cat. Afr. Pl. Welw. i. 1008), is grown in Angola and affords well-tasted fruit, but always inferior to that grown in Europe.

Excluded Species.

F. obovata. Sim, For. Fl. Port. E. Afr. 101, t. xciv. C., is a species of *Cordia* (Boraginæ) and very near *C. abyssinica*.

F. ralumensis, Warb. in Notizbl. königl. Bot. Gart. Berlin, ii. 112, is erroneously attributed to Tropical Africa by the Index Kewensis; Ralum is in the Bismarck Archipelago, Polynesia.

Urostigma binderianum, Kotschy in Sitzb. Akad. Wien. Math. Nat. li. (1865) 353 is *Anona senegalensis*, Pers.—Type seen in the Vienna Herbarium.

KEY TO THE SUBGENERA.

Ostiole (mouth) of the receptacle with the bracts visible from outside and spreading transversely across the orifice.

Basal bracts of receptacles arranged in a single whorl at the apex of the peduncle, none either on the peduncle or over the surface of the receptacle.

Male flowers with 3-6 stamens; leaves toothed or lobed, scabrous I. CARICA.

Male flowers usually with 2 stamens; leaves often toothed and scabrous or hairy II. SYCOMORUS.

Male flowers with a single stamen; leaves always entire and nearly always smooth, rarely hairy or scabrous IV. UROSTIGMA.

Basal bracts scattered on the peduncle and over the surface of the receptacle, sometimes very small III. SYCIDIUM.

Ostiole of the receptacle pore-like and more or less 2-lipped, with all the bracts descending abruptly into the receptacle and not visible from outside V. BIBRACTEATÆ.

Subgenus I. CARICA, Miq.—*Leaves scabrous, alternate, variable, when undivided ovate and acuminate, often 3-lobed to near the middle or more obscurely 5-lobed; stipules caducous; receptacles axillary or subaxillary, stipitate, with 3 basal bracts arranged in a whorl; ostiole with several imbricate bracts visible from outside, the outermost spreading horizontally across the orifice; male flowers with 3-6 stamens.*

Only tropical African species 1. *F. palmata*.

Subgenus II. SYCOMORUS, Gasp.—*Leaves alternate, ovate, suborbicular or rarely lanceolate, entire or repand-dentate, glabrous, hairy or scabrous; stipules mostly caducous; receptacles arranged in leafless panicles borne on the main stem or older branches, rarely solitary and axillary, usually rather large, with 3 basal bracts arranged in a whorl, and rarely also a few extra bracts scattered over the surface; ostiole with numerous imbricate bracts visible from outside, the outermost spreading horizontally across the orifice, the inner descending into the receptacle; male flowers mostly with 2 stamens, very rarely only 1 or 3; perianth at first completely enveloping the stamens.*

*Leaves entire or equally toothed all round the margin.

Receptacles borne in panicles on the main stem or on the principal branches, rarely also a few of them in the axils of the leaves (see 4, *F. mallotocarpa*, and 8, *F. Sur.*):

Stipules persistent for some time; panicles long and slender, with short lateral branches racemously arranged; receptacles setose-pilose 2. *F. vogeliana*.

Stipules caducous; panicles thyrsoïd or rarely subracemose; receptacles glabrous, tomentose or scaly-puberulous:

Mature receptacles tomentose:

Leaves suborbicular or elliptic-orbicular, entire 3. *F. Sycomorus*.

Leaves ovate, coarsely dentate, hairy on the nerves and midrib below 4. *F. mallotocarpa*.

Leaves mostly obovate, glabrous below 5. *F. gongoensis*.

Mature receptacles glabrous or scaly-puberulous :

Leaves suborbicular or elliptic-orbicular :

Leaves entire or with undulate margins,
scabrous and only slightly hairy above 6. *F. Mucoso*.

Leaves repand-dentate, setose-pilose on
both surfaces 7. *F. sidifolia*.

Leaves ovate, ovate-elliptic or lanceolate :

Receptacles scaly-puberulous 8. *F. Sur*.

Receptacles glabrous or rarely minutely
pubescent when young :

Leaves lanceolate or oblong-lanceolate,
entire, glabrous 9. *F. riparia*.

Leaves ovate or ovate-elliptic, mostly
repand-dentate, glabrous or hairy 10. *F. capensis*.

Receptacles axillary and solitary, sometimes borne
towards the base of the young shoots :

Leaves very broadly ovate, mostly coarsely
repand-dentate ; receptacles puberulous ... 11. *F. Vallis-Choudæ*.

Leaves orbicular or ovate, mostly subentire or
obtusely serrate ; receptacles densely to-
mentose 12. *F. gnaphalocarpa*.

**Leaves toothed only towards the base, the remainder of
the margin quite entire or undulate :

Venation very lax on the lower surface 13. *F. golungensis*.

Venation very close and fine on the lower surface 14. *F. senegalensis*.

Subgenus III. SYCIDIUM, Miq.—Leaves opposite or alternate, variable in shape,
mostly toothed or variously divided, scabrous (in 19, *F. urceolaris*, only slightly
scabrous) ; stipules caducous, rarely subpersistent ; receptacles (where known)
axillary, small to medium-sized, with the bracts scattered on the peduncle and
frequently also on the outer surface of the receptacle ; ostiole with the outer bracts
plainly visible and spreading horizontally across the orifice, the inner descending
into the receptacle ; male flowers mostly with a solitary stamen, sometimes
accompanied by an abortive ovary.

Stems 1-3 ft. high, arising from a creeping rhizome ... 15. *F. pygmaea*.

Shrubs, trees or climbers with much-branched stems :

Leaves nearly all opposite, often with 3-dentate
tips 16. *F. capreæfolia*.

Leaves always alternate, entire or variously toothed
or lobed, but never only 3-dentate at the apex :

Leaves linear-lanceolate, entire, about 6 times as
long as broad 17. *F. acutifolia*.

Leaves ovate or elliptic, never more than 3 times
as long as broad, sometimes divided :

Stems climbing or twining ; leaves rather
distantly denticulate 18. *F. pendula*.

Much-branched trees or shrubs :

Leaves mostly very asymmetrical, the mid-
rib dividing the lamina into two very un-
equal halves, usually under 6 in. long :

Receptacles shortly setulose or nearly
glabrous :

Leaves long-caudate-acuminate ... 19. *F. urceolaris*.

Leaves rounded or shortly acuminate :

Tree about 70 ft. high ; leaves usually
not lobed 20. *F. exasperata*.

Shrub up to 8 ft. high ; leaves usually
lobed 21. *F. asperifolia*.

Receptacles roughly setose-scabrous ... 22. *F. storthophylla*.

Leaves symmetrical, the midrib dividing the
blade into approximately equal halves,
6-12 in long :

Leaves chartaceous, scabrous, entire or
with one or two side-lobes, otherwise
entire 23. *F. variifolia*.

Leaves membranous, setose-pubescent,
coarsely lobulate and dentate nearly
the whole length of the margin ... 24. *F. sciariophylla*.

Subgenus IV. UROSTIGMA, Gasp.—*Leaves alternate, always entire, rarely slightly scabrous ; stipules caducous ; receptacles axillary or rarely borne on the branches of two seasons' growth, pedunculate or sessile, small, with 3 basal bracts arranged in a whorl, none scattered on the outside of the receptacle ; ostiole with several imbricate bracts spreading across the mouth and visible from the outside, a few of the inner ones curving slightly into the receptacle ; male flowers with a solitary stamen.*

*Receptacles glabrous or very slightly and finely puberulous when mature :

Leaves linear-lanceolate or linear, or if elliptic then
not or only slightly acuminate :

Leaves obtuse at both ends ; petiole comparatively
short, 4-7 lin. long. 25. *F. verruculosa*.

Leaves tailed-acuminate, narrowed from below
the middle to the apex ; petiole comparatively long, up to 2½ in. 26. *F. salicifolia*.

Leaves abruptly narrowed at the apex and very
shortly acuminate ; petiole ½-1 in. long ... 27. *F. Pretoriae*.

Leaves ovate, rhomboid-ovate or if elliptic then
acuminate :

Leaves more or less caudate-acuminate :

Leaves ovate-rhomboid, more or less cuneate
at the base 28. *F. Lecardii*.

Leaves neither ovate-rhomboid nor cuneate at
the base :

Leaves cordate or rounded at the base,
acutely caudate-acuminate, smooth ; re-
ceptacles small :

Leaves long-caudate-acuminate 29. *F. Welwitschii*.

Leaves shortly caudate-acuminate ... 30. *F. cordata*.

Leaves rounded at the base, rather obtusely
acuminate, often slightly scabrous :

Receptacles about ½ in. in diam. 31. *F. dicranostyla*.

Receptacles about ¼ in. in diam. 32. *F. Zenkeri*.

Leaves obtuse or slightly obtusely acuminate ... 33. *F. ingens*.

**Receptacles softly and densely tomentose when mature :

Midrib of the leaves fading away and branched below the apex of the lamina 34. *F. katagumica*.

Midrib of the leaves continued to the apex of the lamina :

Receptacles with peduncles $1\frac{1}{2}$ - $2\frac{1}{2}$ lin. long ... 35. *F. kawuri*.

Receptacles sessile 36. *F. ingentoides*.

Subgenus V. BIBRACTEATÆ, Mildbr. & Burret.—*Leaves alternate, nearly always entire, glabrous or hairy, but never scabrous; stipules persistent or caducous; receptacles axillary or borne in fascicles on the trunk or main branches, usually with 2 or sometimes 3 basal bracts in a single whorl, the latter sometimes large and enveloping the receptacles for some time, no bracts scattered over the outer surface of the receptacle; ostiole pore-like, and more or less 2-lipped, with none of the bracts visible from outside but descending more or less vertically into the interior of the receptacle; male flowers with a solitary stamen.*

§ 1. FASCICULATÆ.—Receptacles borne on short leafless arrested branchlets or in fascicles on the main trunk or branches remote from the leaves; stipules mostly caducous.

Leaves ovate or ovate-rotundate, cordate at the base, rather large; receptacles usually large :

Lateral nerves 5-9 on each side of the midrib; receptacles large, $1-1\frac{1}{2}$ in. in diam. :

Young branchlets very thick and stout; leaves very shortly and obtusely acuminate ... 37. *F. umbellata*.

Young branchlets slender; leaves distinctly caudate and often rather acutely acuminate 38. *F. polita*.

Lateral nerves about 16 on each side of the midrib; receptacles rather small, $\frac{2}{3}$ in. in diam. 39. *F. Fischeri*.

Leaves elliptic, oblong or obovate, if cordate at the base then rather small or with parallel margins :

*Receptacles large, 1-2 in. in diam., mostly wrinkling like a dried plum when dry :

Leaves large, 6 in. long or more, mostly cordate or broad at the base, purplish below :

Leaves rounded or truncate at the base; stipules caducous 40. *F. brachylepis*.

Leaves cordate at the base; stipules more or less persistent 41. *F. dryepodtiana*.

Leaves smaller, mostly less than 6 in. long, narrowed to or obtuse or rounded at the base :

Leaves obovate, more or less cuneate to an obtuse base, about twice as long as broad 42. *F. elegans*.

Leaves oblong, oblong-elliptic or oblong-oblanccolate, usually more than 3 times as long as broad :

Lateral nerves usually few (10 or less) and distant, spreading at angles of 45° - 70° :

Lateral nerves about 10, more numerous and closer towards the base of the leaf 43. *F. Buntingii*.

- Lateral nerves 8 or less, equally spaced on the lamina :
- Receptacles rounded at the base ; leaves loosely reticulate, broadly rounded at the base ... 44. *F. ugandensis*.
- Receptacles stipitate at the base ; leaves closely and delicately reticulate ... 45. *F. Gossweileri*.
- Receptacles rounded at the base ; leaves narrowly obtuse or subacute at the base ; leaves closely and delicately reticulate :
- Receptacles thick and woody, $1\frac{1}{2}$ in. in diam. ... 46. *F. macrosperma*.
- Receptacles fleshy and soft, $\frac{3}{4}$ -1 in. in diam. ... 47. *F. sansibarica*.
- Lateral nerves very numerous and close, spreading from the midrib almost at right angles :
- Leaves membranous, shortly caudate-acuminate ... 48. *F. Demeusii*.
- Leaves coriaceous, obtuse or rounded at the apex :
- Ultimate venation strong and close ... 49. *F. kisantuensis*.
- Ultimate venation weak and lax ... 50. *F. artocarpoides*.
- **Receptacles small, about $\frac{1}{2}$ in. in diam. or less, not or scarcely wrinkled when dry :
- Lateral nerves of leaves 4-5 on each side of midrib ; leaves never cordate ; petiole nearly as long as the leaf-blade ... 51. *F. lukanda*.
- Lateral nerves of leaves usually 8 or more, if fewer then leaves cordate ; petiole mostly shorter than the blade :
- Receptacles globose or subglobose, approximately as broad as long :
- Leaves acuminate :
- Leaves up to 5 in. long and 2 in. broad ; petiole slender ... 52. *F. ottoniæfolia*.
- Leaves 6-7 $\frac{1}{2}$ in. long, 3-4 in. broad ... 53. *F. ealænsis*.
- Leaves obtuse or rounded at apex ; petiole stout ... 54. *F. usambarensis*.
- Receptacles ellipsoid or subovoid, longer than broad :
- Leaves rounded or cordate at the base :
- Leaves cordate ; peduncles very stout ... 55. *F. rudens*.
- Leaves rounded at the base or truncate ; peduncles mostly fairly slender :
- Leaves small, 3 in. long or less, membranous, broader above the middle ; petioles very slender ; receptacles small ... 56. *F. tremula*.

Leaves usually over 4 in. long, or if shorter then broader below the middle, chartaceous; petioles usually fairly stout; receptacles fairly large:

Receptacles stipitate within the basal bracts:

Peduncles $\frac{1}{2}$ in. long; leaves rounded at the base 57. *F. Pynaerti*.

Peduncles $\frac{3}{4}$ in. long; leaves obtuse at the base 58. *F. maculosa*.

Receptacles rounded at, and with the connate bases of the basal bracts more or less closely adpressed to, their base.

Peduncles slender, scarcely $\frac{1}{2}$ lin. thick:

Leaves 2-3 $\frac{1}{4}$ in. long, 1 $\frac{1}{2}$ -2 in. broad; acumen $\frac{1}{4}$ in. long ... 59. *F. kimuenzensis*.

Leaves 5-7 $\frac{1}{2}$ in. long, 2-3 $\frac{1}{4}$ in. broad; acumen $\frac{1}{3}$ - $\frac{3}{4}$ in. long 60. *F. polybractea*.

Peduncles stout, 1 lin. thick, broader towards the apex:

Leaves about twice as long as broad; receptacles $\frac{1}{2}$ in. long. 61. *F. ulugurensis*.

Leaves about 3 times as long as broad; receptacles $\frac{3}{4}$ in. long or more:

Receptacles borne on 2- or 3-year old branches ... 62. *F. Dewevrei*.

Receptacles borne on very old branches 63. *F. umangiensis*.

Leaves narrowed to, and more or less cuneate at, the base:

Lateral nerves 10-13 on each side of midrib 64. *F. Scheffleri*.

Lateral nerves 7-8 on each side of midrib 65. *F. fasciculiflora*.

§ 2. AXILLARES.—Receptacles borne in pairs or solitary in the axils of the leaves of the young shoots, rarely some extending to the two-year-old wood.

¶ 1. *Stipulares*.—Stipules mostly large and conspicuous, persistent during the flowering and fruiting periods.

Leaves more or less pandurate, usually cordate and toothed at the base:

Leaves 6-12 in. long or more:

Leaves 5-7 in. broad, entire 66. *F. lyrata*.

Leaves 2 $\frac{1}{2}$ -3 in. broad, often hastate or toothed at the base 67. *F. sagittifolia*.

Leaves 3 $\frac{1}{2}$ in. long or less 68. *F. crassicausta*.

Leaves not pandurate, mostly narrowed to the base or sometimes rounded but never cordate or toothed:

Receptacles covered with large prominent warts:

Receptacles with beaks up to $\frac{1}{4}$ in. long; lateral nerves of leaves diverging from the midrib at an angle of 45°, thick 69. *F. rhynchocarpa*.

Receptacles shortly beaked; lateral nerves of leaves diverging almost at right angles, slender:

Leaves $1\frac{3}{4}$ – $2\frac{1}{4}$ in. broad; receptacles $\frac{1}{2}$ – $\frac{3}{4}$ in. in diam. 70. *F. praticola*.

Leaves $1\frac{1}{4}$ in. broad or less; receptacles 1 in. in diam. 71. *F. stipulifera*.

Receptacles not warted or only slightly so:

Receptacles with the ostiole produced into a conspicuous beak about 2 lin. long 72. *F. tessellata*.

Receptacles not beaked or only very slightly so:

*Receptacles $\frac{1}{2}$ –1 in. in diam; leaves usually more than 3 in. long:

Receptacles about $\frac{1}{2}$ in. in diam., never stipitate within the basal bracts, their walls $\frac{1}{2}$ lin. thick or less; leaves with 4–5 pairs of nerves:

Leaves rather long- and mostly gradually acuminate; receptacles sessile or shortly pedunculate:

Receptacles glabrous 73. *F. camptoneura*.

Receptacles densely and shortly pubescent 74. *F. camptoneur-*
[*oides*].

Leaves abruptly and very shortly acuminate; receptacles with slender peduncles about $\frac{1}{2}$ in. long 75. *F. nyanzensis*

Receptacles about $\frac{1}{2}$ in. in diam., sessile, sometimes stipitate within the basal bracts, their walls $\frac{1}{2}$ lin. thick or less; leaves with about 6–8 nerves on each side of the midrib

Leaves acuminate:

Leaves oblong or oblong-elliptic; acumen about $\frac{3}{4}$ in. long:

Receptacles stipitate within the basal bracts:

Branchlets glabrous; venation of leaves slender below 76. *F. namalalensis*.

Branchlets pubescent; venation of leaves very thick below ... 77. *F. ebolowensis*.

Receptacles not stipitate 78. *F. Conraui*.

Leaves obovate-elliptic; acumen scarcely $\frac{1}{4}$ in. long 79. *F. densestipulata*.

Leaves obovate, cuneate at the base; acumen 1 in. long 80. *F. Winkleri*.

Leaves rounded or very obtusely and shortly pointed at the apex 88. *F. Anomani*.

Receptacles $\frac{3}{4}$ –1 in. in diam., with very thick walls:

Receptacles sessile, but sometimes stipitate within the basal bracts:

Leaves 9–11 in. long; receptacles rounded at the base 81. *F. Preussii*.

Leaves $3\frac{1}{2}$ – $6\frac{1}{2}$ in. long; receptacles stipitate at the base 82. *F. pringsheimiana*.

Receptacles pedunculate; peduncle up to in. long:

Lateral nerves spreading at a wide angle; receptacles puberulous 83. *F. cyathistipula*.

- Lateral nerves ascending at an acute angle; receptacles glabrous ... 84. *F. Rederi*.
- **Receptacles $\frac{1}{4}$ in. or rarely $\frac{1}{2}$ in. in diam.; leaves usually small, 1-3 in. or rarely $4\frac{1}{2}$ in. long:
- Leaves of two kinds, the younger smaller and chartaceous, the older larger and rigidly coriaceous ... 85. *F. mutantifolia*.
- Leaves of one kind on the shoot:
- Leaves $\frac{1}{2}$ -1 in. long. ... 86. *F. lingua*.
- Leaves $2-4\frac{1}{2}$ in. long:
- Leaves gradually obtusely acuminate; lateral nerves about 12 ... 87. *F. kamerunensis*.
- Leaves not acuminate; lateral nerves 6-7 ... 88. *F. Anomani*.
- ¶ 2. *Caduca*.—Stipules caducous, falling on the unfolding of the young leaves, only those surrounding the terminal bud persistent at the time of flowering (sometimes more or less persistent in 92, *F. luteola*, and 93, *F. craterostoma*).
- *Leaves obtriangular, broadly truncate at the apex or retuse, with the midrib divided some distance below and never directly continued to the apex of the blade; receptacles pedunculate or sessile:
- Leaves 1 in. long or less; imperfectly known species of this group ... 89. *F. buxifolia*.
- Leaves over 2 in. long:
- Receptacles pedunculate, glabrous; peduncle $2\frac{1}{2}$ -5 lin. long ... 90. *F. Leprieurii*.
- Receptacles sessile or subsessile, glabrous or hairy:
- Receptacles permanently hairy ... 91. *F. pilosula*.
- Receptacles glabrous or at first very slightly hairy at the base:
- Receptacles globose or ovoid-globose, $3\frac{1}{2}$ -4 lin. in diam.; stipules persistent or sub-persistent:
- Receptacles with a very small ostiole; leaves long-cuneate from almost the top of the blade ... 92. *F. luteola*.
- Receptacles with a large gaping orifice; leaves shortly cuneate, more or less rounded in the upper half ... 93. *F. craterostoma*.
- Receptacles globose or ovoid-globose, $3\frac{1}{2}$ -4 lin. in diam.; stipules caducous; leaves scarcely cuneate at the base ... 90. *F. Leprieurii*, var. [sessilis.
- Receptacles depressed-globose, $7\frac{1}{2}$ lin. in diam.; stipules caducous ... 94. *F. rubropunctata*
- **Leaves neither obtriangular nor truncate at the apex; midrib almost invariably continued to the apex of the leaf-blade:
- †Receptacles sessile:
- ‡Receptacles more or less completely invested until nearly mature by large and often calyptiform persistent basal bracts:
- Leaves broadest above the middle, somewhat elongated oblanceolate-obovate, gradually attenuated to a narrow base, with rather short and at first shaggy-villous petioles; receptacles densely villous with reddish-yellow hairs ... 95. *F. eribotryoides*

- Leaves broadest about the middle, elliptic or oblong-elliptic, rounded at the base or if slightly narrowed then equally so at both ends :
- Leaves over 5 in. long ; midrib inconspicuous and glabrous above, more or less villous beneath :
- Petiole villous with long reflexed hairs ... 96. *F. Dawei*.
- Petiole glabrous or with finely scaly epidermis :
- Basal bracts coriaceous, villous ; mature receptacles glabrous or thinly pilose 97. *F. clarencensis*.
- Basal bracts membranous, pubescent ; mature receptacles hispid ... 98. *F. chlamydo-* [carpa.]
- Leaves 4 in. long or less ; midrib equally prominent and pubescent on both surfaces 99. *F. Kitubalu*.
- Leaves broadest below the middle, ovate or ovate-orbicular :
- Leaves ovate or oblong-ovate, usually much longer than broad, acuminate ... 100. *F. ovata*.
- Leaves ovate-orbicular, scarcely acuminate, with slender lateral nerves ... 101. *F. mallotoides*.
- Leaves ovate, not acuminate ; lateral nerves very stout ... 102. *F. Bubu*.
- ‡‡Receptacles not invested by the basal bracts, the latter usually small and often caducous or deciduous :
- ||Leaves hairy on both surfaces or only below or only on the midrib below :
- Receptacles asymmetrical, with a large V-shaped groove on the side facing the branchlet ... 103. *F. asymmetrica*.
- Receptacles symmetrical, not grooved :
- Leaves elongated and very large, with 11-18 lateral nerves :
- Leaves somewhat narrowed to an obtuse base ... 104. *F. rubrorecepta-* [cula.]
- Leaves rounded to a broad truncate base ... 105. *F. Goliath*.
- Leaves not elongated, usually with much fewer lateral nerves :
- §Leaves usually large and orbicular or ovate-orbicular ; young shoots mostly very densely villous with shaggy yellow hairs :
- Leaves glabrous and shining on the upper surface ... 106. *F. zuvalensis*.
- Leaves mostly hairy on both surfaces, dull above :
- Leaves 4-8 in. in diam., membranous or chartaceous, undulate-crenate at the rounded base, the midrib branched below the apex of the blade ... 107. *F. Wakefieldii*.
- Leaves 2-3 in. in diam., entire, coriaceous, midrib divided ... 108. *F. glumosoides*.

- Leaves 2-4 in. in diam., entire, rigidly coriaceous, midrib continued to the apex of the blade 109. *F. Sonderi*.
- §§ Leaves oblong or oblong-elliptic, rounded or cordate at the base :
 Receptacles densely and softly tomentose when mature ... 110. *F. Stuhlmannii*.
- Receptacles thinly pubescent or glabrescent when mature :
 Receptacles $\frac{1}{2}$ in. in diam. :
 A shrub with several stems ; leaves rounded at the base ; receptacles $\frac{1}{2}$ in. in diam. ... 111. *F. Dar-es-* [salaamii.
- A large tree ; leaves cordate at the base ; receptacles about $\frac{1}{4}$ in. in diam. ... 112. *F. glumosa*.
- Receptacles $\frac{1}{4}$ in. in diam. ... 113. *F. nigropunctata*.
- §§§ Leaves obovate or oblanceolate, rather narrow at the base :
 Leaves crowded on short young branchlets ; receptacles densely tomentose ... 114. *F. eriocarpa*.
- Leaves scattered ; receptacles softly pubescent :
 Petioles $\frac{1}{2}$ - $\frac{3}{4}$ in. long ; leaves 1-2 in. broad ... 115. *F. Hochstetteri*.
- Petioles 2-2 $\frac{1}{2}$ in. long ; leaves 3-5 $\frac{1}{2}$ in. broad ... 119. *F. Quibeba*.
- ||| Leaves quite glabrous on both surfaces :
 Leaves large, ovate, cordate at the base, as broad as or nearly as broad as long :
 Receptacles densely tomentose ; leaves rather longer than broad, shallow-cordate 116. *F. Dahro*.
- Receptacles puberulous ; leaves broader than long, deeply cordate ... 117. *F. soldanella*.
- Leaves large, obovate, obovate-elliptic or elliptic, 5-20 in. long :
 Lateral nerves 15-18 on each side midrib 118. *F. zobiænsis*.
- Lateral nerves 10 or less on each side midrib :
 Receptacles prominently warted ; leaves often finely pubescent beneath ... 119. *F. Quibeba*.
- Receptacles not or only slightly warted ; leaves always glabrous below :
 Receptacles 1 $\frac{1}{2}$ -1 $\frac{3}{4}$ in. in diam. ... 120. *F. wildemanni* [una.
- Receptacles about 1 in. in diam. ... 121. *F. pseudo-Vogelii*.
- Receptacles $\frac{3}{4}$ in. or usually much less in diam. :
 Receptacles with a spur at the base, glabrous ... 122. *F. subcalcarata*.
- Receptacles not spurred at the base :
 Basal bracts silky pubescent ... 123. *F. Vogelii*.
- Basal bracts densely villous :
 Receptacles woolly-pilose or adpressed-pilose ... 124. *F. Nckbudu*.
- Receptacles glabrous ... 125. *F. vestitobracteata*.

Leaves mostly small, oblanceolate or obovate,
if cordate then less than 5 in. long :

Receptacles tomentose or densely pubescent
when mature :

Leaves obovate, $1\frac{1}{2}$ -3 in. broad ; re-
ceptacles globose 126. *F. basarensis*.

Leaves oblanceolate or slightly obovate,
 $\frac{3}{4}$ - $1\frac{1}{2}$ in. broad or less ; receptacles
ovoid-ellipsoid 127. *F. Petersii*.

Receptacles glabrous or only slightly
pubescent when mature :

Leaves rounded or very obtusely
mucronate at the apex, $2\frac{3}{4}$ - $3\frac{1}{4}$ in.
broad 128. *F. Adolphi-Fre-* [derici.

Leaves more or less acuminate, 1-2 in.
broad :

Leaves rounded or slightly cordate at
base :

Receptacles warted 129. *F. subcostata*.

Receptacles not warted ; leaves ovate
or ovate-elliptic, broader below
the middle 130. *F. annobonensis*.

Receptacles not warted ; leaves
elliptic or oblong-elliptic, mostly
slightly broader above the
middle :

Leaves approximately twice as
long as broad :

Lateral nerves about 11 ... 131. *F. Lujæ*.

Lateral nerves about 7 ... 132. *F. sessilis*.

Leaves less than $1\frac{1}{2}$ times as long
as broad :

Leaves distinctly cordate at the
base, obtusely acuminate,
 $4\frac{1}{2}$ in. long or less ... 133. *F. leonensis*.

Leaves rounded or truncate at
base, acutely acuminate,
mostly over 6 in. long ... 134. *F. aganophila*.

Leaves narrowed to the base :

Leaves tailed-acuminate, acumen
 $\frac{1}{2}$ - $\frac{3}{4}$ in. long 135. *F. arcuatonervata*.

Leaves shortly acuminate, acumen
about $1\frac{1}{2}$ lin. long :

Leaves with straight sides,
cuneately attenuated to a
narrow base 136. *F. oreodryadum*.

Leaves with rounded sides and
often rounded at the base ... 137. *F. Thoningii*.

††Receptacles pedunculate :

‡Leaves mostly cordate at the base, mostly broadly
ovate or suborbicular :

Leaves rather long-caudate-acuminate :

Leaves softly pubescent especially on the
midrib and lateral nerves below, rounded
at base, oblong or oblong-elliptic ... 138. *F. brachypoda*.

Leaves cordate or truncate at base, glabrous 139. *F. populifolia*.

- Leaves rounded or very shortly and obtusely pointed at the apex :
- Receptacles stipitate within the basal bracts :
- Leaves suborbicular :
- Receptacles very prominently umbonate at the apex ; leaves with the midrib bifurcate below the apex 140. *F. mittuensis*.
- Receptacles rounded at the apex ; leaves with undivided midrib 141. *F. abutilifolia*
- Leaves oblong-elliptic 149. *F. zambesiaca*.
- Receptacles not stipitate at the base :
- Leaves large, usually well over 2½ in. long, as long as or longer than broad :
- Receptacles prominently umbonate :
- Branches and leaves glabrous ; leaves, when fresh, with red coloured nerves below 142. *F. Kerstingii*.
- Branches and leaves softly and densely pubescent ; leaves with white nerves below 143. *F. Ledermannii*.
- Receptacles slightly or not umbonate :
- Receptacles ¾ in. in diam., rarely 1 in., not crowded at the ends of the shoots ; peduncles not recurved :
- Peduncle 1-4½ lin. long :
- Leaves hairy below :
- Receptacles ¾ in. in diam. ; peduncles 4½ lin. long ... 144. *F. budduensis*.
- Receptacles about ½ in. in diam. ; peduncles 1 lin. long or less 145. *F. vasta*.
- Receptacles less than ½ in. in diam. ; peduncles 3 lin. long 146. *F. congensis*.
- Leaves glabrous below 147. *F. discifera*.
- Peduncle ½-1 in. long :
- Leaves glabrous above ; Nile district 148. *F. platyphylla*.
- Leaves hairy above ; Zambesi district 149. *F. zambesiaca*.
- Receptacles 1 in. in diam., crowded at the ends of the shoots ; peduncles 1-1¼ in. long, recurved 150. *F. recurvata*.
- Leaves small, subreniform, broader than long, hairy 151. *F. tettensis*.
- ‡‡Leaves never ovate or orbicular, mostly broader above the middle :
- Leaves hairy below or on the midrib and lateral nerves :
- Leaves linear-oblong-lanceolate, ¾-1 in. broad ; receptacles very small, scarcely 2 lin. in diam. 152. *F. Ruspolii*.
- Leaves broader, usually over 1 in. ; receptacles 3 lin. in diam. or usually more :
- Receptacles stipitate, glabrous, with large rounded warts 153. *F. cyphocarpa*.
- Receptacles not stipitate, hairy, not warted 154. *F. rhodesiaca*.

Leaves glabrous on both surfaces :

Receptacles tomentose or densely pubescent
when mature :

Leaves oblong or oblong-elliptic, rounded
at the base :

Petiole $\frac{1}{4}$ in. long or less 155. *F. Burkei*.

Petiole $\frac{3}{4}$ in. long or more 156. *F. spragueana*.

Leaves oblanceolate, attenuated to an
obtuse or subacute base 157. *F. iteophylla*.

Receptacles glabrous or very slightly pubescent
when mature :

Leaves very small, 1-1 $\frac{1}{2}$ in. long, with
rather close somewhat flabellate lateral
nerves diverging at an acute angle from
the midrib 158. *F. depauperata*.

Leaves well over 1 $\frac{1}{2}$ in. long, at any rate
the average ones ; lateral nerves not
flabellate :

Leaves large, oblong or linear-oblong,
fairly long-acuminate, up to 14 in.
long, with the lateral nerves spread-
ing at a wide angle : [*fera*.
Peduncle tomentose 159. *F. pseudomangi-*

Peduncle glabrous :

Leaves rounded or slightly cordate
at the base ; mature receptacles [*oides*.
about 3 $\frac{1}{2}$ lin. in diam. 160. *F. mangifer-*

Leaves narrowed to and often cuneate
at the base ; mature receptacles
5-6 lin. in diam. 161. *F. Barteri*.

Leaves smaller, rarely more than 6 in.
long :

Filaments of the stamens broadly
winged ; receptacles about 1 $\frac{1}{4}$ in.
in diam., stipitate 162. *F. cyathistipu-* [*oides*.

Filaments of the stamens terete or
absent ; receptacles rounded at the
base or if stipitate then less than
 $\frac{3}{4}$ in. in diam. :

Lateral nerves 5-6 on each side,
conspicuously arcuate :

Leaves over 3 in. long :

Receptacles $\frac{1}{4}$ in. in diam. ;
leaves acuminate 163. *F. ardisioides*.

Receptacles $\frac{3}{4}$ -1 in. in diam. ;
leaves rounded or obscurely
acuminate 164. *F. Scott-Elliottii*.

Leaves 3 in. long or less 165. *F. natalensis*.

Lateral nerves 8-15 on each side
of the midrib :

Leaves oblanceolate, obovate or
oblong, over $\frac{1}{2}$ in. broad :

Receptacles ovoid, prominently
and gradually umbonate, $\frac{3}{4}$
in. long ; venation promi-
nent below, straw-coloured 166. *F. Kirkii*.

- Receptacles $\frac{1}{2}$ in. long or much less, rarely prominently umbonate; venation of leaves not or hardly straw-coloured below:
- Petioles and peduncles slender or the latter very short:
- Leaves obovate or oblong-elliptic, usually less than half as long as broad 167. *F. excentrica*.
- Leaves oblong or oblong-oblancoolate, usually well over three times as long as broad:
- Leaves membranous, with very numerous delicate and close lateral nerves ... 168. *F. persicifolia*.
- Leaves chartaceous, with few and appreciably distant lateral nerves:
- Leaves rounded at the apex; petiole comparatively short ... 169. *F. gurichiana*.
- Leaves shortly pointed; petiole comparatively long ... 170. *F. Dekdekana*.
- Petioles and peduncles stout, the latter 3-5 lin. long:
- Leaves elongate-oblancoolate, acuminate, with distant side-nerves 171. *F. Mildbrædii*.
- Leaves obovate, with close side-nerves ... 172. *F. burretiana*.
- Leaves linear-lanceolate, $\frac{1}{2}$ in. broad or less 173. *F. neriifolia*.
- Lateral nerves about 25 on each side of the midrib, very close together 174. *F. elasticoides*.

1. *F. palmata*, *Forsk. Fl. Ægypt.-Arab.* 179. A bush or small tree; branches and branchlets purplish when dry, finely puberulous or nearly glabrous, rarely softly tomentose. Leaves variable, the undivided ones ovate, acutely acuminate, when divided then more or less ovate-orbicular in outline, truncate or rounded at the base, rarely slightly cordate, 3-lobed to near the middle in the upper half, with sometimes two obscure side-lobes at the base, $2\frac{1}{2}$ -8 in. long, $1\frac{1}{4}$ -5 in. broad, subobtusely dentate, thinly chartaceous, scabrous on both surfaces, 5-7-nerved at the base, remaining lateral nerves 5-7 on each side, diverging from the midrib at an angle of about 45° , branched near the margin; tertiary nerves subparallel, rather lax, prominent below; petiole usually $\frac{1}{4}$ - $1\frac{1}{2}$ in. long, rarely up to 4 in.

long, puberulous; stipules deciduous, lanceolate, acute, 4-5 lin. long, adpressed-pubescent outside. Receptacles axillary or from the axils of fallen leaves on shoots of two seasons' growth, solitary, pedunculate, subglobose or pyriform, umbonate, stipitate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, about $\frac{1}{2}$ in. in diam., puberulous or slightly scabrous; peduncle 2-4 lin. long, pubescent; basal bracts 3, inserted at the same level, ovate or ovate-lanceolate, subacute, $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long, minutely puberulous outside, glabrous and shining within. Ostiolar bracts numerous, the outer slightly ascending, the intermediate spreading horizontally across the ostiole, the lowermost slightly curved towards the base of the receptacle. Male flowers rather numerous in the upper third of the receptacle and a few scattered amongst the female, pedicellate; pedicels compressed, 1- $1\frac{1}{2}$ lin. long, minutely puberulous; perianth-segments 4-6, linear-lanceolate, subacute, membranous, glabrous; stamens 3-4; filaments short; anthers oblong, about $\frac{1}{2}$ lin. long. Gall flowers with pedicels like those of the male; perianth-segments 5-6, linear-subulate, acute, scarcely 1 lin. long, membranous. Female flowers sessile; ovary smooth, with a slightly lateral stigma.—Vahl, *Symb.* i. 84, t. 24; *Miq. Ann. Mus. Lugd.-Bat.* iii. 290 and in *Hook. Lond. Journ. Bot.* vii. 225; *King in Ann. Bot. Gard. Calcutta*, i. 146, t. 185 and in *Hook. f. Fl. Brit. Ind.* v. 530; *Brandis, Indian Trees*, 607; *Schweinf. in Bull. Herb. Boiss.* iv. App. ii. 123; *Mildbr. & Burret in Engl. Jahrb.* xlvi. 189, partly. *F. caricoides*, *Roxb. Fl. Ind.* iii. 529; *Miq. in Hook. Lond. Journ. Bot.* l.c. 224. *F. virgata*, *Roxb. l.c.* 530: *Wight Ic.* t. 649; *Miq. in Ann. Mus. Lugd.-Bat.* iii. 290 and *Lin. Afr. Vrije-Boom.* 20; *Boiss. Fl. Orient.* iv. 1155; *Brandis, For. Fl. Ind.* 419. *F. Pseudo-Sycamorus*, *Decne in Ann. Sc. Nat.* 2me sér. ii. 242; *Miq. in Hook. Lond. Journ. Bot.* vi. 227; *Boiss. Fl. Orient.* iv. 1155. *F. Pseudo-Carica*, *Miq. in Hook. Lond. Journ. Bot.* vi. 225; *A. Rich. Tent. Fl. Abyss.* ii. 271. *F. Pseudo-Carica*, var. *tomentosa*, *A. Rich. l.c.* 271. *F. petitiana*, *A. Rich. l.c.* *F. Robecchii*, *Warb. ex Mildbr. & Burret, l.c.*, 190, name only.

Nile Land. Eritrea: Saganeiti; Marakhat Valley, *Schweinfurth & Riva*, 1674! Geleb, *Schweinfurth*, 1024! 1166! Addi Conzi, near Acour, *Schweinfurth & Riva*, 1152! Abyssinia: near Adowa, *Schimper*, 157! *Steudner*, 1363! Amba-Sea, *Schimper*, 287! 591! Serraba, *Schimper*, 1099! Aman, *Schimper*, 1440! Wojerat, *Petit*, 87! Ababa, *Steudner*! and without precise locality, *Courbon*! Somaliland: Hararmaja Lake, *Ellenbeck*, 478a! *Robecchi Briccquetti*, 161! Maid, *Hillebrandt*, 1462!

Occurs also in Egypt, Arabia and Northern India.

Very variable in the shape of the leaves and in their indumentum; in *Ellenbeck's* and *Briccquetti's* specimens, from Somaliland, the leaves are quite silky-tomentose below, becoming at length pubescent.

2. *F. vogeliana*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 295. A tree 30-50 ft. high; young branchlets leafy towards the apex, strigose-hirsute. Leaves obovate or obovate-elliptic, shortly and subacutely

acuminate, rounded or slightly cordate at the base, 4-8 in. long, $1\frac{3}{4}$ -5 in. broad, rather coarsely undulate-dentate, thinly chartaceous or almost membranous, glabrous above except for a few hairs sometimes on the midrib, long-pilose with rust-coloured hairs chiefly on the midrib and lateral nerves beneath; midrib slightly raised above, prominent below, scarcely $\frac{3}{4}$ lin. broad at the base; lateral nerves 6-7 on each side of the midrib, the basal pair opposite, the others subopposite to alternate, diverging from the midrib at an angle of 45° , slightly arcuate, looped close to the margin, distinct above, prominent below; tertiary nerves subparallel, 2-3 lin. apart, linking the lateral nerves at right angles, prominent below; veins rather close but rather indistinct below; petiole $\frac{3}{4}$ -2 $\frac{3}{4}$ in. long, at first pubescent, at length glabrous or nearly so; stipules subpersistent, lanceolate or ovate-lanceolate, acutely acuminate, about $\frac{1}{2}$ in. long, submembranous, glabrous. Receptacles paniculate, mostly at the base of the trunk (*Vogel*); panicles long and slender, leafless, up to 2 ft. long; lateral branches up to 2 $\frac{1}{2}$ in. long, glabrous or slightly pubescent. Receptacles somewhat obovoid, a little more than $\frac{1}{2}$ in. in diam., setose-pilose with yellowish hairs. Basal bracts 2, slightly connate at the base, ovate, about $1\frac{3}{4}$ lin. long and broad, pilose. Ostiole prominent; bracts spreading horizontally across the ostiole, rounded, membranous, glabrous, the innermost ones descending into the receptacle, linear. Male flowers sessile, near the ostiole; perianth-segments unequal, membranous, enclosing the pair of stamens like a cloak. Female flowers subsessile with long slender styles. Gail flowers pedicellate.--Mildbr. & Burret in Engl. Jahrb. xlv. 193. *F. stellulata*, Warb. in Engl. Jahrb. xx. 152. *Sycomorus vogeliana*, Miq. Afr. Vrije-Boom. 13 and in Hook. Niger Fl. 522.

Upper Guinea. Ivory Coast: between Kassigne and Atteou, *Chevalier*, 17087! Southern Nigeria: River Niger, *Vogel*! Oban, *Talbot*, 89! Cameroons: Amba Bay, *Mann*, 702! Bipinde, *Zenker*, 1704! Barombi, *Preuss*, 550! Victoria, *Preuss*, 1323! Neu Tegel, *Winkler*, 194! near Dipika, *Ledermann*, 442! Batanga, *Dinklage*, 381! Fernando Po: San Carlos, *Mildbraed*, 6794! Bokoko, *Mildbraed*, 6967! and without precise locality, *Vogel*, 179!

Lower Guinea. Spanish Guinea: on the Abca River and near Uelleburg, *Tessmann*, 11! 392!

Var. *latifolia*, Hutchinson. Leaves rounded-elliptic, about 9 in. long and 6 in. broad.

Upper Guinea. Southern Nigeria: near Lagos, *Rowland*, 18!

One of *Vogel*'s sheets in the Kew Herbarium is marked "St. Vincent, Cape Verde," but this is probably an error, as the specimen seems to be part of his 179 from the Fernando Po.

3. *F. Sycomorus*, *Linn. Sp. Pl. ed. i.* 1059. A large tree with spreading crown; young branchlets with a circle of long slender hairs just below each node, otherwise glabrous or nearly so. Leaves suborbicular or ovate-orbicular, rounded or obtuse at the apex, cordate or rounded at the base, 2-5 in. long, $1\frac{3}{4}$ -3 $\frac{1}{2}$ in. broad, subentire or slightly undulately toothed, dull and glabrous on both

surfaces or minutely puberulous below, sometimes slightly scabrous, palmately nerved at the base; midrib prominent below, continued to the apex of the blade; principal pair of basal nerves ascending to above the middle of the leaf-blade, with 8-10 lateral nerves on their lower sides; remaining lateral nerves about 3 on each side of the midrib, diverging from it at an angle of about 40°, distinct on both surfaces, prominent below, bifurcate near the margin; tertiary nerves very slender, wavy between the lateral ones; veins very delicate and close; petiole relatively short, $\frac{3}{4}$ - $1\frac{3}{4}$ in. long, at first finely papillose and pilose, at length glabrous; stipules deciduous, those surrounding the terminal bud lanceolate, villous. Receptacles in leafless panicles produced on the main branches or on the stem, obovoid or obovoid-globose, sometimes stipitate at the base, about 1 in. in diam., with a conspicuous ostiole, softly tomentose. Basal bracts 2, opposite, ovate, subcoriaceous, pubescent outside. Ostiole with numerous exserted suberect bracts; outer bracts ovate-triangular, subacute, coriaceous, finely puberulous or glabrescent outside, inner ones spreading horizontally across the ostiole, the innermost longer and descending into the receptacle, glabrous. Male flowers sessile near the ostiole; perianth membranous, covering the 1-3 stamens; anther-cells free at the base. Female flowers shortly pedicellate; style quite lateral, reddish, with an oblong yellow stigma.—Miq. in Ann. Mus. Lugd.-Bat. iii. 282; Oliv. in Trans. Linn. Soc. xxix. 149, t. 99; Engl. Pflanzenwelt Afr. i. i. 46, fig. 38; Mildbr. & Burret in Engl. Jahrb. xvi. 191, fig. 1, B. *F. Sycomorus vera*, Forsk. Fl. Ægypt.-Arab. 180. *F. Chanas*, Forsk. l.c. 219. *F. integrifolia*, Sim, For. Fl. Port. E. Afr. 101, t. lxxxix. *F. flavidobarba*, Warb., *F. pallidobarba*, Warb., *F. ukambensis*, Warb., and *F. blepharophora*, Warb., ex Mildbr. & Burret in Engl. Jahrb. xvi. 192, names only. *Sycomorus antiquorum*, Gasp. Ricerch. Caprif. Fic. 86; Miq. in Hook. Lond. Journ. Bot. vii. 109 and Afr. Vijge-Boom. 10, t. 1, fig. A; Kotschy, Plantæ Biederianæ, 4. *Sycomorus rigida*, Miq. in Hook. Lond. Journ. Bot. vii. 110 and Afr. Vijge-Boom. 10. t. 1, fig. B; Kotschy, Plantæ Biederianæ, 4.

Nile Land. Nubia: near Suakin, *Schweinfurth*, 540! near Erkauit, *Schweinfurth*, 337! El Mecherif, *Schweinfurth*, 611! Eritrea: Ginda, *Schweinfurth*, 166! Geleb, *Schweinfurth*, 1506! near Keren, *Schweinfurth*, 992! *Beccari*, 72! Abyssinia: Serraba, 6000 ft., *Schimper*, 1128! Worrhey, *Schimper*, 877! Jelajeranne, *Schimper*, 1834! Somaliland, *Riva*, 881! Ahl Mountains, *Hildebrandt*, 1463! Sudan: Khartoum, *Petherick*! near Dinka, *Binder*; Shendi District, *Speke & Grant*! Sennar, *Kotschy*, 227! Blue Nile, near Sennar, *Muriel*, 17! Kordofan, *Pfund*, 398! Uganda: Unyoro, *Dawe*, 774! Kibero, Lake Albert, *Baqshawe*, 907! Acholi Country, *Dawe*, 868! British East Africa: Ukamba; Mkuyuni, *Scott Elliot*, 6371! 6752! Ikanga, *Hildebrandt*, 2679!

Mozamb. Distr. German East Africa: Quare River, *Volkens*, 2049! between Simba and Kwagogo, *Engler*, 1678! Dar-es-Salaam, *Stuhlmann*! Mugarura, in Lake Kivu, *Mildbraed*, 1106! Portuguese East Africa: alluvial plains, *Sim*, 6145! British Central Africa: Nyasaland; Upper Shire River, *Scott Elliot*,

8429 ! Rhodesia : Sabi River, *Swynnerton*, 1002a ! Chimbabava River, Lower Buzi River, *Swynnerton*, 1002 ! Kalouw, *Rogers*, 8204 !

Occurs also in Egypt, Arabia, and the Comoro Islands.

There is a good illustration showing the habit of this tree in Karsten and Schenk, *Vegetationsbilder*, ii. t. 56.

4. *F. mallotocarpa*, Warb. in *Engl. Jahrb.* xx. 154. A tree 10–30 ft. high or more with the habit of an Alder ; sap watery-viscid rather than milky ; trunk whitish, erect ; branches smooth, spreading, glabrous ; branchlets numerous, spreading, softly tomentose towards the tips or sometimes nearly glabrous. Leaves evergreen, ovate or oblong-ovate, rounded, obtuse or shortly acuminate, rounded and often a little unequal-sided at the base, $2\frac{1}{2}$ –11 in. long, $1\frac{1}{2}$ –5 in. broad, subchartaceous, coarsely and irregularly obtusely repand-dentate, 3-nerved at the base, slightly pubescent on the nerves and veins or rarely glabrous above, rather densely pubescent with soft spreading hairs below especially on the midrib and lateral nerves, remaining lateral nerves 5–7 on each side of the midrib, slightly arcuate, diverging from the midrib at an angle of about 45° , looped and branched near the margin, prominent on both surfaces especially below ; tertiary nerves lax, subparallel ; reticulation minute, delicate ; petiole up to $3\frac{3}{4}$ in. long, pubescent or almost tomentose ; stipules caducous, ovate-lanceolate, subacutely acuminate, about $\frac{1}{2}$ in. long, coriaceous, densely adpressed-pubescent outside, glabrous within. Receptacles sometimes on separate crowded panicles borne on the lower part of the trunk, or sometimes on the same tree solitary in the axils of the leaves on the ultimate branchlets, pedunculate, globose, $\frac{3}{4}$ –1 in. in diam., densely and softly villous-tomentose ; peduncle 2–4 lin. long, rather stout, tomentose or shortly pubescent. Basal bracts 3, small, rather coriaceous, becoming glabrous. Ostiole inconspicuous, or at length with the bracts considerably projecting, the outer bracts broadly ovate, shortly pubescent, the innermost descending into the receptacle, linear, obtuse, about 2 lin. long, glabrous. Male flowers with 1–4 stamens. Female flowers with narrow acute membranous perianth-segments. Gall flowers pedicellate.—Warb. in *Engl. Pfl. Ost-Afr. C.* 161, t. ix. *F. clethrophylla*, Hiern in *Cat. Afr. Fl. Welw.* i. 1017 ; Mildbr. & Burret in *Engl. Jahrb.* xlv. 262. *F. capensis*, var. *guineensis*, Hiern, l.c. 1016, not of Miq. *F. capensis*, Mildbr. & Burret, l.c. 195, partly, not of Thunb. *F. capensis*, var. *mallotocarpa*, Mildbr. & Burret, l.c. 198. *F. capensis*, var. *mallotocarpa*, forma *pubifolia*, Mildbr. & Burret, l.c. 199. *F. kiboschensis*, Warb., *F. kondensis*, Warb., and *F. kwaiensis*, Warb. ex Mildbr. & Burret, l.c. 197–199, names only.

Upper Guinea. Fernando Po : Musola, above San Carlos, *Mildbraed*, 6992 !

Nile Land. British East Africa : Nyeri, *Grant in Herb. Battiscombe*, 816 !

Lower Guinea. Angola : Golungo Alto ; various localities, *Welwitsch*, 6335 ! 6341 ! 6342 ! 6414 ! 6422 !

Mozamb. Distr. German East Africa : Kilimanjaro ; Kiboso, *Alluand*, 206 ! *Volkens*, 1582 ! 1584 ! Marangu, *Volkens*, 2073 ! between Meru and Aruscha, *Uhlig*, 692 ! Ugueno Mountains, *Volkens*, 465 ! Nager Nyavatura, on the Kagera River, *Mildbraed*, 312 ! Usambara ; Kwamkuyo, *Braun*, 984 ! Usaramo ; Jega, *Stuhlmann*, 8630 ! Uluguru Mountains, *Stuhlmann*, 8981 ! Lindi ; Mchomanjoma, *Koerner*, 2296 ! Kondeland, Umuamba, *Goetze*, 1307 ! Rhodesia : Victoria Falls ; rain forest, *Engler*, 2955 ! 2911a ! Bulawayo, *Kolbe*, 4079 ! Transvaal : Limpopo Valley ; Umkiva, *Hutchins*, 14 !

Ellenbeck, 1634, from Schoa, Somaliland, included by *Mildbraed* and *Burret* under *F. Sur*, seems to belong to *F. mallotocarpa* ; the young figs are densely and softly tomentose.

5. *F. gongoensis*, *De Wild. in Fedde, Repert.* xii. 196. A tree ; young branchlets more or less terete, with deciduous bark. Leaves elliptic or obovate, narrowly acuminate, rounded or cordate at the base, $3\frac{1}{2}$ –8 in. long, 2– $4\frac{1}{2}$ in. broad, glabrous, distinctly 3-nerved at the base, remaining lateral nerves 6–7 on each side, slightly impressed above, prominent below. Receptacles arranged in panicles up to 24 in. long, globose or pear-shaped, more or less stipitate, up to $\frac{1}{2}$ in. long and 5 lin. broad, densely velvety hirsute, mammillate at the apex, with a bracteate ostiole ; peduncle up to nearly $\frac{1}{2}$ in. long, velvety with spreading hairs. Basal bracts connate into a 2–3-lobulate disc. Flowers more or less as in *F. mallotocarpa*.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 211.

South Central. Belgian Congo : territory of the Gongo chief, *Seret*, 314 !

6. *F. Mucoso*, *Welw. ex Ficalho, Pl. Uteis*, 270. A small tree, 10–12 ft. high, or in some localities a large spreading tree ; branchlets covered with a brown scaly bark ; young branchlets villous near the leaf-bases with reddish hairs. Leaves few and usually confined to the tips of the branchlets, suborbicular, cordate at the base, shortly and rather abruptly acuminate, 2–6 in. in diam., entire or with slightly undulate margins, subchartaceous, slightly scabrous on both surfaces, puberulous below and scattered-pilose on the midrib and lateral nerves, rarely softly pubescent below ; midrib prominent below, gradually tapered to the apex of the blade ; lateral nerves about 5 on each side of the midrib, diverging from it at an angle of about 45°, the basal pair with several lateral nerves radiating to the margin on their lower side, the remainder often branched near the margin ; tertiary nerves prominent below, parallel, 1– $1\frac{1}{2}$ lin. apart ; veins forming a close delicate reticulation below ; petiole 1– $1\frac{1}{2}$ in. long, shortly tomentose and sparingly long-pilose ; stipules deciduous, those enclosing the terminal bud ovate, acutely acuminate, about $\frac{1}{3}$ in. long, setose-villous with rust-coloured hairs outside. Receptacles pear-shaped or slightly club-shaped, paniculate on the stronger main branches, pedunculate, obovoid or subglobose, variable in size, up to $2\frac{1}{4}$ in. in diam., very finely puberulous, smooth ; peduncle about $\frac{1}{2}$ in. long. Basal bracts 3, whorled, subcoriaceous. Ostiole prominent, with several bracts exerted from the mouth, the other bracts

numerous and pointing into the receptacle, somewhat fleshy, glabrous. Male flowers not seen.—Hiern in Cat. Afr. Pl. Welw. i. 1015; Mildbr. & Burret in Engl. Jahrb. xlv. 193. *F. corylifolia*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 27, incl. var. *glabrescens*, Warb. l.c. 28; De Wild. in Bull. Soc. Bot. Belg. lii. 203.

Upper Guinea. Ivory Coast: Bingerville, *Chevalier*, 17348! Gold Coast: Prahsu, *Cummins*, 5! Cameroons: Bipinde, *Zenker*, 1623! 3832! Johann-Albrechtshöhe, *Büsgen*, 172! Victoria, cultivated in the botanic garden, *Winkler*, 24! Molundu; between Lokomo, Bumba and Bange, *Mildbraed*, 4385!

Nile Land. Uganda: Usoga, *Dawe*! Toro, *Bayshawe*, 1022! Buddu, *Dawe*, 309!

Lower Guinea. St. Thomas Island, *Quintas*, 167! Spanish Guinea, *Tessmann*, 13a! Gaboon, *Klaine*! Lower Congo: Kisantu, *Gillet*, 815! 1259! 1309! and without precise locality, *Smith*! Angola: Golungo-Alto; banks of the River Cuango, *Welwitsch*, 6389! 6416!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3377! 3452! Kwa Muera, north-west of Fort Beni, *Mildbraed*, 2325! New Antwerp, *Seret*, 16! and without precise locality, *Dewèvre*, 681!

Mozamb. Distr. German East Africa: Usambara Mountains; Amani, *Engler*, 736! *Zimmermann*, 64! Dar-es-Salaam, *Holtz*, 2565!

Cultivated specimens seen in the Brussels Botanic Gardens.

According to *Dawe*, this is a large spreading tree from which canoe-like troughs used in making banana beer are obtained.

7. *F. sidifolia*, *Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 1018*. A large tree 30–70 ft. high; trunk $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. in diam., divided a little above the base into tortuous twisted branches, clothed with a reddish ferruginous bark; branchlets stout, purplish, glabrescent in their lower parts, densely villous with dark brown hairs in their upper parts. Leaves rounded-ovate, cordate at the base, slightly unequal-sided, shortly acuminate, $3\frac{1}{2}$ –10 in. long, $2\frac{1}{2}$ –8 in. broad, chartaceous, repand crenate-dentate, setose-pilose on both surfaces, more densely so below; lateral nerves 4–6 on each side of the midrib, diverging from it at an angle of 45° . slender; petiole $1\frac{3}{4}$ –7 in. long, densely hispid; stipules caducous, broadly ovate, cuspidate, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, hispid at the base and on the midrib, otherwise glabrous. Receptacles (according to *Welwitsch*) as large as the common fig (*F. Carica*), smooth when ripe, peach-coloured, paniculately clustered on their own branchlets produced on the trunk and thicker branches. Male flowers with a 3-partite perianth; segments broad, imbricate and enveloping the two stamens; filaments short. Perianth-segments of the female 3, linear-subulate; style lateral, rather long.—Mildbr. & Burret in Engl. Jahrb. xlv. 262; De Wild. in Bull. Soc. Bot. Belg. lii. 229.

Lower Guinea. Angola: Golungo Alto; near Sange, *Welwitsch*, 6421! forests of Sobato de Bango and Sobato de Quilombo, *Welwitsch*, 6345! near Canguerasange, *Welwitsch*, 6348!

South Central. Belgian Congo: Lukombe, *Sapin*!

8. *F. Sur*, *Forsk. Fl. Ægypt.-Arab.* 180. A tree similar to *F. Sycomorus*, Linn.; branchlets twiggy, pubescent. Leaves ovate or ovate-elliptic, acutely acuminate, rounded or subcordate at the base, 3-6 in. long, $1\frac{1}{4}$ -3 in. broad, coarsely and undulately dentate with distant teeth, chartaceous, dull and glabrous on both surfaces except on the nerves; midrib flat above, prominent below, continued to the apex of the blade; lateral nerves 5-6 on each side of the midrib, diverging from it at an angle of 45° or slightly less, distinct on both surfaces, prominent below, slightly arcuate, looped and becoming much more slender towards the margin, finely puberulous; tertiary nerves subparallel, slender; veins forming a close delicate venation on the lower surface; petiole $1-1\frac{1}{4}$ in. long, rather slender, minutely puberulous; stipules deciduous or persistent for a short time, lanceolate, acute, about $\frac{3}{4}$ in. long, adpressed-tomentose outside, reddish and glabrous within. Receptacles in racemose panicles leafless or leafy towards the apex, globose or obovoid-globose, with a prominent ostiole, $\frac{1}{2}$ - $\frac{2}{3}$ in. in diam., covered with a brown scaly papillose deciduous indumentum; peduncle $\frac{1}{3}$ - $\frac{3}{4}$ in. long, somewhat slender, with indumentum like that of the receptacle. Basal bracts 3, ovate, obtuse, nearly 1 lin. long, finely puberulous outside. Ostiole large, with several exerted outer bracts; outer bracts very broadly ovate-rounded, with shortly ciliate margins; innermost bracts descending, linear-oblong, obtuse, $1\frac{1}{2}$ lin. long, with a rather thick middle nerve and membranous margins. Male flowers subsessile or pedicellate; perianth enveloping the large elliptic obtuse solitary anther. Female flowers sessile; style slender. Gall flowers pedicellate.—*Pers. Syn. Pl.* ii. 611; *Roem. & Schult. Syst.* i. 517; *Spreng. Syst. Veg.* iii. 784; *Mildbr. & Burret in Engl. Jahrb.* xvi. 199. *F. panifica*, Del. in *Ann. Sc. Nat.* 2me sér. xx. 94; *Ferr. & Galin. Voy. Abyss. Atlas. Bot.*, t. xvi.; *A. Rich. Tent. Fl. Abyss.* ii. 269. *Sycomorus panifica*, Miq. in *Hook. Lond. Journ. Bot.* vii. 111, t. iii. A; *Dietr. Syn. Pl.* v. 559. *Sycomorus Sur*, Miq. *Afr. Vijege-Boom.* 11; *Dietr. Syn. Pl.* v. 560.

Nile Land. Eritrea: Halai, *Courbon!* *Schweinfurth*, 178! Abyssinia: Memsach district, *Schimper*, 149! Ghaba Valley, *Steudner!* and without precise locality, *Schimper*, 889!

Vernacular name, *Choddo* (*Schimper*, *Schweinfurth*).

Occurs also in Arabia.

The specimens quoted above have been compared with Forskål's type in the Copenhagen Herbarium.

9. *F. riparia*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 270. A large tree; young leafy branchlets glabrous except the terminal buds, reddish-brown or purplish when dry. Leaves lanceolate or oblong-lanceolate, shortly and obtusely acuminate, rounded or obtuse at the base, 3-6 in. long, $1-2\frac{1}{2}$ in. broad, entire, thinly chartaceous, glabrous on both surfaces; midrib flat or slightly

raised above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves 5-7 on each side of the midrib, the lowermost pair ascending at a sharp angle and reaching nearly to the middle of the blade, the others diverging at an angle of about 45° , slightly raised above, prominent below, rather slender, gradually fading away near the margin; tertiary nerves lax and very slender, distinct below; veins very delicate and indistinct; petiole $1-1\frac{1}{4}$ in. long, longitudinally sulcate, reddish-brown when dry, glabrous; stipules deciduous, those enclosing the terminal bud lanceolate, acutely acuminate, $\frac{1}{2}-\frac{3}{4}$ in. long, adpressed-pubescent, with glabrous margins. Receptacles borne in panicles mostly on the main-stem, pedunculate, subglobose, rounded or slightly stipitate at the base, about $\frac{1}{2}$ in. in diam., glabrous; peduncle 3-4 lin. long, rather slender, finely puberulous. Basal bracts 3, small, broadly ovate, puberulous outside. Ostiole with numerous exerted glabrous bracts; innermost bracts very numerous, descending into the receptacle, linear, obtuse, $1\frac{1}{4}$ lin. long, glabrous. Male flowers sessile, with a membranous perianth enclosing the 2 subsessile anthers. Female flowers subsessile; style rather thick and short, with an oblong stigma.—*Sycomoros? riparia*, Miq. in Hook. Lond. Journ. Bot. vii. 114. *F. capensis*, Mildbr. & Burret in Engl. Jahrb. xlvi. 195, partly; not of Thunb.

Nile Land. Abyssinia: Mandel district, *Schimper*, 1885! Shireh, *Quartin-Dillon & Petit*!

10. *F. capensis*, *Thunb. Diss. Fic. 13.* A shrub or small cauliflorous tree; branchlets glabrous or softly pubescent, with pointed more or less villous buds. Leaves ovate or ovate-elliptic, obtuse or shortly acuminate, rounded slightly cordate or shortly cuneate at the base, $2\frac{1}{2}-9$ in. long, $1\frac{1}{2}-5$ in. broad or sometimes more, usually coarsely repand and obtusely dentate, chartaceous or thinly coriaceous, glabrous or softly pubescent especially on the midrib and lateral nerves; midrib prominent below, gradually narrowed to the apex of the blade; lateral nerves usually about 6-7 on each side of the midrib, diverging from the midrib at an angle of about 45° , arcuate, gradually fading towards the margin and branched; veins rather closely reticulate below; petiole variable, up to 3 in. long, sulcate, glabrous or pubescent; stipules oblong-lanceolate, acute, villous or nearly glabrous outside, caducous. Receptacles borne in leafless simply branched panicles on the main-stem or when shrubby towards the base of the branches; panicles up to nearly 1 ft. long, glabrous or nearly so; peduncles $\frac{1}{3}-\frac{1}{2}$ in. long, glabrescent. Receptacles obovoid or obovoid-globose, subrounded or stipitate at the base, $\frac{3}{4}-1$ in. long, with a usually prominent mammillate ostiole, glabrous. Basal bracts whorled, 3, ovate-triangular, often slightly hairy. Ostiole prominent, with numerous often hairy bracts spreading transversely across the orifice. Male flowers subsessile; perianth

hyaline, enveloping the 2 subsessile anthers. Female flowers very shortly pedicellate; perianth-segments oblong-lanceolate, acute, membranous, glabrous. Achene obliquely ellipsoid, shining; style laterally inserted.—Thunb. Fl. Cap. ed. Schult. 34; Mildbr. & Burret in Engl. Jahrb. xlvi. 195, partly, and excl. var. *mallotocarpa*, Mildbr. & Burret, p. 198; De Wild. in Bull. Soc. Bot. Belg. lii. 202. *F. Lichtensteinii*, Link, Enum. ii. 451. *F. Brassii*, R. Br. in Trans. Hort. Soc. Lond. v. 448. *F. thoningiana*, Miq. in Ann. Mus. Lugd.-Bat. iii. 295. *F. capensis*, var. *guineensis*, Miq. l.c. *F. capensis*, var. *trichoneura*, Warb. in Engl. Jahrb. xx. 153, and var. *pubescens*, Warb. in De Wild. & Durand, Reliq. Dewevr. 215. *F. Sycomorus*, var. *prodigiosa*, Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 1012, and var. *alnea*, Hiern, and var. *polybotrya*, Hiern, l.c. 1013 and 1014. *F. plateiocarpa*, Warb. in Engl. Jahrb. xxx. 292. *F. stellulata*, var. *glabrescens*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 27. *F. villosipes*, Warb. l.c. 28. *F. erubescens*, Warb. l.c. 29, t. vi.; De Wild. in Bull. Soc. Bot. Belg. lii. 209. *F. Munsæ*, Warb. l.c. 29, t. xvii. *F. guineensis*, Stapf in Johnston, Liberia, ii. 652. *F. kiboschensis*, Warb., *F. kwaiensis*, Warb., *F. simbilensis*, Warb., *F. Matabelæ*, Warb., *F. umbonigera*, Warb., *F. oblongicarpa*, Warb., *F. sericeogemma*, Warb., *F. brachypus*, Warb., *F. grandicarpa*, Warb., *F. sarcipes*, Warb., and *F. caulocarpa*, Warb., ex Mildb. & Burret in Engl. Jahrb. 197-8, names only. *F. ostiolata*, De Wild. in Bull. Soc. Bot. Belg. lii. 220, incl. var. *brevipedunculata*, De Wild. l.c. 221. *Sycomorus capensis*, Miq. in Hook. Lond. Journ. Bot. vii. 113, t. iii. fig. B. *Sycomorus guineensis*, Miq. in Hook. Niger Fl. 523, and in Hook. Lond. Journ. Bot. vii. 112, t. xiv. fig. B. *S. thoningiana*, Miq. Afr. Vijge-Boom. 13 and in Hook. Lond. Journ. Bot. vii. 112, t. xiv. A.

Upper Guinea. Senegambia: Cayor, *Leprieur*! *Talmy*! Cape Verde, *Brunner*, 118! French Guinea: *Konakry*, *Dybowski*, 5! 8! 9! *Iles de Los*, *Pobéguin*, 1231! Sierra Leone, *Scott Elliot*, 4633! *Don*! Liberia: *Fishtown*, *Dinklage*, 1880! *Sinoc Basin*, *Whyte*, 7! 19! *Monrovia*, *Farmar*, 346! *Cape Palmas*, *Vogel*, 48! *Ivory Coast*: *Atteou*, valley of the *Agnieby*, *Chevalier*, 16184! *Gold Coast*: various localities, *Chipp*, 226! 319! 470! *Soward in Herb.* *Chipp*, 655! *Cummins*, 111! *Johnson*, 591! *Brass*! *Farmar*, 481! *Togo*: various localities, *Kersting*, 5! 48! 99a! *Baumann*, 467! 472! 522! 550! *Zech*, 343! 344! 345! *Northern Nigeria*: *Katagum district*, *Dalziel*, 345! *Abinsi and vicinity*, *Dalziel*, 744! *Southern Nigeria*: *Lagos*, *Moloney*, 14! *Dawodu*, 90! *Dodd*, 416! *Ibu*, *Vogel*, 27! *Cameroons*: *Mao Jarendi*, *Ledermann*, 2283! *Bipinde*, *Zenker*, 2419!

North Central. Eastern Shari: near *Ndelle*, *Chevalier* 7596! 7597! *French Congo*: Upper Ubangi; *Krebedje*, *Chevalier*, 5435

Nile Land. *Jur*: *Jur Ghattas*, *Schweinfurth*, 134a! 1329! *Uganda*: *Madi*, *Speke & Grant*! *North-west Ankole*, *Dawe*, 455! *Entebbe*, *Bagshawe*, 733!

Lower Guinea. *St. Thomas Island*, *Henriques*, 1! *Lower Congo*: *Kisantu*, *Gillet*, 440! 1146! 1321! *Angola*: *Malange*, *Buchner*, 115 partly! *Gossweiler*, 1009! *Marques*, 8!

South Central. *Belgian Congo*: *Gongo Chief's village*, *Seret*, 312! *Bo Chief's village*, *Seret*, 286! *between Dungu and Befuka*, *Seret*, 701! *Katoutown*,

Dewèvre, 164! West side of Lake Albert Edward, *Mildbraed*, 1973! Fort Beni, *Mildbraed*, 2385! Monbutt: Munza, *Schweinfurth*, 3426! 3455!

Mozamb. Distr. Zanzibar, *Stuhlmann*, 797! German East Africa: Usambara, *Engler*, 904a! Sibili, *Holst*, 469! 2302! 2367! Kwai, *Albers*, 151! 365! Uluguru Mountains, *Goetze*, 218! Kibata, *Busse*, 3110! Bukoba, *Mildbraed*, 202! Mugarura Island, *Mildbraed*, 1103! Rovuma River, *Kirk*! Portuguese East Africa: Lusite Valley, *Johnson*, 165! Rhodesia: Matoppo, *Engler*, 2861a! Bulawayo, *Rand*, 399!

Occurs also in South Africa and the Cape Verde Islands.

11. **F. Vallis-Choudæ**, *Del. in Ann. Sci. Nat. 2me sér.* xx. 94.

A large tree; young branchlets glabrous. Leaves scattered, broadly ovate, rounded or slightly cordate at the base, obtuse at the apex, 4–8 in. long, 3–7 in. broad, very coarsely and obtusely repand-dentate in the upper half or rarely subentire, thinly chartaceous or almost membranous, dull and glabrous on both surfaces or rarely shortly pubescent below; midrib flat above, prominent below, gradually tapered to the apex of the blade, with three principal nerves at the base; lateral nerves opposite or subopposite, the lowermost pair ascending to above the middle of the lamina, with prominent side nerves on the side next the margin; tertiary nerves subparallel, arcuate between the lateral nerves; veins slender and distinct below; petiole $1\frac{1}{4}$ – $2\frac{1}{2}$ in. long, glabrous or nearly so; stipules deciduous, linear-lanceolate, obtuse, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrous or slightly puberulous outside. Receptacles axillary, solitary, pedunculate, pear-shaped or subglobose, about $1\frac{3}{4}$ in. in diam. when ripe, minutely puberulous; peduncle $\frac{1}{4}$ to nearly $\frac{1}{2}$ in. long, stout and woody, glabrous. Basal bracts small and soon falling off. Ostiole large and slightly produced; bracts numerous, the outer exserted and ascending, coriaceous, ovate-triangular, glabrous, the innermost descending vertically into the receptacle, linear, obtuse, 1-nerved, $\frac{1}{4}$ in. long, with membranous margins, glabrous. Male flowers sessile; perianth membranous, enclosing the 2 stamens and a rudimentary pistil; anthers large, acutely apiculate. Female flowers subsessile; style slender, with a large stigma. Gall flowers pedicellate.—*Ferr. & Galin. Voy. Abyss. Atlas, Bot.* t. i; *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 26, t. xxiii.; *Mildbr. & Burret in Engl. Jahrb.* xlv. 194. *Sycomorus schimperiana*, *Miq. in Hook. Lond. Journ. Bot.* vii. 112 and in *Afr. Vrije-Boom*, 12, t. ii. A. *F. Schweinfurthii*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 295, name only, descr. in *Verhandl. Zool.-Bot. Ges. Wien*, xviii. 686. *F. Kannenbergii*, *Warb.* and *F. grandicarpa*, *Warb. ex Mildbr. & Burret l.c.* 195, names only.

Upper Guinea. Sierra Leone: Berria, *Scott Elliot*, 4980! Buyabuya, *Scott Elliot*, 4289! French Guinea: Middle Niger; Bammako, *Chevallier*, 246! Togo: Misahöhe, *Baumann*, 467! Bismarckburg, *Büttner*, 732! Sokode, *Schröder*, 29! Kersting, 34! Losso, *Kersting*, 351! Northern Nigeria:

Nupe, *Barter*, 1316! Katagum district, *Dalziel*, 342! Cameroons: South Adamaoua; *Baturi*, *Mildbraed*, 4816!

North Central. French Sudan: *Krebedje*, *Chevalier*, 5416! Eastern Shari: *Ndelle*, *Chevalier*, 7948!

Nile Land. Abyssinia: *Belegez*, *Galinier*; near *Sabra*, *Schimper*, 1280! and without precise locality, *Schimper*, 312! Galabat: banks of the River *Gendua*, *Schweinfurth*, 547! Niamniam: by the *Nabambisso* River, *Schweinfurth*, 2967! Uganda: *Entebbe*, *Bagshawe*, 700! Manyonyo, *Stuhlmann*, 1472!

South Central. Belgian Congo: *Bangala*, *Hens*, C 109! Equateur, *Dewivre*, 561! *Wangata*, *Dewivre*, 670a! Niamniam: *Wando*, *Schweinfurth*, 3232! west side of *Lake Albert Edward*, *Mildbraed*, 1949!

Mozamb. Distr. German East Africa: *Wau Island* in *Lake Kivu*, *Mildbraed*, 1149! *Ujiji*, *Trotha*, 12! *Livingstone Mountains*, *Goetze*, 1173! *Ugogo*; *Mpapua* stream, *Kannenber*, 11! *Uluguru Mountains*, *Stuhlmann*! *Marang*, *Volkens*, 1755! by the *Dehu* River, *Volkens*, 2176! *Sakare*, *Engler*, 944! *Mbalu*, *Engler*, 1492! *Amani*, *Engler*, 745! *Sigi-Tal*, *Zimmermann*, 1049!

12. *F. gnaphalocarpa*, *A. Rich. Tent. Fl. Abyss.* ii. 270. A large spreading tree; branchlets pilose when young. Leaves orbicular or ovate-orbicular, rounded at the apex, cordate at the base, 2-5 in. long, $1\frac{1}{2}$ -3 in. broad, rigidly coriaceous, subentire or obtusely serrate, scabrous on both surfaces, pilose on the nerves; midrib prominent below, continued to the apex of the leaf-blade; nerves several radiating from the base, the principal basal pair as in *F. Sycomorus*; remaining lateral ones 4-5 on each side of the midrib, diverging from it at an angle of about 45° , prominent below, branched towards the margin; veins as in *F. Sycomorus*; petiole $\frac{1}{4}$ -3 in. long, pilose or at length becoming glabrous; stipules subpersistent, lanceolate or linear-lanceolate, acutely acuminate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, tomentose outside, glabrescent towards the margin. Receptacles axillary, solitary, pedunculate, pear-shaped or somewhat globose, often stipitate, about $1\frac{1}{2}$ in. long and nearly as much in diam., densely tomentose; peduncle $\frac{1}{4}$ - $\frac{3}{4}$ in. long, stout, tomentose, the hairs at length often falling off. Basal bracts in a whorl of 3 at the apex of the peduncle or sometimes the bracts scattered over the receptacle, triangular-ovate, obtuse, about $1\frac{1}{2}$ lin. long and broad, pubescent outside. Ostiolar bracts spreading horizontally across the orifice, the outer pubescent outside, the innermost descending vertically into the receptacle, linear from a broad rounded base, obtuse, $\frac{1}{4}$ in. long, glabrous. Male flowers sessile, with 2 stamens. Female flowers shortly pedicellate; perianth-segments membranous, acutely acuminate; achene obovoid, smooth; style lateral with a terete thicker stigma.—*Mildbr. & Burret* in *Engl. Jahrb.* xlv. 190. *Sycomorus gnaphalocarpa*, *Miq.* in *Hook. Lond. Journ. Bot.* vii. 113 and in *Afr. Vijge-Boom.* 15, t. ii. fig. B. *S. trachyphylla*, *Miq.* in *Hook. l.c.* 110 and in *Afr. Vijge-Boom.* 11, t. i. fig. C. *F. trachyphylla*, *Fenzl* in *Flora*, 1844, 311, name only, ex *Miq.* in *Ann. Mus. Lugd.-Bat.* iii. 295; *Hiern* in *Cat. Afr. Pl. Welw.* i. 1014. *F. sidifolia* *Welw.* ex *Hiern*, l.c., partly. *F. damarensis*, *Engl.* in *Engl. Jahrb*

x. 5. *F. hereroensis*, Engl. ex Warb. in Baum, Kunene-Samb. Exped. 219, name only.

Upper Guinea. Senegambia: near St. Louis, *Chevalier*! Gold Coast, *Evans*, 5! Amansare, *Chipp*, 516! Togo: various localities, *Kersting*, A 522! A 523! *Doering*, 130! French Guinea: Porogué, Zandiela, *Chevalier*, 692! Middle Niger, *Chevalier*, 216! Northern Nigeria: various localities, *Dalsiel*, 301! 743! *Dudgeon*, 67! Cameroons: Musgu, *Vogel*, 65!

Nile Land. Abyssinia: various localities, *Schimper*, 874! 1433! *Stuedner*, 1362! *Ellenbeck*, 1635! Galabat; near Matamma, *Schweinfurth*, 543! Fazokl, *Kotschy*, 518! Bahr el Jebel; near Bor, *Muriel*, 111! Jur: Jur Ghattas, *Schweinfurth*, 135! 1775! Uganda: Kawali Plateau, *Stuhlmann*, 2894! Madi, *Speke & Grant*!

Lower Guinea. Angola: various localities, *Welwitsch*, 6353! 6374! 6378! 6382! 6407! 6415! *Gossweiler*, 359! 1003! *Pearson*, 2004! 2021! 2217! *Baum*, 86! Damaraland; Haikamchab, *Galpin & Pearson*, 7552!

Mozamb. Distr. German East Africa: Bukoba; near Itara, *Mildbraed*, 184! Portuguese East Africa: near Mazzaro, *Kirk*! Mount Maruma, *Swynnerton*, 616! and without precise locality, *Peters*! Rhodesia: Umtali, *Engler*, 3127! near Chirinda, *Swynnerton*, 636! hills near the River Lusitu, *Swynnerton*, 636a! Victoria, *Monro*, 361! Sesheke, *Seiner*, 54! Bechuanaland; near Toting, *Seiner*, 205!

Occurs also in the Cape Verde Islands.

According to *Dudgeon* this species yields a hard rubber of a reddish colour. exported by the Niger Company.

13. *F. golungensis*, *Hutchinson in Kew Bulletin*, 1915, 316. A tree 12–25 ft. high or perhaps taller, sometimes parasitic, exuding a very viscid milky juice; trunk straight, erect, bare below, hirsute when young; branches elongated, ascending, hirsute, leafy. Leaves obovate or elliptic-obovate, rounded or slightly pointed at the apex, cordate at the base, 7–11 in. long, $4\frac{1}{2}$ –7 in. broad, with 1–7 obtuse coarse teeth on each side of the lower rounded part, otherwise entire, somewhat membranous, sparingly pilose above, long-pilose with spreading white hairs below, 7-nerved at the base, remaining lateral nerves 8–9 on each side of the midrib, diverging at an angle of 45° , once or twice branched $\frac{1}{2}$ – $1\frac{1}{2}$ in. from the margin, distinct on both surfaces, more prominent below; tertiary nerves rather lax and wavy, prominent below; petiole 1–5 in. long, stout, hirsute; stipules ovate-lanceolate, very acuminate, $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, blood-red-purple, deciduous. Receptacles not known.—*F. sp.*, Hiern in Cat. Afr. Pl. Welw. i. 1016.

Lower Guinea. Angola: Golungo Alto; forests of Queta Mountains, parasitical on *Pseudospondias microcarpa*, Engl., *Welwitsch*, 6409! by the River Cuango, *Welwitsch*, 6347!

14. *F. senegalensis*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 230, 295. A tree. Leaves oblong-elliptic, deeply cordate at the base, shortly and obtusely pointed at the apex, 9–10 in. long, $4\frac{1}{2}$ – $5\frac{1}{2}$ in. broad, undulately dentate around the base but entire in the upper part of the margin, rigidly chartaceous, shortly setulose-pilose on both

surfaces, especially on the nerves below; midrib very prominent below, about 2 lin. broad at the base, gradually narrowed to the apex of the blade; lateral nerves 7-12 on each side of the midrib, diverging from it at a wide angle, looped and branched towards the margin, very prominent below; tertiary nerves wavy, rather distant, prominent below; veins forming a fine close network below; petiole stout, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long in the specimens seen, 2 lin. thick, densely setose-pilose; stipules probably persistent.

Upper Guinea. Senegambia: St. Louis, *Brunner*. Ivory Coast: between the Potou lagoon and Alépé, *Chevalier*, 17375!

I have not seen an authentic specimen of this species, the type of which appears to be lost. The above description is based entirely on two leaves collected by Chevalier which I think may belong to *F. senegalensis*.

15. *F. pygmæa*, *Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 1009*. A dwarf shrublet, 1-3 ft. high, rarely taller; rhizome creeping; stems ascending or suberect, branched, hispid, leafy. Leaves oblong-ovate, obtuse, rounded or truncate at the base, $\frac{3}{4}$ - $3\frac{1}{2}$ in. long, $\frac{1}{3}$ - $1\frac{3}{4}$ in. broad, distantly dentate or slightly lobed, rigidly chartaceous, scabrous above, densely and shortly hispid below, light-green when dry; midrib slightly prominent above, more so below, about $\frac{1}{3}$ lin. broad at the base, hispid; lateral nerves 5-6 on each side, subdistinct above, prominent below, looped very near the margin; veins lax, fairly distinct below; petiole 1 lin. long, densely hispid; stipules deciduous, ovate, obtuse, broad at the base, about $\frac{1}{10}$ in. long, hairy on the back. Receptacles axillary, solitary, ellipsoid or obovoid, contracted at the base into a stipe about $\frac{1}{4}$ in. long resembling a peduncle, a little over $\frac{1}{2}$ in. long, scabrid-hispidulous when mature; bracts very rudimentary at the base of the stipe and a few scattered on the receptacle. Ostiolar bracts numerous, the outer slightly ascending and imbricate, closing the mouth of the ostiole, more or less transversely oblong or broadly ovate, membranous, minutely ciliolate, the inner descending, ovate-oblong, rounded at the apex, about $1\frac{1}{4}$ lin. long, 1-nerved, membranous with jagged margins, minutely ciliolate. Male flowers with 5 perianth-segments; stamen usually solitary. Female flowers shortly pedicellate; perianth-segments linear, acute, membranous, white, glabrous. Achene slightly winged; style lateral, slender, as long as or slightly longer than the achene; stigma small, subentire.—Mildbr. & Burret in *Engl. Jahrb. xlv. 203*. *F. brevicula*, Hiern in *Cat. Afr. Pl. Welw. i. 1009*; Mildbr. & Burret, l.c. 261.

Lower Guinea. Angola: Huilla; in bushy pastures near Lopollo and throughout nearly the whole plateau of Huilla, *Welwitsch*, 6370! near Catumba, *Welwitsch*, 6371! Massalanka, on the Mashonge River, *Baum*, 591! Cubango; near Fort Princeza Amelia, *Gossweiler*, 2391!

Mozamb. Distr. Bechuanaland: Botletle River, *Baincs*! *Seiner* (sect. II.), 173!

16. *F. capreæfolia*, *Del. in Ann. Sci. Nat. 2me sér. xx. 94.* Branchlets subterete, villous with whitish hairs when young, at length becoming pubescent. Leaves often opposite or subopposite, lanceolate or oblong-lanceolate, obtuse or subtruncate at the base, acute or 3-fid at the apex, otherwise entire, $1\frac{1}{4}$ –4 in. long, $\frac{1}{2}$ – $1\frac{1}{2}$ in. broad, thinly and rigidly chartaceous, scabrous with minute tubercles on both surfaces; lateral nerves 5–6 on each side of the midrib, distinct on both surfaces, prominent below, arcuate, indistinctly looped near the margin; venation rather faint; petiole short, $1\frac{1}{2}$ –4 lin. long, pubescent or almost villous, with a pair of stipules at the base of each; stipules persistent, lanceolate, subacute, $\frac{1}{4}$ in. long, keeled on the back, finely puberulous on the outside, shortly ciliate, brown when dry. Receptacles axillary, solitary, pedunculate, subglobose, contracted at the base, $\frac{1}{2}$ – $\frac{3}{4}$ in. in diam., scabrid-hispidulous, without a definite whorl of bracts at the base; peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. long, scabrid-hispidulous, bearing 3–4 scattered ovate obtuse coriaceous puberulous bracts about $\frac{3}{4}$ lin. long. Ostiole broad and gaping, with numerous imbricate bracts visible from the outside; outer ostiolar bracts broadly triangular, obtuse, finely puberulous on the outside, minutely ciliate, the lower all descending into the receptacle, oblong-lanceolate, obtuse, about $1\frac{1}{4}$ lin. long, translucent, glabrous. Male flowers numerous, long-pedicellate; pedicel stout, minutely puberulous; perianth-segments 4–5, unequal and some connate in the lower part, obtuse or truncate at the apex, membranous, glabrous; stamen solitary with usually an abortive female flower at its base. Female flowers in separate receptacles, very numerous, sessile; perianth-segments 6, linear, acute, glabrous. Achene smooth; style lateral, slender, longer than the achene, with a purple stigma.—*Warb. in Warb. & De Wild. Fic. Fl. Congo, 36, t. xxii.*; *Warb. in Engl. Pfl. Ost-Afr. C. 161*; *Engl. Pflanzenwelt Afr. i. i. 118, fig. 100*; *Mildbr. & Burret in Engl. Jahrb. xlv. 202.* *F. tridentata*, *Fenzl in Flora, 1844, 311, name only.* *F. antithetophylla*, *Steud. ex Miq. in Hook. Lond. Journ. Bot. vii. 236, t. v. B*; *A. Rich. Tent. Fl. Abyss. ii. 272.* *F. palustris*, *Sim. For. Fl. Port. E. Afr. 99, partly, incl. t. xc., fig. C.*

Upper Guinea. Togo: Atakpame, *Doering, 321!* Kara River, near Kakedjande, *Kerling, A 622!* Northern Nigeria: Nupe, *Barter, 879!* Katagum District, *Dulziel, 742!* Abyssinia: Garua, on the River Benué, *Ledermann, 3449!* between Boki and Sandjere Kodjore, *Ledermann, 3706!*

Nile Land. Eritrea: near Keren, *Beccari, 70!* *Schweinfurth, 785!* Galabat: bank of the Atbara River, near Matamma, *Schweinfurth, 550!* between Matamma and Shendy, *Schweinfurth, 742!* Abyssinia: by the Tacazze River, *Schimper, 886!* 1446! *Galinier*; on the Mörebb River, *Schimper, 179!* Sudan: Fasokl, *Prince Paul de Wurtemberg!* Sennar, *Kolschy, 228!* *Cienkowsky, 195!* Blue Nile; near Wad el Gazal, *Muriel, 20!* and at Abu Harras, *Schweinfurth, 546!* Khartum, *Schweinfurth, 764!* 870! Bara, *Pfund, 508!* Fashoda, *Baker, 105!* Niamniam: by the River Ibba, *Schweinfurth, 3926!* River Sway, *Schweinfurth, 133!* near Dokkuttu, *Schweinfurth, 2755!*

Mozamb. Distr. German East Africa: Pangani, *Stuhlmann, 794!* near

Mtemerc, *Goetze*, 62! Rovuma River, 26 miles from the mouth, *Kirk*! Portuguese East Africa: near Sena, *Kirk*! near Moramballa, *Kirk*! Magenja da Costa, on the Mucabella River, *Sim*, 6237! Nyasaland: island in the Shire River, *Scott*! Rhodesia: island above Victoria Falls, *Kolbe*, 3163!

Var. *ovatifolia*, Hutchinson. Leaves ovate or ovate-elliptic, entire or slightly 3-lobed, $1\frac{1}{2}$ –2 in. broad.

Upper Guinea. Senegambia: banks of the Gambia, *Heudelot*, 3501!

17. *F. acutifolia*, *Hutchinson in Kew Bulletin*, 1915, 317. Branchlets slender, leafy, purplish when dry, finely and rather sparingly hispid when young. Leaves linear-lanceolate, gradually obtusely acuminate, rounded or obtuse at the base, $3\frac{1}{2}$ – $4\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. broad, entire, thinly chartaceous, moderately scabrous on both surfaces; midrib prominent on both surfaces, narrow above, broader below, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves 9–10 on each side of the midrib, diverging from it at an angle of 75–90°, distinct on both surfaces, prominent below, straight or nearly so up to near the margin, and then continued parallel to the margin and joined with the next nerve; tertiary nerves very lax and reticulate, prominent below; veins very faint below; petiole comparatively short, 2–3 lin. long, slightly setulose-pubescent; stipules caducous, linear-lanceolate, subacute, $1\frac{1}{4}$ lin. long, coriaceous, glabrous or nearly so. Receptacles axillary, solitary, pedunculate, subglobose, about $\frac{1}{2}$ in. in diam., shortly setulose; peduncle about 4 lin. long, slender, setulose, with 2–3 small scattered bracts. Ostiole fairly prominent, with several bracts visible from the outside, the inner bracts spreading horizontally across the orifice. Male flowers long-pedicellate; pedicel glabrous; perianth-segments lanceolate, subacute, membranous, glabrous; stamen solitary; anther obtuse. Female flowers shortly pedicellate; achene smooth; style slender. Gall flowers pedicellate.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1709!

Chevalier, no. 12228, from Kollangui, in French Guinea, seems to be this species, but there are no receptacles on the specimen at Kew.

Resembles *F. capreaefolia*, Del., but among other differences the leaves are relatively longer and more acuminate, and the lateral nerves spread more nearly at right angles.

18. *F. pendula*, *Welw. ex Van Tiegh. in Bull. Soc. Bot. France*, xli. 486, *name only* (*pendulus*); *Hiern in Cat. Afr. Pl. Welw.* i. 1008, *description*. Shrubby; branches very long, sarmentose, climbing high and far, pendulous; younger fruiting branchlets nodding, ashy, turning purplish in a dried state, more or less hispid with rust-coloured hairs; internodes up to $3\frac{1}{2}$ in. long. Leaves obliquely ovate-oblong, acutely and subcaudately acuminate, rounded to a shortly cuneate unequal-sided base, 3–6 in. long, 1– $2\frac{1}{2}$ in. broad, thinly chartaceous or membranous, rather distantly denticulate,

scabrid-punctate above, pubescent or almost tomentose with rather soft spreading hairs below especially on the nerves and veins, 3-nerved at the base, remaining lateral nerves 5-7 on each side, arcuate, diverging from the midrib at an angle of nearly 45° , slightly prominent below; tertiary nerves rather lax, subparallel, distinct below; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long, densely hispid; stipules caducous, linear from a broad more or less ovate base, acute, $\frac{1}{4}$ in. long, 1-nerved, subcoriaceous, glabrous within, hispidulous outside especially on the nerve. Receptacles axillary, solitary, obovoid-globose, $\frac{3}{4}$ -1 in. long, greenish-red when ripe, setose-pubescent. Bracts very small and scattered; peduncle or stipe about $3\frac{1}{2}$ lin. long, hispidulous. Male flowers with a membranous 5-lobed perianth and a single stamen. Female flowers numerous; perianth membranous, 3-lobed, glabrous; style elongated.—Mildbr. & Burret in Engl. Jahrb. xlv. 262. *F. Warburgii*, Winkl. in Engl. Jahrb. xli. 276, from description.

Upper Guinea. Cameroons: between Victoria and Bota, *Winkler*, 449.

Lower Guinea. Angola: Pungo Andongo; in forests on the Calamba Islands in the River Cuanza and also about Lombe and Condo, *Welwitsch*, 6359!

19. *F. urceolaris*, *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 1010. A shrub 4-6 ft. high or rather more, branched from the base, or a small tree; branches virgate, terete, finely scabrous; internodes $\frac{1}{2}$ -2 in. long. Leaves alternate, obliquely elliptic with the midrib dividing the blade unequally, cuneate or rounded at the base, more or less caudate-acuminate, 4-9 in. long, $1\frac{1}{2}$ -3 in. broad, almost membranous, coarsely repand-dentate, sometimes less toothed on the narrower than on the broader side, slightly scabrous on the lower surface; midrib very prominent on the lower surface, continued to the apex of the acumen; lateral nerves 6-7 on each side of the midrib, arcuate, looped and branched very near to the margin, distinct on both surfaces, prominent below; tertiary nerves lax and mostly zig-zag, slender but prominent below; acumen about $\frac{3}{4}$ in. long; petiole $\frac{1}{3}$ - $\frac{3}{4}$ in. long, very minutely scabrous; stipules deciduous, ovate from a broad base, acute, scabrous outside, $\frac{1}{5}$ - $\frac{1}{3}$ in. long (*Hiern*). Receptacles axillary on the young shoots, 2 or 3 together or solitary, shortly pedunculate, globose, 3-4 lin. in diam., very minutely scabrous and spotted. Basal bracts very small and scattered on the peduncle and sometimes one or two extending on to the lower part of the receptacle, ovate, subacute, about $\frac{1}{3}$ lin. long, coriaceous, finely and sparsely puberulous. Ostiole rather large, with numerous imbricate bracts visible from the outside; outer bracts spreading horizontally across the ostiole, very broadly ovate or rounded, mucilaginous, hyaline, glabrous, the inner slightly pointing into the receptacle. Male flowers not seen. Female flowers sessile; perianth-segments very thin; achenes rounded, smooth; style lateral, slender, with a blackish stigma.—Mildbr. & Burret in Engl. Jahrb. xlv. 201, partly. *F. urceolaris*, var. *bumbana*, *Hiern*, l.c.

1010. *F. colpophylla*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 31. *F. scolopophora*, Warb. l.c. 33. *F. xiphophora*, Warb. l.c. 34, t. ix. and x.

Upper Guinea. Cameroons: Lomie; near the River Jah, *Mildbraed*, 5405! Molundu; Old French frontier, *Mildbraed*, 4785! near Victoria, *Winkler*, 449! Fernando Po: Musola, upper part of San Carlos, *Mildbraed*, 7010! Bokoko, *Mildbraed*, 6900!

North Central. Shari district: Ndelle, *Chevalier*, 7932!

Nile Land. Niamniam; on the Nabambisso river, *Schweinfurth*, 2999! British East Africa: Nyanza Basin; Malama's, *Battiscombe*, 680! Uganda: Buddu, *Scott Elliot*, 7436!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 222! Belgian Congo: Kinsuka, *Vanderyst*! Kisantu, *Gillet*, 169! 433! 1294! Imese, *Laurent*! Angola: Golungo Alto; mostly near streams in various localities, *Welwitsch*, 6336! 6390! 6394! 6402! 6403! Cazengo district, *Gossweiler*, 703! 4438!

Mozamb. Distr. German East Africa; Walegga district, *Stuhlmann*, 2922! Bukoba, *Stuhlmann*, 982! 1594!

Described partly from living plants in the Brussels Botanic Gardens, kindly placed at my disposal for study by Dr. E. De Wildeman.

20. *F. exasperata*, *Vahl*, *Enum.* ii. 197. A tree up to 70 ft. high, with spreading branches and soft grey smooth bark; sap watery, viscid; branchlets twiggy, slender, scabrid-pubescent. Leaves elliptic or obovate-elliptic or rarely suborbicular, rounded or slightly cuneate at the base, up to $5\frac{1}{2}$ in. long, $1\frac{1}{4}$ –4 in. broad, finely denticulate, rarely crenate or 3-lobed, chartaceous, very scabrous on both surfaces; midrib prominent below; lateral nerves 3–5 on each side of the midrib, the lowermost pair ascending to the middle or beyond the middle of the blade, with numerous looped side-nerves connecting it with the margin; tertiary nerves numerous subparallel, prominent, spreading at right angles across the blade; petiole $\frac{1}{2}$ –1 in. long, scabrous; stipules early deciduous. Receptacles axillary on the young shoots or towards their base, solitary or in pairs, pedunculate, obovoid or subglobose, up to $\frac{1}{2}$ in. in diam., roughly scabrous; peduncles 1– $3\frac{1}{2}$ lin. long, densely scabrous, with the basal bracts scattered along it and also sometimes here and there on the receptacle; bracts ovate, obtuse, small, sometimes all towards the base of the peduncles but never arranged in a regular whorl. Ostiole slightly prominent, with numerous imbricate bracts spreading across the mouth and visible from the outside; ostiolar bracts subequal, the lower curving into the receptacle, linear-oblong, obtuse, membranous and translucent, 1-nerved, very finely ciliate around the upper part, otherwise glabrous. Male flowers few, subsessile; perianth-segments 4–6, linear-oblong, obtuse, $\frac{3}{4}$ lin. long, membranous, pubescent in the upper part. Stamen solitary, sessile, about $\frac{1}{3}$ lin. long. Female flowers shortly pedicellate; perianth-segments similar to the male; ovary smooth; style lateral, about as long as the ovary, 2-fid.—*Miq.* in *Hook. Lond. Journ. Bot.* vii. 231, t. 14, fig. C; *Engl. Pfl. Ost-Afr. C.* 161; *Hiern* in

Cat. Afr. Pl. Welw. i. 1010; De Wild. & Durand, Contr. Fl. Congo, i. 54; Mildbr. & Burret in Engl. Jahrb. xlv. 200, partly. *F. serrata*, Forsk. Fl. Ægypt.-Arab. 179, not of Linn. *F. scabra*, Willd. in Mém. Acad. Berl. 1798, 102, t. 2, not of Forst. f. *F. coronata*, Spin. Jard. Sebastien, 1809, 10, ex Colla, Hort. Ripul. 56, t. 8. *F. glandulosa*, Hort. ex G. Don in Loud. Hort. Brit. 416, name only. *F. aspera*, Hort. ex Steud. Nom. ed. 2, i. 636. *F. punctifera*, Warb. in Warb. & De Wild. Fic. Fl. Congo, i. 35, t. 7; De Wild. Miss. Laurent, 71, and Études Fl. Bas- et Moyen-Congo, i. 236, and in Bull. Soc. Bot. Belg. lii. 223. *F. silicea*, Sim, For. Fl. Port. E. Afr. 102, t. lxxxvii. *F. scabra*, Sim, l.c. 102, t. xc. fig. C. *F. cyanescens* and *F. pycnophysa*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 201, names only. *F. asperifolia*, Chipp, List of Trees, etc., of the Gold Coast, 35, not of Miq.

Upper Guinea. Senegambia; Karkaudy, *Heudelot*, 863! Casamanze River, *Chevalier*! and without precise locality, *Heudelot*, (?) 893! (quoted by Miquel as *Brunner*). French Guinea: Konakry, *Dybowski*, 4! Kindia, *Chevalier*, 12799! Sierra Leone: Rotumba Island, *Kirk*, 22! Samu Country, *Scott Elliot*, 4212! 5350! Ivory Coast: Sassandra, *Chevalier*, 17913! Bingerville, *Chevalier*, 17314! Gold Coast: Krepi Plains, *Johnson*, 533! Amokokrom, *Chipp*, 325! and without precise locality, *Insert*! Togo: Sokode, *Kersting*, 53! A 561! Loma, *Kersting*! *Warnecke*, 348! Southern Nigeria: Lagos, *Moloney*! Rowland! Ebute Metta, *Millen*, 80! Bonny River, *Kalbreger*, 64! Epindo, *Foster*, 327! Cameroons: various localities, *Preuss*, 1322! *Deistel*, 110a! *Reder*, 470! *Winkler*, 204! 732! *Büsgen*, 66! 106! 373! *Zenker*, 1591! *Ledermann*, 2471a! 2875! 2900! Fernando Po, *Mann*, 196!

Nile Land. Uganda: Busiro, *Dawe*, 112!

Lower Guinea. Island of St. Thomas, *Henriques*, 2! Spanish Guinea: Campo, *Tessmann*, 426! Gaboon: Libreville, *Klainu*, 530! Lower Congo: Kisantu, *Lazaret*! French Congo: Moyombo, *Lecomte*! various localities, *Cabra*, 17! *Laurent*, 1210! *Gillet*, 236! 345! 648! 1345! Angola: Gohingo Alto; Sange, *Welwitsch*, 6411! near Bango, Canguerasange, Cambondo and Trombeta, *Welwitsch*, 6387! Cazengo, *Gossweiler*, 4758! 4865! Mussemba, *Pogge*, 489!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3503! West bank of Lake Albert Edward, *Mildbraed*, 1963! Fort Beni, on the Semliki River, *Mildbraed*, 2204! Dyuma Valley, *Gentil & Gillet*! Basoko, *Laurent*! Lukombe, *Sapin*! Sankuru, *Sapin*! Kinsundi, *Vanderyst*! Lake Leopold II., *Body*! Yumbi, *Laurent*, 416! Djanga, *Serdt*, 772! Ifuta, *Laurent*! Sadi, *Cabra-Michel*, 31!

Mozamb. Distr. Zanzibar, *Kirk*! German East Africa: various localities, *Albers*, 102! *Engler*, 930a! 3269! *Holtz*, 751! 1233! *Warnecke*, 447! *Zimmermann*, 74! 913! *Holst*, 503! 2367! *Stolz*, 72! Portuguese East Africa: Quisico, *Sim*, 5381! Inharreme, *Sim*, 5290! Nhamaurra, *Sim*, 5644!

Used in many parts of Africa as a substitute for emery paper.

Occurs also in Arabia.

21. *F. asperifolia*, *Miq. in Hook. Niger Fl.* 524. A shrub about 8 ft. high; branchlets somewhat slender, pubescent. Leaves variable (*Barter*), nearly entire and then oblong-elliptic, toothed, shortly acuminate at the apex, rounded and slightly unequal-sided

at the base, or pinnately 3-5-lobed and then cuneate at the base, 2-4 in. long, $1\frac{1}{4}$ -2 in. broad, rigidly chartaceous, scabrous on both surfaces; midrib slightly raised above, prominent beneath, about $\frac{1}{3}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 6-8 on each side of the midrib, arcuate, looped very close to the margin, prominent below; tertiary nerves very lax and branched, distinct below; veins rather close, impressed above, distinct below; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long, thickened towards the base, slightly pubescent; stipules deciduous, linear-lanceolate, acutely acuminate, 3 lin. long, about 1 lin. broad, finely puberulous on the outside, with a distinct midrib. Receptacles axillary, solitary or in pairs, pedunculate, globose or obovoid-globose, about 5 lin. in diam., scabrous, with a prominent ostiole; peduncle $\frac{1}{4}$ - $\frac{1}{2}$ in. long, rather slender, puberulous. Bracts scattered on the peduncle, and a very few small ones on the receptacle, broadly ovate, hairy. Ostiole with numerous bracts visible from the outside, spreading horizontally across the orifice, more or less broadly ovate, the outer slightly puberulous, the rest glabrous. Male flowers not seen. Female flowers subsessile; perianth-segments linear, acute, slightly ciliate; achene obliquely ellipsoid; style lateral, slender, with a reddish stigma.—Miq. in Hook. Lond. Journ. Bot. vii. 564, t. 15, fig. B.; Mildb. & Burret in Engl. Jahrb. xlv. 202; De Wild. in Bull. Soc. Bot. Belg. lii. 200.

Upper Guinea. Gold Coast: Tano River, *Chipp*, 342! Southern Nigeria: Abo, *Vogel*, 47! Epindo, *Foster*, 327! Northern Nigeria: Nupe, *Barter*, 135! Cameroons: Bipinde, *Zenker*, 1940! mouth of the Bange River, *Mildbraed*, 4474! forest between Lokomo, Bumba and Bange, *Mildbraed*, 4420!

South Central. Belgian Congo: Kamba, *Laurent*! Bombata, *Allard*!

A specimen without figs collected by Scott Elliot (5130) near Musaia in the Talla Hills, Sierra Leone, is probably this species.

22. *F. storthophylla*, *Warb. in Warb. & De Will. Fic. Fl. Congo*, 32. A shrub about 8 ft. high or a small bushy tree; branchlets terete, scabrid-pubescent. Leaves alternate, obovate-oblancheolate, narrowly caudate-acuminate, 3-6 $\frac{1}{2}$ in. long, $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. broad, rigidly chartaceous, pinnately and laciniately lobed or repand-dentate, scabrous and dull above, very roughly scabrous and pubescent below; midrib slightly prominent but very narrow above, much more prominent and broader below, $\frac{1}{2}$ - $\frac{3}{4}$ lin. thick at the base, gradually tapered to the apex of the acumen; lateral nerves about 6 on each side of the midrib, diverging from it at an angle of about 45°, in the lobed leaves continued to the tips of the lobes, in the toothed leaves faintly looped and branched very close to the margin, prominent and straw-coloured below; tertiary nerves slender and more or less flexuous, rather lax and prominent below; veins very slender and lax; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long, strigose-pubescent; stipules early deciduous. Receptacles axillary, mostly solitary or sometimes paired, shortly pedunculate, globose, about 4 $\frac{1}{2}$ lin. in diam., rather

densely setose and with a very few scattered bracts disposed here and there over the surface; peduncle about 1 lin. long, hispid, with 2 or 3 small scattered bracts disposed upon it. Bracts very small, ovate, pubescent. Ostiole large and slightly protruding, with numerous bracts exerted from the mouth; ostiolar bracts spreading across the orifice, most of them slightly ascending, with their tips inflexed or the outer suberect, all more or less oblong-elliptic, rounded at the apex, membranous. Male and gall flowers in one receptacle, the former numerous, pedicellate; perianth-segments 5 or 6, unequal, oblanceolate-linear, obtuse, membranous, glabrous; anther solitary; filament very short. Female flowers in separate receptacles, pedicellate; perianth more or less as in the male but more fleshy and not ciliate; achenes oblique, smooth; style nearly as long as the achene, slender. Gall flowers pedicellate; perianth-segments 6, oblanceolate-linear, obtuse, minutely ciliate in the upper part, $1\frac{1}{4}$ lin. long. Receptacular scales small and hair-like, white.—*F. paludicola*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 32, t. xii.; De Wild. Études Fl. Bas- et Moyen-Congo, i. 236; Th. & Hël. Durand. Syll. Fl. Congol. 507. *F. urceolaris*, Mildbr. & Burret in Engl. Jahrb. xlvi. 201, partly, not of Welw.

Nile Land. Niamniam: Atoboroo River, *Schweinfurth*, 2834! Uganda: Ruwenzori; Yeria, *Scott Elliot*, 7760! Mubuku Valley, 5000 ft., *Scott Elliot*, 7625! Kampala, *Scott Elliot*, 7329! 7497! east side of Lake Albert Edward, *Scott Elliot*, 8049! Entebbe, *Mahon*! *Bagshawe*, 708! Busiro, *Daw*, 111! North Kitontogolo, *Ussher*, 75! Nyanza Basin, *Moon*, 587!

South Central. Belgian Congo: Fort Beni, *Mildbraed*, 2387! 2403! west side of Lake Albert Edward, *Mildbraed*, 1954!

Mozamb. Distr. German East Africa: Wau Island in Lake Kivu, *Mildbraed*, 1159! Ruanda, *Kaudt*, 137! Lake Mohasi, *Mildbraed*, 570! 571! Bukoba, *Stuhlmann*, 1140! 1511! 3636!

Mildbraed and Burret have united this species with *F. urceolaris*, Welw.; the specimens quoted above differ from that species in the more coriaceous, more deeply divided and rougher leaves, and densely setose receptacles.

23. F. variifolia, Warb. in Warb. & De Wild. Fic. Fl. Congo, 30, t. xv. Branches hanging (*Schweinfurth*); branchlets finely longitudinally sulcate, thinly pilose, at length glabrous, reddish-brown when dry. Leaves variable, some quite entire, oblong or oblong-elliptic, shortly cordate at the base, obtusely cordate-acuminate, 6–8 in. long, $2\frac{1}{4}$ – $3\frac{1}{2}$ in. broad, others 3-lobed in the upper third, lobes spreading and forming a wide sinus, gradually obtusely acuminate, scabrous and with a few scattered setose hairs on the upper surface, scabrous below and pilose only on the midrib and lateral nerves, 5-nerved at the base; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually narrowed to the apex of the leaf; lateral nerves 9–14 on each side, diverging from the midrib at an angle of about 75° , slightly arcuate, those running into the lobes slightly more prominent than the others, looped quite close

to the margin, distinct above, prominent below; tertiary nerves wavy, lax and rather prominent below; petiole 1-1 $\frac{3}{4}$ in. long, rather densely pilose; stipules caducous, ovate or ovate-lanceolate, obtuse, 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ lin. long, becoming coriaceous, pilose outside, glabrous and shining within. Receptacles not known but probably produced on the older wood.—Mildbr. & Burret in Engl. Jahrb. xlv. 203, partly.

South Central. Belgian Congo: Monbuttu; Kibali River, *Schweinfurth*, 3614!

24 *F. sciarophylla*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 31. t. xiii. A shrub about 8 ft. high; young leafy branchlets long-pilose or almost villous. Leaves elliptic or oblong-elliptic in outline, pinnatifid or pinnatilobed or sometimes 3-lobed in the upper third and the lower portion coarsely repand-dentate, rounded or slightly cordate at the base, apex and lobes subcaudately acuminate 6-12 in. long, 4-7 in. broad including the lobes, membranous, densely whitish-villous on both surfaces when quite young and just released from the bud, pilose on both surfaces when mature, on the lower surface especially on the midrib and lateral nerves, about 9-nerved at the base; lateral nerves about 11 on each side of the midrib, diverging from the midrib at an angle of 70°, nearly straight, mostly extended to the apices of the lobes or teeth, distinct on both surfaces, prominent below; tertiary nerves subparallel, slightly wavy, slender, 2-2 $\frac{1}{2}$ lin. apart, distinct on both surfaces; petiole 1-2 in. long, but probably often much longer, rather stout, sulcate when dry, long-pilose; stipules deciduous, oblong-lanceolate, long and acutely acuminate, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, about 3 lin. broad, submembranous, glabrous on both surfaces. Receptacles not known but probably produced on the older wood.—*F. variifolia*, Mildbr. & Burret in Engl. Jahrb. xlv. 203, partly, not of Warb.

Nile Land. Nianniam: by the River Hoo, *Schweinfurth*, 3872! Uganda: North-west Ankole, 4000 ft., *Dawe*, 471! Budongo Forest, *Fyffe*, 267!

25. *F. verruculosa*, Warb. in Engl. Jahrb. xx. 166. A moderate-sized tree, 15-25 ft. high or more, or when occurring in swampy ground often a small shrub with straight unbranched stem; young branches glabrous or puberulous. Leaves lanceolate or lanceolate-elliptic, obtuse at both ends, 2 $\frac{1}{2}$ -6 in. long, 1-2 $\frac{1}{2}$ in. broad, entire, chartaceous or subcoriaceous, mostly shining on the upper surface, finely pustulate and sometimes very slightly rough to the touch below; midrib prominent on both surfaces, broader below, gradually tapered to the apex of the leaf-blade; lateral nerves 10-16 on each side of the midrib, diverging from it at an angle of 70-80°, mostly more prominent above than below, rather slender, looped near the margin; tertiary nerves and veins forming a fairly distinct delicate venation below; petiole 4-7 lin. long, fairly stout, glabrous; stipules

caducous, lanceolate, acutely acuminate, about $\frac{3}{4}$ in. long, finely puberulous or nearly glabrous, closely striate. Receptacles axillary, solitary or in pairs, pedunculate, globose, 3-4½ lin. in diam., glabrous or minutely pubescent towards the ostiole, often reddish-purple when dry; peduncle 1-3 lin. long, finely puberulous. Basal bracts 3, connate at the base, more or less ovate, obtuse, small, puberulous or nearly glabrous, ciliate. Ostiole slightly prominent, with several broad imbricate puberulous or glabrous bracts visible from the outside, the inner of these spreading horizontally across the orifice. Male flowers sessile; perianth-segments reddish, for some time enclosing the solitary obtuse anther. Female flowers sessile; styles lateral, slender, with narrow stigmas. Gall flowers pedicellate.—Hiern in Cat. Afr. Pl. Welw. i. 1004; Mildbr. & Burret in Engl. Jahrb. xlv. 205. *F. prœruptorum*, Hiern, l.c. *F. palustris*, Sim, For. Fl. Port. E. Afr. 99, partly, excl. figure. *F. angolensis*, Warb., *F. Buchanani*, Warb., *F. chariensis*, Warb., *F. ndellensis*, Warb., ex Mildbr. & Burret, l.c. 206, names only.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 1317! Kontagora, in marshes, *Dalziel*, 80! Cameroons: Korowal Plateau, in brooks, *Ledermann*, 3865! Bakari, on the Mao Jerendi River, *Ledermann*, 2276!

North Central. Eastern Shari: Ndelle, *Chevalier*, 6866! 7721! 8105!

Nile Land. Uganda: Entebbe, in swamps, *Bayshawe*, 768! Unyoro, *Bayshawe*, 1561!

Lower Guinea. Angola: Huilla, *Antunes*, 192! Monino district, *Welwitsch*, 6366! 6373! 6375! Longa River, *Baum*, 672! Bailundo district, *Wellman*! Malange district, *Gossweiler*, 1006!

Mozamb. Distr. German East Africa: Ruanda; Nyanza Mountain, *Kandt*, 18! Mohasi Lake, *Mildbraed*, 478! Nyasaland: Mlolo, *Buchanan*, 125! 453! near Kankanja, *Kirk*! near Zomba, *Cameron*! Gazaland: near Chirinda, *Swynnerton*, 146b! Zona River, *Swynnerton*, 146a! Rhodesia: Barotseland; near Sefula, *Prosch*, 11! forest near Salisbury, *Flanagan*, 3017! Portuguese East Africa: Inhambane, *Sim*, 5414! Ngamiland: Botletle River, *Seiner*, 192!

Var. stipitata, Mildbr. & Burret, l.c. 206. Receptacles contracted at the base above the basal bracts into a short stipe.

Upper Guinea. Cameroons: Swamp at Garua, *Ledermann*, 3417! 4958! Mfongu, *Ledermann*, 5968!

26. *F. salicifolia*, *Vahl*, *Symb.* i. 82, t. xxiii. A tree, sometimes somewhat climbing; branches covered with light brown bark; young branchlets usually puberulous, soon becoming glabrous. Leaves lanceolate or oblong-lanceolate, or rarely oblong, gradually and subacutely acuminate or obtuse at the apex, obtuse, rounded or slightly cordate at the base, 1-6 in. long (rarely up to 9 in. long), $\frac{1}{2}$ -2 in. broad, entire, firmly chartaceous or subcoriaceous, sometimes purplish, equally reticulate on both surfaces, glabrous and mostly shining on the upper surface, conspicuously verruculose below, often densely so, sometimes glaucous-green when dry, distinctly 2-5-nerved a little above the base; midrib flat or slightly raised above, prominent below, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex;

lateral nerves 12–20 on each side, very distinct and slightly raised on both surfaces, curved, arising from the midrib at an angle of about 65° ; veins prominent on both surfaces, sometimes rather lax; petiole $\frac{1}{2}$ – $2\frac{1}{2}$ in. long, usually rather slender, narrowly channelled on the upper side, glabrous; stipules deciduous, linear, about 1 in. long, glabrous. Receptacles usually crowded, axillary, mostly in pairs, shortly pedunculate, globose, about $\frac{1}{4}$ in. in diam., very finely and shortly pubescent or nearly glabrous; peduncle 1– $1\frac{1}{2}$ lin. long, rather slender, densely shortly tomentose. Basal bracts deciduous, very small. Ostiole with about 3 or 4 outer bracts closing the orifice; outer bracts transversely oblong-elliptic, about $\frac{2}{3}$ lin. broad; inner bracts spreading horizontally across the ostiole, the innermost descending slightly into the receptacle. Male flowers sessile, with elliptic perianth-segments and solitary subsessile anther. Female flowers sessile; perianth-segments 2–3, short, ovate-lanceolate, glabrous; achene smooth; style slender.—Pers. Syn. ii. 611; Roem. & Schult. Syst. i. 512; Spreng. Syst. Veg. iii. 783; Warb. in Engl. Pf. Ost-Afr. C. 162, partly; Mildbr. & Burret in Engl. Jahrb. xlv. 206, partly. *F. indica*, Forsk. Fl. Ægypt.-Arab. 179, not of Linn. *F. iteoides*, Miq. in Ann. Mus. Lugd.-B.t. iii. 315, name only. *Urostigma salicifolium*, Miq. in Hook. Lond. Journ. Bot. vi. 556. *F. Teloukat*, Battand. & Trabut in Bull. Soc. Bot. France, lviii. 628, 674.

Nile Land. Eritrea: near Mahio in the Haddas Valley, *Schweinfurth*, 176! central part of Lawa Valley, *Schweinfurth*, 1691! around Keren, *Beccari*, 39! *Schweinfurth*, 1000! Abyssinia: Mai Gouagoua, *Quartin-Dillon*. French Somaliland: Adal country, *Héricourt*, 25! British Somaliland: without precise locality, *Mrs. Lort-Phillips*! Sudan: Segedi, near Sennar, *Kotschy*, 257! Kordofan; Jebel Kadugli, *Broun*, 1340! Jebel Daier, *Broun*, 876!

Var. *latifolia*, Hutchinson. Leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ in. broad.

North Central. Eastern Shari: Ndelle, *Chevalier*, 6767!

Occurs also in Arabia and Algeria. The Socotran specimens referred to this species by Balfour (Botany of Socotra, 282) are all *F. Pretoriæ*, Burt-Davy.

27. *F. Pretoriæ*, Burt-Davy in Trans. Roy. Soc. S. Afr. ii. 365, with figures. A large tree; branchlets mostly short and twiggy, glabrous and purplish when young, rarely minutely puberulous. Leaves spreading, oblong or oblong-elliptic, rounded at the base, mostly rather abruptly obtusely and shortly acuminate, 2– $3\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{3}{4}$ in. broad, entire, rigidly coriaceous, often somewhat glaucous below, light-green when dry; midrib almost equally prominent on both surfaces, straw-coloured, $\frac{3}{4}$ –1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 10–12 on each side of the midrib, equally prominent on both surfaces, spreading at a wide angle, rather slender, looped well within the margin; tertiary nerves and veins strongly reticulate on both surfaces; petiole $\frac{1}{2}$ –1 in. long, glabrous; stipules caducous, those surrounding the terminal bud linear-lanceolate, acutely acuminate,

$\frac{1}{3}$ – $\frac{1}{2}$ in. long, purplish, glabrous. Receptacles axillary, crowded towards the ends of the branchlets, shortly pedunculate or subsessile, globose, $3\frac{1}{2}$ –4 lin. in diam., spotted, glabrous; peduncle up to 1 lin. long, terete, glabrous. Basal bracts 3, whorled, ovate-orbicular, about $\frac{2}{3}$ lin. broad, glabrous. Ostiole only slightly protruded, with 3 or 4 broad bracts visible from the outside and spreading across the mouth, glabrous or slightly puberulous; inner bracts rather fleshy, curved into the receptacle, glabrous. Male flowers sessile; perianth-segments 3, ovate, obtuse, slightly fleshy, glabrous; anther solitary, sessile. Female flowers subsessile; achene brightly shining; style longer than the achene, slender. Gall flowers pedicellate.—*F. salicifolia*, Balfour, Botany of Socotra, 282; Warb. in Engl. Pfl. Ost-Afr. C. 162, partly; Mildbr. & Burret in Engl. Jahrb. xlv. 206, partly; not of Vahl. *F. salicifolia*, var. *australis*, Warb. in Viertelj. Naturforsch. Ges. Zürich. li. 139.

Nile Land. Somaliland: Ahl Mountains, *Hildebrandt*, 1460! and without precise locality, *Drake-Brockman*, 418! 427! 435!

Mozamb. Dist. Kilimanjaro: Lake Chala, *Volkens*, 1787! Portuguese East Africa: Ressano Garcia, *Schlechter*, 11909!

Occurs also in Socotra and South Africa; this species is the famous "Wonderboom" of Pretoria.

28. *F. Lecardii*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 24, t. xi. figs. 1–2. A tree; leafy branchlets terete, softly pubescent when young, at length becoming glabrous or nearly so. Leaves rhomboid-elliptic or ovate-rhomboid, gradually and obtusely acuminate, shortly cuneate at the base, $2\frac{1}{2}$ – $4\frac{1}{2}$ in. long, $1\frac{1}{4}$ – $2\frac{1}{2}$ in. broad, entire, coriaceous, strongly reticulate and slightly shining on both surfaces, glabrous; midrib slightly more prominent below than above, gradually tapered to the apex; lateral nerves 9–12 on each side, looped near the margin, the loops forming an irregular semi-circle, like the veins prominent on both surfaces; petiole 1–2 in. long, very narrowly grooved on the upper side, softly pubescent when young, soon becoming quite glabrous; stipules very caducous, linear-lanceolate, acute, about $\frac{1}{2}$ in. long, softly pubescent or puberulous outside. Receptacles axillary, in pairs, sessile, globose, shortly mammillate at the apex, about 4 lin. in diam., at first finely whitish-pubescent, at length glabrous, often brown-spotted when dry. Basal bracts broadly-ovate, rounded at the apex, nearly $\frac{1}{2}$ lin. long, slightly membranous, glabrous, brown when dry. Ostiolar bracts spreading horizontally across the ostiole, subreniform, emarginate, membranous, glabrous, the lower oblong, obtuse, $\frac{1}{2}$ lin. long. Male flowers few, near the ostiolar bracts; perianth-segments elliptic-obovate, subacute, membranous; stamen solitary; filament short and thick; anther small, with distinct cells. Gall flowers numerous, pedicellate; perianth-segments 3, lanceolate, subacute,

$\frac{1}{3}$ lin. long, membranous; ovary stipitate, obovoid, minutely pitted, with a lateral style and large stigma. Female flowers sessile; perianth as in the gall flowers but shorter; ovary triquetrous, shining; style lateral, slender, about half the length of the ovary; stigma small.—Mildbr. & Burret in Engl. Jahrb. xlvi. 208.

Upper Guinea. Senegal: without precise locality, *Lecard*, 197! *Bellamy*, 467! Northern Nigeria: Yola Province on rocky hills, *Dalziel*, 143! Cameroons: Kokumi Hills, on the River Benu, *Ledermann*, 4756! Garua, *Ledermann*, 3505! Lagdo Hills, *Ledermann*, 4371! Tschamba, *Ledermann*, 5238!

29. *F. Welwitschii*, *Warb. in Engl. Jahrb.* xx. 160. A lofty tree up to 130 ft. high, never seen to throw out aërial roots (*Welwitsch*); trunk always straight, moderately thick; head dense, ovoid-oblong; branches suberect, repeatedly divided; young leafy shoots mostly softly tomentose but sometimes quite glabrous and always becoming so when mature. Leaves ovate or ovate-elliptic, long and acutely caudate-acuminate, cordate or rounded at the base, $2\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $1\frac{1}{2}$ – $3\frac{1}{4}$ in. broad, entire, rigidly chartaceous or rarely submembranous, glabrous and closely reticulate on both surfaces, sometimes slightly shining, often finely punctate on the lower surface; midrib slightly more prominent below than above, glabrous; lateral nerves about 10 on each side, arising from the midrib at an angle of about 65° , looped well within the margin, like the veins prominent on both surfaces; petiole $1\frac{1}{4}$ – $2\frac{1}{2}$ in. long, slender, subterete, glabrous; stipules very caducous, linear, acute, $1\frac{1}{2}$ –2 in. long on the newly opened shoots, membranous, pubescent outside on the lower part. Receptacles axillary, sessile, solitary or in pairs, subglobose, obtusely mammillate at the apex, 3–4 lin. in diam., thinly pubescent or nearly glabrous when ripe. Basal bracts 3, imbricate, broadly ovate, rounded at the apex, about $1\frac{1}{2}$ lin. long and broad, coriaceous, finely and rather thinly pubescent outside, glabrous within. Outer ostiolar bracts about 3, imbricate, spreading horizontally over the mouth of the ostiole, suborbicular, the remainder also spreading horizontally, ovate or oblong-ovate, rounded or truncate at the apex, membranous. Male flowers several, near the ostiole, subsessile; perianth-segments 4, obovate-elliptic, rounded at the apex, $\frac{1}{2}$ lin. long, membranous; stamen solitary; filament $\frac{1}{2}$ lin. long; anther $\frac{1}{4}$ lin. long. Gall flowers numerous, scattered amongst the female, pedicellate; perianth-segments 4–5, oblanceolate, subacute, membranous. Female flowers sessile: perianth more or less as in the gall flowers; style lateral, subsistent.—Hiern in *Cat. Afr. Pl. Welw.* i. 998; Mildb. & Burret in *Engl. Jahrb.* xlvi. 208; De Wild. in *Bull. Soc. Bot. Belg.* lii. 235. *F. Welwitschii*, var. *beroensis*, Hiern, l.c. 999. *F. Pireiri* and *F. urophylla*, Welw. ex Mildbr. & Burret, l.c. 209, names only. *F. malangensis*, Warb. ex Mildbr. & Burret, l.c. 209, name only.

Lower Guinea. Belgian Congo: Lower Congo, *Smith*, 42! *Pechuel-Lösche*! Angola: Ambriz; Quibança, *Welwitsch*, 6355! Libongo; in the more elevated

forests, *Welwitsch*, 6404! Zenza do Golungo; at the River Chiche and among the Mongolo and Calumguembo Mountains, *Welwitsch*, 6356! Cazengo; borders of forests near Cacula, *Welwitsch*, 6354! Pungo Andongo; near Caghuy and at the River Casalalé, *Welwitsch*, 6364! Mossamedes; River Bero, *Welwitsch*, 6379! 6381! Loanda district, *Gossweiler*, 422! Malange district *Gossweiler*, 1004! 1008! *Buchner*, 548! Kisolle, *Buchner*, 553! Kakulo, *Buchner*, 558!

South Central. Belgian Congo: Lake Tumba, *Laurent*!

30. *F. cordata*, *Thunb. Diss. Fic. 8, with figure.* Branches somewhat elongated and straight, covered with yellowish-brown puberulous grooved bark; young lateral branchlets short and twiggy, densely and softly tomentose. Leaves ovate-elliptic or oblong-elliptic, rounded or very slightly subcordate at the base, acutely acuminate, $1\frac{1}{2}$ – $4\frac{1}{2}$ in. long, $\frac{3}{4}$ –2 in. broad, rigidly coriaceous, equally strongly reticulate on both surfaces, glabrous; midrib continued to the apex of the leaf-blade; lateral nerves 5–7 on each side of the midrib, looped and much-branched well within the margin, somewhat flexuous, equally prominent on both surfaces; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, grooved when dry, glabrous; stipules caducous, acutely acuminate, softly tomentose. Receptacles axillary, sessile or very shortly pedunculate, mostly in pairs, slightly depressed-globose, about $\frac{1}{4}$ in. in diam., spotted, minutely puberulous. Basal bracts rounded, hairy outside, about one-third as long as the receptacles. Ostiole with 2 or 3 overlapping rounded bracts visible from the outside. Male flowers few, near the ostiolar bracts; perianth membranous; stamen solitary. Female flowers subsessile, numerous. Achene smooth.—*Thunb. Fl. Cap. ed. Schult. 33*; *Drège Zwei Pfl. Documente, 97. 147, 148*; *Mildbr. & Burret in Engl. Jahrb. xlv. 207. Urostigma Thunbergii, Miq. in Hook. Lond. Journ. Bot. vi. 556. F. glaucophylla, Desf. Tabl. 209, and Cat. Plant. Hort. Paris, ed. 3, 346. F. tristis, Kunth et Bouché, Ind. Sem. Hort. Berol. 1846, 19. F. atrovirens, Hort. Berol. ex Mildbr. & Burret, l.c., name only. F. cordata, var. Marlothii, Warb. in Schinz, Viertelj. Naturforsch. Ges. Zürich, li. 137.*

Lower Guinea. Damaraland: Okahandya, *Dinter, 275*!

Occurs also in South Africa.

31. *F. dicranostyla*, *Mildbr. in Engl. Jahrb. xlv. 204.* A small tree; branchlets terete, softly and densely shortly tomentose when young, at length becoming puberulous or nearly glabrous. Leaves elliptic or oblong-elliptic, obtusely or subobtusely caudate-acuminate, rounded at the base, $4\frac{1}{2}$ –7 in. long, 2–3 in. broad, acumen about $\frac{3}{4}$ in. long, entire, thinly and rigidly chartaceous, dull and very finely scabrous on both surfaces; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, minutely puberulous on both surfaces; lateral nerves subopposite, 6–9 on each side of the midrib, distinct on both surfaces, more prominent beneath, looped three or four

times near the margin, slightly curved, arising from the midrib at an angle of about 40° ; veins distinct on both surfaces, prominent below, rather close; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, about 1 lin. thick at the base, softly puberulous; stipules lanceolate, $\frac{1}{4}$ in. long, shortly tomentose, deciduous. Receptacles axillary, solitary, pedunculate, subglobose, about $\frac{1}{2}$ in. in diam. or slightly more, puberulous; peduncle about 3 lin. long, softly shortly tomentose; basal bracts 3, ovate, obtuse, $\frac{3}{4}$ –1 lin. long, shortly pubescent outside. Ostiole not prominent, with about three to five free imbricate bracts visible from the outside; upper bracts imbricate, spreading horizontally across the ostiole, suborbicular, submembranous, the lower descending, lanceolate, obtuse, 1 – $1\frac{1}{4}$ lin. long, with membranous margins. Male flowers several near the ostiolar bracts, shortly pedicellate; perianth enclosing the solitary sessile obtuse anther. Female flowers with perianth similar to the male; style with 2-fid filiform stigmas.—*F. bembicicarpa*, Warb. ex Mildbr. & Burret, l.c., name only, not of K. Schum. & Lauterb.

Upper Guinea. Senegal: Koukan, *Chevalier*, 562! Ndonté T'vigna, *Chevalier*, 2653! Ziguinehor, on the Casamanze River, *Chevalier*, 2651! Sierra Leone: Farana; by the River Niger, *Scott Elliot*, 5330a! 5351! Togo: Loso, *Kersting*, 632! Atkapane, *Doering*, 303! Kirikiri, *Kersting*, 77! Sokode, *Kersting*, 24!

Nile Land. Uganda: Madi and Bari, *Dawe*, 881!

Var. (?) *nitida*, Hutchinson. Leaves shining and quite smooth on the upper surface.

Upper Guinea. Senegal: opposite the Cape Verde Islands, *Perrottet*!

North Central. Central Shari: district of the Sarras Goundi, *Chevalier*, 8598!

Var. *nitida* may represent a distinct species, but in the absence of receptacles it seems better for the present to treat it as a variety.

32. *F. Zenkeri*, Warb. ex Mildbr. & Burret in *Engl. Jahrb.* xlv. 204, fig. 2. A tree about 60 ft. high; branchlets numerous, slender, longitudinally sulcate and dark purple when dry, glabrous. Leaves oblong-elliptic or elliptic, subacutely acuminate, broadly obtuse or slightly obtuse at the base, sometimes slightly oblique, $2\frac{3}{4}$ –4 in. long, 1 – $1\frac{3}{4}$ in. broad, entire, thinly chartaceous, prominently reticulate on both surfaces, sometimes slightly shining above, glabrous above, minutely verruculose below; midrib prominent on both surfaces, nearly $\frac{1}{2}$ lin. broad at the base; lateral nerves 7–8 on each side of the midrib, more prominent below than above, looped near the margin; veins rather close, distinct and somewhat prominent on both surfaces; petiole about $\frac{1}{2}$ in. long, slightly puberulous or nearly glabrous; stipules caducous, lanceolate, about $1\frac{3}{4}$ lin. long, glabrescent. Receptacles axillary, solitary, pedunculate, subglobose, about 4 lin. in diam., light green and laxly reticulate when dry, smooth; peduncle $1\frac{1}{2}$ –2 lin. long, minutely puberulous or nearly glabrous; basal bracts 3, broadly ovate, rounded at the apex, submembranous, convex below, glabrous except the minutely puberulous

margin. Ostiole closed with transverse bracts; outer bracts horizontal, suborbicular, about 1 lin. broad, minutely puberulous, inner bracts gradually descending into the receptacle, a little more fleshy than the outer ones. Male flowers shortly pedicellate, with membranous perianth-segments and a solitary stamen. Female flowers sessile; perianth-segments membranous; style lateral, slender. Gall flowers pedicellate.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1562!

33. *F. ingens*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 288. A tree or shrub; young branchlets stout, with dull grey bark. Leaves ovate or oblong-ovate, rounded at the apex, deeply cordate or rounded-truncate at the base, $3\frac{1}{4}$ –6 in. long, $2\frac{1}{4}$ –4 in. broad, entire, chartaceous, glabrous, slightly shining above, finely warted between the veins below, finely reticulate on both surfaces, light glaucous-green when dry; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 8–9 on each side of the midrib, nearly equally prominent on both surfaces, diverging from the midrib at a very wide angle, prominently bifurcate $\frac{1}{2}$ – $\frac{3}{4}$ in. from the margin; tertiary nerves lax and reticulate, very slender like the veins; petiole 1–1 $\frac{1}{2}$ in. long, sulcate, glabrous; stipules deciduous, not seen. Receptacles axillary, mostly in pairs, shortly pedunculate, globose, rounded at the base, 4–5 lin. in diam., warted when dry, glabrous or slightly pubescent; peduncle 1–3 lin. long or shorter, stout, very slightly puberulous. Basal bracts 2, ovate, rounded at the apex, subpersistent, coriaceous. Ostiole closed with about 3 visible imbricate bracts spreading horizontally across it, not conspicuous. Male flowers subsessile, with a solitary stamen. Female flowers sessile; ovary smooth; style slender. Gall flowers pedicellate.—*Engl. Hochgebirgsfl. Trop. Afr.* 191; *Warb. in Engl. Pfl. Ost-Afr. C.* 161. *Urostigma ingens*, *Miq. in Hook. Lond. Journ. Bot.* vi. 554. *U. xanthophyllum*, *Miq. in Hook. l.c. U. caffrum*, *Miq. Afr. Vijge-Boom.* 31. *U. xanthophyllum*, var. *ovatocordatum*, *Sond. in Linnæa*, xxiii. 136. *F. schimperiana*, *Hochst. ex A. Rich. Tent. Fl. Abyss. ii.* 266, and in *Ferr. & Galin. Voy. Abyss. Atlas. Bot. t. ii.* *F. xanthophylla*, *Steud. ex Miq. in Hook. Lond. Journ. Bot.* vi. 554. *F. caffra*, *Miq. Ann. Mus. Lugd.-Bat.* iii. 288. *F. pondoensis*, *Warb. in Viertelj. Naturforsch. Ges. Zurich.* li. 140. *F. mayenjensis*, *Sim. For. Fl. Port. E. Afr.* 99, t. xciii. fig. B. *F. cordata*, *Sim. l.c.* 99, not of *Thunb.* *F. lutea*, *Mildbr. & Burret in Engl. Jahrb.* xlvi. 209, not of *Vahl.* *F. Albersii*, *Warb. ex Mildbr. & Burret, l.c.* 210, name only.

Upper Guinea. Senegal: Casamanze River; Manpalago, *Chevalier!* Gold Coast, *Erans*, 3! Togo: near Tabalo, *Kersting*, 431! Basari, *Kersting*, 401! Northern Nigeria: Badegi, *Lamb*, 45! near Zaria, *Lamb!* Southern Nigeria: Lagos, *Foster*, 25! Cameroons: Garua; hills south of the Benue, *Ledermann*, 3472! 3479! Dodo, *Ledermann*, 2995!

North Central. Shari: Kaga Kindi, *Chevalier*, 7204! Corbol, *Chevalier*, 9259!

Nile Land. Eritrea: below Geleb, *Schweinfurth*, 1419! Lalamba, *Schweinfurth*, 1802! Galabat: by the River Gendua, *Schweinfurth*, 555! Abyssinia: Jelajeranne, *Schimper*, 1771! near Amba Sea, *Schimper*, 875! Abba Lerruke, *Schimper*, 1098! and without precise locality, *Schimper*, 943! Sudan: Tumat River: Kamamil, *Prince Paul Wilhelm von Württemberg*! near Fasokl, *Kotschy*, 485! Somaliland: Maid, *Hildebrandt*, 1461! Jur: Jur Ghattas, *Schweinfurth*, 1484! 1993! British East Africa: Ukamba; Kitui, *Hildebrandt*, 2683! Uganda: Madi, *Speke & Grant*, 752!

Mozamb. Distr. German East Africa: Mugarura Island, Lake Kivu, *Milbræd*, 1105! Usambara; Mbalu district, *Engler*, 1493! Kwei, *Albers*, 35! Mlalo, *Holst*, 412! Massai Steppe, *Uhlig*, 1012! Portuguese East Africa: Boruma, *Menyharth*, 770! near Arenga, *Sim*, 5653! Lebombo Mountains, *Sim*, 6305! Rhodesia: Victoria Falls, *Allen*, 182! Livingstone, *Rogers*, 7455! 7464! Victoria, *Monro*, 349! 390! 757! Matoppo Hills, *Miss Gibbs*, 285! *Engler*, 2915a! 2956! Umtali, *Engler*, 3153! Tropical Transvaal: Limpopo valley, *Hutchins*, 17!

Occurs also in South Africa.

Ficus lutea, Vahl, with which the above specimens have hitherto mostly been identified, is probably quite a different species and most likely one of the *Bibracteatae*, as the ostiole is described as having a *bifid* umbo at the apex.

34. *F. katagumica*, *Hutchinson in Kew Bulletin*, 1915, 317, with fig. A shady tree; branchlets leafy, softly tomentose, sulcate. Leaves ovate-oblong or oblong-elliptic, slightly cordate or rounded at the base, rounded at the apex, $2\frac{1}{4}$ –4 in. long, $1\frac{1}{4}$ – $2\frac{1}{2}$ in. broad, entire, rigidly subcoriaceous, glabrous and somewhat glaucous on both surfaces; midrib prominent on both surfaces but more so below, about 1 lin. broad at the base, gradually tapered to, but branched and fading away below the apex of the blade; lateral nerves 5–6 on each side of the midrib, diverging from it at an angle of about 60°, prominently bifurcate a considerable distance from the margin, distinct on both surfaces, rather slender and straw-coloured; veins more prominent above than below, forming a fairly close reticulation; petiole $\frac{3}{4}$ –1 in. long, tomentose towards the base, straw-coloured; stipules caducous, coriaceous, tomentose. Receptacles axillary, solitary or in pairs, pedunculate, globose or slightly obovoid-globose, 5 lin. in diam., permanently densely white-tomentose; peduncle 2–3 lin. long, $\frac{3}{4}$ lin. thick, densely and softly tomentose. Basal bracts 3, more or less ovate, obtuse, subsistent, pubescent towards the base. Ostiole slightly prominent, with 3 or 4 imbricate glabrescent bracts visible from the outside, the inner bracts spreading horizontally across the orifice. Male flowers subsessile, with acute perianth-segments and solitary stamen; filament short; anther broader than long. Female flowers with perianth similar to the male. Gall flowers pedicellate.

Upper Guinea. Northern Nigeria: Katagum district, *Dalziel*, 305!

35. *F. kawuri*, *Hutchinson in Kew Bulletin*, 1915, 319. A large tree; branchlets leafy, softly and densely tomentose. Leaves oblong

or oblong-lanceolate, mostly truncate at the base, sometimes slightly cordate, obtusely and shortly acuminate at the apex, 3-7 in. long, $1\frac{1}{4}$ -3 in. broad, entire, thinly chartaceous, glabrous except the midrib above and dull on both surfaces; midrib pubescent in the lower half on the upper surface, prominent below, about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 8-10 on each side of the midrib, diverging from it at an angle of 45° - 60° , prominent but rather slender on both surfaces, prominently bifurcate some distance from the margin; veins equally prominent on both surfaces, distinctly reticulate; petiole 1 in. long, sulcate, softly pubescent; stipules caducous, tomentose outside. Receptacles in the axils of fallen leaves on the two seasons old branchlets, solitary or in pairs, pedunculate, subglobose, about 5 lin. in diam., permanently softly white-tomentose; peduncle $2\frac{1}{2}$ lin. long, terete, tomentose. Basal bracts subpersistent, rusty-pubescent outside. Ostiole with several glabrescent imbricate bracts visible from the outside, the inner ones spreading horizontally across the orifice. Male flowers crowded near the ostiole, sessile; perianth-segments membranous, glabrous; anther solitary, subsessile. Female flowers shortly pedicellate; achene obovoid, smooth; style lateral, nearly as long as the achene, with a jagged stigma. Gall flowers pedicellate.

Upper Guinea. Northern Nigeria: Lokoja, and common throughout Northern Nigeria, Dalziel, 910! Cameroons: between Kanjang and Boki, Ledermann, 3691!

36. *F. ingentoides*, Hutchinson in *Kew Bulletin*, 1915, 319. Young branchlets softly tomentose, leafy. Leaves oblong-lanceolate or ovate-oblong, rounded or slightly cordate at the base, shortly and obtusely acuminate, $2\frac{1}{2}$ -5 in. long, 1 - $2\frac{1}{2}$ in. broad, entire, thinly coriaceous, glabrous and dull on both surfaces or slightly shining above; midrib distinct on both surfaces, slightly more prominent below, gradually tapered to the apex of the blade; lateral nerves 8-10 on each side of the midrib, diverging from it at an angle of about 80° , distinct on both surfaces, bifurcate some distance from the margin; veins forming a fine distinct reticulation on both surfaces; petiole $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, pubescent, at length glabrous or nearly so; stipules caducous, coriaceous, pubescent outside. Receptacles in the axils of fallen leaves on branchlets two seasons old, shortly pedunculate, globose or slightly obovoid-globose, about 5 lin. in diam., permanently softly tomentose; peduncle 1 lin. long or less, stout, tomentose. Basal bracts persistent, slightly pubescent outside, glabrous within. Ostiole with a few imbricate puberulous bracts visible from outside, the inner ones spreading horizontally across the orifice. Male flowers subsessile; perianth-segments membranous; stamen solitary; anther longer than broad. Female flowers sessile; achene smooth; style long and slender, with an acute stigma. Gall flowers pedicellate.—*F. Stuhlmannii*, var.

glabrifolia, Warb. in Engl. Jahrb. xx. 162. *F. lutea*, Mildbr. & Burret in Engl. Jahrb. xlv. 209, partly, not of Vahl.

Nile Land. Eritrea: neighbourhood of Aerur, *Schweinfurth*, 1687!

Mozamb. Distr. German East Africa: Usukuma; Nyangesi, *Stuhlmann*, 4144! Lake Victoria: Bussisi, *Stuhlmann*, 750! Mwanza, *Stuhlmann*, 4585!

37. *F. umbellata*, *Vahl*, *Enum. Pl.* ii. 182. A tree 20–25 ft. high (*Welwitsch*); young branchlets stout, leafy, glabrous, nearly $\frac{1}{2}$ in. thick just below the apex. Leaves large, ovate-orbicular or nearly orbicular, shortly and obtusely acuminate, truncately rounded at the base or broadly cordate, 4–10 in. long, $2\frac{1}{2}$ – $8\frac{1}{2}$ in. broad, entire, thinly chartaceous, glabrous and dull on both surfaces; midrib flat above, prominent below, nearly 2 lin. broad at the base below, gradually tapered to the apex; lateral nerves about 7–9 on each side of the midrib, diverging from it at an angle of a little more than 45° , the lowermost pair opposite and with about 4 prominent side nerves on the lower side, the remainder gradually becoming alternate upwards, the uppermost 3–4 pairs bifurcate 1– $1\frac{1}{2}$ in. from the margin, looped, all distinct on the upper surface, prominent below; tertiary nerves faint and rather lax below, wavy; venation delicate and close, distinct below; petiole $1\frac{1}{4}$ –3 in. long, about $1\frac{1}{4}$ lin. thick, glabrous; stipules deciduous, those surrounding the terminal bud ovate-triangular, subacutely acuminate, coriaceous, minutely ciliate. otherwise glabrous. Receptacles borne in fascicles on the older branches remote from the leaves, very shortly pedunculate, broadly obovoid-globose, with a distinct ostiole, 1– $1\frac{1}{4}$ in. long and in diam., minutely puberulous, becoming coarsely wrinkled when dry. Basal bracts 2, suborbicular, $\frac{1}{4}$ in. broad, rigidly coriaceous, very minutely puberulous. Ostiole 2-lipped, the surrounding part subcircular and slightly elevated; orifice about 1 lin. broad; bracts not seen.—*Pers. Syn.* ii. 608; *Roem. & Schult. Syst. Veg.* i. 499; *Spreng. Syst. Veg.* iii. 778; *Schumach. & Thonn. Beskr. Guin. Pl.* 25; Mildbr. & Burret in Engl. Jahrb. xlv. 222. *F. tuberculosa*, *Welw.* ex *Hiern* in *Cat. Afr. Pl. Welw.* i. 999. *F. megalodisca*, *Warb.* in *Warb. & De Wild. Fic. Fl. Congo*, 2, t. ii. *F. Woermanni*, *Warb.* ex Mildbr. & Burret in Engl. Jahrb. xlv. 222, name only.

Upper Guinea. French Guinea: Los Islands, *Pob'quin*, 1229! *Konakry*, *Dybowski*, 7! *Sierra Leone*: Old Wallia, *Searcies River Valley*, *Scott Elliot*, 4639! *Gold Coast*: Sefwhi and Wam districts, *Armitage*! and without precise locality, *Thonning*! *Togo*: Atkapame, *Busse*, 3532! *Northern Nigeria*: Bida, *Lamb*, 34! *Cameroons*: without precise locality, *Woermann*!

Lower Guinea. French Congo: by the *Alima River*, *Thollon*, 966! *Belgian Congo*: *Kimuenza*, *Gillet*, 1747! *Angola*: *Golungo Alto*, *Welwitsch*, 6413!

38. *F. polita*, *Vahl*, *Enum. Pl.* ii. 182. A large tree about 50 ft. high; branchlets somewhat slender, very minutely puberulous when young. Leaves ovate or ovate-oblong, slightly cordate or rounded at the base, caudate-acuminate, 3–6 in. long, 2 – $4\frac{1}{2}$ in. broad,

entire, membranous or subchartaceous, glabrous and dull on both surfaces, 5-nerved at the base; midrib flat on the upper surface, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 7 on each side of the midrib, diverging from it at an angle of about 45° , slender, prominent on both surfaces, bifurcate about $\frac{1}{2}$ – $\frac{3}{4}$ in. from the margin; lowermost pair and the pair above opposite, the others alternate or subalternate; veins very close and slender, forming a delicate reticulation below; petiole slender, up to $4\frac{1}{2}$ in. long, finely sulcate, very minutely puberulous; stipules early deciduous, lanceolate-acuminate, 5 lin. long, subcoriaceous, glabrous. Receptacles arranged in fascicles on thick woody outgrowths from the old wood, pedunculate, subglobose, about $1\frac{1}{2}$ in. in diam. when dry, wrinkling like a dried plum, glabrous or very minutely and sparingly pubescent; peduncle $\frac{1}{3}$ – $\frac{3}{4}$ in. long, 1 lin. thick, glabrous. Basal bracts 3, broadly triangular. Ostiole slightly impressed, with the bracts all descending into the receptacle. Male flowers with 3–4 lanceolate perianth-segments and a solitary stamen. Female flowers with 3 ovate-lanceolate obtuse perianth-segments; style long and slender with a short slightly oblique stigma.—Pers. Syn. ii. 608; Roem. & Schult. Syst. i. 499; Spreng. Syst. Veg. iii. 778; Mildbr. & Burret in Engl. Jahrb. xvi. 222. *Urostigma politum*, Miq. in Hook. Lond. Journ. Bot. vi. 553. *F. syringifolia*, Warb. in Engl. Jahrb. xx. 170, not *F. syringifolia* of Kunth & Bouché. *F. pseudo-elastica*, Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 996. *F. niamniamensis*, Warb. in Warb. & De Wild. Fic. Congo, 14, t. xx. *F. umbrosa*, Sim. For. Fl. Port. E. Afr. t. lxxxviii. excl. fig. of receptacles. *F. barombiensis*, *F. stenosiphon*, *F. syringoides*, *F. pachysarca*, Warb. ex Mildbr. & Burret, l.c. 222–223, names only.

Upper Guinea. Senegal: by the River Casamanze, *Chevalier*, 2662! Iton, *Chevalier*, 2663! without locality, *Isert*. French Guinea: Los Islands, *Pobiquin*, 1233! Konakry, *Dybowski*, 6! Ivory Coast: Basin of the Cavally River at Beriby, *Chevalier*, 20008! Gold Coast: Krepi Plains, *Johnson*, 549! 551! Togo: Ndsolo, *Baumann*, 561! Kete Kratschi, *Zech*, 4! Northern Nigeria: Zungeru, *Dalziel*, 568! Katagum district, *Dalziel*, 321! Southern Nigeria: Owerri district, *Sherriff*! Cameroons: Barombi, *Preuss*, 409! Victoria botanic garden, *Winkler*, 428! Neu-Tegel, *Winkler*, 207!

North Central. Central Shari: Koulfé, *Chevalier*, 8784 bis! 8832! 9002!

Nile Land. Mittu: near Mvolo, *Schweinfurth*, 2826! Niamniam: by the Linduku River, *Schweinfurth*, 3134!

Lower Guinea. Angola: Golungo Alto; near the River Cuango, *Welwitsch*, 6344! Chella Mountains, *Welwitsch*, 6365! Sange, *Welwitsch*, 6396, 6397!

South Central. Belgian Congo: south bank of the Kassai, *Luja*, 212!

Mozamb. Distr. German East Africa: without locality, *Stuhlmann*! Portuguese East Africa: Magenja da Costa, *Sim*, 5549!

Var. *persicarpa*, Hutchinson. Receptacles shortly stipitate, $2\frac{1}{2}$ in. in diam., spotted.

Upper Guinea. Cameroons: Molundu district; between Lokomo, Bumba and Bange, *Mildbraed*, 4421!

Sim's figure of his *F. umbrosa* shows the receptacles sessile and stipitate, but in his type specimen they are long-pedunculate and rounded at the base.

39. *F. Fischeri*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 227. A tree up to 50 ft. high; branchlets thick, terete, glabrous. Leaves ovate, slightly attenuated to the apex, slightly and rather widely cordate or rounded at the base, 4–7 in. long, $2\frac{3}{4}$ – $4\frac{1}{2}$ in. broad, entire, thinly chartaceous, glabrous and dull on both surfaces or slightly shining above; midrib slightly raised above, prominent below, about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves numerous, about 16 on each side of the midrib, several radiating from the base of the midrib, the others diverging from it at an angle of 55° , nearly straight, prominently looped near the margin, very slender and slightly prominent on both surfaces; tertiary nerves laxly reticulate, distinct on both surfaces; veins very fine and scarcely visible; petiole $1\frac{1}{2}$ –3 in. long, widened towards the base, glabrous; stipules early deciduous. Receptacles fasciculate on the stem (or perhaps the main branches), pedunculate, broadly ellipsoid-globose, truncate at both ends, with a sunken beak-like ostiole, $\frac{2}{3}$ – $\frac{3}{4}$ in. long, $\frac{2}{3}$ in. in diam., slightly wrinkled and deep straw-coloured when dry, glabrous; peduncle about $\frac{1}{2}$ in. long, about $\frac{3}{4}$ lin. thick, thickened towards the apex, glabrous. Basal bracts early deciduous, their bases connate and expanded into a glabrous plate-like disc closely adpressed to the receptacle. Ostiole 2-lipped; bracts all descending into the receptacle. Receptacular wall firm, $1\frac{1}{4}$ – $1\frac{1}{2}$ lin. thick. Male flowers shortly pedicellate; stamen solitary.

Mozamb. Distr. German East Africa: Kagehi, *Fischer*, 545! Tabora, *Trotha*, 56! Uduhc, near Tabora, *Siegel*, 1597! and without precise locality, *Trotha*, 195! Rhodesia: 100 miles north of the Victoria Falls, *Kesteven*! near Livingstone, *Seiner*, 16! Motata, *Jalla*!

A remarkably distinct species, distinguished among the *Fasciculatæ* by the large ovate leaves, numerous lateral nerves, and pedunculate fasciculate receptacles on the old wood. Mildbraed and Burret (l.c.) were in doubt as to whether the receptacles were pedunculate; Lord Kesteven's specimen has two, well preserved, with peduncles nearly $\frac{1}{2}$ in. long.

40. *F. brachylepis*, *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 1011. A tall or moderate-sized tree, glabrous throughout, very copiously milky, with wide spreading head; branches spreading; branchlets dark-coloured in the dried state, sometimes subverticillate by the proximity of the nodes, leafy towards the apex. Leaves oblong, shortly and gradually obtusely acuminate, rounded or truncate at the base, 4–7 in. long, $1\frac{3}{4}$ – $3\frac{1}{4}$ in. broad, entire, thinly chartaceous, dull on both surfaces, 7-nerved at the base; midrib flat above, prominent beneath, about 1 lin. broad at the base, gradually tapered to the apex; lateral nerves (excluding the basal ones) 8–10 on each side, spreading from the midrib at an angle of 45° – 56° , distinct on both surfaces, slender, branched and indistinctly looped near the margin, but forming only a very indistinct intramarginal line; tertiary nerves slender, very slightly prominent on both sides; veins very slender, fairly distinct on both surfaces; petiole $\frac{3}{4}$ – $3\frac{1}{2}$ in. long,

about 1 lin. thick at the middle, broader towards the base, slightly grooved when dry; stipules caducous, lanceolate, acuminate, about $2\frac{1}{2}$ lin. long. Receptacles on the 2-5-year-old branches and also on the trunk, 2 or 3 or even 6 to 8 together, but mostly in fours, pear-shaped, $1-1\frac{1}{2}$ in. long, $\frac{3}{4}-1\frac{1}{4}$ in. in diam., green or yellowish, smooth, densely beset with small whitish scarcely elevated spots; peduncles slightly flattened, $\frac{3}{4}-1$ in. long, narrowly sulcate, finely puberulous. Basal bracts soon deciduous. Ostiole sunken, 2-lipped, with small bracts. Male flowers not seen. Female flowers with long slender styles. Gall flowers long-pedicellate.—Mildbr. & Burret in Engl. Jahrb. xlv. 223; De Wild. in Bull. Soc. Bot. Belg. lii. 201. *F. Marquessii*, Warb. ex Mildbr. & Burret, l.c., name only.

Lower Guinea. Angola: Golungo Alto; forests of Quisuculo in Sobate Bango and in Sobato Quilombo, *Welwitsch*, 6338! 6419b! Lunda-Kassal region: Malangi, *Marques*, 65! between Cammondai and Prototipo, *Gossweiler*, 5066!

South Central. Belgian Congo: Kapalumba, *Sapin*!

41. *F. dryepondtiana*, *Gentil in Rev. Hort. Belg.*, 1906, 85, with fig. Stem simple, terete. Leaves spreading or slightly drooping, oblong, gradually or subcaudately acuminate, cordate at the base, 9-13 in. long, $3\frac{1}{2}-4$ in. broad, chartaceous, with undulate entire margins, dark green and slightly shining on the upper surface, purple below, minutely puberulous on the midrib and lateral nerves below, otherwise glabrous, 5-nerved at the base, remaining lateral nerves about 7 on each side, subopposite, looped and branched some distance from the margin, prominent below; veins rather lax, distinct below; petiole $1\frac{3}{4}-3$ in. long, terete except for a shallow groove on the upper surface, glabrous; stipules persistent, linear from a broad base, very acute, with recurved folded margins, $1-1\frac{1}{4}$ in. long, about $\frac{1}{4}$ in. broad at the base, dark brown, glabrous. Receptacles fasciculate on short very thick cushion-like branchlets borne on the older leafless branches, about 9 in each fascicle, pedunculate, globose, $1\frac{1}{4}-1\frac{3}{4}$ in. in diam., covered with greenish-white spots, densely tomentose when quite young, becoming pubescent; peduncle 4-5 lin. long, rather stout, glabrous or very minutely puberulous; basal bracts 2, broadly ovate, obtuse, subcoriaceous, about $1\frac{1}{2}$ lin. long, puberulous outside. Ostiole inconspicuous, circular, 2-lipped; bracts all descending into the receptacle, linear-lanceolate, acutely acuminate, 3- $3\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, subcoriaceous, keeled, glabrous. Male flowers not seen. Female flowers shortly pedicellate; perianth-segments lanceolate, subacute, glabrous. Achene smooth; style lateral, longer than the achene, with a large fleshy stigma.—Mildbr. & Burret in Engl. Jahrb. lxvi. 262; De Wild. in Fedde, Repert. xii. 303 and in Bull. Soc. Bot. Belg. lii. 205.

Upper Guinea. Cameroons: Molundu district, *Mildbraed*, 4388! 4430! 4447! Bumba, *Mildbraed*, 4506!

Lower Guinea. Gaboon: Libreville, *Klaine*, 576! 1277!

South Central. Belgian Congo: Welle district; near Poko, *Seret*, 650! Kwango district; Madibi, *Lesrauwaet*, 98! Limbuta, *Laurent*, 1355! Lake Foa, *Sapin*! Bombe, *Gentil*! and without precise locality, *Body*!

Described chiefly from living plants in the Brussels Botanic Garden and at Kew; the receptacles were collected by Sapin. According to Body the leaves are employed in native medicine as a cure for plague.

42. *F. elegans*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 288. A tree about 40 ft. high; young branchlets rather stiff, leafy towards the apex, very minutely puberulous. Leaves obovate or obovate-elliptic, very shortly and obtusely pointed at the apex, slightly narrowed to a very obtuse base, 3–4½ in. long, 1½–2¼ in. broad, entire, thinly chartaceous, dull and glabrous on both surfaces, finely dotted above; midrib flat above, very prominent below, about ¾ lin. broad at the base, gradually tapered to the apex; lateral nerves about 11 on each side of the midrib, diverging at an angle of about 75°, slender, distinct on both surfaces, slightly raised below, looped about 1 lin. from the margin, the loops forming a distinct crenate intramarginal nerve; veins very fine, fairly distinct below; petiole ½–1 in. long, about ¾ lin. thick, with a broad channel on the upper side, glabrous, straw-coloured when dry; stipules deciduous, not seen. Receptacles fasciculate on the branchlets of a few seasons' growth, 4–5 in a fascicle, pedunculate, globose or ellipsoid-globose, ¾–1 in. in diam., shortly pubescent; peduncle ½–1 in. long, ¾–1 lin. thick, shortly but rather sparingly pubescent. Basal bracts small, connate at the base, soon falling off. Ostiole small and 2-lipped; bracts all descending into the receptacle, linear-lanceolate, subacute, glabrous. Male flowers shortly pedicellate, with a solitary stamen. Female flowers subsessile. Gall flowers long-pedicellate.—Mildbr. & Burret in *Engl. Jahrb.* xvi. 230. *Urostigma elegans*, *Miq. in Hook. Lond. Journ. Bot.* vi. 557, vii. 563, t. xiii. A and in *Hook. Niger Fl.* 521.

Upper Guinea. Gold Coast: Cape Coast Castle, *Vogel*, 25! 87! Krobo Plains, *Johnson*, 559! Togo: east of Nyande, *Doering*, 228! Southern Nigeria: common in and around Lagos, *Millen*, 23! Cameroons: *North-west Cameroon Company's Collector* (in *Herb. Berlin*)!

43. *F. Buntingii*, *Hutchinson in Kew Bulletin*, 1915, 320. *with fig.* An epiphyte; stem 3 ft. in circumference; young branchlets elongated, tapered to the apex, ribbed, glabrous. Leaves elongate-oblong, gradually and obtusely acuminate, rounded or obtuse at the base, 4–6½ in. long, 1–1½ in. broad, entire, shining above, dull and glabrous below; midrib flat above, prominent below, gradually tapered to the apex of the blade; lateral nerves about 10 on each side of the midrib, diverging from it at an angle of about 75°, arcuate, looped near the margin, prominent below; tertiary nerves reticulate; veins forming a close network below; petiole about ½ in. long, glabrous, sulcate above; stipules early caducous, very small, acute. Receptacles borne in fascicles on very short leafless lateral branchlets

on the main stem, pedunculate, subglobose, about $1\frac{3}{4}$ in. in diam. when ripe, shrinking to $1\frac{1}{4}$ in. when dry, with very thick walls, cordate at the base, strigillose-pubescent; peduncle $1\frac{1}{4}$ in. long, recurved, stout, puberulous. Basal bracts caducous, from a sketch by the collector more or less lanceolate and about 7 lin. long, probably membranous. Ostiole small and pore-like, with the bracts all descending into the receptacle. Male flowers rather long-pedicellate, with a solitary obtuse anther. Female flowers pedicellate; stigmas papillose.

Upper Guinea. Liberia: bank of the Mano River in Gola Forest, *Bunting*! According to the collector the latex and fruit are worthless.

44. *F. ugandensis*, *Hutchinson in Kew Bulletin*, 1915. 321. A tree 30 ft. high or more; branchlets covered with greyish glabrous bark. Leaves elliptic or oblong-elliptic, rounded at the base, shortly-acuminate, $2-4\frac{1}{2}$ in. long, $1-2\frac{1}{4}$ in. broad, entire, chartaceous, pustulate above, glabrous and slightly shining below; midrib flat above, prominent below, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 9-11 on each side of the midrib, diverging from it at an angle of $45^{\circ}-60^{\circ}$, subopposite, prominent on both surfaces, looped and branched towards the margin; tertiary nerves and veins forming a lax reticulation below; petiole $\frac{3}{4}-1\frac{1}{4}$ in. long, strongly sulcate, glabrous; stipules caducous. Receptacles fasciculate on the older shoots, pedunculate, ellipsoid-globose, about $1\frac{1}{4}$ in. long, shrivelling up like a desiccated plum when dry, puberulous; peduncle $\frac{3}{4}$ in. long, about $1\frac{1}{4}$ lin. thick, minutely puberulous. Basal bracts early deciduous, not seen. Ostiole 2-lipped, somewhat inconspicuous; bracts all descending into the receptacle. Male flowers shortly pedicellate; perianth-segments 4-5, linear-lanceolate, subacute, membranous, glabrous. Stamen solitary; filament short; anther ovoid, obtuse. Gall flowers long-pedicellate.

Nile Land. Uganda: Buddu, at 3800 ft., *Dawe*, 256!

45. *F. Gossweileri*, *Hutchinson in Kew Bulletin*, 1915. 321, *with fig.* A tree 50 ft. high with a short irregular trunk and broad head; branches spreading, beset on the upper side with leafless fruiting twigs 2-4 in. long; young branchlets short, glabrous or sometimes finely puberulous. Leaves oblong or oblong-elliptic, rather abruptly acuminate (acumen $\frac{3}{4}-4$ lin. long), obtuse, truncate or slightly rounded at the base, 2-4 in. long, 1-2 in. broad, entire, chartaceous, dull on both surfaces when dry, glabrous, closely and finely reticulate below; midrib slightly impressed above, prominent below, $\frac{1}{2}-\frac{3}{4}$ lin. broad at the base, gradually tapered to and becoming very slender at the apex of the blade; lateral nerves 9-10 on each side of the midrib, diverging from it at an angle of about 60° , very slender, looped near

the margin, distinct on both surfaces; tertiary nerves lax and inconspicuous; petiole 1-3 in. long, slender, minutely puberulous; stipules caducous, those surrounding the terminal bud lanceolate, long-acuminate, about $\frac{1}{2}$ in. long, subcoriaceous, glabrous. Receptacles borne in fascicles on short cushion-shaped protuberances on the main branches, pedunculate, obovoid, contracted at the base, $1\frac{1}{3}$ in. long, $\frac{3}{4}$ -1 in. in diam., closely spotted, softly pubescent; peduncle $\frac{3}{4}$ -1 in. long, about $1\frac{1}{4}$ lin. thick, angular and twisted when dry, softly pubescent. Basal bracts deciduous, leaving a small pubescent rim encircling the top of the peduncle. Ostiole slightly raised, subtomentose, 2-lipped; bracts all descending into the receptacle, the pair nearest the orifice linear, obtuse, 3 lin. long, somewhat fleshy, glabrous, the others acutely acuminate. Male flowers shortly pedicellate: perianth-segments obovate-oblongate, rounded at the apex, glabrous. Stamen solitary, accompanied by a slender style produced at the base of the filament; filament $\frac{1}{2}$ lin. long; anther-cells diverging at the base; connective slightly produced at the apex. Female flowers with acutely acuminate perianth-segments. Style slender, the stigmas of several flowers cohering.

Lower Guinea. Angola: Malange district; M'Bango woods, *Gossweiler*, 1005!

46. *F. macrosperma*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xvi. 223. A tree 130 ft. high; trunk stout; branchlets twiggy, sulcate, glabrous. Leaves oblong or oblong-lanceolate, gradually and obtusely acuminate, obtuse at the base, $2\frac{1}{4}$ - $3\frac{1}{4}$ in. long, $\frac{2}{3}$ -1 in. broad, entire, chartaceous, dark-coloured on the upper surface when dry, fuscous-brown below, glabrous; midrib flat above, prominent below, about $\frac{1}{3}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 9 on each side of the midrib, diverging from it at an angle of about 55° , slender, distinct below, looped near the margin; veins very lax and only slightly conspicuous below; petiole slender, 4-5 lin. long, very minutely puberulous; stipules early deciduous, glabrous. Receptacles thick and woody, borne on the trunk, pedunculate, subglobose, $1\frac{1}{2}$ in. in diam., shortly and densely hispid; peduncle stout, $1-1\frac{1}{4}$ in. long, about $2\frac{1}{2}$ lin. thick, shortly hispid. Basal bracts 2, soon deciduous, leaving the large orbicular basal portion closely adpressed to the receptacle. Ostiole 2-lipped; bracts few, not visible from the outside, all descending into the receptacle. Male flowers pedicellate: perianth-segments 3, connate at the base. Stamen solitary. Female flowers sessile or subsessile; style filiform.

Upper Guinea. Togo: Atakpame; near Enjaau-Bena, *Doering*, 356! Cameroons: Bipindi, *Zenker*, 2639!

Lower Guinea. Gaboon, *Duparquet*!

47. *F. sansibarica*, *Warb. in Engl. Jahrb.* xx. 171. A tree with large spreading main branches on which are borne numerous clusters

of figs. Leaves oblong or lanceolate-oblong, obtuse at both ends, $3\frac{1}{2}$ – $5\frac{1}{2}$ in. long, $1\frac{1}{4}$ – $2\frac{1}{4}$ in. broad, entire, firmly chartaceous, finely verrucose above, otherwise dull and glabrous on both surfaces; midrib slightly impressed above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 8–9 on each side of the midrib, the lowermost pair opposite and sharply ascending, the others diverging from the midrib at a wide angle and mostly arcuate, slender, prominent below, looped close to the margin; tertiary nerves very lax and branched, distinct below; veins closely reticulate and distinct on the lower surface; petiole $1\frac{3}{4}$ – $2\frac{1}{4}$ in. long, glabrous; stipules deciduous. Receptacles borne in clusters on the old main branches, globose, $\frac{3}{4}$ –1 in. in diam., green when fresh, minutely puberulous, wrinkled like a plum when dry, with a basal stipe $1\frac{1}{2}$ lin. long. Basal bracts not seen. Ostiole 2-lipped, with no bracts visible from the outside, all descending into the receptacle. Male flowers with a solitary stamen.—Mildbr. & Burret in Engl. Jahrb. xlv. 223. *F. Langenburgii*, Warb. in Engl. Jahrb. xxx. 293. *F. delagoensis*, Sim, For. Fl. Port. E. Afr. 99, t. xcii. *F. libertiana*, Warb. ex Mildbr. & Burret, l.c., name only

Mozamb. Distr. Zanzibar, *Stuhlmann*, 793! *Sacleux*, 2021! German East Africa: Dar-es-Salaam, *Stuhlmann*! Langenburg, at Lake Nyasa, *Goetze*, 859!

In the Berlin Herbarium there is a photograph of a tree of this species showing large spreading main branches with a multitude of figs arranged in clusters, none of which appear to be borne on the younger branches or on the young shoots.

Occurs also in extratropical Portuguese East Africa.

48. **F. Demeusei**, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 20, t. xiv. figs. 5–6. Branchlets glabrous, grey or brownish-grey, fairly slender. Leaves rather elongate-oblong, shortly and rather abruptly obtusely acuminate, narrowed to an obtuse base, $3\frac{1}{2}$ –6 in. long, $1\frac{1}{2}$ –2 in. broad, entire, membranous, dull and glabrous on both surfaces; midrib flat and more or less straw-coloured above, prominent below, $\frac{3}{4}$ –1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 14–17 on each side of the midrib, diverging from it at a very wide angle, slender, looped near the margin, distinct on both surfaces, prominent below; tertiary nerves only slightly less prominent than the lateral ones and following their direction, distinct below; veins fairly lax and distinct below; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrous; stipules caducous, lanceolate, acuminate. Receptacles not seen, but no doubt borne in fascicles on the main stem or branches remote from the leaves.—Th. & Hól. Durand, Syll. Fl. Congol. 505; Mildbr. & Burret in Engl. Jahrb. xlv. 229.

South Central. Belgian Congo; without precise locality, *Demeuse*, 410!

According to a sketch on the type specimen the receptacles are pedunculate.

49. *F. kisantuensis*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 22, t. v. A large tree 50–80 ft. high, containing a thick milk; head depressed-hemispherical, very broad; branches spreading, bending sometimes upwards, sometimes downwards; branchlets leafy towards the apex, curved, ashy-grey, glabrous. Leaves rather scattered, slightly obliquely oblong or oblong-ob lanceolate, rounded or very shortly and obtusely acuminate, slightly narrowed or rounded to an obtuse base, 5–7 in. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. broad, entire, chartaceous, glabrous and dull on both surfaces; midrib flat or slightly impressed above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex; lateral nerves 16–19 on each side, very slender, distinct above, slightly prominent below, spreading from the midrib at an angle of about 75° , looped, the loops forming a crenate line about 1 lin. from the margin; tertiary nerves similar to the lateral ones but scarcely so prominent; veins rather lax, distinct below; petiole $\frac{3}{4}$ –1 in. long, stout, about $1\frac{1}{4}$ lin. thick, longitudinally sulcate when dry, glabrous, rather abruptly contracted into the midrib; stipules caducous, ovate-lanceolate, coriaceous, glabrous. Receptacles fasciculate on the older wood, pedunculate, obovoid, about $1\frac{3}{4}$ in. long, wrinkled like a desiccated plum when dry; peduncle about 1 in. long; basal bracts in a single whorl, soon falling off. Male flowers with a single stamen. Female flowers numerous, subsessile.—De Wild. *Études Fl. Bas- et Moyen-Congo*, i. 236; Th. & Hël. Durand. *Syll. Fl. Congol.* 506; Mildbr. & Burret in *Engl. Jahrb.* xlv. 229; De Wild. in *Bull. Soc. Bot. Belg.* lii. 214. *F. sp.*, Hiern in *Cat. Afr. Pl. Welw.* i. 1002. *F. inkasuensis*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 22; Th. & Hël. Durand, l.c. *F. rectangula*, Warb. ex Mildbr. & Burret, l.c., name only.

Lower Guinea. Spanish Guinea: without precise locality, *Tessmann*, 8a! Lower Congo: Stanley Pool district; Kisantu, *Gillet*, 598! Angola: Golungo Alto; mountainous places of Sobato de Bumba, *Welwitsch*, 6339! 6420b.

South Central. Belgian Congo: Monbuttu; Bongwa, *Schweinfurth*, 3625! 3666! Upper Aruwimi, *Pynaert*, 691! Inkasu, *Laurent*! Eala, *Pynaert*, 651!

50. *F. artocarpoides*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 23, t. iii. A large tree or epiphyte; branchlets many-ribbed when dry, minutely puberulous. Leaves oblong or oblong-elliptic, rounded at or very slightly narrowed to an obtuse base, broadly and obtusely apiculate at the apex, 5–6 in. long, 2– $2\frac{1}{2}$ in. broad, entire, rigidly chartaceous or subcoriaceous, glabrous and dull on both surfaces; midrib flat above, very prominent below, 1– $1\frac{1}{4}$ lin. broad at the base, gradually narrowed to the apex, longitudinally sulcate when dry; lateral nerves slender, about 12–15 on each side of the midrib, diverging from it almost at right angles, $\frac{1}{3}$ – $\frac{1}{2}$ in. apart, looped, the loops forming a crenate line 1– $1\frac{1}{2}$ lin. from the margin; tertiary nerves slightly less distinct than the lateral ones and parallel with them; ultimate venation very delicate and obscure; petiole about $1\frac{1}{2}$ in.

long, deeply grooved on the upper surface, glabrous, about $1\frac{1}{4}$ lin. thick; stipules early caducous. Receptacles fasciculate on the older branches remote from the leaves, pedunculate, obovoid-globose, $1-1\frac{1}{2}$ in. in diam., wrinkling like a desiccated plum when dry, finely pubescent; peduncle about $\frac{3}{4}$ in. long, thicker towards the apex, glabrous. Basal bracts very small. Ostiole minute, 2-lipped; bracts few, all descending into the receptacle, glabrous. Male flowers pedicellate; perianth oblong-linear, obtuse, membranous, glabrous. Stamen solitary; filament $\frac{1}{2}$ lin. long; anther oblong, obtuse, $\frac{2}{3}$ lin. long. Female flowers subsessile. Gall flowers long-pedicellate.—Th. & Hél. Durand, Syll. Fl. Congol. 504; Mildbr. & Burret in Engl. Jahrb. xlv. 229.

Lower Guinea. Lower Congo, *Gillet*, 2014!

South Central. Belgian Congo: Eala, *Laurent*, 731! 764! Lie, *Laurent*, 125!

51. *F. lukanda*, *Welw. ex Ficalho, Pl. Uteis*, 269. A tree 20–35 ft. high, but usually met with as a much-branched shrub of 5–6 ft., and then (according to *Welwitsch*) closely resembling in its foliage a young erect plant of ivy, glabrous, exuding a watery viscid sap; branches patent, very crowded; bark dusky-grey or ashy; branchlets spreading, ascending or somewhat erect, pale green or somewhat dusky towards the apex, shining and slightly angular when dry. Leaves elliptic or oblong-elliptic, sometimes slightly oblique, subcaudately or gradually obtusely acuminate, slightly rounded and obtuse at the base, 3–5 in. long, $1\frac{1}{3}-2\frac{1}{4}$ in. broad, entire, chartaceous, glabrous, dull on both surfaces, distinctly 3-nerved about $1\frac{1}{4}$ lin. above the base, the basal pair of nerves extending to about the middle of the blade; midrib slightly impressed above, prominent below, scarcely $\frac{1}{2}$ lin. broad a little above the base; lateral nerves (including the basal ones) 4–5 on each side, minutely impressed above, prominent below, rather slender, arising from the midrib at an angle of 45°, slightly curved, looped, the loops forming a crenate line about $1\frac{1}{2}$ lin. within the recurved margin; tertiary nerves subparallel to the lateral ones, wavy, distinct below; veins close, rather faint below, not visible above; petiole 1–3 in. long, slender, about $\frac{1}{2}$ lin. thick, very narrowly channelled on the upper surface, glabrous; stipules very early deciduous, lanceolate, subacute, about $\frac{3}{4}$ in. long, glabrous. Receptacles very abundant, 1–3 together on the thicker branches and sometimes also on the trunk where it is about 1 ft. in diam., and sometimes on the green branches, at first green, afterwards turning yellow, ellipsoid-globose, about $\frac{1}{2}$ in. in diam., glabrous; peduncle up to $\frac{3}{4}$ in. long, rather slender, glabrous. Basal bracts caducous, leaving an oblique persistent basal portion closely adpressed to the base of the fig. Ostiole small and inconspicuous. Bracts all descending into the receptacle. Male flowers sessile with a solitary stamen. Female and gall flowers numerous.—*F. ottoniaefolia*, Hiern

in Cat. Afr. Pl. Welw. i. 1003, not of Miq. *F. sterculioides*, Warb. in Engl. Jahrb. xx. 175; Mildbr. & Burret in Engl. Jahrb. xvi. 229. *F. Dewevrei*, Mildbr. & Burret, l.c. 225, partly not of Warb. *F. longipedunculata*, De Wild. in Fedde, Repert. xii. 195, and in Bull. Soc. Bot. Belg. lii. 217.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 3652! between Sangmelima and Ebolowa, *Mildbraed*, 5560! between Ebolowa and Nkomakak, *Mildbraed*, 5822!

Nile Land. Uganda: without precise locality, *Scott Elliot*, 7515! South Buddu, *Dave*, 296! Kipayo, *Dümmer*, 713!

Lower Guinea. Spanish Guinea: Nkolentangan, *Tessmann*, 335! Uelleburg, *Tessmann*, 66! 439! Angola: Golungo Alto, *Welwitsch*, 6391! 6392! 6393!

South Central. Belgian Congo: Bomaneh, *Laurent*, 1352!

Mozamb. Distr. German East Africa: Bukoba, *Stuhmann*, 1019! Wau Island, in Lake Kivu, *Mildbraed*, 1157!

52. *F. ottoniæfolia*, *Miq.* in *Ann. Mus. Lugd.-Bat.* iii. 288. A tree up to 30 ft. high (*Chipp*); stems twiggy (*Vogel*); branchlets smooth, covered with glabrous straw-coloured bark. Leaves oblong or oblong-elliptic, shortly and obtusely or caudately long-acuminate, when long-acuminate then the acumen somewhat oblique (in the dried leaves), rounded or very slightly cuneate at the base, $2\frac{1}{2}$ –6 in. long, 1 – $2\frac{1}{4}$ in. broad, thinly chartaceous or almost membranous, glabrous on both surfaces, mostly much darker coloured above, very finely reticulate below; midrib slightly impressed above, prominent but rather slender below, scarcely $\frac{3}{4}$ lin. broad at the base, gradually tapered to and almost fading away at the apex; lateral nerves 7–10 on each side, spreading from the midrib at an angle of about 65° or almost at right angles, slender, looped, the loops forming a rather deeply crenate line about 1 lin. from the margin; veins very slender and rather close, not visible above, distinct (but only very slightly raised) below; petiole $\frac{3}{4}$ – $1\frac{3}{4}$ in. long, glabrous, about $\frac{3}{4}$ lin. thick; stipules very caducous, present only at the apex of the newly opened shoots, linear-lanceolate, very acutely acuminate, about $\frac{1}{2}$ in. long, glabrous. Receptacles in axillary pairs, or perhaps sometimes also fasciculate on the older branches, pedunculate, subglobose when ripe, stipitate at the base when young, at length rounded, $\frac{1}{2}$ in. or slightly more in diam., very finely rusty-puberulous when young, at length glabrous. Basal bracts soon falling off, connate at the base into a persistent circular plate closely applied to the receptacle. Ostiole small and 2-lipped; bracts all descending into the receptacle, subacute, glabrous. Male flowers shortly pedicellate; perianth-segments lanceolate, membranous, glabrous. Stamen solitary. Female flowers sessile. Gall flowers shortly pedicellate, numerous.—*Urostigma ottoniæfolium*, *Miq.* in *Hook. Lond. Journ. Bot.* vi. 557. *F. Buttneri*, Warb. in *Engl. Jahrb.* xx. 157; Mildbr. & Burret, l.c. xvi. 224, incl. var. *globicarpa*, Warb. *F. Gilletii*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 19, t. i.

F. cyclocarpa, Warb., and *F. cerasicarpa*, Warb. ex Mildbr. & Burret, l.c., names only.

Upper Guinea. Sierra Leone: Falaba; near Musaia, *Scott Elliot*, 5151! Limba; near Madina, *Scott Elliot*, 5568! and without precise locality, *Afzelius*! French Guinea: Konakry, *Dybowski*, 3! Iles de Los, *Pobéquin*, 1236! Gold Coast: Asientiem, *Chipp*, 292! Togo: Bismarckburg, *Battner*, 714! Lome, *Warnecke*, 324! Dahomey, *Poisson*, 451! Cameroons: Edea, island in the River Sanaga, *Krücke*, 8! Bipinde, *Zenker*, 3652! Johann-Albrechtshöhe, *Staudt*, 896! Fernando Po, *Vogel*, 176! *Mann*, 431!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 1120!

53. *F. ealænsis*, De Wild. in Fedde, Repert. xii. 194, 198. An epiphyte; branchlets about 5 lin. in diam., glabrous. Leaves oblong-elliptic, rounded or subcordate at the base, abruptly acuminate, subacute, 6–7½ in. long, 3–4 in. broad, entire, subcoriaceous, glabrous on both surfaces; midrib prominent below, continued to the apex of the acumen; lateral nerves about 9 on each side of the midrib, diverging from it at a wide angle, slightly arcuate, looped near the margin, forming an intramarginal nerve about 2 lin. from the margin; venation distinct below; petiole 2½–4½ in. long, ¾ lin. thick, broader towards the base, glabrous; stipules not seen, early caducous. Receptacles fasciculate on more or less prominent cushions, pedunculate, globose, ½ in. in diam., very minutely puberulous; peduncle ½ in. long, ⅔ lin. thick, finely puberulous. Basal bracts caducous, connate at the base into a glabrous flat orbicular disc-like body closely adpressed to the receptacle. Ostiole inconspicuous, 2-lipped; bracts all descending into the receptacle, acutely acuminate, glabrous. Male flowers pedicellate; perianth-segments spatulate, membranous. Stamen solitary; filament ½ lin. long; anther broadly oblong, with a thick keeled connective at the back. Female flowers subsessile, with rather short perianth-segments. Achene subglobose, smooth, slightly fleshy outside; style laterally attached, nearly as long as the achene, with a rather broad stigma.—*De Wild. in Bull. Soc. Bot. Belg. lii. 206.*

South Central. Belgian Congo: Equateur district; Eala, *Laurent*, 1359!

54. *F. usambarensis*, Warb. in Engl. Jahrb. xx. 159. A tree 160 ft. high; young branchlets stout, with smooth brown bark; terminal buds acute, finely puberulous. Leaves elliptic or oblong-elliptic, rounded at both ends or very obtuse at the base, 4–6 in. long, 1¾–3 in. broad, entire, coriaceous, dull and glabrous on both surfaces, finely reticulate below; midrib somewhat prominent on both surfaces, about 1½ lin. broad at the base on the lower surface, gradually tapered to the apex of the blade, sometimes slightly zig-zag at the top; lateral nerves 11–14 on each side of the midrib, diverging from it at an angle of about 65°, equally prominent on both surfaces, nearly straight, looped near the margin; tertiary nerves slightly less prominent than the lateral ones and following their direction, rather

zig-zag; petiole stout, slightly compressed, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long, $1\frac{1}{2}$ –2 lin. broad, somewhat ribbed by compression when dry, glabrous; stipules caducous. Receptacles produced in a pulvinate cluster on the older wood remote from the leaves, perhaps about 5 in a cluster, pedunculate, globose, with a slightly prominent 2-lipped ostiole, $3\frac{1}{2}$ lin. in diam., finely and rather sparingly pubescent, brownish-yellow and with dark brown warts when dry; peduncles $\frac{3}{4}$ in. long, about $\frac{2}{3}$ lin. thick, slightly thicker towards the apex, softly pubescent. Basal bracts probably 2, connate, coriaceous, tomentose outside. Ostiolar orifice $\frac{1}{2}$ lin. long, linear; bracts all descending into the receptacle, subulate-lanceolate, subacute, glabrous, margins membranous. Male and female perianth-segments 3, oblong, obtuse. Stamen solitary; filament short; anther ovoid-ellipsoid. Style slender, with an oblong papillose stigma.—Mildbr. & Burret in Engl. Jahrb. xvi. 230.

Mozamb. Distr. German East Africa: Usambara; Amboni, *Holst*, 2897!

55. *F. rudens*, *Hutchinson in Kew Bulletin*, 1915, 322, with fig. An extensive climber; stems soft, hollow, resembling cables (*Gossweiler*), up to 60 ft. long; branchlets twiggy, slender, glabrous. Leaves oblong-elliptic or slightly obovate-elliptic, acutely acuminate (acumen 3–5 lin. long), cordate at the base, $1\frac{1}{3}$ –3 in. long, $\frac{3}{4}$ – $1\frac{1}{3}$ in. broad, entire, submembranous, dull and glabrous on both surfaces; midrib slightly impressed above, slender, fairly prominent below, about $\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 6–7 on each side of the midrib, diverging from it almost at a right angle, looped near the margin, slender, distinct below; veins lax and distinct below; petiole 4–10 lin. long, very slender, glabrous; stipules deciduous, not seen. Receptacles borne on the stems, produced in fascicles on very short cushion-branchlets, about 6 in each fascicle, pedunculate, ellipsoid or obovoid-ellipsoid, slightly contracted at the base, $\frac{3}{4}$ in. long, about $\frac{1}{2}$ in. in diam., finely warted, extremely minutely puberulous; peduncle stout, $\frac{1}{2}$ in. long, compressed, 1 lin. thick, minutely puberulous. Basal bracts soon falling off, leaving an oblique narrow rim at the base of the receptacle. Ostiole very small and 2-lipped, not produced; bracts all descending into the receptacle, more or less subulate-lanceolate, acute, glabrous. Male flowers pedicellate; perianth-segments 3, elliptic, subacute. Stamen solitary; filament fairly stout; anther ovoid-ellipsoid, obtuse. Female flowers subsessile; perianth-segments lanceolate; achene obliquely ellipsoid; style lateral, shorter than the achene, with a large papillose stigma. Gall flowers numerous, pedicellate.

Lower Guinea. Angola: eastern slopes of Monte de Lau and Monte Bello, *Gossweiler*, 4597!

Closely allied to *F. tremula*, Warb., from the east coast of Africa, but distinguished from the latter by the shape of the leaves and the larger figs on stouter peduncles.

56. *F. tremula*, Warb. in *Engl. Jahrb.* xx. 171. A shady tree 30 ft. high; young branchlets short and slender, glabrous, covered with smooth light coloured bark; three-year-old shoots bearing the figs. Leaves oblong or oblong-elliptic, gradually and obtusely acuminate, rounded or subtruncate at the base, $1\frac{1}{2}$ –3 in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. broad, entire, membranous, glabrous on both surfaces, finely reticulate below; midrib slightly prominent below, narrow; lateral nerves 6–7 on each side of the midrib, diverging from it at an angle of about 65° , very slender, distinct on both surfaces, slightly raised below, looped near the margin; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, very slender, glabrous; stipules deciduous, not seen. Receptacles fasciculate on the older parts of the branches, pedunculate, ellipsoid or slightly obovoid, about $\frac{1}{2}$ in. long, wrinkled when dry, glabrous; peduncle rather slender, $\frac{1}{2}$ –1 in. long, thickened towards the top, glabrous. Basal bracts 3, soon falling off, ovate, obtuse, $\frac{3}{4}$ lin. long, submembranous, glabrous. Ostiole not prominent, very minute, 2-lipped; bracts numerous, all descending into the receptacle, subulate-lanceolate. Male flowers pedicellate; perianth-segments membranous, obtuse. Stamen solitary; filament rather slender; anther ellipsoid. Female flowers subsessile, with a small perianth; achene broadly ovoid, shining; style lateral, slender, nearly as long as the achene, with an oblong stigma. Gall flowers pedicellate, with a short style and very thick stigma.—Warb. in *Engl. Pfl. Ost-Afr. C.* 162, t. x. figs. F–K; Mildbr. & Burret in *Engl. Jahrb.* xvi. 229. *F. pulvinata*, Warb. in *Engl. Jahrb.* xx. 169.

Mozamb. Distr. Zanzibar, *Stuhlmann*, coll. I. 110! French Island, *Kirk*, 18! German East Africa: Bagamoyo, *Stuhlmann*, 274! Usaramo: Vikindo, *Stuhlmann*, 6100! Portuguese East Africa: Beira, *Johnson*, 55!

57. *F. Pynærti*, *De Wild.* in *Fedde, Repert.* xii. 197. Branchlets fairly stout, lenticellate. Leaves oblong-elliptic, rather broadly acuminate (acumen about $\frac{1}{2}$ in. long), rounded at the base, 3–5 in. long, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. broad, entire, chartaceous, dull and glabrous on both surfaces; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 8 on each side of the midrib, spreading at a wide angle, looped near the margin, prominent below; tertiary nerves about half as conspicuous as the lateral ones and parallel to them; veins finely reticulate; petiole $1\frac{1}{2}$ –2 in. long, scarcely 1 lin. thick, with a broad shallow groove on the upper surface, glabrous; stipules early caducous, lanceolate, about 3 lin. long, glabrous. Receptacles borne in fascicles on the older branches remote from the leaves, pedunculate, oblong-ellipsoid, stipitate at the base, $\frac{1}{2}$ in. long, very minutely puberulous; stipe $1\frac{1}{4}$ lin. long; peduncle 4 lin. long, minutely puberulous. Basal bracts very small and deciduous, connate at the base. Ostiole small and inconspicuous, 2-lipped; bracts all descending into the receptacle, lanceolate,

glabrous. Male flowers with a solitary stamen.—De Wild. in Bull. Soc. Bot. Belg. lii. 223.

South Central. Belgian Congo : Equateur district ; Eala, *Pynaert*, 1314 !

58. *F. maculosa*, *Hutchinson in Kew Bulletin*, 1915, 323. A small tree; branches terete, those bearing the clusters of figs $\frac{1}{2}$ – $\frac{3}{4}$ in. in diam., covered with a grey bark marked with large scattered lenticels; young leafy branchlets fairly slender, glabrous. Leaves oblong or oblong-elliptic, obtusely acuminate, rounded at the base, $3\frac{1}{2}$ – $6\frac{1}{2}$ in. long, 2 – $2\frac{1}{2}$ in. broad, entire, thinly chartaceous, dull and glabrous on both surfaces; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves 6–8 on each side of the midrib, diverging from it at an angle of about 75° , prominent below, looped some distance from the margin, rather slender; tertiary nerves subparallel to the lateral ones; veins prominent below, laxly reticulate; petiole 1 in. long, slender, glabrous; stipules early caducous, linear-lanceolate, very acutely acuminate, $\frac{3}{4}$ in. long, subcoriaceous, glabrous. Receptacles fasciculate on the branches of several years' growth, remote from the leaves, 3–5 in a fascicle, pedunculate, narrowly obovoid-ellipsoid, stipitate at the base, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, about 5 lin. in diam., glabrous, straw-coloured and spotted when dry, not wrinkled; stipe 1 – $1\frac{1}{4}$ lin. long; peduncles slender, $\frac{3}{4}$ in. long, twisting and angular, very minutely puberulous. Basal bracts small and caducous, their narrowly connate bases persistent and 1-sided. Ostiole slightly produced, minute, pore-like; bracts all descending into the receptacle, linear, acute, up to 2 lin. long, with membranous margins. Male flowers with a solitary stamen. Females sessile, with large papillose stigmas.—*F. polybractea*, *Mildbr. & Burret in Engl. Jahrb.* xvi. 225, partly.

Upper Guinea. Togo : Sokode ; Barariruoba Tamberna village, *Kersting*, A. 545 !

59. *F. kimuenzensis*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 23. Young branchlets glabrous. Leaves oblong or oblong-elliptic, obtusely acuminate, slightly cordate at the base, 2 – $3\frac{1}{4}$ in. long, $1\frac{1}{2}$ – 2 in. broad, entire, chartaceous, glabrous on both surfaces; midrib flat above, prominent and rounded below, gradually tapered to the apex of the blade; lateral nerves about 8 on each side of the midrib, diverging from it at a wide angle, nearly straight, looped near the margin; tertiary nerves scarcely less conspicuous than the lateral ones and parallel to them; veins moderately close below, blackish when dry; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, black when dry, glabrous; stipules caducous. Receptacles fasciculate on the old wood, pedunculate, oblong-ellipsoid, flattened at the top, about $\frac{3}{4}$ in. long, straw-coloured and covered with scattered brown spots when dry, glabrous; peduncle

slender, $\frac{3}{4}$ in. long, finely puberulous. Basal bracts small, deciduous, their bases connate into a flat one-sided plate-like body closely adpressed to the receptacle. Ostiole very small, slightly sunken, 2-lipped; bracts all descending into the receptacle. Male flowers with a solitary stamen. Female flowers sessile. Gall flowers stalked.—Th. & Hél. Durand, Syll. Fl. Congol. 506; Mildbr. & Burret in Engl. Jahrb. xlv. 229.

Lower Guinea. Lower Congo: Stanley Pool district; Kimuenza, *Gillet*, 2170!

60. *F. polybractea*, Warb. in *De Wild. & Durand, Reliq. Dewèrè*. 216. Branchlets stout, leafy, those bearing the leaves and receptacles terete, 4–5 lin. in diam., glabrous, covered with light brown bark and prominently marked with scattered lenticels. Leaves oblong, gradually and very obtusely acuminate, acumen $\frac{1}{2}$ – $\frac{3}{4}$ in. long, rounded at the base, 5–7 $\frac{1}{2}$ in. long, 2–3 $\frac{1}{4}$ in. broad, entire, rigidly chartaceous when dry, dull on both surfaces, closely and minutely verruculose on the upper surface, very minutely puberulous on the midrib and lateral nerves below, otherwise glabrous, 5–7-nerved at the base, remaining lateral nerves 9–11 on each side, subopposite, diverging from the midrib at an angle of about 80°, looped, the loops forming a deeply crenate line 1 $\frac{1}{2}$ lin. within the margin, slightly immersed above, prominent below; tertiary nerves wavy, distinct below; veins rather close, but not prominent below; petiole 1–2 in. long, about $\frac{3}{4}$ lin. thick, very minutely puberulous; stipules (or are they bracts?) ovate-lanceolate, subacute, about 4 lin. long, membranous, brown when dry, very minutely puberulous or nearly glabrous. Receptacles fasciculate, supra-axillary, pedunculate, ellipsoid, $\frac{1}{3}$ in. long (mature?), $\frac{1}{4}$ in. in diam., reddish-puberulous; peduncles about $\frac{1}{2}$ in. long, minutely reddish puberulous; basal bracts small, caducous.—Mildbr. & Burret in Engl. Jahrb. xlv. 225, partly.

South Central. Belgian Congo: Equateur district, *Dewèrè*, 1168a! Eastern Province; near Stanley Falls, *Dewèrè*.

61. *F. ulugurensis*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 226, t. 4. A tree; two- or three-year-old branches terete, bearing the receptacles, very prominently warted with large black protuberances; young branchlets purplish when dry, glabrous. Leaves elliptic, obtusely caudate-acuminate, rounded or slightly narrowed at the base, 4–6 in. long, 2 $\frac{1}{4}$ –3 $\frac{1}{2}$ in. long, entire, glabrous and dull on both surfaces; midrib prominent below, about 1 lin. broad, gradually tapered to the apex; lateral nerves 9–11 on each side of the midrib, diverging from it at an angle of about 65°, the lowermost pair opposite, looped near the margin, nearly equally prominent on both surfaces; tertiary nerves following the direction of the lateral ones and dividing the space between them, somewhat zig-zag;

venation fine and distinct below; petiole 1-1½ in. long, glabrous; stipules caducous. Receptacles produced in fascicles on the older wood remote from the leaves, pedunculate, seen only in a young state, ellipsoid-obovoid, with a slightly prominent ostiole, glabrous, the largest seen about ½ in. long; peduncle 3-4 lin. long, rather stout, minutely puberulous. Basal bracts 2, ovate, obtuse, 1½ lin. long, 1¼ lin. broad, coriaceous, finely puberulous outside. Ostiole slightly protruded, 2-lipped; bracts all descending into the receptacle, none visible from the outside, the innermost linear. Male flowers not seen but no doubt with a solitary stamen.

Mozamb. Distr. German East Africa: Uluguru Mountains; Mhora, in the north-east. *Stuhlmann*, 9022! Drachenberg near Amani, *Zimmermann*, 2631!

62. *F. Dewevrei*, *Warb. in De Wild. & Durand, Reliq. Dewevr.* i. 215 and in *Warb. & De Wild. Fic. Fl. Congo*, 18. Branches terete, covered with a grey glabrous bark; young branchlets rather slender, glabrous. Leaves oblong, subacutely caudate-acuminate (acumen in the mature leaves about ½ in. long), rounded at the base, 4-5 in. long, 1½-1¾ in. broad, entire, thinly chartaceous, closely punctate and glabrous above, minutely puberulous on the midrib and lateral nerves below especially when quite young, dull on both surfaces, finely reticulate below, 3-nerved at the base, remaining lateral nerves about 7 on each side, slender, diverging from the midrib almost at right angles, looped, the loops forming a coarse crenate line about 1¼ lin. from the margin, distinct on both surfaces, prominent below; tertiary nerves very lax, fairly distinct below; veins forming a close network but scarcely prominent below; petiole ¾-2 in. long, slender, scarcely ¾ lin. thick, minutely puberulous when young, soon becoming glabrous, black when dry; stipules caducous, present only at the tips of the shoots, linear-lanceolate, very acute, ¾-1¼ in. long, submembranous, with wavy thinner margins. Receptacles axillary or arising from the axils of fallen leaves, ellipsoid-globose, ¾-1 in. long, puberulous or nearly glabrous; peduncle about ½-¾ in. long. Basal bracts reduced to a very small ring. Ostiole small, scarcely prominent, with linear descending bracteoles only. Male flowers with 1 stamen. Anther thick, obtuse. Female flowers few.—*Mildbr. & Burret in Engl. Jahrb.* xlv. 225; *De Wild. in Bull. Soc. Bot. Belg.* lii. 205. *F. viridimaculata*, *De Wild. in Fedde, Repert.* xii. 197, and in *Bull. Soc. Bot. Belg.* lii. 232.

South Central. Belgian Congo: Ituri district, *Mildbraed*, 3237! Eala, *Pynaert*, 939! 1107! *Laurent*, 727! Aruwimi district; Lokandu, *Dewèvre*, 1102!

63. *F. umangiensis*, *De Wild. in Fedde, Repert.* xii. 198. Branchlets slender, with grey bark. Leaves oblong-elliptic, rounded or slightly cordate at the base, more or less abruptly and long acuminate, 5-7 in. long, 2-3 in. broad, chartaceous, entire, glabrous;

lateral nerves 10-11 on each side of the midrib; veins distinct below; petiole 1-1 $\frac{3}{4}$ in. long, about $\frac{1}{2}$ lin. thick, glabrous; stipules caducous. Receptacles fasciculate on the older branches, up to 16 in a fascicle, pedunculate, ellipsoid, about $\frac{1}{2}$ in. long, brown with black spots when dry; peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in. long, thickened towards the apex. Basal bracts small, connate at the base into an expanded disc-like body with an irregular margin. Ostiole 2-lipped, with the bracts all descending vertically into the interior of the receptacle. Male flowers with a single stamen.—De Wild. in Bull. Soc. Bot. Belg. lii. 230.

South Central. Belgian Congo: Umangi Island, in the River Congo, *Laurent!*

Var. *Laurentii*, De Wild. in Fedde, l.c., and in Bull. Soc. Bot. Belg. l.c. Lateral nerves slightly more numerous than in the type; receptacles about 1 in. long.

South Central. Belgian Congo: Eala, *Laurent*, 1350!

64. *F. Scheffleri*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 225. A tree 20-25 ft. high; branchlets longitudinally sulcate when dry, purplish, very minutely puberulous. Leaves oblong-lanceolate, gradually and obtusely acuminate, cuneate at the base. 3-5 $\frac{1}{2}$ in. long, 1-2 in. broad, entire, slightly warty on the upper surface, glabrous and very finely reticulate with a purplish venation below; midrib impressed above, prominent below, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex of the blade, purple when dry; lateral nerves 10-13 on each side of the midrib, diverging from it at an angle of 45°-60°, distinct above, prominent but slender below, looped well within the margin, the loops forming an intramarginal deeply crenate nerve about 1 $\frac{1}{4}$ lin. from the margin; tertiary nerves not prominent; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in. long, blackish-purple when dry, glabrous; stipules caducous, not seen. Receptacles produced in fascicles on the trunk or on the older branches remote from the leaves, pedunculate, oblong-ellipsoid, nearly $\frac{3}{4}$ in. long, a little over $\frac{1}{2}$ in. broad, slightly verrucose and minutely pubescent; peduncle $\frac{1}{2}$ in. long or slightly more, curved, almost glabrous. Basal bracts deciduous, connate at the base. Ostiole very small and inconspicuous, 2-lipped; bracts all descending into the receptacle, numerous, acute, with narrowly membranous margins. Male flowers with 3-4 perianth-segments and a solitary stamen; anther-connective thickened at the back. Female flowers not seen. Gall flowers pedunculate, numerous.

Mozamb. Distr. German East Africa: Usambara mountains, north-west of Derema, *Scheffler*, 215!

65. *F. fasciculiflora*, *Hutchinson in Kew Bulletin*, 1915, 324. with *fig.* A tree 50-65 ft. high; crown broad; branches bearing the receptacles terete, covered with a grey bark; young branchlets slender, glabrous, blackish when dry. Leaves obovate or obovate-oblong.

gradually acuminate, cuneate at the base, 3-5½ in. long, 1¼-2¼ in. broad, entire, rigidly chartaceous, glabrous, dull and reddish-brown when dry; midrib impressed above, prominent below, gradually tapered to the apex of the blade; lateral nerves about 7-8 on each side of the midrib, diverging from it at an angle of 45°-80°, prominent below, looped near the margin; veins finely reticulate below, blackish when dry; petiole 1-1¾ in. long, slender, glabrous or very minutely puberulous; stipules caducous, linear-lanceolate, long and acutely acuminate, ¾-1 in. long, glabrous. Receptacles fasciculate on branches of several years' growth, about four in each fascicle, pedunculate, blackish-green, with small and large brighter green spots, ellipsoid, very slightly contracted at the base, 6-7 lin. long, about 4 lin. in diam., minutely puberulous; peduncle ½ in. long, fairly stout, very minutely puberulous. Basal bracts ovate, somewhat membranous, glabrous, subsistent, at length recurved. Ostiole circular, small and pore-like; bracts few, all descending vertically into the receptacle. Male flowers subsessile: perianth-segments oblanceolate, membranous, glabrous. Stamen solitary; filament ½ lin. long; anther ovoid, obtuse. Female flowers subsessile. Gall flowers long-pedicellate.—*F. Gilletii*, Mildbr. & Burret in Engl. Jahrb. xvi. 229, partly, not of Warb.

Upper Guinea. Cameroons: Lake Tibati, *Ledermann*, 2410!

66. *F. lyrata*, Warb. in Engl. Jahrb. xx. 172. A tree up to nearly 40 ft. high; branchlets thick, longitudinally grooved when dry, very minutely puberulous or glabrous. Leaves large, pandurate, apex truncate or rounded and often broadly emarginate with sometimes a very short obtuse acumen in the middle, cordate with a narrow sinus at the base, 6-12 in. long. 5-7 in. broad across the widest part which is about a third of the whole length from the apex, entire, rigidly coriaceous, dull and glabrous on both surfaces, 9-10-nerved at the base, remaining lateral nerves 4-5 on each side, spreading from the very thick midrib at an angle of 40°, becoming longitudinally grooved on both surfaces when dry, very prominent below, looped and branched well within the margin; tertiary nerves few, arising from the lateral almost at a right angle, slightly prominent below; veins very close and distinct on the lower surface; petiole stout, ¾-1½ in. long, 2-2½ lin. broad, longitudinally grooved below, channelled above, and wrinkled with transverse lines when dry, glabrous; stipules persistent, narrowly triangular, gradually and acutely acuminate, 1¾-2 in. long, ¾ to nearly 1 in. broad at the base, entire, chartaceous, striate within, glabrous. Receptacles axillary, mostly in pairs, sessile, globose, about 1¾ in. in diam. when fresh, with walls about 2 lin. thick, finely puberulous outside; basal bracts about 3 (*Warburg*), triangular, adpressed to the receptacle. Ostiole subdepressed; bracts lanceolate. Receptacular wall thick, wrinkled and puberulous outside. Male perianth-segments 3,

ovate-lanceolate. Stamen solitary; anther ovoid, obtuse. Female perianth-segments 3, ovate, obtuse. Style rather short; stigma short, suboblique, papillose.—Mildbr. & Burret in Engl. Jahrb. xlv. 241; De Wild. in Bull. Soc. Bot. Belg. lii. 219. *F. pandurata*. Sander ex Watson in Gard. Chron. 1911, l. 234, figs. 107, 108, not of Hance. *F. togoensis*, Warb. ex Mildbr. & Burret, l.c., name only. *F. jollyana*, A. Cheval. ex De Wild. l.c.

Upper Guinea. Liberia: Gola; north bank of Lofa River, *Banting*! Ivory Coast: Keeta, *Chevalier*, 19351! and without precise locality, *Jolly*, 43! Togo: avenue tree at Bismarckburg, *Büttner*, 713! Dahomey, *Poisson*, 5! Cameroons: near Barombi, *Preuss*, 455!

Lower Guinea. French Gaboon: Libreville, *Klaine*, 1556! and without precise locality, *Thollon*, 763!

Cultivated in most European Botanic Gardens; fine specimens have been observed at Berlin, Brussels and Kew.

67. *F. sagittifolia*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 241. An epiphyte on the Oil palm; branchlets stout, glabrous. Leaves elongate-pandurate, subacutely caudate-acuminate, narrowly cordate at the base, 1 ft. or slightly more long, $2\frac{1}{2}$ –3 in. broad across the widest part, entire except at the rounded obscurely angular or dentate or occasionally somewhat hastate base, rigidly coriaceous, slightly shining or dull and glabrous on both surfaces, about 5-nerved at the base, remaining lateral nerves about 15 on each side, spreading from the midrib at an angle of slightly more than 45° , prominent on both surfaces, looped, the loops forming an irregular continuous parallel line about $1\frac{1}{2}$ lin. from the margin; tertiary nerves and veins very close and prominent on both surfaces; midrib very thick at the base on the lower surface, gradually tapered to the apex, narrow above; petiole stout, $\frac{3}{4}$ in. long, about $2\frac{1}{2}$ lin. broad, glabrous; stipules persistent, ovate-lanceolate, acutely acuminate, $\frac{3}{4}$ to nearly 1 in. long, membranous, glabrous, brown when dry. Receptacles in axillary pairs, sessile, globose, about $\frac{3}{4}$ in. in diam., minutely puberulous. Basal bracts 2, ovate, obtuse, keeled, $1\frac{1}{2}$ –2 lin. long and broad, very coriaceous, slightly puberulous. Ostiolar bracts numerous, all descending vertically into the receptacle, subulate or subulate-lanceolate, very acute, 1–2 lin. long, reddish in the middle, with membranous hyaline margins. Male flowers few, sessile in the lower part of the receptacle; perianth-segments 3, lanceolate, subacute, membranous; anther sessile, solitary, $\frac{3}{4}$ lin. long, with a very broad and laterally flattened connective. Female flowers sessile, scattered amongst the gall flowers, with a fleshy perianth adherent to the ovary; style a little longer than the ovary, slender, with a thickened oblong stigma. Gall flowers similar to the female but pedicellate and with a shorter style.

Upper Guinea. French Guinea: near Layah, *Scott Elliot*, 4656! Togo: Lome, *Warnecke*, 428! Dahomey: Allada, *Poisson*!

Formerly cultivated at Berlin under the name *F. subpanduraformis*.

68. *F. crassicosta*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 11, t. xvi. *figs.* 5-7. Branchlets rather stout, glabrous, the two-year-old ones prominently marked with large whitish lenticels. Leaves oblong-oblancoate or narrowly pandurate, very shortly and obtusely acuminate, truncate or sometimes slightly cordate at the base, $2\frac{1}{4}$ - $3\frac{1}{2}$ in. long, $\frac{3}{4}$ - $1\frac{1}{4}$ in. broad, entire, coriaceous, glabrous and dull on both surfaces, about 9-nerved at the base, remaining lateral nerves 7-9 on each side, arising from the midrib at an angle of 45° - 60° , looped, the loops forming a crenate line about $\frac{3}{4}$ lin. from the margin, distinct above, prominent and straw-coloured below; tertiary nerves and veins not visible above, fairly prominent and rather lax below; midrib flat above, prominent below, about 1 lin. broad at the base, gradually fading to the apex; petiole $\frac{1}{3}$ - $\frac{3}{4}$ in. long, glabrous, the bark splitting transversely and peeling off; stipules subpersistent, lanceolate, acutely long-acuminate, $\frac{3}{4}$ -1 in. long, nearly 2 lin. broad at the base, submembranous, closely longitudinally striate, glabrous. Receptacles solitary, sessile, depressed-globose, about $1\frac{1}{2}$ in. in diam., wrinkling when dry, otherwise glabrous. Basal bracts 2, connate at the base, about 2 lin. broad, glabrous. Ostiole small and scarcely prominent, 2-lipped; mouth about 1 lin. broad; bracts all descending into the receptacle, lanceolate, subobtuse, membranous, glabrous. Male flowers rather numerous, long-pedicellate; pedicels up to $2\frac{1}{2}$ lin. long; perianth-segments 3, linear, subacute, membranous. Stamen solitary; filament up to $1\frac{1}{4}$ lin. long, red; anther oblique, 1 lin. long, obtuse. Female flowers numerous; perianth-segments subulate-lanceolate, membranous. Achene smooth, obliquely ellipsoid; style slender, as long as the ovary; stigma papillose.—Mildbr. & Burret in *Engl. Jahrb.* xlvi. 231. *F. epiphytica*, De Wild. in Fedde, *Repert.* xii. 195 and in *Bull. Soc. Bot. Belg.* lii. 208.

South Central. Belgian Congo: Stanley Pool District; Lukolela, *Demeuse*, 469! between Eala and Coquilhatville, *Laurent*, 787!

69. *F. rhynchocarpa*, Warb. ex Mildbr. & Burret in *Engl. Jahrb.* xlvi. 235. A tree with a broad crown; branchlets covered with glabrous grey bark, subterete or angular when dry. Leaves obovate or obovate-oblancoate, shortly and obtusely acuminate, attenuated to the base, 4-9 in. long, $1\frac{3}{4}$ -3 in. broad, entire, coriaceous, dull and glabrous on both surfaces, with prominent pale venation below; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 6-10 on each side of the midrib, diverging from it at an angle of 45° , nearly straight until branched into loops some distance from the margin, prominent below; tertiary nerves much-branched, forming with the veins a close prominent reticulation below; petiole about 1 in. long, usually very stout, about $1\frac{1}{2}$ -2 lin. broad, glabrous; stipules persistent, intrapetiolar, connate at their bases and encircling the stem, ovate-lanceolate, acute or subacute, 1 - $1\frac{1}{2}$ in. long,

membranous, reddish-purple when dry, longitudinally striate, glabrous. Receptacles axillary, solitary, pedunculate, shortly stipitate, subglobose, about $\frac{3}{4}$ in. in diam., with a very long and somewhat woody beak about $\frac{1}{4}$ in. long, beset with conspicuous warts about $\frac{1}{2}$ lin. long, strigillose-pubescent; peduncle $\frac{1}{4}$ in. long, fairly stout, glabrescent. Basal bracts 2, connate at the base, ovate or ovate-orbicular, about $2\frac{1}{4}$ lin. broad, membranous, glabrous or nearly so. Ostiole 2-lipped, very small; bracts few, all descending into the receptacle, linear-lanceolate, acute. Male flowers pedicellate; pedicel stout, 1 lin. long, glabrous; perianth-segments 3, lanceolate, acute, membranous, about 1 lin. long, glabrous; anther solitary, with a short filament, $\frac{2}{3}$ lin. long, each cell shortly mucronate at the apex. Gall flowers becoming large. Female flowers pedicellate; perianth-lobes 3, oblong; style slender.

Mozamb. Distr. German East Africa: Usambara; Nquelo, *Frau Kummer*, 25! Dereima, *Scheffler*, 198! 216! Amani, *Zimmermann*, 963! 2633! *Engler*, 3383! Sakarc, *Engler*, 940!

A species with remarkable receptacles, which have a very long woody beak and are covered with prominent warts.

70. **F. praticola**, *Mildbraed & Hutchinson in Kew Bulletin*, 1915, 325, with fig. An epiphytic shrub; branchlets rather sharply angular, about $1\frac{1}{2}$ lin. in diam., glabrous, covered with a grey smooth bark. Leaves oblong-elliptic, long-acuminate (acumen narrowed to a subobtuse apex, $1-1\frac{1}{4}$ in. long), obtuse or slightly rounded at the base, $6-7\frac{1}{2}$ in. long, $1\frac{3}{4}-2\frac{1}{4}$ in. broad, entire, coriaceous, dull on both surfaces, with a reddish midrib below (*Mildbraed*), light green above when dry, pale yellow below; midrib prominent below, sharply keeled in the lower part, about $\frac{2}{3}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 11 on each side of the midrib, spreading from it almost at right angles, prominent below, looped about $1\frac{1}{2}-2$ lin. from the margin; tertiary nerves slightly less prominent than the lateral and following their direction, slightly flexuous; veins scarcely visible above, thick and prominent below; petiole $\frac{1}{2}-1$ in. long, rather slender, with a single deep groove on the upper surface, spotted with small black lenticels, glabrous; stipules persistent, intrapetiolar, encircling the branchlets, narrowly lanceolate, acutely long-acuminate, $\frac{3}{4}-1$ in. long, membranous, reddish-purple when dry, glabrous. Receptacles axillary, quite sessile, not stipitate, slightly depressed-globose, with a protruding glabrescent ostiole, $\frac{1}{2}$ to nearly $\frac{3}{4}$ in. in diam., beset with large very prominent tongue-like glabrous warts, strigillose-pubescent. Basal bracts 2, connate at the base, closely adpressed to the receptacle, suborbicular, $1\frac{1}{2}$ lin. broad, membranous, glabrous. Ostiole 2-lipped; orifice about $\frac{3}{4}$ lin. wide; bracts not visible from the outside, all descending into the receptacle, linear, membranous, glabrous. Receptacular wall about 1 lin. thick, fleshy. Male flowers subsessile; perianth-segments 3, ovate-lanceolate, membranous, glabrous, about $\frac{3}{4}$ lin.

long; stamen solitary; filament $\frac{1}{2}$ lin. long; anther $\frac{1}{2}$ lin. long, mucronate. Female flowers pedicellate; pedicel up to 1 lin. long; perianth-segments 3, lanceolate, acute, $\frac{3}{4}$ lin. long, membranous, glabrous. Achene smooth; style about $1\frac{1}{2}$ times the length of the achene, slender, with a large papillose stigma. Receptacular scales subulate-lanceolate, acute, 1 lin. long, membranous in the upper part.

Upper Guinea. Fernando Po: grasslands of Moka, in the south-east of the island, 4000-6000 ft., *Mildbraed*, 7106!

71. *F. stipulifera*, *Hutchinson in Kew Bulletin*, 1915, 326. A shrub or small tree; branchlets angular, very sparingly pubescent, covered with a greyish bark. Leaves lanceolate or linear-lanceolate, gradually and obtusely acuminate, narrowed to the base, $3\frac{1}{2}$ -5 in. long, $1-1\frac{1}{6}$ in. broad, entire, chartaceous, punctate above, glabrous and dull on both surfaces or slightly shining below; midrib flat above, prominent below, about $\frac{2}{3}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 9-11 on each side of the midrib, diverging from it almost at right angles, nearly straight, looped, the loops forming a crenate line about 1 lin. from the margin; tertiary nerves slightly less prominent than the lateral, reticulate, rather lax, distinct below; veins somewhat indistinct and lax below; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. long, slender, glabrous, about $\frac{1}{2}$ lin. thick; stipules persistent, rather densely clothing the young shoots, lanceolate, acute, up to $\frac{3}{4}$ in. long, membranous, glabrous. Receptacles not seen attached, but very probably axillary, sessile (?), subglobose, 1 in. in diam., prominently warted, the warts being red in the fresh state, shortly strigillose-pubescent. Basal bracts 2, connate at the base, ovate-orbicular, rounded at the apex, about $1\frac{1}{4}$ lin. long, nearly 2 lin. broad, membranous, glabrous. Ostiole not at all prominent, 2-lipped; bracts all descending into the receptacle. Male flowers pedicellate; perianth-segments subulate-lanceolate, membranous, glabrous. Stamen solitary; filament short; anther $\frac{1}{2}$ - $\frac{2}{3}$ lin. long, minutely mucronate. Female flowers pedicellate; perianth-segments 3, unequal, subulate-lanceolate, very acute, membranous. Achene ellipsoid, smooth; style a little shorter than the achene, 2-fid.

Nile Land. Uganda: South Buddu, 3900 ft., *Dawe*, 301!

72. *F. tessellata*, *Warb. in Engl. Jahrb.* xx. 156. A tree; branchlets rather sharply angular when dry, minutely puberulous. Leaves oblong-elliptic, shortly and rather gradually acuminate, obtuse at both ends, $4-8\frac{1}{2}$ in. long, $1\frac{1}{2}$ -3 in. broad, coriaceous, entire, dull and pale green above when dry, light brown beneath, glabrous on both surfaces; midrib flat above, very prominent below, about $1\frac{1}{2}$ lin. broad at the base, gradually narrowed at the apex; lateral nerves 6-7 on each side, distinct above, prominent below, diverging from the

midrib at an angle of 45° , looped some distance from the margin, loops forming a deeply crenate line about $1\frac{1}{2}$ lin. from the margin; veins close and rather fine below, forming an areolate-reticulate venation; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, ribbed when dry, covered with glabrous deciduous bark; stipules persistent, lanceolate, acute, $\frac{3}{4}$ in. long, about 4 lin. broad at the base, membranous, glabrous. Receptacles axillary, solitary or in pairs, sessile, globose, contracted at the apex into a beak about 2 lin. long, rather densely hispid, nearly glabrous around the ostiole. Basal bracts probably 2, soon splitting up, membranous, glabrous. Ostiole 2-lipped; orifice 4 lin. long, very narrow; bracts small, descending. Male flowers few, subsessile; perianth-segments 3, lanceolate, acute, membranous, glabrous. Stamen solitary; filament short; anther $\frac{3}{4}$ lin. long, shortly mucronate. Female flowers sessile; perianth-segments 3, linear-lanceolate, very acute, membranous, as long as the achene; achene obliquely ellipsoid, shining; style lateral, as long as the achene; stigma shortly 2-fid. Receptacular scales linear-subulate, acute, $1\frac{1}{2}$ lin. long, membranous, glabrous.—*F. Winkleri*, Mildbr. & Burret in Engl. Jahrb. xvi. 236. partly.

Upper Guinea. Sierra Leone: Sugarloaf Mountain, *Scott Elliot*, 4030! Scarcies Valley; near Buyabuya, *Scott Elliot*, 4565! and without precise locality, *Afzelius*! Togo: Bismarckburg, *Büttner*, 711! French Guinea; Ditiun, *Chevalier*, 12989!

73. *F. camptoneura*, *Mildbr. in Engl. Jahrb.* xvi. 233. partly, and excl. var. A tree 25 ft. high or a climbing shrub; branchlets glabrous or slightly puberulous, angular when dry, covered with grey bark. Leaves elliptic, oblong-ob lanceolate or oblanceolate, gradually and acutely or subacutely acuminate (acumen $\frac{3}{4}$ –1 in. long), rounded or narrowed at the base, $4\frac{1}{2}$ –9 in. long, 1–4 in. broad, entire, rigidly chartaceous or subcoriaceous, glabrous and dull on both surfaces or slightly shining below, strongly and closely reticulate below; midrib flat above, prominent below, nearly $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 4–5 on each side, looped a long way from the margin, often with a second intramarginal nerve between the loops and the margin, prominent below; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. long, narrowly sulcate, glabrous; stipules persistent, linear-subulate to lanceolate, very acute, about $\frac{1}{2}$ – $\frac{1}{2}$ in. long, rigidly chartaceous, slightly puberulous or almost glabrous. Receptacles axillary, solitary, subsessile or pedunculate, globose, nearly $\frac{1}{2}$ in. in diam., glabrous and often very slightly tuberculate; peduncles (when present) about $\frac{1}{4}$ in. long, nearly $\frac{3}{4}$ lin. thick, glabrous. Basal bracts deciduous but probably 2, connate at the base. Ostiole not prominent, 2-lipped; mouth $\frac{1}{3}$ lin. wide; bracts not visible from the outside, the upper spreading transversely across the ostiole, the lower small and subulate-lanceolate, pointing into the receptacle, glabrous. Male flowers sessile; perianth-segments 3, oblong,

obtuse, rather rigid, glabrous. Stamen solitary; anther subsessile, nearly $\frac{1}{2}$ lin. long. Female flowers shortly pedicellate; perianth-segments more or less as in the male. Achene reddish, distinctly and closely verrucose. Gall flowers, about 2 in the receptacle examined, much larger than the female and bright yellow, with a thick pedicel.

Upper Guinea. Fernando Po, *Mann*, 307! Cameroons: Buea, *Deistel*! *Reber*, 1315! 1477! 1479! Batanga, *Dinklage*, 1168! Ebolowa, *Mildbraed*, 5615! Molundu district; between Lokomo, Bumba and Bange, *Mildbraed*, 4360!

Lower Guinea. Gaboon: near Libreville, *Klaine*, 2873! Sierra del Crystal, *Trilles*, 56!

Mildbraed's var. *angustifolia* is a distinct species which De Wildeman had named in ms. *F. arcuatonevata*, under which name it will be found.

74. *F. camptoneuroides*, *Hutchinson in Kew Bulletin*, 1915, 326. A large epiphytic shrub or small tree up to 25 ft. high; branchlets slender, sharply angular or ribbed when dry, glabrous. Leaves elliptic or oblong-elliptic, gradually and obtusely acuminate (acumen nearly $\frac{3}{4}$ in. long), rounded or slightly narrowed to the base, 4–6 $\frac{1}{2}$ in. long, 1 $\frac{1}{2}$ –2 $\frac{3}{4}$ in. broad, entire, chartaceous, dull and glabrous on both surfaces; midrib slightly impressed above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the acumen; lateral nerves about 5 on each side of the midrib, diverging from it at an angle of 45° or slightly more, arcuate, prominent on both surfaces, looped some distance within the margin and often again more faintly looped, the second loops forming a slender wavy intramarginal nerve; tertiary nerves much-branched, rather lax, prominent like the rather close veins on both surfaces; petiole $\frac{1}{2}$ –1 in. long, scarcely 1 lin. thick, very shortly and sparingly pubescent; stipules persistent, lanceolate, obtuse, 6–8 lin. long, about 2 lin. broad at the base, subchartaceous, glabrous. Receptacles axillary, sessile, subglobose, somewhat flattened on the top, nearly $\frac{3}{4}$ in. in diam., with thin walls, shortly and rather densely pubescent. Basal bracts 2, connate at the base, ovate, rounded at the apex, subchartaceous, slightly puberulous towards the base outside. Ostiole not prominent, 2-lipped; mouth about $\frac{1}{2}$ lin. wide. Bracts not visible from the outside, the upper ovate-lanceolate, obtuse, the lower linear-lanceolate, subacute, glabrous. Male flowers sessile; perianth-segments 2–3, lanceolate. Stamen solitary; anther nearly sessile, obtuse. Female flowers stoutly pedicellate; perianth-segments 3–4, with membranous margins. Achene finely and closely pitted. Receptacular scales oblong-lanceolate, acute, about 1 $\frac{1}{2}$ lin. long.—*F. camptoneura*, *Mildbr. in Engl. Jahrb.* xlv. 233, partly.

Upper Guinea. Fernando Po: north side of Pico Santa Isabel, *Mildbraed*, 6411! 7137! Cameroons: Neu-Tegel, *Winkler*, 167! Niasoso, *Büsgen*, 287! Bangwe. *Conrau*, 208!

75. *F. nyanzensis*, *Hutchinson in Kew Bulletin*, 1915, 327. Branchlets ribbed or angular when young, covered with grey finely puberulous bark. Leaves oblanceolate or oblong-oblanceolate, very shortly and obtusely acuminate, cuneate at the base, $2\frac{1}{2}$ – $4\frac{1}{2}$ in. long, 1–2 in. broad, entire, rigidly coriaceous, glabrous and dull on both surfaces; midrib flat above, prominent and rounded below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 5 on each side of the midrib, diverging at an angle of about 45° , looped near the margin, rather slender, prominent on the lower surface; tertiary nerves scarcely distinguishable; veins finely reticulate below, scarcely raised; petiole rather stout, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrous; stipules persistent, lanceolate, acute, up to $\frac{3}{4}$ in. long, membranous, longitudinally striate, glabrous. Receptacles axillary, probably in pairs, pedunculate, globose, about $\frac{1}{3}$ in. in diam., marked with scattered black spots when dry, shortly whitish-pubescent; peduncle 5–6 lin. long, $\frac{2}{3}$ lin. thick, shortly pubescent. Basal bracts 2, slightly connate at the base, broadly ovate, rounded at the apex, $1\frac{1}{2}$ lin. long and broad, thinly chartaceous, glabrous. Ostiole 2-lipped, slightly produced, glabrous; mouth $\frac{1}{2}$ lin. broad; bracts few, not visible from the outside, all descending. Flowers too young for description.

Nile Land. Uganda: Entebbe, near Lake Victoria, *Bagshawe*, 690!

76. *F. namalalensis*, *Hutchinson in Kew Bulletin*, 1915, 328, *with fig.* A small tree; branchlets about $2\frac{1}{2}$ lin. thick, covered with smooth pale bark. Leaves oblong or oblong-elliptic, slightly narrowed to or rounded at the base, caudate-acuminate at the apex, $5\frac{1}{2}$ – $8\frac{1}{2}$ in. long, 2– $3\frac{1}{4}$ in. broad (acumen $\frac{1}{2}$ – $\frac{3}{4}$ in. long), entire, rigidly coriaceous, dull and glabrous on both surfaces, with pale straw-coloured slender venation below; lateral nerves about 5–6 on each side of the midrib, slightly arcuate, diverging from it at an angle of about 60° , very prominent below, looped well within the margin; petiole 1– $1\frac{1}{2}$ in. long, stout, covered with flaky deciduous brown bark; stipules persistent, lanceolate or oblong-lanceolate, acute, half encircling the shoots at the base, $\frac{3}{4}$ –1 in. long, about $\frac{1}{4}$ in. or more broad, membranous, purple, glabrous. Receptacles axillary, probably solitary or in pairs, pedunculate, depressed-globose, long-stipitate above the basal bracts, about $\frac{3}{4}$ in. in diam., slightly warted, otherwise glabrous; stipe $2\frac{1}{2}$ –3 lin. long, nearly 1 lin. thick, sparingly puberulous; peduncle 2–3 lin. long, stout, glabrous or nearly so. Basal bracts probably 2, more or less ovate-elliptic, soon partially falling off, membranous. Ostiole small and pore-like, about $\frac{1}{2}$ lin. broad. Male flowers with a membranous perianth and a solitary stamen. Female flowers sessile. Gall flowers stalked, numerous.

Nile Land. Uganda: growing around large trees in the Namalala Forest, *Fyffe*, 77! 83!

77. *F. ebolowensis*, *Mildbraed & Hutchinson in Kew Bulletin*, 1915, 329. A small epiphytic shrub with long branches; young branchlets shortly strigillose-pubescent, about $\frac{1}{2}$ in. in diam. near the apex, subterete, with short internodes. Leaves oblong or slightly oblanceolate-oblong, caudate-acuminate (acumen obtuse, $\frac{1}{2}$ – $\frac{3}{4}$ in. long), slightly cuneate at the base, 4–7 $\frac{1}{2}$ in. long, 1 $\frac{1}{4}$ –2 $\frac{1}{2}$ in. broad, entire, rigidly coriaceous, dull and glabrous on both surfaces, dull-green above, with thick pale nerves below; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 6–7 on each side of the midrib, diverging from it at an angle of 45°, prominently looped 1 $\frac{1}{2}$ –2 lin. from the margin; tertiary nerves scarcely evident, together with the veins forming a close pale yellow network below; petiole $\frac{3}{4}$ –1 in. long, stout, 1 $\frac{1}{4}$ –1 $\frac{1}{2}$ lin. thick, shortly pubescent; stipules persistent, intrapetiolar, paired, slightly connate at the base and quite encircling the stem, ovate-lanceolate, subacute, $\frac{3}{4}$ –1 in. long, submembranous, striate, dull brown, minutely puberulous outside. Receptacles green, with reddish brown spots, axillary, solitary (?), sessile, but stipitate within the basal bracts, globose, with a very small wart-like ostiole at the apex, rounded above the stipitate base, $\frac{1}{2}$ in. or slightly more in diam., finely puberulous; stipe 1 $\frac{1}{2}$ lin. long, cylindric, about $\frac{3}{8}$ lin. in diam. Basal bracts 2, ovate-orbicular, mucronate, 1 $\frac{1}{4}$ lin. long and broad, membranous, slightly puberulous near the base outside, otherwise glabrous. Ostiole 2-lipped; orifice about $\frac{1}{3}$ lin. long; bracts all descending, the upper small, the lowermost subulate-lanceolate, hyaline, glabrous. Male flowers subsessile; perianth-segments 3, lanceolate, subobtusate, membranous, glabrous. Stamen solitary; filament short; anther $\frac{1}{2}$ lin. long, obtuse. Female flowers pedicellate; perianth-segments 4–5, linear-lanceolate, acute, membranous. Achene smooth; style not seen.

Upper Guinea. Cameroons: Ebolowa district; Ekuk, *Mildbraed*, 5689!

78. *F. Conraui*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 25, t. xi. figs. 3–4. Branchlets obtusely angular, about 2 $\frac{1}{2}$ lin. thick, smooth, mottled with large purplish-brown spots when dry, nearly covered with the large persistent stipules. Leaves elongate oblong-elliptic, long and acutely caudate-acuminate, slightly narrowed to an obtuse base, 7–8 in. long, 2 $\frac{1}{4}$ –2 $\frac{3}{4}$ in. broad, entire, chartaceous, glabrous, prominently and closely reticulate with whitish veins below and brownish interspaces, green above; midrib slightly immersed above, very prominent, convex or almost keeled and about 1 $\frac{1}{2}$ lin. broad below, gradually tapered to the apex; lateral nerves 8–10 on each side, very slightly raised and inconspicuous above, very distinct, but only a little prominent below, arising from the midrib at an angle of about 60°, slightly curved, looped, the loops forming a crenate line 1 $\frac{1}{2}$ –2 lin. from the margin; veins hardly visible above, very distinct below; petiole $\frac{3}{4}$ –1 in. long, 1–1 $\frac{1}{2}$ lin.

thick, smooth, straw-coloured when dry; stipules persistent, numerous, ovate-lanceolate, very acutely acuminate, up to $1\frac{1}{4}$ in. long, membranous, glabrous. Receptacles axillary, sessile, subglobose, about $\frac{1}{2}$ in. in diam., shortly pubescent or puberulous. Basal bracts ovate-orbicular, about 2 lin. long, membranous, glabrous. Ostiole slightly produced, 2-lipped; mouth about $\frac{1}{2}$ lin. wide; bracts all descending, the upper broader than the others and ovate-lanceolate, obtuse, the lower linear or linear-lanceolate, membranous. Male flowers not seen.—Mildbr. & Burret in Engl. Jahrb. xlv. 236; De Wild. in Bull. Soc. Bot. Belg. lii. 203.

Upper Guinea. Southern Nigeria: Agege, *Kitson*! Western Lagos, *Rouland*! Cameroons: Molundu, *Mildbraed*, 3957! 4988! Bangue, *Conrau*, 280! Buea, *Reder*, 395 partly! near the River Jah, *Mildbraed*, 5410!

North Central. Eastern Shari: Snoussi district; banks of the Gounda River, *Chevalier*, 7315!

Lower Guinea. Lower Congo: Dembo, *Gillet*, 2101!

South Central. Belgian Congo: Eala, *Pynaert*, 1405! 1742! Sanda, *Vanderyst*!

Differs from *F. Preussii*, Warb., by its symmetrical and more acutely long-acuminate leaves.

79. *F. densestipulata*, *De Wild. in Fedde, Repert.* xii. 194. Branchlets somewhat thick, sulcate, shortly tomentose. Leaves obovate-elliptic, shortly acuminate, slightly cuneate at the base, $4\frac{1}{2}$ –10 in. long, $1\frac{3}{4}$ – $3\frac{1}{2}$ in. broad, entire, rigidly coriaceous, glabrous, dull on both surfaces; midrib flat above, very prominent and rounded below, $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex; lateral nerves about 8 on each side of the midrib, those near the middle subopposite, diverging at an angle of 45° , looped some distance from the margin, distinct on both surfaces, prominent below; tertiary nerves very slender, reticulate, forming with the veins a delicate reticulation below; petiole $\frac{1}{2}$ –1 in. long, rather stout, transversely wrinkled, glabrous; stipules numerous, up to $1\frac{1}{4}$ in. long and 7 lin. broad, shortly velvety outside. Receptacles axillary, solitary or in pairs, pedunculate, slightly depressed-globose, $\frac{1}{2}$ in. in diam., glabrous, white-spotted; peduncle about 5 lin. long or shorter, shortly tomentose. Basal bracts 2, more or less papery, about 2 lin. long. Ostiole 2-lipped, very slightly protruding, with no bracts visible from the outside; mouth scarcely $\frac{1}{2}$ lin. broad, channel about 1 lin. long; upper bracts ovate, acute, $\frac{1}{4}$ lin. long, the lower linear-lanceolate. Male flowers with a short thick stalk; perianth-segments 3, unequal, lanceolate, acute, membranous. Stamen solitary; filament very short; anther $\frac{1}{2}$ lin. long, shortly mucronate. Female flowers shortly pedicellate; perianth-segments 3, lanceolate, subacute, nearly 1 lin. long, membranous, glabrous; achene oblong-obovoid, shining; style lateral, about half the length of the achene; stigma papillose, $\frac{1}{3}$ lin. long.—De Wild. in Bull. Soc. Bot. Belg. lii. 204.

South Central. Belgian Congo: without precise locality, *Seret*, 734!

80. *F. Winkleri*, *Mildbr. & Burret in Engl. Jahrb.* xlv. 236, *partly*. A tree; branchlets about $\frac{1}{4}$ in. in diam. near the apex, glabrous. Leaves obovate-elliptic, caudate-acuminate and in one leaf seen with a large obtuse tooth near the acumen, narrowed to or slightly rounded at the base, 7-9 in. long, $2\frac{1}{2}$ - $3\frac{1}{2}$ in. broad, coriaceous, glabrous and dull on both surfaces, brown below, with thick pale-coloured nerves and venation; midrib very prominent below, about $1\frac{1}{2}$ lin. broad at the base, gradually narrowed to the apex of the acumen; lateral nerves 7-8 on each side of the midrib, diverging from it at an angle of 45° or slightly more, the lower subopposite, prominently looped about 2 lin. from the margin; tertiary nerves lax and much-branched, forming with the veins a rather close nervation very conspicuous below, but not visible above; acumen narrow, subacute, 1 in. long; petiole stout, $\frac{3}{4}$ -1 in. long, $1\frac{1}{2}$ lin. thick, glabrous, covered with a thin brown deciduous epidermis; stipules intrapetiolar, clasping the stem, much broken in the specimen seen but probably mostly lanceolate, acutely acuminate, about $\frac{3}{4}$ in. long, membranous, striate, glabrous. Receptacles axillary, solitary (?), sessile, not stipitate, depressed-globose, with a small shortly protruding ostiole at the apex, a little over $\frac{1}{2}$ in. in diam., strigillose-pubescent, reticulately wrinkled when dry. Basal bracts not seen complete, but evidently 2 and closely adpressed to the base of the receptacle, membranous and glabrous. Ostiole 2-lipped, with no bracts visible from the outside; channel about $\frac{1}{2}$ lin. wide and $1\frac{1}{2}$ lin. long; bracts descending into the receptacle, ovate-subulate, glabrous. Perfect flowers not seen.

Upper Guinea. Cameroons: Victoria, forest near the Botanical garden, *Winkler*, 1204!

Chevalier's plant (12989) from French Guinea, which was included in this species by Mildbraed and Burret, represents quite a distinct species, *F. lesselabii*, Warb., with much more shortly and obtusely acuminate leaves and larger figs with very long beaks.

81. *F. Preussii*, *Warb. in Engl. Jahrb.* xx. 156. Branchlets sulcate when dry, covered with greyish glabrous bark. Leaves not crowded, large, slightly obliquely oblong or oblong-oblongeolate, shortly and obtusely acuminate, rounded at the base, 9-11 in. long, $2\frac{1}{2}$ - $3\frac{1}{2}$ in. broad, entire, chartaceous, glabrous, closely reticulate below; midrib slightly immersed above, prominent and rather broad below; lateral nerves 6-7 on each side, spreading from the midrib at an angle of about 45° , looped, the loops forming an irregular line 2-3 lin. from the margin; veins forming a close distinct network below, not visible above; petiole 1- $1\frac{3}{4}$ in. long, about $1\frac{1}{2}$ lin. thick, deeply and narrowly sulcate when dry, with deciduous epidermis; stipules persistent or subsistent, ovate-lanceolate, acute or subacute, about $\frac{3}{4}$ in. long and 4 lin. broad, submembranous, glabrous, faintly striate. Receptacles supra-axillary, sessile, subglobose.

2 in. in diam., with very thick walls. Basal bracts 2, connate at the base, semi-orbicular, about $2\frac{1}{2}$ lin. broad, membranous, glabrous. Ostiole not at all prominent, not seen in a complete state, but very probably 2-lipped; bracts lanceolate. Male flowers: perianth-segments 4, linear-lanceolate, acute. Stamen solitary; filament very short. Female perianth 4-partite, as in the male but longer; style elongated, filiform, with a subclavate stigma.—Warb. in Warb. & De Wild. Fic. Fl. Congo, 10, t. xviii.; Mildbr. & Burret in Engl. Jahrb. xlv. 237; De Wild. in Bull. Soc. Bot. Belg. lii. 223. *F. Staudtii*, Warb. ex Mildbr. & Burret, l.c., name only.

Upper Guinea. Cameroons: Barombi, *Preuss.*, 454!

South Central. Belgian Congo: Lukolela, *Durèr.*, 843! Kwilu, *Sapin!* Lufuku, *Sapin!* Eala, *Laurent*, 706! 717! *Piquart*, 872!

82. *F. pringsheimiana*, *J. Braun & K. Schum. in Mitteil. Deutsch. Schutzgeb.* ii. 162. Branchlets rather sharply angular, somewhat slender, glabrous. Leaves elliptic or obovate-elliptic, obtusely caudate-acuminate, acumen $\frac{3}{4}$ –1 in. long, cuneate at the base, $3\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $1\frac{1}{2}$ –3 in. broad, entire, rigidly coriaceous, dull and glabrous on both surfaces, yellowish-brown below when dry; midrib prominent and often slightly keeled below when dry, about 1 lin. broad at the base, gradually tapered to the apex; lateral nerves 8–10 on each side of the midrib, diverging from it at a wide angle (about 75°), prominently looped, the loops forming a crenate intramarginal nerve about $1\frac{1}{2}$ lin. distant from the margin, prominent on the lower surface; tertiary nerves fairly prominent and flexuous on the lower surface, like the lateral nerves light-coloured; petiole comparatively short, $\frac{1}{3}$ –1 in. long, deeply grooved on the upper surface, glabrous; stipules persistent, lanceolate, subacute, about $\frac{1}{2}$ in. long, more or less membranous, reddish-purple when dry, with narrow hyaline margins. Receptacles axillary, solitary (?), sessile below the basal bracts, obovoid-globose, stipitate at the base, with a very small wart-like ostiolar protuberance at the apex, glabrous; stipe stout, about 2 lin. long. Basal bracts 2, connate at the base, ovate, obtuse, about $1\frac{1}{4}$ lin. broad, thinly chartaceous, glabrous. Ostiole 2-lipped, minute, slightly protruding, with no bracts visible from the outside; orifice $\frac{1}{3}$ lin. long; channel very narrow, 3 lin. long; bracts all descending, rather few, subulate, 1 lin. long, glabrous. Receptacular wall about 2 lin. thick, soft. Male flowers with a single stamen. Female flowers pedicellate; perianth-segments 3 or 4, linear, reddish, with hyaline margins, about $\frac{3}{4}$ lin. long, glabrous; achene oblong-ellipsoid, pitted, shining; style slender, nearly as long as the achene.—Mildbr. & Burret in Engl. Jahrb. xlv. 234.

Upper Guinea. Cameroons: without precise locality, *Braun*, 142!

Differs from *F. cyathistipula*, Warb., in its more shortly cuneate leaves and sessile receptacles with very small ostioles.

83. *F. cyathistipula*, *Warb. in Engl. Jahrb.* xx. 173. A small

tree 12-20 ft. high, very much branched, evergreen; trunk and branches with sparing or copious milky sap; branchlets spreading, angular, glabrous, according to Welwitsch pendulous after the habit of *Salix babylonica*, Linn., densely clothed with the persistent stipules. Leaves alternate, oblanceolate or elliptic-oblanceolate, shortly and obtusely acuminate, mostly rather long-attenuated to the base, $2\frac{3}{4}$ - $5\frac{1}{2}$ in. long, $1\frac{1}{4}$ -2 in. broad, entire, rigidly coriaceous, dull on both surfaces, distinctly reticulate below but not so above, glabrous; midrib slightly immersed above, very prominent below, nearly $1\frac{1}{2}$ lin. broad at the base, smooth; lateral nerves 5-7 on each side, scarcely visible above, prominent below, looped, the loops forming an irregular line 1-2 lin. from the margin; veins forming a distinct network below giving the surface a spotted appearance in the dried state; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. long, glabrous, the epidermis at length splitting transversely and falling away in pieces; stipules persistent, imbricate, lanceolate or ovate-lanceolate, acute or subacute, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, up to 4 lin. broad, reddish, submembranous. Receptacles axillary, solitary or in pairs, pedunculate, very shortly stipitate within the basal bracts, ellipsoid, umbonate, nearly $1\frac{1}{2}$ in. long and a little more than $\frac{3}{4}$ in. in diam., very thinly puberulous outside; peduncle $\frac{3}{4}$ in. long, sulcate, puberulous; stipe nearly 2 lin. long. Basal bracts 2, ovate, rounded at the apex, membranous, glabrous. Ostiole small and pore-like; bracts all descending into the interior of the receptacle, glabrous. Male flowers with a solitary stamen. Gall flowers very numerous, stalked.—Warb. in Engl. Pfl. Ost-Afr. C. 161, t. x., A-E and in Warb. & De Wild. Fic. Fl. Congo, 13, t. xxvii.; Mildbr. & Burret in Engl. Jahrb. xlvii. 234, partly; De Wild. in Bull. Soc. Bot. Belg. lii. 203. *F. callescens*, Hiern in Cat. Afr. Pl. Welw. i. 1001.

Upper Guinea. Cameroons: Duala, *Büsgen*, 565! Niasoso, *Büsgen*, 288!

Nile Land. Uganda: Sesse Islands, Lake Victoria, *Carpenter*, 13! Entebbe, *Bagshawe*, 691!

Lower Guinea. Lower Congo: Kimuenza, south of Leopoldville, *Mildbraed*, 3561! Kisantu, *Gillet*, 1245! Angola: Golungo Alto; between the Cuango and Quiapoze streams, *Welwitsch*, 6395! Quiquele-quele spring near Sange, *Welwitsch*, 6385! 6420! Amboini, near the fort of Quissaco, *Gossweiler*, 4481!

South Central. Belgian Congo: Epulu, between Irumu and Mawambi, *Mildbraed*, 2979! Bambata, *Allard*, 189! Eala, *Laurent*, 708! Gumbari, *Seret*, 467! Atenes, *Sapin*! Lutshima, *Sapin*! and without precise locality, *Dewèvre*, 403! *Demeuse*, 463!

Mozamb. Distr. German East Africa: Bukoba, *Stuhlmann*, 3237! 3645! 3779! Lake Kivu, *Mildbraed*, 1155! Uluguru, *Stuhlmann*, 8715! Amani, *Braun*, 995!

84. *F. Rederi*, *Hutchinson in Kew Bulletin*, 1915, 329. Branchlets and stipules more or less as in *F. camptoneura*. Leaves obovate or obovate-elliptic, subobtusely acuminate, more or less cuneate at the base, $3\frac{1}{2}$ -5 in. long, $1\frac{1}{2}$ - $2\frac{1}{2}$ broad, entire, chartaceous, dull and glabrous on both surfaces, with a close pale yellow venation on the lower surface; midrib flat above, prominent below, about 1 lin.

broad at the base, gradually tapered to the apex; lateral nerves about 5 on each side of the midrib, diverging at an angle of 45° , becoming rather slender and looped towards the margin; tertiary nerves few and very slender, more or less zig-zag between the lateral ones; veins enclosing slightly raised dark brown areas on the lower surface; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrous; stipules as above. Receptacles axillary, pedunculate, ellipsoid-obovoid, stipitate, nearly $1\frac{1}{2}$ in. long and 1 in. in diam., glabrous; peduncle 3–4 lin. long, sulcate, glabrous, nearly 1 lin. thick; stipe about $2\frac{1}{2}$ lin. long, stout. Basal bracts 2, connate at the base, ovate-orbicular, about 2 lin. long, submembranous, glabrous. Ostiole not prominent, 2-lipped; mouth $\frac{1}{2}$ lin. wide, with no visible bracts from the outside; bracts very few, descending, linear, up to 3 lin. long, slightly fleshy, glabrous. Receptacular wall about $2\frac{1}{2}$ lin. thick. Male flowers not seen, but almost certainly with only 1 stamen. Female flowers stoutly pedicellate; perianth-segments 4, oblong-ovate, obtuse, with membranous hyaline margins. Achene smooth; style rather thick, shortly 2-lobed. Receptacular scales subulate-lanceolate, acute, $1\frac{1}{2}$ lin. long, with thin membranous margins.—*F. cyathistipula*, Mildbr. & Burret in Engl. Jahrb. xlv. 234, partly, not of Warb.

Upper Guinea. Cameroons: Buea, *Reder*, 395! Ebenda, *Reder*, 1503!

This species has leaves very similar to *F. camptoneura*, Mildbr., and receptacles like those of *F. cyathistipula*, Warb.

85. *F. mutantifolia*, *Hutchinson in Kew Bulletin*, 1915, 330, with fig. Branchlets quadrangular, shortly brownish-tomentose, at length nearly glabrous. Leaves when young very different from the adult stage; young leaves narrowly oblanceolate, rounded at the apex, slightly narrowed to an obtuse base, 1– $1\frac{1}{2}$ in. long, $\frac{1}{3}$ – $\frac{1}{2}$ in. broad, entire, chartaceous, becoming almost black on the upper surface when dry, rather finely reticulate and brown below, with about 9 pairs of lateral nerves; mature leaves rigidly coriaceous, oblong-oblanceolate, slightly truncate or rounded at the apex, obtuse at the base, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, $\frac{3}{4}$ –1 in. broad, entire, light green on both surfaces when dry, shining above; midrib flat or very slightly immersed above, slightly raised below, $\frac{1}{2}$ lin. broad at the base, gradually narrowed to the apex, bifurcate about $\frac{1}{4}$ in. from the apex; lateral nerves 9–11 on each side, very slightly immersed above, slightly prominent below, diverging from the midrib at an angle of 45° , looped, the loops forming a crenate intramarginal nerve about $\frac{3}{4}$ lin. from the margin; tertiary nerves and veins very few, scarcely evident; petiole 3–4 lin. long, of the young leaves rather slender, glabrous, of the mature leaves about $\frac{3}{4}$ lin. thick; stipules persistent or subpersistent, ovate, acutely acuminate, about 2 lin. long and $1\frac{1}{2}$ lin. broad, membranous, pubescent when young, soon becoming glabrous or nearly so. Receptacles crowded towards the apex of each shoot, sessile, ovoid-globose, about $2\frac{1}{2}$ lin. in diam., minutely and softly puberulous;

ostiole not prominent. Basal bracts 3, broadly ovate or suborbicular, rounded at the apex, about $\frac{3}{4}$ lin. long and broad, membranous, thinly pubescent outside. Ostiolar bracts all pointing straight into the receptacle, the middle two much larger than the others, linear-oblong, obtuse, $1\frac{1}{6}$ lin. long, membranous, the others about two-thirds as long, subulate or subulate-lanceolate, acute, membranous. Male flowers not seen. Female flowers numerous, sessile; perianth very thin, enclosing the style, but not the rather large oblong stigma. Receptacular scales few, subulate, very acute, $\frac{3}{4}$ lin. long, membranous.

Lower Guinea. Angola: Malange district, *Gossweiler*, 1004! Right bank of the river Cubango, near Fort Princesa Amelia, *Gossweiler*, 1973!

According to Gossweiler his 1973 was epiphytic on a Cæsalpineous plant, which had already been suffocated; after the death of the latter the *Ficus* evidently developed into an independent tree.

86. *F. Lingua*, *Warb. in De Wild. & Th. Durand, Reliq. Dewevr.* 216. A large epiphytic shrub with horizontally spreading branches; branchlets slender with short internodes, pubescent with brownish hairs. Leaves oblanceolate, rounded at the apex, narrowed to the base, $\frac{1}{2}$ –1 in. long, $2\frac{1}{2}$ – $3\frac{1}{2}$ lin. broad, entire, chartaceous, dull and glabrous on both surfaces; midrib slightly impressed above, prominent below, gradually tapered to the apex of the blade; lateral nerves 5–6 on each side of the midrib, ascending from it at an acute angle, distinct on the lower surface; petiole 1 lin. long, glabrous; stipules persistent, lanceolate, acute, $1\frac{1}{2}$ lin. long, glabrous or nearly so. Receptacles axillary, sessile, solitary or in pairs, globose, 2 lin. in diam., glabrous. Basal bracts 2–3, membranous, deciduous, finely puberulous outside. Ostiole small, pore-like; bracts all descending into the receptacle, small, glabrous. Male flowers with a solitary stamen. Achenes smooth.—*Warb. in Warb. & De Wild. Fic. Fl. Congo*, 24; *De Wild. Miss. É. Laurent*, 71; *Mildbr. & Burret in Engl. Jahrb.* xlv. 248; *De Wild. in Fedde, Repert.* xii. 303, and in *Bull. Soc. Bot. Belg.* lii. 216.

Upper Guinea. Cameroons: Campo, *Ledermann*, 375! road to Olanga, *Tessmann*, 785! forest between Lokomo, Bumba and Bange, *Mildbraed*, 4383!

Lower Guinea. Spanish Guinea: Uelleburg, Fang district, *Tessmann*, 61! French Congo: Fernaud, *Leconte*, 21!

South Central. Belgian Congo: Aruwimi district; Lokandu and Lowa, *Dewèvre*, 1136! Kasai district; Dibebe, *Laurent*! Mondjo, *Pynaert*, 306!

87. *F. kamerunensis*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 258. Branchlets sulcate, fairly slender, thinly pubescent, with thin scaly deciduous bark. Leaves oblanceolate-obovate, gradually and obtusely acuminate, cuneate at the base, 2– $3\frac{1}{2}$ in. long, 1– $1\frac{1}{2}$ in. broad, entire, glabrous, dark-coloured above when dry, brown below; midrib flat above, prominent below, $\frac{3}{4}$ lin. broad at the base, gradually tapered at the apex of the blade; lateral nerves numerous,

about 12 on each side of the midrib, diverging from it at an angle of 45° , looped near the margin, indistinct above, prominent below; veins distinct below; petiole comparatively short, 3 lin. long, subterete, glabrous; stipules more or less persistent, lanceolate from an ovate base, about $\frac{1}{3}$ in. long, membranous, pubescent on the back, otherwise glabrous. Receptacles axillary, sessile, globose, $\frac{1}{4}$ in. in diam., glabrous. Basal bracts 2, connate at the base, membranous. Ostiole small and pore-like; bracts all descending into the receptacle, glabrous. Male flowers shortly pedicellate; perianth-segments 3, glabrous. Stamen solitary; anther oblong. Female flowers sessile. Gall flowers pedicellate.—*F. fulvistipula*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlvii. 259, name only.

Upper Guinea. Sierra Leone: Talla Hills, near Ninia, *Scott Elliot*, 4913! Ivory Coast: Cavally Basin; between Grabo and Tate, *Chevalier*, 19785! Anyama, *Chevalier*, 20706! Southern Nigeria: Cross River, *Meyer*! Cameroons: Bipinde, *Zenker*, 1701! Victoria; in the botanical garden, *Winkler*, 1091! Neu-Tegel, *Winkler*, 212! Johann-Albrechtshöhe, *Staudt*, 897!

Lower Guinea. Gaboon: Libreville, *Claine*, 451! *Bellay*, 192!

88. *F. Anomani*, *Hutchinson in Kew Bulletin*, 1915, 331. Branchlets fairly stout, purplish when dry, glabrous. Leaves oblong or oblong-oblongate, obtuse at both ends or slightly narrowed to the base, 2–4½ in. long, 1–1½ in. broad, entire, thinly coriaceous, glabrous and dull on both surfaces; midrib flat above, prominent and straw-coloured below, 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 6–7 on each side of the midrib, diverging from it at an angle of 45° , very slender, indistinct above, prominent below, looped near the margin; tertiary nerves and veins scarcely evident; petiole $\frac{1}{2}$ –1¼ in. long, stout, broadly grooved above, 1–1¼ lin. thick, glabrous; stipules persistent, broadly ovate, acute, about 4 lin. long, glabrous outside. Receptacles axillary, sessile, ovoid-globose, about 4 lin. in diam., finely pubescent or nearly glabrous, with a large umbonate ostiole. Basal bracts 2, small and closely adpressed to the receptacle, membranous, glabrous. Ostiole pore-like; bracts all descending into the receptacle, glabrous. Male flowers shortly pedicellate; perianth-segments obovate, membranous, glabrous. Stamen solitary; anther nearly as broad as long. Female flowers sessile; style as long as the achene, slender. Gall flowers pedicellate.

Upper Guinea. Sierra Leone: Scarcies River Valley, near Kukuna, *Scott Elliot*, 4693! Ivory Coast: Lower Cavally River; Mount Nienokue, *Chevalier*, 19447! 19473! Gold Coast: Dunkwa district; Deyniasse, *Chipp*, 151! Schwibi and Wam districts, *Armitage*! Cameroons: near Mundame, *Büsgen*, 140!

Known to the natives of the Gold Coast as *Anomani*.

89. *F. buxifolia*, *De Wild. in Fedde, Repert.* xii. 302. An epiphytic shrub; branchlets somewhat flattened, pubescent when young, later with glabrescent deciduous bark. Leaves small,

triangular-oblongate, truncate and slightly emarginate at the apex, narrowed to a subacute base, $\frac{3}{4}$ –1 in. long, 5–7 lin. broad, membranous when young, becoming more chartaceous, dull and glabrous on both surfaces; midrib flat above, prominent below, becoming slender and branching below the apex of the blade; lateral nerves 5–6 on each side of the midrib, very slender, looped within the margin, distinct on both surfaces; petiole $1\frac{1}{2}$ –2 lin. long, slender, glabrous; stipules soon caducous, lanceolate, subacute, about 2 lin. long, slightly pubescent. Receptacles not known.—De Wild. in Bull. Soc. Bot. Belg. lii. 202.

South Central. Belgian Congo: Ituri Region; Wambutti, *Mildbraed*, 2901! Upper Aruwimi, *Pynaert*, 692!

In cultivation at the Serres Coloniales, Lacken, Brussels, in 1913.

90. **F. Leprieuri**, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 219. A tree up to about 80 ft. high; young branchlets short and twiggy, subterete, glabrous. Leaves small, obtriangular, mostly quite truncate, rarely slightly rounded, undulate or broadly emarginate at the apex, cuneate to an obtuse base, $1\frac{1}{2}$ –3 in. long, $1\frac{1}{4}$ – $2\frac{3}{4}$ in. broad across the top, entire, chartaceous or rigidly subcoriaceous, glabrous and mostly somewhat dull on both surfaces; margins recurved; midrib prominent below, convex, abruptly two or three times divided about a third of its length from the apex, when thrice divided then the third division continuing the midrib towards the apex of the leaf but much fainter and usually again branched; lateral nerves 4–7 on each side, arising from the midrib at an angle of from 45° – 65° , looped, the loops forming a wavy line parallel with and about 1 lin. from the margin; tertiary nerves and veins rather lax, distinct below; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. long, $\frac{1}{2}$ – $\frac{3}{4}$ lin. thick, glabrous; stipules caducous, small, lanceolate, acute, rusty-hirsute or tomentose on the outside. Receptacles in axillary pairs on the young annual shoots, pedunculate, globose, mammillate at the apex, 3–4 lin. in diam., smooth; peduncles $2\frac{1}{2}$ –5 lin. long, glabrous or very minutely and sparingly puberulous; basal bracts connate into a saucer-shaped entire shortly ciliolate fleshy cup about $\frac{1}{2}$ lin. high. Ostiole pore-like, gaping; bracts all descending into the receptacle, glabrous. Male flowers with a solitary stamen. Female flowers numerous, sessile; perianth cupular, 3-lobed, lobes triangular, acute, membranous, glabrous. Gall flowers pedicellate; pedicels red, glabrous; perianth as in the male, membranous.—*Mildbr. & Burret* in Engl. Jahrb. xlv. 246, excl. syn. *F. furcata*, Warb. *F. triangularis*, Warb. in Engl. Jahrb. xx. 174, Notizbl. königl. Bot. Gart. Berlin, v. 64, t. iii. and in Engl. Pflanzenwelt Afr. i. ii. 682, fig. 580.

Upper Guinea. Senegambia: Cayor, *Leprieur*! Sierra Leone: King Road, *Barter*! Mount Yamba, near Buyabuya, *Scott Elliot*, 4286! 4991! French Guinea: Casamance River, Carabane, *Chevalier*, 2655! Ditiun, *Chevalier*, 12988! Liberia: Sinoe Basin, *Whyte*, 10! *Sim*, 36! Fishtown, *Dinklage*, 1907! 2081! Gold Coast: Asientiem, *Chipp*, 294! and without precise locality,

Burton & Cameron! Togo: Lome, *Warnecke*, 458! Ndolo, *Busse*, 3508! Southern Nigeria: Lagos, *Barter*, 2228! *Dawodu*, 251! Ibadan, *Dodd*, 417! Old Calabar, *Thomson*, 71! Cameroons: Barombi, *Prauss*, 114! 544! Victoria, *Winkler*, 1222! 1463! *Stössel*, 75!

Var. *intermedia*, Hutchinson. Leaves mostly more or less rounded at the apex; receptacles mostly with a distinct peduncle, never quite sessile.

Upper Guinea. Cameroons: Banjo, *Ledermann*, 2202! between Bakari and Mbanti, *Ledermann*, 2296! between Mba and Madube, *Ledermann*, 2586! Tschape Pass, *Ledermann*, 2777!

Var. *sessilis*, Hutchinson. Leaves more or less rounded-truncate at the apex; receptacles sessile or almost so.—*F. furcata*, Warb. in Engl. Jahrb. xx. 173; Warb. & De Wild. Fic. Fl. Congo, 17, t. xxi; De Wild. in Bull. Soc. Bot. Belg. lii. 209. *F. Leprieuri*, Mildbr. & Burret in Engl. Jahrb. xlv. 246, partly, as to syn. *F. furcata*, Warb.

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3356! Eala, *Pynaert*, 579! Basoko, *Claessens*, 749! between Tely and Poko, *Secret*, 646! between Zobia and Buta, *Secret*, 892! and without precise locality, *Dowère*!

In many respects var. *intermedia* is almost exactly intermediate between typical *F. Leprieuri* and the plant described by Warburg as *F. furcata*; the first mentioned has the stalked receptacles of *F. Leprieuri*, but the more rounded leaves of *F. furcata*. Were this intermediate form not present, the extreme form might well be taken to be distinct species.

91. *F. pilosula*, *De Wild. in Fedde, Repert.* xii. 199. Branchlets fairly slender, straw-coloured, angular when dry, glabrous. Leaves oblanceolate or obtriangular, broadly truncate at the apex, mostly cuneate to the base, $1\frac{1}{2}$ – $3\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{2}$ in. broad, entire, coriaceous, glabrous and dull on both surfaces; midrib flat above, prominent below, straw-coloured, branched $\frac{1}{2}$ – $\frac{3}{4}$ in. below the apex of the blade; lateral nerves 5–7 on each side, diverging from it at an angle of 45° , very slender, looped near the margin; veins rather obscure; petiole $\frac{1}{3}$ – $\frac{1}{2}$ in. long, grooved, glabrous; stipules persistent or subsistent, lanceolate, subacute, 3 lin. long, puberulous outside. Receptacles axillary, sessile, geminate, depressed-globose, 3– $4\frac{3}{4}$ lin. in diam., pilose. Basal bracts 2, ovate, subsistent, shortly rusty-tomentose outside. Ostiole small and pore-like, inconspicuous; bracts few, all descending into the receptacle, glabrous. Male flowers with a solitary stamen. Female flowers sessile, gall ones stalked.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 222.

South Central. Belgian Congo: Eala, *Pynaert*, 1130!

Mozamb. Distr. Zanzibar, *Sacleur*, 2059!

92. *F. luteola*, *De Wild. in Fedde, Repert.* xii. 199. Branchlets angular, glabrous. Leaves oblanceolate, broadly truncate at the apex, cuneate at the base, $1\frac{1}{2}$ –3 in. long, $\frac{3}{4}$ – $1\frac{3}{4}$ in. broad, otherwise as in *F. pilosula*, *De Wild.*, but rather oblique and mostly broader across the top; petiole $\frac{1}{4}$ –1 in. long, smooth; stipules subsistent, lanceolate, nearly 2 lin. long, glabrous. Receptacles as in *F. pilosula*, but only pubescent around the base and at length glabrous or nearly so.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 218. *F. craterostoma*.

Mildbr. & Burret in Engl. Jahrb. xlv, 247, partly, as to Mildbraed 2416.

South Central. Belgian Congo: near Nala, *Seret*, 801! Inyolo, *Laurent*, 1060! Dyunia Valley, *Gillet & Gentil*, 2804! Kwa Muera, near Fort Beni, *Mildbraed*, 2416!

93. *F. craterostoma*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv, 247, *partly*. A shrub or small tree; branchlets slender, glabrous. Leaves obovate or triangular-obovate, truncate at the apex, shortly cuneate at the base, more or less rounded in the upper half, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{2}$ in. broad, entire, thinly coriaceous, glabrous; midrib prominent and straw-coloured below, divided about $\frac{1}{4}$ in. below the apex; lateral nerves about 7 on each side of the midrib, diverging from it at an angle of 45° , distinct on both surfaces, rather slender but prominent below, veins prominent; petiole $\frac{1}{3}$ – $\frac{3}{4}$ in. long, smooth; stipules persistent or subsistent. Receptacles axillary, sessile, subglobose, about 4 lin. in diam., glabrous. Basal bracts puberulous outside. Ostiole large and gaping, smooth; bracts few, all descending into the receptacle, glabrous. Male flowers with a solitary stamen.

Mozamb. Distr. German East Africa: Uluguru Mountains; Ruvu River, *Stuhlmann*, 8995! East Usambara; near Amani, *Engler*, 741! West Usambara; Wugiri, *Uhlig*, 1510!

94. *F. rubropunctata*, *De Wild. in Fedde, Repert.* xii. 199. Epiphyte; branchlets slightly angular, glabrous. Leaves triangular-obovate, rounded-truncate at the apex, cuneate at the base, 3 – $4\frac{1}{2}$ in. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. broad, entire, coriaceous, glabrous; midrib nearly equally prominent on both surfaces, divided about $\frac{3}{4}$ in. below the apex of the blade; lateral nerves about 8 on each side of the midrib, diverging at an angle of about 45° , slightly recurved, looped near the margin, nearly equally prominent on both surfaces but slightly more so below; veins lax and prominent below; petiole $\frac{1}{2}$ –1 in. long, smooth; stipules caducous or subsistent. Receptacles as in *F. pilosula* but about $\frac{1}{2}$ in. in diam. or slightly more and quite glabrous.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 226.

South Central. Belgian Congo: Eala, *Laurent*, 763!

95. *F. eriobotryoides*, *Kunth & Bouché, Ind. Sem. Hort. Berol.* 1846, 14. A tree 20–30 ft. high or sometimes of huge size, with the leaves crowded at the ends of the branchlets; young branchlets very thick, shaggy-villous with yellowish hairs. Leaves elongate-oblongate, shortly and obtusely acuminate, narrowed to an obtuse base, $5\frac{1}{2}$ –11 in. long, 2–4 in. broad, rigidly chartaceous, entire, glabrous above, the same below but when young shaggy on the midrib with long yellow hairs, which eventually fall away; midrib flat or slightly impressed above, very prominent below, about 2 lin. broad at the base, gradually tapered to the apex; lateral nerves 10–16 on each side of

the midrib, diverging from it at an angle of about 45° , slightly arcuate, distinct above, very prominent below, looped close to the margin; tertiary nerves wavy and reticulate; venation close and forming a neat distinct network on both surfaces; petiole $1-2\frac{1}{2}$ in. long, about 2 lin. thick, at first densely shaggy-villous with hairs, yellowish when dry, which eventually fall off and leave the petiole merely furfureaceous; stipules ovate-lanceolate, acutely acuminate, $1-1\frac{1}{2}$ in. long, shortly and rather densely pubescent, deciduous. Receptacles axillary, sessile, globose or obovoid-globose, up to $1\frac{1}{2}$ in. in diam., densely villous with yellow hairs. Basal bracts suborbicular, membranous, large, villous outside, glabrous towards the margin. Ostiole small and inconspicuous, pore-like; bracts all descending into the receptacle, glabrous. Male flowers rather numerous, pedicellate; perianth-segments linear-lanceolate, acute. Stamen solitary; anther oblong, $\frac{1}{3}$ lin. long. Female flowers sessile; style rather short with a thick stigma. Gall flowers very numerous, pedicellate.—Miq. in Ann. Mus. Lugd.-Bat. iii. 288; Mildbr. & Burret in Engl. Jahrb. xvi. 241; De Wild. in Bull. Soc. Bot. Belg. lii. 209. *F. Afzelii*, Hort. Berol. ex Kunth & Bouché, Ind. Sem. Hort. Berol. 1846, 14, name only. *F. lanigera*, Warb. in Engl. Jahrb. xx. 162. *Urostigma eriobotryoides*, Miq. Afr. Vierge-Boom. 39.

Upper Guinea. Sierra Leone: near Duunia, *Scott Elliot*, 5017! near Sulimania, *Scott Elliot*, 5330a! and without precise locality, *Vogel*, 139! French Guinea: Kindia, *Chevalier*, 12774! Ivory Coast: Alépé, *Chevalier*, 17891! Gold Coast: Kumassi, *Cummins*, 120! Krobo Plains, *Johnson*, 581! Aburi, *Johnson*, 930! Southern Nigeria: Asaba district; Ogodo, *Unwin*! Cameroons: Dipika, *Ledermann*, 453! Mungo, *Bucholz*, 80! Neu-Tegel, *Winkler*, 213! 222! Buea, *Reeder*, 711!

Lower Guinea. French Congo: Mayumbe forests, *Thollon*, 1125!

Mozamb. Distr. German East Africa: Wau Island, in Lake Kivu, *Mildbraed*, 1170! Bukoba, *Stuhlmann*, 1449!

Var. *Caillei*, A. Chev. ex Mildbr. & Burret in Engl. Jahrb. xvi. 242. Differs from the type in the leaves being permanently and rather densely pubescent with gold-coloured hairs on the lower surface.—*F. monbutensis*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 11, t. xxv.

Upper Guinea. French Guinea: Bed of the River Ditiun, *Chevalier*, 12989! Southern Nigeria: Owerri district, *Sherriff*! Northern Nigeria: Ankpa, *Lamb*, 21! 81!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 157! 3335! Gumbari, *Seret*, 464!

Var. *latifolia*, Hutchinson. Leaves broad and rounded or subcordate at the base.

Lower Guinea. Island of Annobon, *Mildbraed*, 6517! 6523!

96. *F. Dawei*, *Hutchinson in Kew Bulletin*, 1915, 332, with fig. A tree up to 50 ft. high, with a spreading habit; young branchlets leafy at the apex, very stout, villous. Leaves large, elongate-elliptic or narrowly oblong-elliptic, shortly and obtusely acuminate (acumen $\frac{1}{3}-\frac{1}{2}$ in. long), rounded and emarginate at the base, 9-12 in. long, $2\frac{1}{2}-6$ in. broad, entire, chartaceous or thinly coriaceous, glabrous, finely

reticulate and dull above, pilose chiefly on the midrib and lateral nerves below; midrib flat or slightly impressed above, very prominent beneath, 2 lin. broad at the base, closely longitudinally ribbed when dry, gradually tapered to the apex; lateral nerves 12-14 on each side of the midrib, spreading at a wide angle from the midrib, slightly arcuate, looped near the margin, distinct on both surfaces, prominent below; tertiary nerves rather lax, zig-zag; venation rather close and conspicuous on both surfaces; petiole 1-3 in. long, compressed, about $2\frac{1}{2}$ lin. broad, villous with reflexed hairs when young, at length becoming merely puberulous; stipules caducous, those surrounding the terminal bud ovate, long and acutely acuminate, about $\frac{3}{4}$ in. long, submembranous, hairy towards the base outside. Receptacles crowded towards the apex of the shoots, sessile, depressed-globose, $\frac{1}{2}$ - $\frac{3}{4}$ in. in diam., finely long-pilose. Basal bracts large, enclosing the developing receptacles for some time, long-pilose outside. Ostiole small and pore-like; bracts all descending into the receptacle, glabrous. Male flowers shortly pedicellate. Stamen solitary. Female flowers sessile; style slender. Gall flowers pedicellate.

Nile Land. Uganda: Buddu, about 3900 ft., *Dawe*, 288!

97. *F. clarencensis*, *Mildbr. & Hutchinson in Kew Bulletin*, 1915, 333. A large tree; branchlets stout, about $\frac{1}{2}$ in. in diam. near the apex, rather sparingly pilose. Leaves oblong-elliptic, shortly and obtusely acuminate, shortly cordate at the base, 6-7 $\frac{1}{2}$ in. long, 3-4 in. broad, entire, thinly coriaceous, glabrous on the upper surface, hairy only on the midrib below; midrib flat above, very prominent below, about 2 lin. broad at the base, gradually tapered to the apex; lateral nerves 10-12 on each side of the midrib, spreading at an angle of 60°-70°, slightly impressed above, prominent below, looped near the margin; tertiary nerves joined between the lateral nerves and forming a zig-zag nerve between them, distinct but rather slender below; veins scarcely visible; petiole $\frac{3}{4}$ -2 in. long, 2 lin. thick, with peeling scaly bark; stipules caducous. Receptacles enclosed until mature by a subcoriaceous hairy calyptra, axillary, sessile, depressed-globose, $\frac{3}{4}$ -1 in. in diam., minutely and very sparingly pubescent. Basal bracts large, almost entirely enveloping the receptacle, densely villous outside. Ostiole slightly elevated, 2-lipped; bracts not visible from the outside, all descending into the receptacle, glabrous. Male flowers shortly pedicellate; perianth-segments lanceolate, glabrous. Stamen solitary. Female flowers sessile; style short. Gall flowers pedicellate.

Upper Guinea. Fernando Po: Clarence Peak, to the north side of Pico Santa Isabel, 3600-4600 ft., *Mildbraed*, 6408!

Allied to *F. eriobotryoides*, with the figs enclosed in a similar large calyptra until nearly ripe; they are, however, quite glabrous and not tomentose as in that species. Spirit material seen at Berlin.

98. *F. chlamydocarpa*, *Mildbr. & Burret in Engl. Jahrb.* xlvii. 244. A tree 40-50 ft. high, with a crown about 100 ft. broad; young branchlets leafy, bearing the receptacles, thick, hirsute when young. Leaves crowded towards the apex of the branches, elliptic, shortly and obtusely acuminate, rounded at the base, 5-8 in. long, 3-3½ in. broad, entire, subcoriaceous, dull and glabrous on both surfaces or slightly pilose on the midrib below; midrib impressed above, very prominent below, about 1½ lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves 13-16 on each side of the midrib, diverging from it at an angle of 45°-65°, distinct on both surfaces, prominent and somewhat angular below when dry, looped and branched near the margin; tertiary nerves zig-zag, lax, delicate, distinct below, forming with the veins a very close fine network on the lower surface; petiole 1¼-2 in. long, stout, glabrous; stipules caducous. Receptacles axillary, solitary, sessile, totally enclosed by an involucre of membranous pubescent bracts, obovoid, 1¼-1½ in. long, hispid. Ostiole not produced, 2-lipped; bracts all descending into the receptacle, numerous, rather long. Male flowers scattered all over the receptacle, subsessile; perianth-segments 3; stamen solitary; anther ellipsoid. Female flowers not seen. Gall flowers numerous, pedicellate.

Upper Guinea. Cameroons: Bambutto Mountains, 6500 ft., *Ledermann*, 1733!

99. *F. Kitubalu*, *Hutchinson in Kew Bulletin*, 1915, 334. A tree up to 30 ft. high or more; habit frequently spreading; young branchlets leafy towards the apex, rather stout, grooved, slightly pubescent. Leaves oblong or elliptic, rounded at both ends or slightly narrowed at the base, 3-4 in. long, 1½-2 in. broad, entire, rigidly chartaceous, pubescent on the midrib above, softly pubescent below; midrib equally prominent on both surfaces, about 1¼ lin. broad at the base, gradually tapered to but bifurcate below the apex of the leaf; lateral nerves about 9 on each side of the midrib, spreading at a wide angle, looped, the loops forming a crenate line ½-1 lin. from the margin, slightly prominent below; principal tertiary nerves only slightly less conspicuous below than the secondary ones, spreading in the same direction; venation rather lax; petiole ¾-1 in. long, slightly compressed, with a single channel on the upper side, shortly pubescent; stipules caducous, those surrounding the terminal bud ovate-lanceolate, acutely and rather long-acuminate, ½-¾ in. long, 3-4 lin. broad, rather scaly in texture, glabrous, black and dull when dry. Receptacles sessile, in axillary pairs, almost covered by the large basal bracts, globose, about 4 lin. in diam., densely pubescent or almost tomentose; basal bracts in the bud stage covering the receptacles like a calyptra, membranous, puberulous outside, more or less villous within. Ostiole small, glabrous, pore-like; bracts all descending into the receptacle, linear-lanceolate, glabrous. Male

flowers subsessile; stamen solitary. Female flowers subsessile, scarcely sufficiently developed on the type for description.

Nile Land. Uganda: Buddu, 4000 ft., *Dawe*, 286!

Mr. *Dawe* states that this tree yields an inferior bark-cloth, and it is planted only when other varieties are unobtainable.

100. **F. ovata**, *Vahl*, *Enum.* ii. 185. A large tree with a very broad crown; young branchlets very stout, leafy, ribbed, purplish, minutely puberulous. Leaves oblong-elliptic or elongate-ovate, shortly and obtusely acuminate, rounded or cordate at the base, 7–10½ in. long, 2½–5½ in. broad, entire, chartaceous, glabrous and dull on both surfaces or finely puberulous below, finely reticulate below, often yellowish-brown when dry; midrib slightly impressed on the upper surface, very prominent below, about 1 lin. broad at the base, gradually tapered to the apex; lateral nerves 8–14 on each side of the midrib, diverging from it at an angle of 45° or slightly more, the lowermost pair opposite, the others either opposite or subalternate, slender, bifurcate ¼–½ in. from the margin, distinct on both surfaces, prominent below; tertiary nerves wavy, less prominent than the lateral and more or less following their direction; veins close and distinct on the lower surface; petiole 1½–2 in. long, longitudinally sulcate, glabrous; stipules caducous, lanceolate, long-acuminate, up to 2¼ in. long, glabrous. Receptacles in axillary pairs, sessile or very shortly pedunculate, subglobose or ellipsoid, 1–2 in. in diam., finely puberulous, enclosed while young by a reddish finely puberulous coriaceous calyptra. Basal bracts small, connate at the base. Ostiole small, pore-like; bracts all descending into the receptacle, glabrous. Male flowers pedicellate: perianth-segments ovate-acuminate, membranous, glabrous; anther solitary, obtuse. Female flowers sessile, with slender styles. Gall flowers long-pedicellate.—*Pers. Syn.* ii. 609; *Roem. & Schultes, Syst. Veg.* i. 502; *Spreng. Syst. Veg.* iii. 178; *Brunner in Flora*, 1840, *Beibl.* i. 72; *Miq. in Ann. Mus. Lugd.-Bat.* iii. 288; *Mildbr. & Burret in Engl. Jahrb.* xlvi. 243. *F. calyptрата*, *Vahl*, l.c., from description. *F. spectabilis*, *Kunth & Bouché*, *Ind. Sem. Hort. Berol.* 1846, 15. *F. africana*, *Hort. Berol. apud Kunth & Bouché*, l.c. *F. Vohsenii*, *Warb. in Engl. Jahrb.* xx. 155, partly. *F. Buchneri*, *Warb.* l.c. 157; *De Wild. in Bull. Soc. Bot. Belg.* lii. 201. *F. megaphylla*, *Warb. in Warb. & De Wild. Fic. Fl. Congo* 1. incl. var. *glabra*, *Warb.* l.c. 2. *F. laurifolioides*, *Warb. ex A. Cheval. in Compt. Rend. Acad. Paris*, cxxxv. 443, name only. *F. Johnstonii*, *Stapf in Johnston, Liberia*, ii. 652, t. 265. *F. Gruendleri*, *Warb. ex Mildbr. & Burret*, l.c., name only. *F. Sapini*, *De Wild. in Fedde, Repert.* xii. 302; *De Wild. in Bull. Soc. Bot. Belg.* lii. 227. *Urostigma ovatum*, *Miq. in Hook. Lond. Journ. Bot.* vi. 553. *U. calyptратum*, *Miq.* l.c.

Upper Guinea. Without precise locality, *Thonning*! Senegambia: shore between Mbidgem and Dakar, *Chevalier*! and without precise locality, *Talmy*! Sierra Leone: Sugarloaf Mountain, *Scott Elliot*, 5754! and without precise locality, *Vohsen*! French Guinea: Sareya, *Chevalier*, 454! Los Islands, *Pobéguin*, 1234! Kindia, *Pobéguin*, 1269! Konakry, *Maclaud*! *Dybowski*! Liberia: Sinoe, *Sim*, 13! 17! *Johnston*! Ivory Coast: Cavally basin, *Chevalier*, 20067! Gold Coast: without precise locality, *Burton & Cameron*! Togo: various localities, *Warnecke*, 337! *Kersting*, 97! A 337! A 394! 429! *Mellin*, 89! *Doering*, 97! *Zech*, 14! Northern Nigeria: Bassa Province; Dekina, *Lamb*, 19! Cameroons: Bipinde, *Zenker*, 2427! Neu-Tegel, *Winkler*, 206! 221! Fernando Po: Musola, above San Carlos, *Mildbraed*, 6986!

Nile Land. Niamniam: on the Linduku River, *Schweinfurth*, 3259! Mansilli River, *Schweinfurth*, 3882! British East Africa: 5 days' march from Lubwas, *Whyte*! Uganda: Mkakawe, *Scott Elliot*, 7271!

Lower Guinea. Angola: Malange, *Marques*, 2! 7! *Gossweiler*, 1010! Loanda, *Gründler*! Soba Bango, *Buchner*, 547! 672!

South Central. Belgian Congo: Monbuttu; Kussumbo River, *Schweinfurth*, 3673! Munza, *Schweinfurth*, 3439! various localities, *Sapin*! *Laurent*, 1075!

Mozamb. Distr. German East Africa: Bukoba, *Stuhlmann*, 1605! Kifumbiro, near Bukoba, *Mildbraed*, 69! Buanjai Mission, *Mildbraed*, 50! Ugalla River, *Böhm*, 123a! Ujiji, Lake Tanganyika, *Trotha*, 139!

Var. *octomelifolia*, *Mildbr.* & *Burret* in Engl. Jahrb. xlv. 244. Leaves below and petioles more or less pilose-pubescent.—*F. octomelifolia*, *Warb.* in *Warb. & De Wild. Fic. Fl. Congo*, 1.

Lower Guinea. Lower Congo: without precise locality, *Cavra*!

Mozamb. Distr. German East Africa: Central Urundi, *Trotha*, 74!

According to Dr. *Mildbraed*, this species produces an inferior bark-cloth.

101. *F. mallotoides*, *Mildbr. & Hutchinson* in *Kew Bulletin*, 1915, 334. A large epiphyte; branchlets rather stout, closely longitudinally sulcate, finely pubescent. Leaves broadly ovate, cordate, slightly and very obtusely pointed at the apex, $5\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $3\frac{1}{2}$ –5 in. broad, entire, chartaceous, dull and glabrous on both surfaces; midrib flat above, very prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 10–12 on each side of the midrib, diverging from it at an angle of 50° – 70° , the lowermost pair with from 4–5 secondary ones radiating from the base on their lower side, all distinct on both surfaces, rather slender but prominent below, branched and looped some distance from the margin; tertiary nerves about half as prominent as the lateral and following their direction, but somewhat zig-zag; veins rather lax, distinct below, petiole $1\frac{1}{2}$ –3 in. long, about 1 lin. thick, glabrous; stipules subsistent, lanceolate, acutely acuminate, $\frac{3}{4}$ in. long, about 4 lin. broad, thinly papyraceous, finely puberulous outside, shortly tomentose within. Receptacles axillary, sessile, green with small reddish-brown spots when fresh, depressed-globose, $\frac{3}{4}$ –1 in. in diam., minutely subadpressed-pubescent on the outside, yellowish-brown and wrinkled when dry. Basal bracts soon deciduous. Ostiole 2-lipped, not prominent; bracts not visible from the outside, all descending into the receptacle, the two nearest the mouth much larger than the others, rigid, thick, oblong, truncate at the apex, 3 lin. long, glabrous,

the others oblong or ovate-oblong, with membranous margins. Male flowers sessile: perianth-segments 3, unequal, oblong-elliptic, membranous, glabrous. Stamen solitary; filament thickened towards the top; anther oblong, $\frac{1}{2}$ lin. long. Female flowers with perianth similar to that of the male; style slender, gradually flattened into the stigma.

Upper Guinea. Cameroons: Molundu district; between Lokomo, Bumba and Bange, *Mildbraed*, 4379!

102. *F. Bubu*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 3, t. viii. Branchlets very stout, nearly $\frac{3}{4}$ in. thick towards the apex, glabrous. Leaves ovate, slightly cordate at the base, rounded at the apex, 5–8 $\frac{1}{2}$ in. long, 3 $\frac{1}{2}$ –5 in. broad, entire, rigidly coriaceous, dull and glabrous on both surfaces; midrib flat above, very prominent below, about 2 lin. broad at the base, gradually tapered to and divided below the apex of the lamina; lateral nerves about 8 on each side of the midrib, diverging from it at an angle of 55°–70°, inconspicuous above, very prominent and thick below, looped some distance from the margin; tertiary nerves and veins slender and rather inconspicuous below; petiole 1 $\frac{1}{2}$ –2 in. long, 2 lin. thick, glabrous; stipules caducous. Receptacles not seen in position, but probably axillary and covered in the young state by the basal bracts, subsessile, oblong-ellipsoid, about 1 $\frac{1}{4}$ in. long, very minutely puberulous. Basal bracts not seen. Ostiole slightly umbonate, pore-like; bracts all descending into the receptacle, linear-lanceolate, glabrous. Male flowers shortly pedicellate, with a solitary stamen.—*Mildbr. & Burret in Engl. Jahrb.* xvi. 244; *De Wild. in Bull. Soc. Bot. Belg.* lii. 201. *F. pachypleura*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 4. *F. Vohsenii*, *Warb. in Engl. Jahrb.* xx. 155, partly.

Upper Guinea. Togo: Bismarckburg, *Büttner*, 712!

Lower Guinea. Spanish Guinea: Uelleburg, *Tessman*, 433a! Lower Congo: between Chimbanze and Mangwala, *Cabra*, 93! 96! Kisantu, *Gillet*, 1167! Luthima, *Sapin*!

103. *F. asymmetrica*, *Hutchinson in Kew Bulletin*, 1915, 336, with *fig.* A large tree about 70 ft. high; trunk smooth with no adventitious roots; branches very stout, horizontal; young branchlets stout, shortly and softly puberulous. Leaves ovate or ovate-elliptic, very shortly and obtusely acuminate, slightly cordate at the base, 5–7 in. long, 2 $\frac{3}{4}$ –4 in. broad, entire, rigidly chartaceous or subcoriaceous, glabrous and dull above, softly puberulous on the midrib and lateral nerves below but otherwise glabrous; midrib prominent below, about 1 $\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 10–11 on each side of the midrib, diverging from it at an angle of 50°–80°, prominent below, rather slender, looped and branched near the margin; tertiary nerves slender, forming arches between the lateral nerves; veins forming a delicate

close network on the lower surface ; petiole 1-1½ in. long, longitudinally sulcate, about 1½ lin. thick, softly puberulous ; stipules caducous. Receptacles axillary, solitary, sessile, subglobose, with a curious groove on the side next the branch, softly shortly tomentose, about ¾ in. in diam. Basal bracts small and coriaceous, probably 2. Ostiole inconspicuous ; bracts all descending into the receptacle, subulate-lanceolate, glabrous. Male flowers shortly pedicellate, with the perianth-segments enclosing the solitary oblong anther ; filament short ; connective slightly keeled on the back. Female flowers numerous, with long slender styles and coherent stigmas.

Lower Guinea. Angola : Cabinda, a common tree, *Gossweiler*, 122 !

104. *F. rubroreceptacula*, *De Wild. in Bull. Soc. Bot. Belg.* lii. 226. Branchlets stout, glabrous except around the leaf-scars. Leaves large, elongate-obovate, shortly and obtusely acuminate, slightly narrowed to an obtuse base, 9-16 in. long, 4½-6 in. broad, entire, coriaceous, dull and glabrous above, finely pilose on the midrib and sparingly so on the lateral nerves below, otherwise glabrous ; midrib flat above, very prominent below, about 3 lin. broad at the base, gradually tapered to the apex of the blade ; lateral nerves about 16 on each side of the midrib, diverging from it at an angle of 50°, prominent and looped below ; venation as in *F. zobiansis*, *De Wild.* ; petiole 2-4 in. long, compressed, 2½ lin. broad, pubescent ; stipules caducous, ovate or ovate-lanceolate, acute, scarcely ½ in. long, glabrous, coriaceous. Receptacles axillary, sessile, depressed-globose, about ¾ in. in diam., slightly pubescent towards the base, otherwise glabrous. Basal bracts deciduous, rusty-pilose, base villous outside. Ostiole small and pore-like ; bracts all descending into the receptacle, glabrous. Male flowers with a solitary stamen. Female flowers sessile ; style slender. Gall flowers pedicellate.

South Central. Belgian Congo : Equateur district : Eala, *Laurent*, 1360 !

105. *F. Goliath*, *A. Cheval. Veg. Ut. Afr. Trop. Fr. Fasc.* v. 262. A tree up to 100 ft. high ; young branchlets fairly stout, glabrous. Leaves obovate or obovate-elliptic, truncate or rounded at the base, very slightly and obtusely pointed at the apex, 5-7½ in. long, 3-5 in. broad, entire, thinly chartaceous, dull and glabrous on both surfaces except on the midrib below ; midrib flat above, fairly prominent below, about 1½ lin. broad at the base, gradually tapered to the apex or almost to the apex of the blade, slightly pubescent ; lateral nerves 11-13 on each side of the midrib, diverging from it at an angle of 45°-65°, rather slender, nearly straight, looped and much-branched near the margin ; tertiary nerves very delicate, somewhat zig-zag between the lateral nerves ; veins very close and fine below ; petiole 2-2½ in. long, broader towards the base, pilose ; stipules deciduous. Receptacles not seen in position, but probably sessile, depressed-globose, about 1¼ in. in diam., glabrous. Basal bracts not seen.

Ostiole pore-like; bracts all descending into the receptacle. Male flowers shortly pedicellate, with a solitary stamen. Female flowers sessile, with a slender style; achene smooth. Gall flowers numerous, pedicellate.—Mildbr. & Burret in Engl. Jahrb. xlv. 269.

Upper Guinea. Ivory Coast: Dabou, *Chevalier*, 16211!

106. *F. zuvalensis*, *Sim, For. Fl. Port. E. Afr.* 100, t. xciii. fig. A. A large tree; young branchlets stout, about 3 lin. thick 1 in. below the apex, whitish-pilose. Leaves ovate or ovate-orbicular, very shortly and bluntly pointed at the apex, rather deeply cordate at the base, 4–7 in. long, $3\frac{1}{2}$ –5 in. broad, rigidly coriaceous, glabrous and shining on the upper surface, rather densely and softly pubescent below; midrib continued to the apex of the blade, about $1\frac{1}{2}$ lin. broad at the base, pilose; lateral nerves 8–9 on each side of the midrib, diverging from it at a wide angle, prominently forked about $\frac{1}{2}$ in. within the margin, distinct on both surfaces, prominent below; veins lax below; petiole $1\frac{1}{4}$ –2 in. long, about 2 lin. thick, pilose and finely warted; stipules deciduous, 1 in. long and pointed, glabrous. Receptacles not seen, but according to Sim's figure axillary, sessile, ovoid-globose, $1\frac{1}{4}$ in. long, 1 in. in diam., with a small pore-like ostiole, pubescent. Basal bracts pubescent.

Mozamb. Distr. Portuguese East Africa: Cusico, *Sim*, 5515! districts of Zuvala, Quisico and Inhambane, and occasionally in Gaza and Lorenzo Marques, *Sim*.

107. *F. Wakefieldii*, *Hutchinson in Kew Bulletin*, 1915, 335, with fig. A tree about 35 ft. high; bark bright-brown; young branchlets very stout, very densely and roughly villous with yellowish hairs when dry. Leaves large, orbicular, cordate and very prominently 3-nerved at the base, 4–8 in. in diam., undulate-arcuate at the base only, membranous or chartaceous, pubescent on both surfaces or only on the nerves above, pilose on the nerves and midrib beneath; midrib flat or slightly impressed above, very prominent below, often somewhat flexuous and always divided below the apex of the blade; each basal nerve with about 5 prominent lateral nerves on its lower side (next the margin); remaining lateral nerves 3–4 on each side of the midrib, diverging from it at an angle of 45° , very prominent below, prominently furcate $\frac{3}{4}$ – $1\frac{1}{2}$ in. from the margin; tertiary nerves zig-zag, prominent and numerous below; veins finely reticulate below, petiole stout, 2–3 in. long, about 2 lin. thick, pilose; stipules caducous, oblong-ovate, obtuse, $1\frac{1}{2}$ –2 in. long, about $\frac{3}{4}$ in. broad, membranous, light-brown when dry, pilose-pubescent on the exposed outer part. Receptacles axillary, sessile, in pairs, globose, about 5 lin. in diam., densely pilose with weak hairs. Basal bracts small, very densely villous. Ostiole slightly protruding, pore-like; bracts all descending vertically into the receptacle, ovate-lanceolate, glabrous. Male flowers subsessile, with a solitary stamen; anther

ellipsoid, obtuse.—*F. vasta*, Mildbr. & Burret in Engl. Jahrb. xlv. 216, partly, not of Forsk.

Nile Land. British East Africa: Nyika country, *Wakefield*, 34! South Eastern Kenya, *Battiscombe*, 859!

Mozamb. Distr. German East Africa: Muansa district; Sonjo Sale, *Merker*, 430! neighbourhood of Sale Rorchoto, *Uhlig*, 254! Ukerewe Island, in Lake Victoria, *Conrads*, 405!

108. *F. glumosoides*, *Hutchinson in Kew Bulletin*, 1915, 336. A tree up to 20 ft. high; branchlets rather slender, villous when young. Leaves orbicular, rounded or very slightly cordate at the base, 2–3 in. in diam., entire, coriaceous, slightly pubescent on the midrib and lateral nerves above, densely and softly pubescent below, with longer hairs on the midrib and lateral nerves, prominently 5-nerved at the base, remaining lateral nerves about 4 on each side of the midrib, diverging from it at an angle of 45° , bifurcate about $\frac{1}{2}$ in. from the margin, slender, prominent below; veins finely reticulate below; petiole 1– $1\frac{1}{2}$ in. long, 1 lin. thick, thinly pilose; stipules caducous, not seen. Receptacles axillary, sessile and otherwise as in *F. glumosa*. Del.

Lower Guinea. Angola: near native villages in the interior of Noro Redondo, *Gossweiler*, 4450!

109. *F. Sonderi*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 295. A tree 20–30 ft. high, with a milky juice; branchlets twiggy, very shaggy-villous with tawny hairs when young, at length shortly pubescent. Leaves ovate-orbicular or suborbicular, rounded at the apex, slightly cordate at the base, 2–4 in. long, $1\frac{1}{2}$ – $3\frac{1}{4}$ in. broad, entire, rigidly coriaceous, long-pilose or hirsute on both surfaces chiefly on the midrib and lateral nerves, about 5-nerved at the base; midrib $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex, flat above, prominent and very hairy below; lateral nerves 4–5 on each side of the midrib (excluding the basal nerves), diverging at an angle of about 45° , arcuate, looped near the margin, distinct on both surfaces, prominent below; tertiary nerves much-branched, wavy, scarcely visible above, prominent below; petiole $\frac{1}{4}$ –1 in. long, densely hirsute-pilose; stipules persistent during the flowering period, ovate-triangular, acutely acuminate, about $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad, reddish when dry, thinly chartaceous, villous outside, glabrous and striate within. Receptacles crowded at the ends of the young branchlets, axillary, geminate, sessile, subglobose, slightly umbonate, nearly $\frac{1}{2}$ in. in diam., villous. Basal bracts 2, suborbicular, about 3 lin. broad, membranous, villous with yellowish hairs outside, glabrous within. Ostiole 2-lipped, slightly projecting and a little gaping when dry, about 1 lin. broad. Bracts all descending into the receptacle, the middle two a little larger than the others, oblong-lanceolate, obtuse, $1\frac{1}{4}$ lin. long, rather fleshy, glabrous, the others

subacute and more membranous. Male flowers shortly pedicellate; perianth enveloping the solitary subsessile anther. Female flowers subsessile; perianth-segments acutely acuminate, membranous, glabrous. Achene ellipsoid, smooth; style slender, about half as long as the achene; stigma oblong, thick, as long as the style. Gall flowers pedicellate, with obtuse perianth-segments and almost sessile stigma. Receptacular scales $\frac{3}{4}$ lin. long, flat, triangular, subacute.—Gibbs in Journ. Linn. Soc. xxxvii. 470; Mildbr. & Burret in Engl. Jahrb. xlv. 262. *F. Rehmannii*, Warb. in Viertelj. Naturforsch. Ges. Zürich, li. 136. *F. Rehmannii*, vars. *ovatifolia* and *villosa*, Warb. l.c. *F. rukwansis*, Warb. in Engl. Jahrb. xxx. 295. *F. montana*, Sim, For. Fl. Port. E. Afr. 101, t. xcv. A. *F. glumosa*, Mildbr. & Burret in Engl. Jahrb. xlv. 217, partly, not of Delile. *F. Engleri*, Warb. ex Mildbr. & Burret, l.c. 219, name only. *F. Kitaba*, De Wild. in Bull. Soc. Bot. Belg. lii. 215. *Sycamorus hirsuta*, Sond. in Linnæa, xxiii. 137.

South Central. Belgian Congo: Kapiri Valley, *Hombé*, 1299!

Mozamb. Distr. German East Africa: Massai Steppes; Mnaingo, *Jäger*, 71! 72! Tabora, *Trotha*, 106! 116! Iloma Mountain, at Ubungu on Lake Rukwa, *Goetze*, 1100! Portuguese East Africa: Lebombo Mountains, *Sim*, 6313! Rhodesia: Makalaka country; on granite kopjies at Pelicosi, *Baines*! Umzingwani Valley, *Baines*! Matopa Hills, *Miss Gibbs*, 26! *Marloth*, 3382! 3407! *Engler*, 2829! *Burt-Davy*, 5247! Bulawayo, *Rand*, 398! Tropical Transvaal: Limpopo Valley, *Hutchins*, 15!

Occurs also in Natal and extra-tropical Transvaal.

According to Rand the tree contains abundant milky juice, which often escapes spontaneously and falls upon the dense dark green foliage below and stains it white, the tree being then recognizable at some distance.

Sim states that examples of this species are abundant on the dry rocky slopes of the Lebombo range and that they are often the only occupants of the dry solid rocks.

110. *F. Stuhlmannii*, *Warb. in Engl. Jahrb.* xx. 161. A tree about 30 ft. high; stem about 2 ft. in thickness; branchlets fairly stout, ribbed, pilose with whitish or slightly fuscous hairs especially when young. Leaves oblong, rounded at the apex, cordate at the base, 3–5½ in. long, 1¼–2¾ in. broad, entire, rigidly chartaceous or subcoriaceous, thinly pubescent especially near the midrib and with slightly impressed venation on the upper surface, softly tomentose or densely pubescent below; lateral nerves 4–5 on each side of the midrib, diverging from it at an angle of 45°, nearly straight, looped some distance from the margin, prominent below; tertiary nerves few, forming with the veins a close prominent venation below; petiole $\frac{3}{4}$ –1½ in. long, stout, grooved above, otherwise subterete, softly pubescent; stipules deciduous, those surrounding the terminal bud more or less lanceolate, adpressed-villous outside, glabrescent towards the margin. Receptacles axillary, probably solitary, sessile, globose, $\frac{1}{2}$ in. in diam. or slightly more, densely tomentose. Basal bracts connate at the base, adpressed-villous outside, glabrous within.

Ostiole 2-lipped, glabrous, scarcely produced, about $\frac{2}{3}$ lin. wide. Bracts all descending into the receptacle, the middle two broader and more fleshy than the others, oblong, $1\frac{1}{4}$ lin. long, glabrous, the others lanceolate, acute, 1 lin. long or less. Male flowers shortly pedicellate; perianth enclosing the solitary anther; anther-cells slightly superimposed. Female flowers sessile; perianth-segments 3, ovate-lanceolate, acutely acuminate, glabrous. Achene ovoid-globose, smooth; style nearly as long as the achene, with a rather broad flattened stigma. Gall flowers long-pedicellate, with a short style. Receptacular scales lanceolate, acute, membranous.—Mildbr. & Burret in Engl. Jahrb. xvi. 220, partly. *F. howardiana*, Sim, For. Fl. Port. E. Afr. 100, t. xcii. A. *F. Homblei*, De Wild. in Fedde, Repert. xii. 195, and in Bull. Soc. Bot. Belg. lii. 212.

Nile Land. British East Africa: Mombasa, *Boivin*! *Sacleux*, 2573!

Mozamb. Distr. German East Africa: Ussukuma Nyangesi, *Stuhlmann*, 4141! Tabora, *Trotha*, 79! Portuguese East Africa: Shupanga, *Kirk*! Mubalusi, *Sim*, 6262! Lorenzo Marques, *Sim*, 6368!

South Central. Belgian Congo: Elizabethville, *Homblé*, 341!

111. *F. Dar-es-salaamii*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xvi. 221, *in syn.* A large much-branched shrub with several stems; young branchlets densely and softly villous with whitish hairs, becoming deeply sulcate and pubescent when older. Leaves oblong or slightly oblong-oblong, wider above the middle, shortly and obtusely acuminate, rounded at the base, 4-7 in. long, 2-2 $\frac{3}{4}$ in. broad, entire, finely puberulous and verrucose especially near the midrib above, shortly pubescent on the veins and nerves below; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex; lateral nerves subopposite, about 9 on each side of the midrib, slightly arcuate and diverging at an angle of about 45°, running parallel for some distance with the margin, looped, prominent on the lower surface; tertiary nerves and veins scarcely separable, forming a prominent rather lax venation below, not visible above; petiole $1\frac{1}{4}$ -2 $\frac{3}{4}$ in. long, slightly compressed, about 1 lin. broad, thinly pilose; stipules deciduous, not seen. Receptacles axillary, sessile, globose, about $\frac{1}{2}$ in. in diam., thinly pubescent, with an inconspicuous 2-lipped ostiole. Basal bracts and receptacles more or less as in *F. Stuhlmannii*, *Warb.*, but with the receptacles much less hairy.—*F. nigropunctata*, *Warb. ex Mildbr. & Burret. l.c.* 220, partly.

Mozamb. Distr. German East Africa: Dar-es-Salaam, near the Bismarck monument, *Holtz*, 923! *Stuhlmann*!

Closely allied to *F. Stuhlmannii*, *Warb.*, but distinguished by the differently shaped leaves, the nature of their indumentum, and the less hairy receptacles.

112. *F. glumosa*, *Del. Cent. Pl. Méroé*, 63. A large tree; branchlets twiggy, pubescent or pilose. Leaves oblong or ovate-oblong, cordate at the base, rounded and very obtusely and shortly acuminate,

2-6 in. long, $\frac{3}{4}$ -3 in. broad, entire, rigidly chartaceous or coriaceous, pubescent above and tomentose below when quite young, soon becoming glabrous above but permanently shortly pubescent below especially on the midrib and lateral nerves, 5-7-nerved at the base; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 6-7 on each side of the midrib, diverging at an angle of about 75° , slender, raised on the lower surface, bifurcate towards the margin; tertiary nerves wavy, rather lax; venation distinct and rather close below; petiole 1-2 $\frac{1}{2}$ in. long, softly tomentose, at length nearly glabrous; stipules caducous. Receptacles axillary, in pairs, sessile or subsessile, globose, 3-4 lin. in diam., finely pubescent or glabrous. Basal bracts small and caducous, the persistent connate base more or less orbicular, long-pilose or glabrous outside. Ostiole small but prominent, pore-like, glabrous; bracts all descending into the receptacle, linear-lanceolate, acute, glabrous. Male flowers subsessile; perianth-segments ovate-lanceolate, subacute, glabrous. Stamen solitary; anther subsessile, $\frac{1}{3}$ lin. long. Female flowers sessile; perianth-segments triangular-ovate, long-tailed-acuminate, glabrous. Achene ellipsoid-globose, shining. Gall flowers pedicellate, numerous.—Mildbr. & Burret in Engl. Jahrb. xlv. 217. *Ficus barbata*, Warb. in Engl. Jahrb. xx. 168; Hiern in Cat. Afr. Pl. Welw. i. 1007. *F. andongensis*, Welw. ex Welw. & Curr. in Trans. Linn. Soc. xxvi. 284, name only; Warb. l.c. *F. humilis*, Warb. l.c. *F. durandiana*, Warb., *F. diensis*, Warb., and *F. nigerica*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 218-220, names only. *F. glumosa*, var. *lanuginosa*, Martelli, Florul. Bogos. 76. *Urostigma glumosum*, Miq. in Hook. Lond. Journ. Bot. iv. 552. *U. fazokelense*, Miq. l.c.

Upper Guinea. Senegal, *Lecard*, 73! French Guinea: Upper Niger, at Diaragonela, *Chevalier*, 475! Middle Niger, *Chevalier*, 168! Sierra Leone: Mount Gonkwi, Talla Hills, *Scott Elliot*, 4882! Northern Nigeria: Nupe, *Barter*, 1033! 1101! Sokoto, *Dalziel*, 396! Yola, *Dalziel*, 147! Katagum district, *Dalziel*, 357! Cameroons: between Dandje and Duk, *Ledermann*, 3655! Sidderi Mountain, on the River Benue, *Ledermann*, 4799! Garua, *Ledermann*, 3351! 4931! Kokumi Mountains, *Ledermann*, 4755! Labare, *Ledermann*, 2253! Dodo, *Ledermann*, 2849!

Nile Land. Eritrea: near Keren, *Schweinfurth*, 806! *Steudner*! *Beccari*, 2! 17! Galabat: Matamma region, *Schweinfurth*, 552! 553! Abyssinia: Tacazze River, *Schimper*, 696! Sennar: Gebel Juli, *Hartmann*! *Fazokl*, *Kotschy*, 469! 495! Kordofan, *Kotschy*, 215! Bongo: Gubbitu, near Kulongo, *Schweinfurth*, 2208! Bahr-el-Ghazal, *Broun*, 1049! Jebel Daier, *Broun*, 885!

Lower Guinea. Lower Congo: Krebedji, *Chevalier*, 5434! Angola: Pungo Andongo; Pedra de Cazella, *Welwitsch*, 6361! Mossamedes; Bero River, *Welwitsch*, 6380!

South Central. Belgian Congo: Niamniam; Makporru, *Schweinfurth*, 136!

Var. *glaberrima*, Martelli, Florul. Bogos. 76. Leaves quite glabrous below when mature.—*F. rubicunda*, Miq. in Ann. Mus. Lugd.-Bat. iii. 289. *F. glumosa*, var. *intermedia*, Martelli, l.c. *F. erioblasta*, Warb., *F. brachylepioides*, Warb., and *F. sokodensis*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 220, names only. *F. gombariensis*, De Wild. in Fedde, Repert. xii. 199

and in Bull. Soc. Bot. Belg. lii. 210. *Urostigma rubicundum*, Miq. in Hook. Lond. Journ. Bot. vii. t. xii. fig. B.

Upper Guinea. French Guinea: near Sulimania, *Scott Elliot*, 5375! Wallia, on the River Scarcies, *Scott Elliot*, 4582! Sierra Leone: Talla Hills, *Scott Elliot*, 4888! near Falaba, *Scott Elliot*, 5170! Togo: near Sokodi, *Kersting*, 59! Yerapana, *Kersting*, 524! Northern Nigeria: Nupe, *Barter*, 1022! Lokoja, *Dalziel*, 146! Abinsi and vicinity, *Dalziel*, 779! Quorra, *Vogel*, 140! Cameroons: between Babundia and Tsebsa, *Ledermann*, 3201! near Garua, *Ledermann*, 3429!

Nile Land. Nubia: Mount Erkowit, *Schweinfurth*, 234! Eritrea: Keren; near Mount Deban, *Beccari*, 19! 40! Lalamba River, *Schweinfurth*, 806! 1800! Halibaret, *Schweinfurth*, 180! Galabat, *Schweinfurth*, 549! 551! Abyssinia: Habab, *Hildebrandt*, 387! *Rohlf's & Stecker*! Kordofan: Kadergli, *Broun*, 1337! Darfur, *Purdy*, 57! Sudan: Jebelim, *Broun*, 1411! Jur; Jur Ghattas, *Schweinfurth*, 1973! Wau, *Broun*, 913! 1240! Madi, *Spoke & Grant*, 689! Uganda: Unyoro; above Kibero, *Bagshawe*, 912!

South Central. Belgian Congo: near Gumbari, *Seret*, 592!

113. *F. nigropunctata*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 220, partly. A small tree about 10 ft. high; branches softly pubescent. Leaves oblong or oblong-elliptic, shortly and obtusely or subacutely acuminate, slightly cordate at the base, $1\frac{3}{4}$ –4 in. long, 1 – $1\frac{3}{4}$ in. broad, entire, chartaceous, slightly pustulate on the upper surface, pubescent on the midrib and lateral nerves below; midrib prominent below, rounded, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 4–6 on each side of the midrib, diverging from it at an angle of 45° , slightly arcuate, looped, nearly invisible above, prominent but slender below, veins lax and inconspicuous; petiole $\frac{1}{2}$ –1 in. long, rather slender, pubescent or nearly glabrous; stipules caducous. Receptacles axillary, sessile, solitary or in pairs, globose, about $3\frac{1}{2}$ lin. in diam., finely and rather sparingly puberulous. Basal bracts 2, connate into a persistent pubescent disc at the base. Ostiole small and inconspicuous, 2-lipped; bracts all descending into the receptacle. Male flowers shortly pedicellate; stamen solitary. Gall flowers pedicellate.—*F. pubigera*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 221, name only.

Mozamb. Distr. German East Africa: Lindi district; Seliman-Mamba, on the way to Kwa Mbua, *Busse*, 2801! Usaramo; Megula, *Stuhlmann*, 7119! Bagamoyo, *Kirk*!

114. *F. eriocarpa*, *Warb. in Engl. Jahrb.* xxx. 294. A tree 25–30 ft. high; branchlets 2–3 lin. thick, strongly sulcate-rugose, reddish-tomentose when young. Leaves elliptic or oblong-elliptic, rounded at both ends or shortly cuneate at the base, 2 – $2\frac{3}{4}$ in. long, 1 – $1\frac{1}{4}$ in. broad, entire, subcoriaceous, rather densely crisped-pubescent on both surfaces especially towards the midrib; midrib slightly raised above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 7–9 on each side of the midrib, diverging from it at an angle of about 75° .

slightly arcuate, looped near the margin, slender, prominent on the lower surface; tertiary nerves only a little less distinct than the lateral and parallel with them, slightly zig-zag; petiole 3-4 lin. long, nearly 1 lin. thick, densely tomentose; stipules deciduous, large, lanceolate, about 2 in. long, membranous, mostly hairy on the outside. Receptacles sessile, produced in pairs from the axils of fallen leaves, ovoid-globose, scarcely $\frac{1}{2}$ in. in diam., densely and softly tomentose. Basal bracts small and deciduous. Ostiole 2-lipped, slightly elevated, glabrescent around the mouth; bracts not visible from the outside, all descending into the receptacle, the two nearest the orifice a little larger and more fleshy than the others, oblong-lanceolate, obtuse, $1\frac{1}{2}$ lin. long, the others lanceolate, subacutely acuminate, membranous. Male flowers with a solitary stamen. Female flowers subsessile; perianth-segments 4-5, oblong-elliptic, mucronate, membranous, glabrous. Achene ellipsoid, smooth; style very slender, with a large stigma which is often adherent to that of a neighbouring one.—Mildbr. & Burret in Engl. Jahrb. xlvi. 254.

Mozamb. Distr. German East Africa: Usafua, near the village of Swira, Goetze, 1348!

A very distinct species allied to *F. Hochstetteri*, A. Rich., but with a distinct habit on account of the very short young branchlets with much abbreviated internodes, and the short petioles of the leaves which appear to be almost verticillate.

115. *F. Hochstetteri*, A. Rich. *Tent. Fl. Abyss.* ii. 267. Branchlets twiggy, woolly-pubescent when young, the older ones nearly glabrous and prominently lenticellate. Leaves oblong, oblong-elliptic or oblanceolate, very shortly and obtusely pointed or rounded at the apex, rounded or obtuse at the base, 2-5 in. long, $\frac{3}{4}$ - $2\frac{1}{2}$ in. broad, entire, thinly chartaceous, pubescent on the midrib and lateral nerves above, softly pubescent or tomentose below, especially on and towards the midrib; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 8-10 on each side of the midrib, diverging from it at an angle of 45° - 75° , rather slender, distinct on both surfaces, looped near the margin, fairly prominent below; tertiary nerves lax and following the direction of the lateral ones; venation close and distinct below: petiole $\frac{1}{3}$ - $\frac{3}{4}$ in. long, pubescent or tomentose; stipules deciduous, those surrounding the terminal bud lanceolate, pubescent outside. Receptacles axillary, sessile or subsessile, globose or ovoid-globose, about 3 lin. in diam., rather densely adpressed-pubescent. Basal bracts 3-4, small and soon falling off, ovate-triangular, obtuse, about $\frac{3}{4}$ lin. long, thinly chartaceous, finely pubescent outside. Ostiole in the middle of a broad glabrescent portion of the receptacle, 2-lipped, not prominent; ostiolar bracts few, all descending into the receptacle, the two next the mouth larger

and more fleshy than the others, oblong, glabrous. Male flowers pedicellate; perianth-segments 3, oblong, rounded at the apex, reddish, glabrous; stamen solitary; filament short; anther broadly oblong, $\frac{1}{3}$ lin. long. Female flowers subsessile; perianth similar to that of the male but more acute. Achene rounded, smooth; style slender, as long as the achene.—Engl. Hochgebirgsfl. Afr. 191. *F. pubicosta*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 16. *F. Schimper*, var. *Hochstetteri*, Mildbr. & Burret in Engl. Jahrb. xlv. 253. *Urostigma Hochstetteri*, Miq. in Hook. Lond. Journ. Bot. vi. 555, and Afr. Vrije-Boom. 32, t. v. B.

Nile Land. Eritrea: near Saganciti, *Schweinfurth*, 1819, partly! Barasio Valley, *Schweinfurth*, 2072! Abyssinia: Shahagenni district, *Schimper*, 373!
South Central. Belgian Congo: Katalla, *Dewèvre*, 141! Lualaba district; Sankuru River, *Ledermann*, 89!

Mozamb. Distr. German East Africa: Lake Mohasi, *Mildbraed*, 467!

116. **F. Dahro**, *Del. in Ann. Sci. Nat. 2me sér. xx. 94.* A magnificent tree (*Delile*); branchlets leafy near the apex, longitudinally wrinkled when dry, pubescent. Leaves broadly ovate, cordate at the base, obtuse at the apex, $2\frac{1}{2}$ –6 in. long, $2\frac{1}{2}$ – $4\frac{3}{4}$ in. broad, entire, rigidly chartaceous, minutely pitted on both surfaces, otherwise glabrous, 9-nerved at the base; midrib about 1 lin. broad at the base, gradually tapered to the apex, flat or slightly immersed above, prominent below; lateral nerves 5–7 on each side of the midrib, the lowermost pair with several side-branches, the remainder mostly bifurcate $\frac{1}{2}$ – $\frac{3}{4}$ in. from the margin, often slightly impressed above, prominent below; tertiary nerves wavy, rather lax, prominent below; venation very close and distinct on the lower surface; petiole $1\frac{3}{4}$ – $3\frac{1}{2}$ in. long, scaly and pubescent, about $1\frac{1}{4}$ lin. thick, closely longitudinally sulcate when dry; stipules deciduous, those covering the apical bud tomentose in the lower part, glabrous above. Receptacles crowded in axillary pairs near the end of the shoots, subsessile, globose, about 7 lin. in diam., densely tomentose, with a prominent unequally 2-lipped gaping glabrous ostiole. Basal bracts connate at the base, densely yellowish-tomentose outside. Mouth of ostiole $1\frac{1}{4}$ lin. wide; bracts all descending into the receptacle, those near the middle much larger than the others, subulate-lanceolate, subacute, 3 lin. long, thick and fleshy near the mouth of the ostiole, keeled, glabrous, the others slightly smaller and more membranous. Male flowers shortly pedicellate; perianth-segments 3, membranous. Stamen solitary; filament at length $\frac{3}{4}$ lin. long; anther $\frac{1}{2}$ lin. long. Female flowers sessile; perianth very thin and membranous, embracing the lower part of the style; achene ovoid, smooth; style as long as the achene, with a prominently thickened stigma. Gall flowers numerous; pedicels $1\frac{1}{2}$ lin. long; style much shorter than in the female flower. —Ferret & Galinier, Voy. Abyss. iii. 159; Atlas, bot. t. xv. [*F. Dahero*];

Martelli Florul. Bogos. 77. *F. benghalensis*, A. Rich. Tent. Fl. Abyss. ii. 265, not of Linn. *F. indiana*, A. Rich. l.c. (error for *F. indica*). *F. vasta*, Mildbr. & Burret in Engl. Jahrb. xlv. 216, partly, not of Forsk.

Nile Land. Abyssinia: around Adowa, *Schimper*, 1934! without precise locality, *Galiniér*.

117. *F. soldanella*, *Warb. in Viertelj. Naturforsch. Ges. Zürich*, li. 136. Branchlets stout, subterete, about $4\frac{1}{2}$ lin. in diam. near the apex, glabrous; leaf-scars oblong-orbicular or horse-shoe-shaped, 5-6 lin. long, 3-4 lin. broad; stipular scars very broad. Leaves suborbicular, very shortly and obtusely acuminate, deeply cordate at the base, $4-6\frac{1}{2}$ in. long, $3\frac{1}{2}-6\frac{1}{2}$ in. broad, entire, chartaceous or subcoriaceous, glabrous and dull on both surfaces, 9-nerved at the base; midrib slightly raised above, prominent below, about 1 lin. broad at the base, gradually narrowed to and finally reaching the apex of the blade; lateral nerves (excluding the basal ones) 4-5 on each side, diverging from the midrib at an angle of 45° , prominent on both surfaces, bifurcate $\frac{1}{4}-\frac{3}{4}$ in. from the margin; tertiary nerves lax and wavy, somewhat prominent below; veins close and distinct below; petiole $1\frac{1}{2}-3\frac{1}{2}$ in. long, narrowly grooved on the upper surface, glabrous; stipules caducous, not seen. Receptacles axillary, probably solitary, sessile or nearly so, depressed-globose, with a very slightly prominent ostiole, slightly stipitate and slightly 7-ribbed at the base, 6-7 lin. in diam., very minutely puberulous; basal bracts 4, ovate, rounded at the apex, about 1 lin. long and broad, coriaceous, reddish-brown when dry, glabrous. Ostiolar bracts all descending vertically into the receptacle, lanceolate, subacute, $\frac{3}{4}-1\frac{1}{2}$ lin. long, reddish, with rather narrowly membranous margins, glabrous. Male flowers very few near the ostiolar bracts, shortly pedicellate; perianth enclosing the solitary subsessile anther. Female flowers sessile, scattered amongst the gall flowers; perianth-segments 4, linear, subacute, about 1 lin. long, hyaline; achene ellipsoid; style lateral, longer than the achene; stigma 2-fid. Gall flowers pedicellate; pedicel stout, $1\frac{1}{2}$ lin. long, glabrous; ovary as in the female flowers but with a larger subsessile stigma. Scales of the receptacle subulate, acute, $\frac{3}{4}$ lin. long, with very narrowly membranous margins.—*F. picta*, Sim, For. Fl. Port. E. Afr. 99, t. xciv., fig. B.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Tete, *Kirk!* Miluane, *Sim*, 6302! Rhodesia: Victoria, *Monro*, 350! Tropical Transvaal: Limpopo Valley, *Hutchins*, 13!

Occurs also in extra-tropical Transvaal.

118. *F. zobiænsis*, *De Wild. in Bull. Soc. Bot. Belg.* lii. 235. A tree; branchlets very stout, about $\frac{3}{4}$ in. in diam., pilose-pubescent. Leaves large, oblong-obovate, very shortly and obtusely acuminate, obtusely rounded at the base, 12-18 in. long, 4-6 in. broad, entire,

coriaceous, dull and glabrous above, finely pubescent below. pilose on the midrib; midrib flat above, prominent below, 3 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 15-18 on each side of the midrib, diverging from it at an angle of 55° , straight, distinct above, prominent below, looped near the margin; tertiary nerves slender, joined between the lateral ones; veins finely reticulate; petiole 2-4 in. long, $2\frac{1}{2}$ lin. thick, pilose; stipules caducous, not seen. Receptacles in axillary pairs, shortly pedunculate, oblong-ellipsoid, minutely puberulous, sometimes slightly warted, $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. in diam., rounded or very shortly stipitate at the base; peduncle 4-6 lin. long, stout, puberulous. Basal bracts caducous, pubescent outside the persistent base. Ostiole very small and pore-like; bracts all descending into the receptacle. Male flowers with a single stamen. Female flowers sessile. Gall flowers pedicellate.

South Central. Belgian Congo: Welle district; Zobia, *Lamboray*!

119. **F. Quibeba**, *Welw. ex Ficalho, Pl. Uteis*, 270. A tree 50-80 ft. high with a broad crown, or sometimes climbing around other trees; trunk straight and usually 4-6-sided as if consisting of 4 to 6 trees grown together (*Welwitsch*); young branchlets soon becoming glabrous, stout. Leaves obovate-elliptic, slightly and very obtusely pointed at the apex, shortly cuneate to an obtuse base, 6-8 in. long, $3-5\frac{1}{2}$ in. broad, entire, coriaceous, glabrous and closely reticulate above, at first sparingly and shortly pubescent below, at length glabrous and closely reticulate; lateral nerves about 6 on each side of the midrib, diverging from it at an angle of $50^{\circ}-70^{\circ}$, distinct above, very prominent below, prominently looped near the margin; tertiary nerves lax and wavy below; petiole 1-3 in. long, stout, about $1\frac{3}{4}$ lin. thick, thinly pubescent or glabrous; stipules caducous, triangular, subcoriaceous, hairy on the back, at length glabrous. Receptacles borne in pairs on the young shoots, closely sessile, depressed-globose, about $\frac{2}{3}$ in. in diam., strongly warted, thinly adpressed-pilose when mature. Basal bracts rounded, rufous-villous outside. Ostiole small and pore-like; bracts all descending into the receptacle. Male flowers with a solitary stamen enclosed at first in the membranous perianth. Female perianth-segments lanceolate, acute, glabrous.—Hiern in *Cat. Afr. Pl. Welw.* i. 1000. *F. verrucocarpa*, Warb. in *Engl. Jahrb.* xxx. 294; Mildbr. & Burret in *Engl. Jahrb.* xlv. 239. *F. Akaie*, De Wild. in *Bull. Soc. Bot. Belg.* lii. 198.

Lower Guinea. Angola: Golungo Alto; Queta Mountains, *Welwitsch*, 6399!

South Central. Belgian Congo: Welle district, *without collector* (in Herb. Brussels).

Mozamb. Distr. German East Africa: Kiwira-Tal, *Gortze*, 1492! Portuguese East Africa: M'Yimbiti, 23 miles from Beira, *Johnson*, 274!

According to both *Welwitsch* and *Johnson* this tree contains very abundant latex. *Welwitsch* states that it supplies a tough and firm white wood which is manufactured into bowls and similar domestic articles.

120. *F. wildemaniana*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 7 (name only), and in *De Wild. & Durand, Reliq. Dewevr.* 217. Branchlets thick and stout, ribbed, about $\frac{1}{2}$ in. thick just below the apex, pilose between the ribs. Leaves large, oblong-oblongate or somewhat pandurate, rounded or cordate at the base, shortly and obtusely acuminate, 6–20 in. long, $3\frac{1}{2}$ – $7\frac{1}{2}$ in. broad, entire, coriaceous, closely reticulate on both surfaces; midrib slightly grooved above when dry, very prominent below, nearly $\frac{1}{4}$ in. broad at the base below; lateral nerves 8–10 on each side of the midrib, looped, distinct on both surfaces, very prominent below; tertiary nerves very lax and much branched below; petiole $\frac{1}{2}$ – $2\frac{1}{2}$ in. long, stout, sharply and deeply ribbed, pubescent between the ribs; stipules not seen, soon caducous. Receptacles large, sessile in axillary pairs, subglobose, about $1\frac{1}{2}$ – $1\frac{3}{4}$ in. in diam., much wrinkled and tuberculate when dry, shortly pubescent. Basal bracts triangular-ovate, obtuse, about $\frac{3}{4}$ in. long, chartaceous, adpressed-pubescent or subvillous outside, glabrous within. Ostiole mammillate, slightly projecting, with a small pore-like orifice; bracts all descending into the receptacle, glabrous. Male flowers with a solitary stamen.—Mildbr. & Burret in *Engl. Jahrb.* xlvii. 239; *De Wild. in Bull. Soc. Bot. Belg.* lii. 235.

South Central. Belgian Congo: Congolo, *Sapin!* Lutshima and Dimba, *Sapin!* Gumbari, *Seret*, 137! between Buta and Bima, *Seret*, 52! Upper Aruwimi, at Eala, *Pynaert*, 695! Kutu, *Laurent!* Kiri, *Laurent!* Sankuru, *Luja!* and without precise locality, *Dewèvre*, 562!

According to Sapin the latex of this species is used in the adulteration of rubber.

121. *F. pseudo-Vogelii*, *A. Chev. in Comptes Rend. Acad. Paris*, cxxxv. 443. Habit and leaves as in *F. Vogelii*, Miq., but the receptacles much larger and about 1 in. in diam.

Upper Guinea. Lagos, *Millson!*

Lower Guinea. Gaboon: Libreville, *Chevalier*, 4408! *Klaine*, 994! *Debeaux*, 169!

This is perhaps merely a large-fruited variety of *F. Vogelii*, Miq.

122. *F. subcalcarata*, *Warb. & Schweinf. in Engl. Jahrb.* xx. 155. Branchlets fairly stout, purplish when dry, glabrous. Leaves elliptic or oblong-elliptic, very shortly and obtusely acuminate, rounded at the base, $5\frac{1}{2}$ –8 in. long, $2\frac{1}{4}$ –4 in. broad, entire, glabrous on both surfaces; midrib flat above, prominent below, about $1\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex of the leaf-blade, straw-coloured below; lateral nerves 8–9 on each side of the midrib, diverging from it at an angle of 45° or more, distinct on both surfaces, prominent and straw-coloured below, looped and becoming slender towards the margin; tertiary nerves and veins forming a very close prominent reticulation on the lower surface; petiole 1– $2\frac{1}{2}$ in. long, 1– $1\frac{3}{4}$ lin. thick, glabrous; stipules deciduous. Receptacles

in axillary sessile pairs, globose-oblong, dilated at the base on one side, about $\frac{3}{4}$ in. long, glabrous. Basal bracts 2, connate at the base, persistent and becoming leathery, glabrous. Ostiole small, 2-lipped; bracts all descending into the receptacle, not visible from the outside. Male and female flowers with 3 lanceolate perianth-segments. Stamen solitary; anther oblong, obtuse. Style slender, with an oblong stigma.—Warb. in Warb. & De Wild. Fic. Fl. Congo, 9, t. xxvi.; Mildbr. & Burret in Engl. Jahrb. xvi. 238, excl. var. *F. Holstii*, Warb. in Engl. Jahrb. xx. 160.

Nile Land. British East Africa: 2 days' journey from Fort Hall, *Hutchins!*

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3624!

Mozamb. Distr. German East Africa: Usambara; Lutindi, *Holst*, 3305! Kilimanjaro; Marangu, *Volkens*, 1253! Portuguese East Africa: Beira, *Johnson*, 57! British Central Africa: Nyasaland; Karonga, *Scott*, 4! Gazaland: near Chirinda, *Swynnerton*, 435!

This species is remarkable in having shortly spurred receptacles. *Volkens*, 1253, from Marangu, Kilimanjaro, referred doubtfully to this species by Mildbræd & Burret, may be distinct, but the material is not sufficiently complete for description.

123. *F. Vogelii*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 288. A tree; young branches stout, angular, covered with scaly deciduous bark. Leaves mostly crowded towards the ends of the branches, oblong-elliptic or elliptic, rounded or slightly cordate at the base, very shortly and obtusely acuminate, $4\frac{1}{2}$ –12 in. long, $1\frac{3}{4}$ –5 in. broad, entire, coriaceous, glabrous and dull on both surfaces or finely pubescent below; midrib flat above, prominent below, about $2\frac{1}{2}$ lin. broad at the base in the broader leaves, gradually tapered to the apex of the blade; lateral nerves 5–7 on each side of the midrib, diverging from it at an angle of about 45° , slightly arcuate, looped and branched near the margin, distinct on both surfaces but more prominent and straw-coloured below; tertiary nerves and veins forming a fine straw-coloured reticulation below; petiole 1 – $4\frac{1}{2}$ in. long, $1\frac{1}{2}$ –2 lin. thick, deeply sulcate, with brown deciduous epidermis; stipules deciduous, those surrounding the terminal bud ovate, $\frac{1}{2}$ in. long, coriaceous, adpressed silky-tomentose outside. Receptacles axillary, sessile, usually in pairs, but sometimes up to 6 together in each leaf-axil, subglobose, about $\frac{1}{2}$ in. in diam., glabrous. Basal bracts 2, silky-pubescent with yellowish hairs on the outside. Ostiole 2-lipped, very slightly prominent; bracts all descending into the receptacle, none visible from the outside, somewhat membranous, glabrous. Male flowers sessile or subsessile; perianth-segments 3, ovate, glabrous; stamen solitary; anther-cells slightly diverging at the base. Female flowers shortly pedicellate; style lateral, with a thick stigma.—Engl. Pflanzenwelt Afr. i. ii. 683, fig. 581; Mildbr. & Burret in Engl. Jahrb. xvi. 237; De Wild. in Bull. Soc. Bot. Belg. lii. 233; Notizbl. königl. Bot. Gart. Berlin, v. 63, t. 1. *F. Dob.* Warb., and *F. albivenia*, Warb. ex Mildbr. & Burret, l.c. 237, 238,

names only. *F. Kaba*, De Wild. in Bull. Soc. Bot. Belg. lii. 213. *Urostigma Vogelii*, Miq. in Hook. Niger Fl. 520, and in Hook. Lond. Journ. Bot. vi. 553.

Upper Guinea. Senegal: Maye (?), *Chevalier*! St. Louis, *Chevalier*! Cayor, *Poisson*! and without precise locality, *Farmar*, 56! French Guinea: Konakry, *Dybowski*! *Poisson*, 16! *Debeaux*, 138! Gambia: near Bathurst, *Dudgeon*, 7! Sierra Leone: without locality, *Scott Elliot*, 5299! *Lane-Poole*! Liberia: Grand Bassa and Cape Palmas, *Vogel*, 6! 47! Sinoe, *Sim*, 25! *Whyte*, 19! Gola, *Bunting*! Gold Coast: Schwhi and Wam districts, *Armitage*! Odorso, *Farmar*, 391! Yenahin, *Chipp*, 130! Togo: various localities, *Schlechter*, 12968! *Baumann*, 571! *Büttner*, 709! 710! *Kersting*, A. 542! A. 543! A. 722! *Zech*! Southern Nigeria: Lagos, *Moloney*! *Schlechter*! Nun River bank, *Mann*, 474! Engenni River, *Holland*, 152! Cross River, *Holland*, 7! Bassa, *Elliott*, 95! Northern Nigeria: Ankpa, *Lamb*, 20! and without precise locality, *Yates*, 55! Cameroons: Barombi, *Preuss*, 500! *Zenker*, 1914! Johann-Albrechtshöhe, *Staudt*, 895!

South Central. Belgian Congo: Bena-Dibcle, *Flamigni*, 171! Middle Congo, *Claessens*, 513! Busira Monene, *Laurent*, 400! Banzyville, *without collector* (in Herb. Brussels)!

Var. *pubicarpa*, Mildbr. & Burret, l.c. 238. Mature receptacles densely whitish pubescent.—*F. incognita*, De Wild. in Bull. Soc. Bot. Belg. lii. 213.

Upper Guinea. Senegal: without locality, *Talmy*, 97! Gold Coast: Krepi Plains, at Blengo, *Johnson*, 523! Togo: Basari, *Kersting*, 550! Lomboro, *Kersting*, A. 539! Fernando Po: Musola, *Mildbraed*, 6976! 6988!

Mozamb. Distr. German East Africa: Coast, without precise locality, *Sacleux*, 405!

124. *F. Nekbudu*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 6, t. iv. A huge forest tree (*Moore*); young branchlets stout, at first adpressed-pubescent, at length glabrous. Leaves spreading horizontally, elliptic or obovate-elliptic, rounded at both ends or rarely slightly cordate at the base, 6–15 in. long, 3½–8 in. broad, entire, coriaceous, glabrous on both surfaces, with petiole, nerves and veins more or less as in *F. Vogelii*, Miq. Receptacles sessile, mostly in pairs, subglobose, about ½–¾ in. in diam., at first woolly-pilose, at length adpressed-pilose. Basal bracts densely villous outside. Ostiole and flowers as in *F. Vogelii*.—Mildbr. & Burret in Engl. Jahrb. xlvi. 239. *F. utilis*, Sim, For. Fl. Port. E. Afr. 100, t. xci.

South Central. Belgian Congo: Welle district, *Witterwulghe*!

Mozamb. Distr. British Central Africa: Nyasaland; Mlanji, *Moore*!

Grown in the Royal Botanic Gardens and at the Serres Coloniales, Brussels, in 1913.

According to Sim the plant described by him under the name *F. utilis* occurs throughout Portuguese East Africa; I have compared his type specimen, 6125, from Lorenzo Marques with the type of *F. Nekbudu* and they seem to be identical. Sim states that his plant is the source of all the native cloth in the M'Chopes district.

125. *F. vestitobracteata*, *Warb. in Engl. Jahrb.* xx. 159. Branchlets stout, often pubescent around the scars of the fallen stipules, otherwise glabrous. Leaves large, oblong-elliptic, shortly and

obtusely acuminate, the acumen about $\frac{1}{4}$ in. long, obtuse or rounded at the base, 7–12 in. long, 3–5 $\frac{1}{2}$ in. broad, entire, thinly coriaceous, dull and glabrous on both surfaces, prominently and closely reticulate below; midrib impressed above, very prominent below, about 1 $\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 9–10 on each side of the midrib, diverging from it at an angle of about 50°, frequently subopposite, slightly arcuate, becoming fainter and looped near the margin, distinct above, prominent but mostly rather slender below; tertiary nerves slender, forming arches with their apices towards the margin between the lateral nerves, distinct on the lower surface; petiole 1 $\frac{1}{4}$ –2 $\frac{1}{2}$ in. long, finely sulcate, glabrous; stipules caducous, those surrounding the terminal bud ovate-lanceolate, probably obtuse, about $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad, subcoriaceous, the outer ones tomentose around the outside of the base, otherwise glabrous, the inner densely tomentose all over the outside. Receptacles axillary, sessile, probably mostly in pairs, depressed-globose, about $\frac{3}{4}$ in. in diam., glabrous. Basal bracts 2, semicircular or semilunar, about 4 lin. broad, densely villous with long yellowish persistent hairs outside, glabrous within. Ostiole slightly prominent, 2-lipped; orifice small; bracts all descending into the receptacle, not visible from the outside, glabrous. Male flowers with a solitary stamen; anther obtuse. Achene smooth, with a slender style and rather long stigma.—De Wild. in Bull. Soc. Bot. Belg. lii. 231. *F. subcalcarata*, var. *vestitobracteata*, Mildbr. & Burret in Engl. Jahrb. xlvii. 238. *F. Alvesii*, Warb. ex Mildbr. & Burret, l.c. 239, name only.

Lower Guinea Princess Island, *Quintas*, 29! 166! (perhaps cultivated). St. Thomas Island, *Alvares*!

Occurs also in Johanna, Comoro Islands.

126. *F. basarensis*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlvii. 253. An epiphyte or tree up to 45 ft. high; branchlets mostly rather slender, thinly pubescent or sometimes quite tomentose when young. Leaves obovate-elliptic or elliptic, rounded or very shortly acuminate, mostly somewhat narrowed to the base, 2 $\frac{1}{2}$ –6 in. long, 1 $\frac{1}{2}$ –3 in. broad, entire, thinly chartaceous or almost membranous, glabrous and dull on both surfaces; midrib flat above, prominent below, rather slender; lateral nerves 8–10 on each side of the midrib, diverging from it at an angle of about 55°, slender, distinct on both surfaces; tertiary nerves following the direction of the lateral nerves and little less prominent; veins rather lax and obscure below; petiole variable, $\frac{3}{4}$ –2 $\frac{1}{2}$ in. long, mostly slender, finely and longitudinally wrinkled, glabrous; stipules caducous, lanceolate, acutely acuminate, 4–5 lin. long, chaffy, slightly puberulous outside. Receptacles usually crowded, in axillary pairs, sessile, globose, 5–8 lin. in diam., densely and softly tomentose with white hairs, with a distinct slightly umbonate glabrescent ostiole. Basal bracts 2,

ovate, obtuse, silky-hairy outside. Ostiole 2-lipped; bracts all descending into the receptacle, the two next the mouth longer and more fleshy than the others, oblong-linear, obtuse, glabrous. Male flowers sessile; perianth-segments 3, broadly elliptic, obtuse, reddish towards the base, membranous, glabrous. Stamen solitary; anther oblong-ellipsoid, obtuse at both ends. Female flowers: perianth-segments 3, ovate-oblong, acutely acuminate, membranous, glabrous. Achene slightly obovoid, smooth; style slightly longer than the achene, slender, with a thickened stigma.

Upper Guinea. Senegambia: Casamanze River, *Chevalier*! Dahomey: without precise locality, *Poisson*! Togo: Basari, growing on an old Baobab, *Kersting*. A. 21! A. 221! 533!

North Central. Shari district: Kaba Maro, *Chevalier*, 9091!

The figs seem rather variable in size; in *Kersting*, 221, they are about 5 lin. in diam. and in *Chevalier*, 9091, one fig measures as much as 8 lin. In the latter specimen the leaves are more chartaceous than in the others, but otherwise it appears to agree with this species.

127. *F. Petersii*, *Warb. in Engl. Jahrb.* xx. 164. A tree up to 60 ft. high; young branchlets crisped-pubescent, at length nearly glabrous, ribbed when dry. Leaves oblanceolate, elliptic-oblanceolate or obovate-oblanceolate, narrowed to an obtuse base or rarely rounded to the base, very shortly and obtusely pointed, $1\frac{3}{4}$ – $3\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{2}$ in. broad, thinly but rather rigidly chartaceous, glabrous on both surfaces; lateral nerves 6–8 on each side of the midrib, slightly arcuate, conspicuous on both surfaces but more prominent below, looped within the margin; tertiary nerves and veins lax and nearly as prominent below as the lateral nerves; petiole up to 2 in. long, slender, glabrous; stipules caducous. Receptacles axillary, mostly paired, quite sessile, ovoid, brown-tomentose when mature, about $4\frac{1}{2}$ lin. long and $3\frac{1}{2}$ lin. in diam., with a conspicuous pore-like ostiole. Basal bracts small and deciduous. Bracts of the ostiole descending vertically into the receptacle, glabrous. Male flowers with a membranous glabrous perianth and a solitary stamen.—*Mildbr. & Burret in Engl. Jahrb.* xlvi. 258. *F. ruficeps*, *Warb. in Engl. Jahrb.* xxx. 294. *F. Galpinii*, *Warb. in Viertelj. Naturforsch. Ges. Zürich*, li. 140. *F. Dinteri*, *Warb. l.c.* 141. *F. schinziana*, *Warb. l.c.* 143.

Lower Guinea. Angola: between Quihita and Gambos, *Pearson*, 2498! 2534! between Gambos Mission Station and Cabama, *Pearson*, 2476! Mount Kileba, *Gossweiler*, 1696! Kubango; between Colui and the River Loanga, *Gossweiler*, 2121!

Mozamb. Distr. German East Africa: Kimamba in Unyanyembe, *Prittwitz & Gaffron*, 269! Ssongea, *Keudel*, 1439! Usagara; Wumi River, *Trotha*, 191! Usafu; near Utengule, *Goetze*, 1057! British Central Africa: Nyasaland; Maravi, *Peters*! Shire Highlands, *Buchanan*, 456!

Occurs also in the Transvaal and in German South West Africa.

128. *F. Adolphi-Friderici*, *Mildbr. in Engl. Jahrb.* xlvi. 232. A rather tall tree; branches glabrous, longitudinally sulcate and

marked with lenticels when dry. Leaves obovate-elliptic, very obtusely mucronate, narrowed to the base, $5\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $2\frac{3}{4}$ – $3\frac{1}{4}$ in. broad, entire, rigidly coriaceous, shining above, dull below, glabrous on both surfaces; midrib flat or slightly impressed above, very prominent below, rounded and nearly 2 lin. broad at the base, gradually tapered to and becoming very slender at but scarcely reaching the apex of the blade; lateral nerves about 12 on each side of the midrib, diverging from it at an angle of 45° or slightly more, slightly arcuate or straight, looped and forming an intra-marginal nerve 1 – $1\frac{1}{2}$ lin. from the margin, distinct on both surfaces, slightly prominent but slender below; tertiary nerves only a little less distinct than the lateral and parallel with them, becoming zig-zag towards the margin; veins fine and rather close; petiole about $\frac{3}{4}$ in. long, finely wrinkled, glabrous; stipules deciduous, glabrous. Receptacles axillary, sessile, globose, about $\frac{1}{4}$ in. in diam., glabrous. Basal bracts 3, ovate, rounded at the apex, about $1\frac{1}{2}$ lin. long and nearly as broad, faintly membranous towards the margin, glabrous. Ostiole slightly prominent, 2-lipped; orifice $\frac{1}{3}$ lin. long; bracts linear, the two next the orifice longer than the others, membranous, glabrous. Male flowers subsessile: perianth enclosing the solitary anther. Female flowers subsessile, small. Achene smooth; style slender, with several stigmas often cohering.

South Central. Belgian Congo: Upper Welle district; near Pojo, between Fort Beni and Irumu, *Mildbraed*, 2831!

A very distinct species allied to *F. aganophila*, Hutchinson, and *F. elasticoides*, De Wild., but differing from the former by the rounded leaf apices with the branched midrib and the cuneate base, and from the latter by the rounded apices, fewer lateral nerves and smaller figs.

129. *F. subcostata*, De Wild. in Fedde, *Repert.* xii. 197. Branchlets longitudinally striate, lenticellate, otherwise glabrous. Leaves oblong or elliptic-oblong, acuminate, the acumen up to 7 lin. long, rounded at the base, 2 – $4\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{3}{4}$ in. broad, entire, rigidly coriaceous, dull and glabrous on both surfaces; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 6 on each side, arcuate, diverging from the midrib at an angle of 45° , looped some distance from the margin, prominent on both surfaces; veins distinct on both surfaces, rather close; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, about 1 lin. thick, glabrous; stipules more or less deciduous, up to nearly $\frac{1}{2}$ in. long and 2 lin. broad, glabrous. Receptacles sessile, in axillary pairs, obovoid-globose, about $5\frac{1}{2}$ lin. in diam., prominently warted, slightly puberulous. Basal bracts 2, suborbicular, membranous, glabrous. Ostiole inconspicuous, 2-lipped, with no bracts visible from the outside; bracts all pointing into the receptacle, oblong or oblong-lanceolate, glabrous. Male flowers shortly pedicellate; perianth-segments 3, unequal, linear or lanceolate, glabrous, about $\frac{3}{4}$ lin. long.

Stamen solitary; filament short; anther nearly $\frac{1}{2}$ lin. long, obtuse. Female flowers with a short stout pedicel; perianth-segments 3, lanceolate, acute, $\frac{3}{4}$ lin. long, membranous; achene obliquely obovoid, smooth; style inserted laterally, about one and a quarter times the length of the achene, with a unilateral stigma. Receptacular scales subulate-lanceolate, acute, $\frac{3}{4}$ –1 lin. long, membranous. Gall flowers with pedicels $\frac{3}{4}$ lin. long, otherwise similar to the female. —De Wild. in Bull. Soc. Bot. Belg. lii. 229.

South Central. Belgian Congo: Eala, *Laurent*, 1357!

130. *F. annobonensis*, *Mildbr. & Hutchinson in Kew Bulletin*, 1915. 337. A shrub; branches terete, nearly glabrous; young branchlets finely puberulous. Leaves ovate-elliptic or oblong-elliptic, shortly and very obtusely acuminate, rounded or subcordate at the base, $2\frac{1}{2}$ –4 in. long, $1\frac{1}{4}$ – $1\frac{3}{4}$ in. broad, entire, chartaceous, finely verrucose on the upper surface, glabrous below; midrib slightly raised above, prominent below, gradually tapered to the apex of the blade; lateral nerves 6–7 on each side of the midrib, diverging from it at an angle of 45° , arcuate, looped some distance from the margin, slightly prominent on both surfaces; veins fairly close and prominent below; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, rather slender, glabrous; stipules caducous, linear-lanceolate, acutely acuminate, 5 lin. long, glabrous, minutely ciliate. Receptacles in axillary pairs, sessile, globose, 4 lin. in diam., glabrous. Basal bracts 2, connate at the base, ovate, obtuse, soon splitting into two unequal parts, 2 lin. long, coriaceous, minutely puberulous outside. Ostiole slightly protruded, 2-lipped; bracts not visible from the outside, all descending into the receptacle, the two nearest the orifice oblong, obtuse, longer and thicker than the others. Male flowers subsessile; perianth-segments 3–4, oblong-elliptic, membranous, glabrous; stamen solitary. Female flowers subsessile; perianth-segments as in the male. Achene ellipsoid, glabrous; style about as long as the achene, slender, with a rather wide flattened stigma.

Lower Guinea. Annobon Island; on dry hills in the north of the island, above the Palé village, *Mildbraed*, 6639!

131. *F. Lujæ*, *De Wild. in Fedde, Repert.* xii. 196. Branchlets glabrous, sulcate when dry, with more or less deciduous bark. Leaves oblong-elliptic or oblanceolate-elliptic, gradually acuminate, subacute, subcordate and slightly unequal-sided at the base, 7–11 in. long and $5\frac{1}{2}$ in. broad, entire, coriaceous, dull and glabrous on both surfaces; midrib flat above, very prominent below, about 2 lin. broad at the base, rounded in section, gradually tapered to the apex of the blade; lateral nerves about 11 on each side of the midrib, the lower subopposite, diverging from the midrib at an angle of 50 – 65° , thick and fairly prominent below, forming loops about 2 lin. distant from the margin; tertiary nerves lax, much branched and slender; veins forming a delicate close network below; petiole

up to $1\frac{1}{4}$ in. long, thick, glabrous; stipules deciduous, sheathing, acuminate, about $1\frac{1}{2}$ in. long and $\frac{1}{2}$ in. broad, glabrous. Receptacles in axillary pairs, sessile, subglobose, 7 lin. in diam. Basal bracts 2, connate into a thick coriaceous plate at the base. Ostiole small, 2-lipped. Bracts all descending into the receptacle.—De Wild. in Bull. Soc. Bot. Belg. lii. 217.

South Central. Belgian Congo: Sankuru, *Luja!* Ilongonga, *Sapin!*

The figs of this species are quite sessile and adhere closely to the branch.

132. *F. sessilis*, De Wild. in Fedde, *Repert.* xii. 196. Branchlets glabrous. Leaves oblong-elliptic, rather long-acuminate, acute, rounded or slightly narrowed to the base, $4-5\frac{1}{2}$ in. long, $1\frac{1}{4}-2\frac{1}{4}$ in. broad, entire, coriaceous, dull and glabrous on both surfaces, prominently reticulate below; midrib flat above, prominent below, $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves about 7 on each side of the midrib, diverging from it at an angle of about 70° , inconspicuous above, prominent below, looped near the margin; tertiary nerves spreading, distinct below; veins forming a delicate network below; petiole about $\frac{1}{2}-\frac{3}{4}$ in. long, about 1 lin. thick, glabrous; stipules up to $\frac{1}{2}$ in. long, caducous. Receptacles axillary, sessile, globose, about $\frac{1}{2}$ in. in diam., minutely pubescent. Basal bracts 2, broadly ovate, about 1 lin. long, scaly, glabrous. Ostiole slightly protruded, 2-lipped; bracts all descending into the receptacle.—De Wild. in Bull. Soc. Bot. Belg. lii. 228.

South Central. Belgian Congo: Equateur district: Eala, *Pynaert*, 1582!

133. *F. leonensis*, Hutchinson in *Kew Bulletin*, 1915, 338. A shrub; branchlets twiggy, brownish when dry, prominently lenticellate; clothed with thin deciduous bark, glabrous. Leaves obovate or suborbicular, slightly cordate at the base, obtusely acuminate at the apex, 2-5 in. long, $1\frac{1}{4}-2\frac{1}{2}$ in. broad, entire, rigidly subcoriaceous, dull and glabrous on both surfaces, becoming blackish above and brown below when dry, closely reticulate below; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 9-12 on each side of the midrib, diverging from it at a wide angle, the lower mostly opposite or subopposite, looped, slightly prominent on the lower surface; tertiary nerves distinct below, mostly following the direction of the lateral; petiole $\frac{1}{2}-1$ in. long, glabrous, with deciduous bark; stipules caducous, linear-lanceolate, $1\frac{1}{2}$ lin. long, glabrous. Receptacles axillary, solitary in one of the uppermost leaf-axils, sessile, globose, about $3\frac{1}{2}$ lin. in diam., glabrous. Basal bracts 3, ovate, rounded at the apex, about $\frac{3}{4}$ lin. long, coriaceous, glabrous. Ostiole 2-lipped, slightly prominent; bracts all descending vertically into the receptacle, subulate or subulate-linear, acute, $\frac{1}{2}-\frac{3}{4}$ lin. long, slightly fleshy, glabrous. Male flowers few, subsessile; perianth-segments

elliptic-ob lanceolate, glabrous; stamen solitary; filament $\frac{1}{2}$ lin. long; anther spreading horizontally on dehiscence. Female flowers sessile; perianth-segments triangular, acute; achene subglobose, smooth; style short. Gall flowers pedicellate.

Upper Guinea. Sierra Leone: by a stream about 500 ft. above sea-level, near Bathurst, *Johnston*, 88! French Guinea: neighbourhood of Kindur, *Pobéguin*, 1282!

134. *F. aganophila*, *Hutchinson in Kew Bulletin*, 1915, 338. A tree 50 ft. high; young branches and branchlets shallowly sulcate when dry, purplish, glabrous. Leaves elliptic or oblong-elliptic, rounded or subtruncate at the base, shortly and subcaudately acuminate at the apex, $3\frac{1}{2}$ –7 in. long, $1\frac{3}{4}$ – $3\frac{1}{2}$ in. broad, entire, coriaceous, glabrous on both surfaces, very slightly shining above; midrib slightly raised above, very prominent below, about $1\frac{1}{2}$ lin. broad at the base, gradually tapered to and becoming very slender at the apex of the acumen; lateral nerves 10–12 on each side of the midrib, diverging from it at a wide angle, slightly curved, looped 1–2 lin. from the margin, the loops forming a distinct intramarginal nerve prominent below; tertiary nerves scarcely less prominent than the lateral and following their direction; veins rather slender and faint; petiole $\frac{1}{2}$ –1 in. long, up to 2 lin. thick, becoming black when dry, glabrous; stipules caducous. Receptacles seen only in a very young condition, axillary, probably sessile.

Upper Guinea. Southern Nigeria: Lagos; Kradu Lagoon, near Jalavu Island, *Barter*, 3238!

Lower Guinea. Spanish Guinea: Uelleburg, *Tessmann*, 434!

Tessmann's specimen consists only of leaves and a branchlet, but I have no doubt that it is the same as Barter's from Nigeria.

135. *F. arcuattonervata*, *De Wild. ex Hutchinson in Kew Bulletin*, 1915, 339. An epiphytic shrub when young; branchlets rather sharply angular, glabrous. Leaves oblanceolate, gradually acuminate, the acumen $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obtuse, narrowed to the base, $3\frac{1}{2}$ –5 in. long, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. broad, entire, chartaceous, finely verrucose on the upper surface, glabrous below; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to and becoming very slender at the apex of the blade; lateral nerves about 5 on each side of the midrib, diverging from it at an angle of 45° , arcuate, looped some distance from the margin, prominent and pale-coloured below; tertiary nerves primarily following the direction of the lateral, very slender, eventually branching, distinct below; petiole 3–4 lin. long, covered with glabrous thin transversely splitting deciduous bark; stipules early deciduous. Receptacles in axillary pairs, or perhaps sometimes solitary, sessile, obovoid-globose, 3–4 lin. in diam., glabrous. Basal bracts 2, more or less semicircular, small, with submembranous margins which break up and fall away, glabrous. Ostiole small and inconspicuous, 2-lipped; bracts all

descending into the receptacle, linear-lanceolate, subacute, glabrous. Male flowers sessile, with a solitary very small stamen. Female flowers sessile, with 3 obovate obtuse perianth-segments. Achene broadly ellipsoid; style slender, with a slightly thickened stigma. - *F. camptoneura*, var. *angustifolia*, Mildbr. in Engl. Jahrb. xlv. 234; De Wild. in Bull. Soc. Bot. Belg. lii. 202.

South Central. Belgian Congo: Ituri district: Kasanga, *Mildbrad*, 3107! Injolo, *Seret*, 984! Eala, *Pynaert*, 1327! 1504!

136. *F. oreodryadum*, *Mildbr. in Engl. Jahrb.* xlv. 240. A tall tree with a broad crown; branchlets glabrous, wrinkled when dry. Leaves oblanceolate or oblong-oblanceolate, very shortly, obtusely and rather abruptly acuminate, more or less narrowly cuneate at the base, 4-6 in. long, $1\frac{1}{4}$ -2 in. broad, entire, rigidly subcoriaceous, dull brown on both surfaces when dry, glabrous; midrib slightly impressed above, prominent below, 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 7-8 on each side of the midrib, the upper diverging from it at a wide angle, the lower more oblique, looped well within the margin, prominent below; veins rather close, prominent below; petiole $\frac{1}{2}$ in. long, glabrous; stipules deciduous, small, glabrous. Receptacles axillary, sessile, in pairs, subglobose, a little over $\frac{1}{2}$ in. in diam., obsolete and sparingly warted, glabrous. Basal bracts 2, soon deciduous, closely adpressed to the receptacle. Ostiole 2-lipped, slightly prominent; bracts not visible from the outside, all descending into the receptacle, ovate-lanceolate, glabrous. Male flowers with 3 perianth-segments and a solitary stamen. Female perianth-segments ovate, acute. Achenes ovoid-ellipsoid, smooth; style shorter than the achene.

Mozamb. Distr. German East Africa: Rugege Forest at Rukarara, *Mildbrad*, 1031!

137. *F. Thonningii*, *Blume in Rumphia*, ii. 17. A medium-sized tree, often about 40 ft. high; young branches minutely puberulous, at length glabrous. Leaves obovate-elliptic or oblong-elliptic, obtuse at both ends, sometimes somewhat cuneate at the base, 2-9 in. long, 1-4 in. broad, entire, chartaceous, glabrous on both surfaces, finely pitted on the upper surface when young, at length minutely verrucose, otherwise glabrous and dull on both surfaces; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 8-12 on each side of the midrib, diverging from it at an angle of 45°-65°, prominent below, looped; tertiary nerves lax and spreading in the same direction as the lateral; ultimate venation rather lax; petiole $\frac{1}{2}$ -2 $\frac{1}{2}$ in. long, glabrous; stipules deciduous, narrowly lanceolate, very acutely acuminate, about $\frac{1}{3}$ in. long, membranous, glabrous or slightly puberulous. Receptacles axillary, sessile, mostly in pairs, globose

or ovoid-globose, 3-4 lin. in diam., very minutely and sparingly puberulous or glabrous. Basal bracts 3, ovate, rounded at the apex, $\frac{1}{2}$ - $\frac{3}{4}$ lin. long, submembranous, finely puberulous outside. Ostiole often umbonate, pore-like; bracts all descending vertically into the receptacle, ovate at the base, submembranous, glabrous. Male flowers subsessile; stamen solitary. Female flowers sessile. Gall flowers pedicellate.—Mildbr. & Burret in Engl. Jahrb. xlv. 257. *F. microcarpa*, Pl. 28, Enum ii. 188; Thonn. in Schum. & Thonn. Beskr. Guin. Vahl; Miq. in Ann. Mus. Lugd.-Bat. iii. 288; Hiern in Cat. Afr. Pl. Welw. i. 1002; not of Linn. f. *F. Schimperii*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 267; Mildbr. & Burret, l.c. 249. *F. Hochstetteri*, var. *glabrior*, Miq. in Ann. Mus. Lugd.-Bat. iii. 289. *F. psilopoga*, Welw. ex Ficalho, Pl. Uteis, 270; Hiern in Cat. Afr. Pl. Welw. i. 1006. *F. chlamydodora*, Warb. in Engl. Jahrb. xx. 163; Engl. Pf. Ost-Afr. C. 161, t. 8, figs. A-F. *F. mabifolia*, Warb. l.c. 165. *F. Dusenii*, Warb. l.c. 168. *F. medullaris*, Warb. l.c. 169. *F. Rokko*, Warb. & Schweinf. l.c. 164; De Wild. in Bull. Soc. Bot. Belg. lii. 225. *F. Rocco*, Warb. & Schweinf. in Notizbl. königl. Bot. Gart. Berlin, v. 63, t. ii. *F. Goetzei*, Warb. in Engl. Jahrb. xxviii. 378. *F. rokkoides*, *F. dusenioides*, *F. kilimandscharica*, *F. Mvumo* and *F. glandulifera*, Warb., ex Mildbr. & Burret in Engl. Jahrb. xlv. 251-3, names only. *F. amadiensis*, De Wild. in Fedde, Repert. xii. 200, and in Bull. Soc. Bot. Belg. lii. 199. *Urostigma Schimperii*, Miq. in Hook. Lond. Journ. Bot. vi. 555, t. xxii. fig. A. *U. Thonningii*, Miq. in Hook. Lond. Journ. Bot. vi. 557, in Hook. l.c. vii. t. xiii. fig. C, in Hook. Niger Fl. 522 and in Afr. Vrije-Boom. 38.

Upper Guinea. Sierra Leone: near Kassa, *Scott Elliot*, 5064! French Guinea: Bibo Dioulasso, *Chevalier*, 915! Bammako, *Chevalier*, 209! Gold Coast: Kropi Plains, at Blengo, *Johnson*, 532! and without precise locality, *Burton & Cameron*! *Evans*, 6! Togo: various localities, *Büttner*, 708! *Warnecke*, 322! *Kersting*, 22! 60! 103! 439! A. 540! A. 541! Southern Nigeria: Lagos, *Dawodu*, 5! Nun River, *Vogel*, 27! Northern Nigeria: Sokoto, *Dalziel*, 397! Katagum district, *Dalziel*, 309! Kuka, *Vogel*, 9! Cameroons: Cameroon Mountain; Musake, *Reder*, 21a! Buca, *Dusen*, 417! *Reder*, 416! Tibati, *Ledermann*, 2330! Fernando Po: grassland of Moka, *Mildbraed*, 7072! rim of crater, amongst rocks, *Mildbraed*, 6514!

North Central. Central Shari: Iro region, *Chevalier*, 8784! Dar Banda, *Chevalier*, 7199!

Nile Land. Eritrea: near Godofelassi, *Schweinfurth*, 179! Acrou, *Schweinfurth & Riva*, 790! 1221! 2084! Geleb, *Schweinfurth*, 1313! Saganeiti, *Schweinfurth & Riva*, 790! *Schweinfurth & Riva*, 1819, partly! Mogod Pass, *Schweinfurth & Riva*! Abyssinia: near Geraz, *Schimper*, 1096! Ethiopia, *Kotschy*, 337! Nianniam: by the River Nabambisso, *Schweinfurth*, 3038! Uganda: Mengo, *Stuhlmann*, 1426!

Lower Guinea. St. Thomas Island, *Wchewitsch*, 6405! *Chevalier*, 13797! Angola: various localities, *Welwitsch*. 6340! 6349! 6351! 6352! 6400! 6418! *Gossweiler*, 439!

South Central. Belgian Congo: various localities, *Schweinfurth*, 3097! 3236! 3511! *Seret*, 26! 287! 288! 662! *Cabra-Michel*, 81! *Cabra*, 67! *Pynaert*, 690! *Laurent*, 770! *Flamigni*, 458! *Bequaert*, 46! *Gillet*, 741! *Buchner*, 546! 550!

Mozamb. Distr. German East Africa: various localities, *Warburg*, 3295!

Holst., 749! 1546! 3295! *Engler*, 1085! *Uhlig*, 525! 1506! *Albers*, 52! *Volkens*, 1823! 1823a! *Jager*, 184! *Boehm*, 59! *Stuhlmann*, 505! 755! 756! 2173! 2279a! *Trotha*, 55! 138! *Mildbraed*, 51! 52! 53! 60! 467a! 693! 1959! 1970! 1975! 1978! *Busse*, 846! *Goetze*, 622! 882! 1442! British Central Africa: Nyasaland; Karonga, *Scott*, 87!

138. *F. brachypoda*, *Hutchinson in Kew Bulletin*, 1915, 339. A spreading tree 40–50 ft. high; branchlets shortly puberulous; internodes about $1\frac{1}{4}$ in. long. Leaves oblong or oblong-elliptic, caudate-acuminate, rounded at the base, 6– $8\frac{1}{2}$ in. long, 3–4 in. broad, entire, rigidly chartaceous or subcoriaceous, 3-nerved at the base; glabrous above, softly pubescent beneath, especially on the midrib and lateral nerves; midrib about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex, flat above, very prominent and rounded below; lateral nerves 10–11 on each side (excluding the basal pair), subopposite, diverging from the midrib at an angle of about 45° , bifurcate about $\frac{1}{2}$ in. from the margin, impressed above, prominent below; venation slightly impressed above, distinct and close below; petiole $2\frac{1}{2}$ –3 in. long, about $1\frac{1}{4}$ lin. thick, longitudinally sulcate, softly pubescent, blackish when dry; stipules caducous, not seen. Receptacles axillary, solitary or geminate, shortly pedunculate, oblong-ellipsoid, slightly contracted at the base, about 7 lin. long and $\frac{1}{2}$ in. in diam., puberulous; peduncle $\frac{1}{4}$ in. long, very stout, about 2 lin. thick, grooved, almost tomentose. Basal bracts connate at the base into an undulate or slightly lobed cup, coriaceous, pubescent outside, glabrous and shining within. Ostiole scarcely visible, pore-like; bracts all descending into the receptacle, linear-lanceolate, glabrous. Male flowers with a solitary stamen.

Nile Land. Uganda: Buddu, 4000 ft., *Dawe*, 290!

The native name in Buddu is *Kokauwe*.

139. *F. populifolia*, *Vahl, Symb.* i. 82, t. xxii. A large tree; branchlets terete, covered with glabrous yellowish bark. Leaves broadly ovate, truncate or rather widely cordate at the base, sometimes slightly peltate, rounded and mostly somewhat acutely acuminate, $2\frac{1}{2}$ –5 in. long, $1\frac{1}{2}$ – $4\frac{1}{2}$ in. broad, entire, chartaceous, glabrous and dull on both surfaces, yellowish-green when dry, 5–9-nerved at the base, remaining lateral nerves about 5–9 on each side, diverging from the midrib at an angle of 45° – 75° , distinct on both surfaces, bifurcate towards the margin; tertiary nerves very lax and slender; petiole $1\frac{1}{2}$ – $3\frac{1}{2}$ in. long, rather slender, glabrous; stipules deciduous, at the time of flowering present only at the apex of the shoot, linear-lanceolate, acutely acuminate, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, about 2 lin. broad, subchartaceous, glabrous within, glaucous-puberulous outside. Receptacles small, axillary, 2–4 together, often in pairs, pedunculate, globose or slightly obovoid-globose, 3–5 lin. in diam., yellowish-brown when dry, with a slightly darker but not prominent ostiole.

often distinctly ribbed or reticulate especially in the lower half, glabrous or minutely mealy-puberulous; peduncles 2-6 lin. long, thickened at the base and apex, glabrous. Basal bracts 2, broadly ovate, obtuse, at length splitting up, about 1 lin. long, slightly coriaceous, glabrous. Ostiolar bracts all pointing into the receptacle, the lowermost longer than the others, linear-subulate, acute, $\frac{1}{2}$ - $\frac{3}{4}$ lin. long, light brown. Male flowers few near the ostiolar bracts, sessile; perianth-segments 3, obovate-oblongate, rounded at the apex; stamen solitary; filament $\frac{1}{4}$ lin. long; anther $\frac{1}{3}$ lin. long, cells distinct. Female flowers numerous, sessile; perianth-segments 3, oblong, membranous; ovary ellipsoid or obovoid, shining; style lateral, about half the length of the ovary, with a linear stigma. Gall flowers pedicellate, similar to the female but with a sessile stigma. Receptacular scales linear, acute, membranous, $\frac{1}{2}$ lin. long.—Vahl, Enum. ii. 181; Mildbr. & Burret in Engl. Jahrb. xvi. 214. *F. religiosa*, Forsk. Fl. Ægypt-Arab. 180, not of Linn. *F. intermedia*, Del. Cent. Pl. Méroë, 64. *F. umbellata*, Miq. in Ann. Mus. Lugd.-Bat. iii. 288, not of Vahl. *F. abutilifolia*, Mildbr. & Burret in Engl. Jahrb. l.c. 214, partly, not of Miq. *F. Hemprichii*, Ehrenberg ex Warb. in Engl. Jahrb. xxxvi. 212, name only. *F. mittuensis*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xvi. 214, name only in syn., not of Warb. descr. *F. populifolia*, vars. *somalensis*, *taitensis* and *major*, Warb. l.c. *Urostigma populifolium*, Miq. in Hook. Lond. Journ. Bot. vi. 552. *U. catalpæfolium*, Miq. in Hook. l.c. 551.

Upper Guinea. Northern Nigeria: Kilba, *Dalziel*, 144! Cameroons: Bornu-Adamana, *Schultze*, 8! Lagdo Mountains, *Ledermann*, 4393!

North Central. Central Shari: Nyellim, *Chevalier*, 8472!

Nile Land. Eritrea: Habab, *Heuglin*, 23! Lawa district, *Schweinfurth*, 1672! near Mahio, *Schweinfurth*, 177! near Keren, *Schweinfurth*, 1812! foot of Zedamba, *Beccari*, 110! Abyssinia: Megebel, *Courbon*, 237! near the River Tacazze, *Schimper*, 880! near Jelajeranne, *Schimper*, 1576! Woha, *Stuedner*, 1361! 1862! Somaliland: Ahl Mountains, near Maid, *Hildebrandt*, 1459! Sheikh Pass, 3000-5000 ft., *Thompson*, 26! Valley of the Web, *Riva*, 1012! Somadu, *Ellenbeck*, 278! and without precise locality, *Lort Phillips*! Sudan: White Nile; Jebel Hill, *Brown*, 519! Sennar: around Roseires and on the banks of the Blue Nile, *Kotschy*, 415! Gebel Werekat, *Hartmann*! British East Africa: Taita Hills; Ndi, *Hildebrandt*, 2842!

Mozamb. Distr. German East Africa: Guara, *Uhlig*, 257! East Usindja; Ngama, *Stuhlmann*, 3563a!

Occurs also in Arabia.

Allied to the Indian *F. religiosa*, Linn., with which it was associated by Forskål, but readily distinguished by its less-tailed acuminate leaves and its pedunculate receptacles.

According to Dr. Dalziel this species is known in the Kilba country of N. Nigeria as *Bijaje* and is reputed in the preparation of arrow poison; in the Katagum district it is known as *Wa* and the fruit is said to be edible.

140. *F. mittuensis*, Warb. in Warb. & De Wild. *Fic. Fl. Congo*, 3. Branchlets fairly stout, about 4 lin. in diam. near the apex, covered with smooth reddish glabrous bark, subterete when dry. Leaves very broadly ovate or suborbicular, cordate at the base

forming a narrow sinus, rounded and sometimes slightly emarginate at the apex, 5-6 in. long, $4\frac{1}{2}$ - $5\frac{3}{4}$ in. broad, entire, thinly chartaceous, dull and glabrous on both surfaces, 9-nerved at the base; midrib flat above, fairly prominent below, about 1 lin. broad at the base, gradually narrowed to the apex, bifurcate about $\frac{3}{4}$ in. from the top; lateral nerves about 4 on each side, diverging from the midrib at an angle of about 45° , bifurcate about 1 in. from the margin, looped, flat above, prominent below; principal tertiary nerves rather lax and slender, reticulate; veins forming a very close network below, whitish, slightly impressed above; petiole $2\frac{1}{4}$ -3 in. long, about 2 lin. thick in the middle, slightly thickened towards the base, glabrous, finely grooved when dry; stipules deciduous, not seen. Receptacles pedunculate, in axillary fascicles, 3-4 in a fascicle, stipitate, obovoid or ellipsoid, prominently umbonate, 6-7 lin. long, 4-5 lin. in diam., brown and slightly verrucose when dry, glabrous; peduncle 3-6 lin. long, very minutely puberulous; basal bracts reduced to a very minute wavy ring. Ostiolar bracts all pointing into the receptacle, the upper (within the umbilicus) more or less ovate, very acute, the lower linear, subacute, 1 lin. long, membranous, glabrous. Male flowers few, near the ostiole, shortly stalked; perianth-segments 5, ovate-orbicular, rounded at the apex, enveloping the solitary sessile stamen in bud; anther $\frac{1}{3}$ lin. long. Female flowers sessile, scattered amongst the numerous gall-flowers: perianth-segments 2, membranous, oblong, glabrous; ovary ovoid-globose, shining; style lateral, with a narrowly oblong stigma. Gall flowers numerous, pedicellate, overtopping the females; pedicel 1 lin. long, reddish. Scales of the receptacle numerous, subulate-lanceolate, acute, $\frac{3}{4}$ lin. long, membranous, red in the middle.—*F. abutilifolia*, Mildbr. & Burret in Engl. Jahrb. xlv. 214, partly, not of Miq.

Nile Land. Mittu: Mvolo, Schweinfurth, 2842!

Distinguished from *F. abutilifolia*, Miq., with which it has been associated by Mildbraed & Burret, by the strikingly prominent umbilicus of the receptacles and the bifurcate midrib of the leaves.

141. *F. abutilifolia*, Miq. in *Ann. Mus. Lugd.-Bat.* iii. 288, partly. Branchlets stout, about 4 lin. in diam. near the apex, covered with light red bark, longitudinally sulcate when dry, minutely puberulous. Leaves large, broadly ovate-orbicular, deeply cordate, the basal lobes overlapping, very obtusely apiculate, $3\frac{1}{2}$ - $8\frac{1}{2}$ in. long, 3-8 in. broad, entire, chartaceous, dull on both surfaces, glabrous above, softly tomentose below when young, becoming pubescent when mature, 7-9-nerved at the base; midrib nearly flat above, somewhat prominent below, about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to and reaching the apex of the leaf; lateral nerves (excluding the basal ones) 6-8 on each side, spreading from the midrib at an angle of 65° , two or three times branched before approaching the margin, distinct on both surfaces, slightly more prominent

below; petiole 2-4½ in. long, flattened in the same plane as the leaf-blade, about 1½ lin. thick, very finely longitudinally sulcate when dry, glabrous or nearly so; stipules not seen, evidently soon deciduous. Receptacles axillary, probably in pairs, pedunculate, obovoid-ellipsoid, stipitate. 7-8 lin. long including the stipe which is about 2 lin. long, rounded at the apex, glabrous, mottled like the fruit of a *Parinarium*; peduncle 4 lin. long, scarcely ¾ lin. thick, puberulous; basal bracts reduced to an oblique rim or cup, finely puberulous. Ostiolar bracts all pointing into the receptacle, linear-subulate, subacute, about 1 lin. long, with narrowly hyaline margins. Male flowers very few, near the ostiole; perianth-segments 3, membranous, enclosing the solitary sessile anther; anther ½ lin. long. Female flowers scattered amongst the gall flowers, subsessile; perianth-segments 3, acutely triangular, about ½ lin. long, thinly membranous and hyaline; ovary obliquely ellipsoid; style lateral, nearly as long as the ovary, with an oblique stigma. Gall flowers numerous, pedicellate, overtopping the female, distinguished by their much shorter styles. Scales of the receptacle subulate, acute, ¾ lin. long, with hyaline margins.—Mildbr. & Burret in Engl. Jahrb. xlv. 214, partly. *Urostigma abutilifolium*, Miq. in Hook. Lond. Journ. Bot. vi. 551, partly, and Afr. Vrije-Boom. 23, t. iii., partly incl. icon.

Nile Land. Sennar: Fazokl, *Kotschy*, 462!

The specimen collected by Burke at Macalisburg, Transvaal, included in this species by Miquel, is distinct, and has been described by Warburg as *F. soldanella*.

Mildbraed & Burret (l.c.) have reduced *F. mittuensis*, Warb., and *Urostigma catalpafolium*, Miq., to this species; but the former may be separated by its very prominently umbonate receptacles and the wider sinus at the cordate base of the leaf, and the latter species, which in the present work is united with *F. populifolia*, Vahl, by its much smaller rounded and not stipitate receptacles and long-acuminate glabrous leaves.

142. *F. Kerstingii*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 215, in syn. A tree 20 ft. high; young flowering branchlets stout, about 4 lin. in diam. near the tip, glabrous, with reddish bark marked by scattered lenticels. Leaves dark green with red nerves (*Barter*), very broadly ovate or suborbicular, very shortly and obtusely acuminate, deeply cordate, the basal lobes forming an open sinus, 4-6 in. long, 3½-6 in. broad, entire, rigidly chartaceous or subcoriaceous, dull on both surfaces, glabrous, 7-9-nerved at the base, the first and second nerves of these with several descending branches; midrib flat above, prominent below, much narrower than the petiole, about ¾ lin. broad at the base, gradually narrowed to and finally reaching the apex of the leaf; lateral nerves (excluding the basal ones) 4-5 on each side, diverging from the midrib at an angle of about 65°, bifurcate about ¾ in. from the margin, distinct above, prominent below; tertiary nerves rather lax; veins close and rather

faint below; petiole 2-4 in. long, $1\frac{1}{4}$ lin. thick, glabrous or thinly pubescent; stipules deciduous, not seen. Receptacles in axillary fascicles at the tips of the shoots, 2-3 in each fascicle, pedunculate, obovoid, $\frac{1}{2}$ in. long, 5 lin. in diam., rounded at the base with a prominent gaping ostiole about $\frac{3}{4}$ lin. long; peduncles 4 lin. long, $\frac{3}{4}$ lin. thick, glabrous; basal bracts forming a one-sided saucer-shaped involucre closely appressed to the base of the receptacle, nearly $\frac{1}{4}$ in. broad, with undulate margin, glabrous. Ostiolar bracts all pointing into the receptacle, the middle one the longest, linear, obtuse, 2 lin. long, $\frac{2}{3}$ lin. broad, subchartaceous, the others a little shorter and subulate from an ovate base, with membranous margins. Male flowers very few, near the ostiolar bracts, pedicellate; perianth membranous, enclosing the solitary sessile stamen. Female flowers numerous, scattered amongst the gall flowers, sessile; perianth small and membranous. Gall flowers numerous, pedicellate, with nearly sessile stigmas. Scales of the receptacle subulate-lanceolate, acute, $\frac{3}{4}$ lin. long, membranous, glabrous, with a reddish midrib.-*F. abutilifolia*, Mildbr. & Burret in Engl. Jahrb. xlvi. 214, partly, not of Miq.

Upper Guinea. French Guinea: Koulikoro, among rocks, *Chevalier*! Togo: Sasi-bu, near Aledyo, *Kersting*, 125! Northern Nigeria: Nupe, *Barter*, 452! 995! Yola, *Dalziel*, 145!

This species is liable to confusion with *F. mituensis*, Warb.; the shortly acuminate leaves with the midrib continuous to the apex, and the peculiar shield-like unilaterally connate basal bracts, which are closely appressed to the rounded base of the receptacle, are its distinguishing features.

143. *F. Ledermannii*, *Hutchinson in Kew Bulletin*, 1915, 340. A large tree 35-50 ft. high, with a broad crown; young branchlets bearing the figs about $\frac{1}{4}$ in. in diam. near the apex, softly tomentose. Leaves grey-green above, greyish-white below (*Ledermann*), ovate-orbicular, slightly and obtusely acuminate, cordate and with an open sinus at the base, $2\frac{1}{2}$ - $4\frac{1}{2}$ in. long, 2- $4\frac{1}{4}$ in. broad, entire, coriaceous, dull and glabrous on the upper surface and very delicately reticulate, shortly and softly pubescent or almost tomentose below; midrib flat above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered and very slender towards the apex of the blade; lateral nerves about 8 on each side of the midrib, the lower recurved, the others diverging at an angle of about 45° , bifurcate some distance from the margin, prominent below; tertiary nerves wavy, slender, distinct; petiole $1\frac{1}{4}$ - $2\frac{1}{2}$ in. long, shortly and softly pubescent, longitudinally sulcate; stipules caducous, those surrounding the terminal bud ovate-lanceolate, acutely acuminate, $\frac{3}{4}$ in. long, whitish silky-puberulous outside, reddish and glabrous within. Receptacles in axillary pairs, pedunculate, obovoid-ellipsoid, about $\frac{1}{2}$ in. long and nearly as much in diam., mottled, glabrous, smooth when dry; peduncle 3-4 lin. long, terete, about $\frac{1}{2}$ lin. thick, finely and softly puberulous. Basal bracts early deciduous, leaving behind a small

annular pubescent rim. Ostiole prominent, small, 2-lipped; bracts few, all pointing into the receptacle, not visible from the outside, glabrous. Male flowers with a short very stout pedicel; perianth-segments slightly membranous, glabrous. Anther solitary, obtuse. Female flowers sessile: achene subglobose, smooth; style lateral, slender, a little shorter than the achene. Gall flowers pedicellate.—*F. abutilifolia*, Mildbr. & Burret in Engl. Jahrb. xvi. 214, partly, not of Miq

Upper Guinea. Cameroons: Lagdo Mountains, *Ledermann*, 4378!

Allied to *F. mittuensis*, Warb., and *F. discifera*, Warb.; from the former it may be readily distinguished by the softly tomentose young branchlets and under surface of the leaves in which the midrib is continuous to the apex of the blade, and from the latter by its hairiness, its more prominent ostiole, and the shape of the bracteate basal involucre.

144. *F. budduensis*, *Hutchinson in Kew Bulletin*, 1915, 340. A tree 20–30 ft. high; branchlets shortly tomentose when young, at length sparingly pubescent. Leaves ovate or ovate-elliptic, very slightly cordate at the base, rounded at the apex, about 6 in. long and $4\frac{1}{2}$ in. broad, entire, rigidly coriaceous, puberulous on the midrib above, otherwise glabrous, softly tomentose below; midrib flat above, prominent below, about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex; basal nerves 5; lateral nerves about 7 on each side of the midrib, the lower opposite, the upper subalternate, diverging from the midrib at an angle of 45° , bifurcate $\frac{1}{2}$ – $\frac{3}{4}$ in. from the margin, very distinct above, prominent below; tertiary nerves faint, lax, wavy; petiole $1\frac{1}{4}$ – $1\frac{3}{4}$ in. long, softly and rather densely pubescent; stipules caducous, not seen. Receptacles axillary, 2–3 together, pedunculate, globose, about $\frac{3}{4}$ in. in diam., smooth, finely puberulous; peduncles $4\frac{1}{2}$ lin. long, stout, shortly tomentose. Basal bracts soon falling off, connate at the base, shortly tomentose outside. Ostiole 2-lipped, gaping in the dry state, slightly produced; mouth about 1 lin. wide. Bracts numerous, all descending into the receptacle, subequal, linear-subulate, acute, $1\frac{1}{4}$ lin. long, submembranous, glabrous. Male flowers small, subsessile; perianth membranous. Stamen solitary; filament up to $\frac{3}{4}$ lin. long; anther subobtusate, $\frac{1}{3}$ lin. long. Female flowers subsessile; perianth-segments subulate-lanceolate, acutely acuminate, membranous, glabrous. Achene oblong, $\frac{3}{4}$ lin. long, smooth; style nearly as long as the achene, with a very thick oblong-linear stigma.

Nile Land. Uganda: Buddu, 3900 ft., *Dawe*, 234!

Closely allied to *F. vasta*, Forsk., but with larger figs on longer peduncles and less cordate leaves.

145. *F. vasta*, *Forsk. Fl. Ægypt.-Arab.* 179. A huge tree; young branchlets stout, softly and densely tomentose. Leaves large, very broadly ovate or ovate-orbicular, mostly rather deeply cordate

at the base, obtuse or rounded at the apex, the smallest about 3 in. long and broad, the largest 14 in. by 10 in., entire, chartaceous, softly pubescent or nearly tomentose on both surfaces; midrib about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex, flat above, prominent below; principal basal nerves about 5; lateral nerves 6-7 on each side of the midrib, diverging from the midrib at an angle of 45° , the two basal pairs on each side with several side branches, the remainder bifurcate $\frac{1}{2}$ -1 in. from the margin, slightly raised on the upper surface, prominent below; tertiary nerves faint and wavy but distinct on both surfaces; petiole up to $4\frac{1}{2}$ in. long, but probably sometimes much longer, tomentose or densely pubescent; stipules deciduous, those enclosing the terminal bud obliquely lanceolate, acutely acuminate, $1\frac{1}{2}$ - $3\frac{1}{4}$ in. long, thinly chartaceous or almost membranous, villous-tomentose outside, glabrous, striate and reddish within. Receptacles axillary, 2-3 together, very shortly pedunculate, subglobose, about $\frac{1}{2}$ in. in diam., pubescent, with a gaping 2-lipped glabrous ostiole; peduncle 1 lin. long or less, stout, tomentose. Basal bracts connate at the base, soon falling away and leaving an orbicular tomentose portion. Ostiole $\frac{3}{4}$ lin. long, slightly oblique, glabrous. Bracts all descending into the receptacle, the middle two much larger than the others, oblong and rounded at the apex or subulate-lanceolate and acute, 2 lin. long, rather fleshy, glabrous. Male flowers few, pedicellate; perianth very membranous. Stamen solitary; filament very short; anther $\frac{3}{4}$ lin. long. Female flowers sessile; perianth reaching to and enclosing the lower part of the style; achene smooth; style slender, a little longer than the achene, with a thickened stigma. Gall flowers pedicellate, with a short sessile stigma. Receptacular scales subulate, 1 lin. long, membranous.—Mildbr. & Burret in Engl. Jahrb. xlv. 216, partly. *F. socotrana*, Balf. f. in Proc. Roy. Soc. Edinb. xii. 96. *F. callabatensis*, Warb. in Engl. Jahrb. xxxvi. 210. *F. Riva*, Warb. l.c. 211. *F. hararensis*, Warb. l.c. 212.

Nile Land. Nubia: between Suakin and Berber, at Chor Harrassa, Schweinfurth, 223! Eritrea: Lalambo, Schweinfurth, 1806! valley of the Dégerra, at Saganeiti, Schweinfurth & Riva, 1240! Abyssinia: Outhan, Schimper, 1140! Galabat: on the Chor River, Schweinfurth, 556! 557! Somaliland: hills above Upper Sheikh, Lort Phillips! Smith River, Donaldson Smith, 64! Jacorsa, Riva, 230! Harar, Robecchi Bricchetti, 156! 162! Galla highlands; near Walengo, Ellenbeck, 1299a! Niammiam: Makporru Hill, Schweinfurth, 136!

Var. *glabrescens*, Hutchinson. Mature leaves glabrous or nearly so below.

Nile Land. Eritrea: near Ginda, Schweinfurth & Riva, 129! 259! Saganeiti, Schweinfurth & Riva, 1320! Keren, Beccari, 282! Abyssinia: Adowa, Schimper, 693!

The species occurs also in Arabia and Socotra.

146. *F. congensis*, Engl. in Engl. Jahrb. viii. 59. A large tree; branchlets puberulous, with rather long internodes, longitudinally

ribbed when dry. Leaves broadly ovate, obtuse, shortly cordate at the base, 5–8 in. long, $3\frac{3}{4}$ – $6\frac{1}{2}$ in. broad, entire, coriaceous, glabrous on the upper surface, sometimes very finely tuberculate, at first softly tomentose, at length softly pubescent with rather short whitish hairs below, 5-nerved at the base, remaining lateral nerves about 8 on each side of the midrib, diverging at an angle of about 45° , bifurcate about $\frac{1}{2}$ in. from the margin, distinct on both surfaces, somewhat prominent below; tertiary nerves wavy, somewhat lax, distinct below; petiole $1\frac{1}{4}$ – $3\frac{1}{2}$ in. long, 1–2 lin. in diam., glabrous; stipules narrowly lanceolate, acutely acuminate, $1\frac{1}{4}$ – $2\frac{1}{2}$ in. long, 3–4 lin. broad, thinly chartaceous, glabrous, reddish-brown when dry. Receptacles axillary, geminate, pedunculate, globose, about 4 lin. in diam., glabrous; peduncle $\frac{1}{4}$ in. long, minutely puberulous. Basal bracts 2, connate at the base, broadly ovate, rounded, finely puberulous outside, membranous towards the margin. Ostiole slightly protruding, 2-lipped; bracts all descending vertically into the receptacle, glabrous. Male flowers subsessile, with membranous glabrous perianth-segments and a solitary stamen. Female flowers subsessile; achene obovoid, with a slender lateral style and filiform stigma.—Mildbr. & Burret in Engl. Jahrb. xlv. 211; De Wild. in Bull. Soc. Bot. Belg. lii. 203. *F. flavovenia*, Warb. in Engl. Jahrb. xx. 158.

Upper Guinea. Togo: Basari, *Kersting*, 336! Ikeburg, *Kersting*, 76! Tamberma, *Kersting*, A. 544! Northern Nigeria: Katagum district, *Dalziel*, 349! Cameroons: Babessi, *Ledermann*, 1978! Bakari, *Ledermann*, 2273! Garua, *Ledermann*, 4666!

Nile Land. Dar Fertit: at the Gudyu, *Schweinfurth*, 156! Bahr el Ghazal; between Tong and Wau, *Brown*. Bongo: Gir, *Schweinfurth*, 1508!

Lower Guinea. Lower Congo: Matadi, *Laurent*! without precise locality, *Gillet*! *Smith*!

South Central. Belgian Congo: Ponta da Lenha, *Naumann*, 223! near Malcla, *Devèvre*, 176! Lusambo, *Laurent*! Mayumbe, *Laurent*! Lake Foa, *Sapin*! Golongo, *Lescauwact*, 411! Vankerkhovenville, *Seret*, 561!

Var. *mollis*, Hutchinson. Mature receptacles softly pubescent.—*F. mollifolia*, Warb. ex Mildbr. & Burret in Engl. Jahrb. xlv. 211, name only.

Upper Guinea. French Guinea: Middle Niger; Dia, *Chevalier*! Upper Niger; Nono, near Kouroussa, *Chevalier*, 430! Northern Nigeria: Katagum district, *Dalziel*, 350! Cameroons: Bakari, *Ledermann*, 2518! Garua, *Ledermann*, 3403!

North Central. Shari district: Ndelle, *Chevalier*, 6948! Kago Bongolo, *Chevalier*, 7253!

South Central. Belgian Congo: Lunda-Kassai district; bank of Luschiko River, *Buchner*, 560!

Ledermann, 1978, from the Cameroons, is somewhat intermediate between true *congensis* and var. *mollis*; the receptacles are rather young, however, and many of them are already nearly glabrous.

147. *F. discifera*, Warb. in Engl. Jahrb. xxxvi. 210. Medium-sized or rather large tree; branchlets stout, terete, nearly $\frac{1}{2}$ in. thick about 1 in. from the apex, glabrous; leaf-scars orbicular or horse-shoe shaped, 2–3 lin. in diam. Leaves very broadly ovate or sub-

orbicular, very shortly and obtusely acuminate, deeply cordate at the base, 4-8 in. long, 3-6½ in. broad, entire, 9-nerved at the base, basal nerves with several branches on the lower side; midrib flat above, prominent below, ¾-1 lin. broad at the base, gradually narrowed and continued to the apex of the blade; remaining lateral nerves 6-7 on each side, distinct above, prominent below, diverging from the midrib at an angle of about 75°, bifurcate ½-¾ in. from the margin, looped, with a semicircular nerve connecting the loops; tertiary nerves rather lax, prominent and zigzag below, veins light-coloured and forming a distinct close network below; petiole 1¼-3½ in. long, nearly 2 lin. thick at the base, subterete, glabrous; stipules deciduous, present only at the tips of the young shoots, lanceolate, acuminate, about 4½ lin. long, coriaceous, glabrous. Receptacles probably axillary near the ends of the shoots, pedunculate, slightly depressed-globose, rounded at both ends, 5-7 lin. in diam., glabrous, ostiole not or only slightly prominent; peduncle 2-3 lin. long, rather stout, very minutely puberulous; basal bracts connate into an oblique saucer-shaped involucre closely appressed to the receptacle, with undulate or crenulate margin. Ostiolar bracts all facing vertically into the receptacle, of two kinds, the middle two much larger than the others, linear-oblong, obtuse, 2 lin. long, ¾ lin. broad, coriaceous, glabrous, the remainder ovate-lanceolate, subacutely acuminate, 1-1¼ lin. long, reddish with membranous hyaline margins. Male flowers few, near the ostiolar bracts, pedicellate; pedicels stout, ⅔ lin. long, red, glabrous; perianth-segments 3, linear-lanceolate, acute, glabrous, membranous; stamen 1; filament ½ lin. long; anther ⅓ lin. long. Female flowers sessile, scattered amongst the gall flowers; perianth-segments 3, linear, acute, reddish, with membranous hyaline margins; ovary obliquely ellipsoid, shining; style shorter than the ovary, with a large 2-lobed stigma. Gall flowers numerous, pedicellate; pedicel ¾ lin. long, stout; perianth-segments 4, oblong, obtuse, membranous.—Mildbr. & Burret in Engl. Jahrb. xlv. 215.

Upper Guinea. Northern Nigeria: Katagum district, *Dalziel*, 330!

Nile Land. Nubia: Gebel Daier, *Broun*, 879! Upper Nile: on the Gebel Arrang, between Gedarif and Abu Harras, *Schweinfurth*, 548! Uganda: Entebbe, *Dawe*, 938!

Dawe's specimen consists of shoot and leaves only, but it appears to be specifically the same as that gathered by *Broun*.

According to *Dalziel* the vernacular name in N. Nigeria is "Wa" and the fruit is edible.

148. *F. platyphylla*, *Del. Cent. Pl. Meroë*, 62. A large tree with smooth light brown bark; branchlets very stout, minutely puberulous. Leaves broadly elliptic or slightly pandurate, rather deeply cordate at the base, rounded at the apex, 5½-10 in. long, 3½-8 in. broad, entire, rigidly chartaceous, glabrous above, very minutely puberulous below, 5-9-nerved at the base, remaining lateral nerves

8-9 on each side, bifurcate some distance from the margin, looped, diverging from the midrib at an angle of about 75° , flat but distinct above, prominent below; tertiary nerves parallel, fairly close, spreading from the lateral nerves at right angles, rather slender; veins very fine and close, visible only on the lower surface; midrib flat above, very prominent below, about 2 lin. broad at the base, gradually narrowed to and bifurcate near the apex of the leaf; petiole 3-5 in. long, $1\frac{1}{2}$ -3 lin. thick, shortly and softly pubescent; stipules deciduous, coriaceous, triangular, 4 lin. long, about 3 lin. broad, softly tomentose outside. Receptacles axillary, 2-3 together, pedunculate, subglobose, about 5 lin. in diam., densely pilose or glabrous and then often warted; peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in. long, densely pubescent; basal bracts 2, connate at the base, ovate, about $1\frac{1}{4}$ lin. long, membranous towards the margin, puberulous. Ostiolar bracts all descending, linear, obtuse, $1\frac{1}{4}$ - $1\frac{3}{4}$ lin. long, $\frac{1}{3}$ lin. broad, membranous, glabrous. Male flowers few, near the ostiole, with a very short thick stalk; perianth membranous, enclosing the solitary sessile stamen. Gall flowers numerous, pedicellate. Female flowers shortly stalked; perianth-segments ovate-lanceolate, subacute, $\frac{1}{2}$ lin. long, membranous, glabrous; ovary obovoid, $\frac{3}{4}$ lin. long, glabrous; style lateral, inserted between the middle and the top of the ovary; stigma rather thick, oblong.—Mildbr. & Burret in Engl. Jahrb. xvi. 212. *F. kotschyana*, Miq. in Ann. Mus. Bot. Lugd.-Bat. iii. 288; T. Thoms. in Speke, Nile Journ. Append. 647; Oliv. in Trans. Linn. Soc. xxix. 149. *F. lateralis*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 5. *F. umbrosa*, Warb. ex Mildbr. & Burret, l.c., name only. *Urostigma kotschyianum*, Miq. in Hook. Lond. Journ. Bot. vi. 553, and Afr. Vijke-Boom. 27, t. iv. B.

Upper Guinea. Senegambia: forests of Bafing River, *Lécard*, 191! between Mopti and Djenne, *Chevalier*! Gambia: banks of the Gambia River near Sukuta Village, *Denton*! Gold Coast: Shai Plains; Agomeda, *Johnson*, 522! Togo: Kete Kratschi, *Zech*, 340! 342! Sokode, *Kersting*, 25! Basari, *Kersting*, 417! Kirikiri, *Kersting*, 54! Northern Nigeria: Katagum district, *Dalziel*, 214! Bornu, *Vogel*, 73! Yoruba, *Dudgeon*, 65! and without precise locality, *Yates*, 8! Cameroons: Adamaua; Garua, *Ledermann*, 3282! Dodo, *Ledermann*, 2914!

Nile Land. Nubia: Meroe, *Cailliaud*. Sudan: Kordofan; Jebel Ghulfan, *Brown*, 1317! Bahr el Ghazal, *Chaltin*! Sennar: Fazokl, *Kotschy*, 527! Mount Tira, *Kotschy*, 407! Dinka: near Tekk, *Schweinfurth*, 1309! Sobat River, near Amot, *Muriel*, 102! Jur: Ghattas Seriba, *Schweinfurth*, 1288! 1328! 2124! 138! Mittu: Kaffulukku, on the Gulu River, *Schweinfurth*, 2811! Uganda: Madi, *Speke & Grant*, 636! expedition to the source of the White Nile, without further locality, *D'Arnauld*! *Sabatier*!

Rubber is obtained from this species on the West Coast.

49. *F. zambesiaca*, *Hutchinson in Kew Bulletin*, 1915, 341. A tree 70-80 ft. high, 24 ft. in girth at 5 ft. from the ground (*Scott*); branchlets stout, with rather short internodes, velvety-tomentose when young. Leaves oblong or oblong-elliptic, shortly cordate at the base, obtuse at the apex, 3-8 in. long, $1\frac{1}{2}$ - $3\frac{1}{2}$ in. broad, entire, rigidly

chartaceous, pubescent on both surfaces mostly on the midrib and lateral nerves; midrib slightly immersed above, very prominent and pilose below, $1\frac{1}{4}$ –2 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 8–11 on each side of the midrib, diverging from it at an angle of 45° , distinct on both surfaces, prominent below, looped near the margin; tertiary nerves slender, much branched, lax, prominent below; veins inconspicuous and finely reticulate below; petiole $\frac{3}{4}$ –2 in. long, pilose; stipules caducous, small, glabrous or nearly so. Receptacles axillary towards the base of the young shoots, pedunculate, obovoid-globose, $\frac{3}{4}$ –1 in. in diam., tomentose; peduncle $\frac{1}{2}$ –1 in. long, densely pubescent. Basal bracts deciduous, connate at the base into an irregular unilateral persistent ring. Ostiole slightly produced, 2-lipped, glabrous, with the bracts all descending into the receptacle; they and the flowers in the specimen examined not in a fit state for description.

Mozamb. Distr. Nyasaland: Shire Valley at Katunga, *Scott*! Portuguese East Africa: Lower Zambesi; opposite Sena, *Kirk*, 7! Shupanga, *Kirk*, 6!

150. *F. recurvata*, *De Wild. in Fedde, Repert.* xii. 200. A tree; branchlets $\frac{2}{3}$ in. in diam., glabrous. Leaves oblong-elliptic or oblong-obovate, very shortly and obtusely acuminate, rounded or slightly cordate at the base, 8–9 in. long, 4–5 in. broad, entire, coriaceous, glabrous above, pilose on the midrib and lateral nerves below; lateral nerves about 13 on each side of the midrib, diverging from it at an angle of 45° , looped near the margin; petiole about $3\frac{1}{2}$ in. long, stout, pilose; stipules caducous. Receptacles axillary and crowded at the ends of the branches, pedunculate, globose, 1 in. in diam., warted when dry, otherwise glabrous; peduncle 1– $1\frac{1}{4}$ in. long, fairly stout, recurved, glabrous. Basal bracts caducous, papery, connate at the base. Ostiole pore-like; bracts all descending into the receptacle, the middle ones larger than the others, glabrous. Male flowers pedicellate; stamen solitary. Female flowers sessile.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 224.

South Central. Belgian Congo: Eala, *Laurent*, 804!

151. *F. tettensis*, *Hutchinson in Kew Bulletin.* 1915, 341. Young branches divaricate, densely tomentose, with very short internodes. Leaves subreniform or transversely oblong-elliptic, cordate at the base, 1– $1\frac{1}{2}$ in. long, 1– $2\frac{1}{4}$ in. broad, entire or with undulate-crenate margins, rigidly coriaceous, softly tomentose on both surfaces, prominently 5–7-nerved at the base, remaining lateral nerves about 3 on each side of the midrib, diverging from it at an angle of 45 – 60° , distinct on both surfaces, more prominent below, bifurcate some distance from the margin; veins finely reticulate beneath the indumentum; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, terete, $\frac{3}{4}$ –1 lin. thick, densely pubescent; stipules caducous, those surrounding the terminal bud

broadly ovate, $\frac{1}{4}$ in. long, the outer whitish-pilose. Receptacles all detached in the solitary specimen examined but probably borne in the axils of fallen leaves just below the young annual shoots, pedunculate, slightly depressed-globose, just over $\frac{1}{2}$ in. in diam., densely and softly pilose-tomentose with whitish hairs; peduncle 3-5 lin. long, about $\frac{3}{4}$ lin. thick, densely whitish-pubescent. Basal bracts deciduous, membranous towards the margin, leaving a pubescent disc-like body closely appressed to the receptacle. Ostiole small and inconspicuous; bracts few, all pointing into the receptacle. Male flowers shortly pedicellate: perianth-segments ovate-lanceolate, subacute, glabrous. Stamen solitary; filament short and stout; anther ovoid. Female flowers sessile; achene ovoid, with rather slender style and large stigma. Gall flowers pedicellate.

Mozamb. Distr. Portuguese East Africa: Lower Zambesi; Tete, *Kirk*!

152. *F. Ruspolii*, *Warb. in Engl. Jahrb.* xxxvi. 211. Branches terete, sparingly whitish-pilose when young, $1\frac{1}{2}$ lin. thick. Leaves linear-oblong-lanceolate, gradually and obtusely acuminate, rounded at the base, $2\frac{1}{4}$ -4 in. long, $\frac{3}{4}$ - $1\frac{1}{4}$ in. broad, entire, chartaceous, light brown when dry, dull on both surfaces, glabrous or very slightly pubescent towards the base of the midrib above, rather densely pilose with reddish spreading hairs on the midrib below, otherwise very minutely and sparingly pubescent or nearly glabrous; midrib flat or very shallowly impressed above, prominent below, slightly narrowed towards and finally reaching the apex of the blade; lateral nerves 9-10 on each side of the midrib, diverging from it at an angle of about 75° , looped, the loops forming a coarsely crenate intramarginal nerve $\frac{1}{2}$ -1 lin. from the margin; veins fairly close and prominent below; petiole $\frac{2}{3}$ - $\frac{3}{4}$ in. long, $\frac{1}{3}$ lin. thick, reddish pubescent; stipules deciduous, linear. Receptacles axillary, in pairs, pedunculate, globose, scarcely 2 lin. in diam., minutely pubescent; peduncle $1\frac{1}{4}$ mm. long, puberulous. Basal bracts 2, connate at the base, puberulous on the outside. Ostiole minute and not prominent; bracts not visible from the outside, all descending into the receptacle, oblong, with membranous margins, glabrous. Male flowers not seen. Female sessile: perianth-segments obovate-oblancheolate, obtuse, reddish, with membranous margins. Achene (young) ellipsoid, smooth; style shorter than the achene, with a thick stigma.—*Mildbr. & Burret in Engl. Jahrb.* xlvi. 261.

Nile Land. Somaliland: Galla Highlands; Ciaffa, Boran Uata, *Ruspoli & Riva*, 526!

Remarkably distinct on account of the narrowly oblong-lanceolate leaves and extremely small receptacles.

153. *F. cyphocarpa*, *Mildbr. in Engl. Jahrb.* xlvi. 261. A large epiphytic shrub; branchlets slender, glabrous or sparingly and

obscurely pilose when young. Leaves lanceolate or oblanceolate, gradually and obtusely acuminate, narrowed to an obtuse base, $2\frac{1}{2}$ –4 in. long, $\frac{3}{4}$ – $1\frac{1}{3}$ in. broad, entire, almost membranous, dull on both surfaces, glabrous above, pubescent on the lower half of the midrib beneath; midrib flat above, prominent below, gradually tapered to the apex of the blade; lateral nerves 10–15 on each side of the midrib, diverging from it at an angle of about 75° , very slender, distinct on both surfaces; tertiary nerves following the direction of the lateral, considerably less distinct below; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, slender, thinly pubescent or nearly glabrous; stipules deciduous, those surrounding the terminal bud lanceolate, subacute, about 2 lin. long, ciliate. Receptacles axillary, very shortly pedunculate, globose, stipitate, about 4 lin. in diam., coarsely and obtusely warted, glabrous; stipe about 1 lin. long. Basal bracts 2, very small and soon deciduous. Ostiole small and 2-lipped; bracts not visible from the outside, all descending into the receptacle, glabrous. Male flowers with a solitary stamen.

South Central. Belgian Congo: Ituri district; Fort Beni, in the forest near Muera, *Mildbraed*, 2392!

154. *F. rhodesiaca*, *Warb. ex Mildbr. & Burret in Engl. Jahrb.* xlv. 254. A tree 20–27 ft. high; branchlets subterete, grooved, the young parts densely villous with dull brown hairs. Leaves oblong or almost elliptic, very shortly acuminate or obtuse at the apex, rounded at the base, 2– $2\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. broad, entire, chartaceous, softly pubescent on both surfaces especially on the midrib; midrib nearly equally prominent on both surfaces, extending to the apex of the blade, about $\frac{3}{4}$ lin. broad at the base; lateral nerves 6–7 on each side of the midrib, diverging from it at an angle of 45° , straight until looped about $1\frac{1}{4}$ lin. from the margin, prominent on both surfaces; tertiary nerves rather lax and much branched, prominent below; venation rather faint; petiole about 4 lin. long, terete, $\frac{3}{8}$ lin. thick, densely rusty hairy; stipules persistent for a short time on the young sterile shoots, lanceolate, subobtuse, $\frac{1}{2}$ – $\frac{1}{2}$ in. long, membranous, pubescent near the midrib on the outside. Receptacles numerous, in axillary pairs, pedunculate, more or less pendulous, globose, 4–5 lin. in diam., finely pubescent especially towards the base; peduncle 3–4 lin. long, rather stout, rusty-tomentose. Basal bracts 2, connate into a disc-like body at the base, ovate, obtuse, $1\frac{1}{4}$ lin. long, shortly and densely hairy outside. Ostiole 2-lipped; orifice $\frac{1}{3}$ lin. broad; bracts all descending into the receptacle, the two nearest the mouth broader and thicker than the others, oblong-lanceolate, obtuse, $1\frac{1}{3}$ lin. long, glabrous, the others more acute and slightly membranous. Male flowers few, pedicellate; perianth-segments 3, ovate, obtuse, glabrous. Stamen solitary; anther oblong, obtuse. Female flowers: perianth-segments

elliptic, rounded at the apex, glabrous. Achene rounded, smooth; style slender.

Mozamb. Distr. South Rhodesia: Salisbury, on stony hills, *Engler*, 3060! Buluwayo, *Kolbe*, 4140!

155. *F. Burkei*, *Miq. in Ann. Mus. Bot. Lugd.-Bat.* iii. 289. A tree; young branchlets shortly pubescent or almost tomentose. Leaves elliptic or elliptic-oblongeolate, rounded or slightly and obtusely pointed at the apex, rounded at or slightly narrowed to an obtuse base, $1\frac{1}{2}$ – $4\frac{1}{2}$ in. long, $\frac{3}{4}$ –2 in. broad, rigidly chartaceous, glabrous and dull on both surfaces, sometimes finely pustulate above; lateral nerves 6–8 on each side of the midrib, straight or curved, looped within the margin, distinct on both surfaces, more prominent below; tertiary nerves and veins usually nearly as prominent as the principal lateral ones, more or less straw-coloured; petiole up to $1\frac{1}{2}$ in. long, glabrous; stipules caducous. Receptacles axillary, paired or solitary, pedunculate, globose or ovoid-globose, 4–5 lin. long, brownish-pubescent when dry, sometimes woolly-pubescent; peduncle 1– $2\frac{1}{2}$ lin. long, shortly pubescent. Basal bracts caducous, pubescent. Ostiole pore-like, protruded, with the bracts descending vertically into the receptacle, glabrous. Male flowers with a membranous glabrous perianth and a single stamen. Female flowers sessile; style slender. Gall flowers stalked.—*Mildbr. & Burret in Engl. Jahrb.* xlvi. 262. *Ficus Erics-Rosenii*, R. E. Fries in *Wiss. Ergeb. Schwed. Rhod.-Kongo-Exped.* i. 15, fig. 1. *Urostigma Burkei*, *Miq. in Hook. Lond. Journ. Bot.* vi. 555.

Mozamb. Distr. Rhodesia: Victoria Falls, in the Rain Forest, *Fries*, 30! *Monro*, 401! *Flanagan*, 3303! Matopo Hills, *Miss Gibbs*, 60! Buluwayo, *Kolbe*, 4090! Gazaland: Chikore Forest, *Swynnerton*, 1001!

Occurs also in the Transvaal.

156. *F. spragueana*, *Mildbr. & Burret in Engl. Jahrb.* xlvi. 253. Young branchlets rather stout, shortly tomentose or pubescent. Leaves oblong or oblong-elliptic, rounded or shortly and acuminately rounded at the base, 2–3 in. long, 1 – $1\frac{1}{2}$ in. broad, entire, chartaceous, glabrous and dull on both surfaces, somewhat prominently reticulate below; midrib flat above, prominent below, nearly 1 lin. broad at the base, gradually tapered to the apex; lateral nerves 9–13 on each side, with nearly as prominent parallel tertiary nerves between, looped about 1 lin. from the margin, distinct above, prominent below; veins forming wavy lines between the nerves, nearly invisible above, slightly prominent below; petiole $\frac{3}{4}$ –1 in. long, rather narrowly channelled above, nearly $\frac{3}{4}$ lin. broad, glabrous; stipules caducous, linear-lanceolate, hairy. Receptacles axillary, shortly pedunculate, globose, nearly 4 lin. in diam., densely and softly tawny-tomentose; peduncle up to 2 lin. long, softly tomentose. Basal bracts 3, small, ovate, pubescent. Ostiole 2-lipped,

inconspicuous; bracts all descending into the receptacle, few, broadly ovate, glabrous. Male flowers shortly pedicellate; perianth-segments membranous, enveloping the solitary anther. Female flowers sessile; perianth-segments 3, ovate, acute, membranous, glabrous. Achene ovoid, $\frac{1}{3}$ lin. long, smooth; style slender, slightly thickened towards the stigma, $\frac{2}{3}$ lin. long. Gall flowers pedicellate.

Upper Guinea. Northern Nigeria: North Bornu; banks of the Komadugu Waube, near Geidam. *Elliott*, 133!

157. *F. iteophylla*, *Miq. in Ann. Mus. Bot. Lugd.-Bat.* iii. 218. An epiphyte (*Broun*) or a tree; young branchlets rather slender, slightly pubescent or almost glabrous, angular. Leaves oblanceolate, obtuse or shortly acuminate, attenuated to an obtuse or subacute base, $1\frac{1}{2}$ –4 in. long, $\frac{1}{2}$ – $1\frac{1}{3}$ in. broad, entire, rigidly chartaceous, dull below, slightly shining above, glabrous; midrib flat above, prominent below, gradually tapered to the apex; lateral nerves 6–10 on each side of the midrib, diverging from it at an angle of 45°, conspicuous on both surfaces, prominent below, very slender, looped close to the margin; tertiary nerves little less conspicuous than the lateral and following their direction, sometimes slightly impressed on the upper surface; venation close and distinct on the lower surface; petiole slender, $\frac{3}{4}$ – $1\frac{3}{4}$ in. long, glabrous, light straw-coloured when dry; stipules deciduous, those around the terminal bud lanceolate or ovate-lanceolate, acute, about 2 lin. long, glabrous or nearly so. Receptacles axillary, crowded on the young shoots, pedunculate, globose or ovoid-globose, 4–6 lin. in diam., tomentose; peduncle 2– $2\frac{1}{2}$ lin. long, sparingly tomentose. Basal bracts 2, soon falling off, leaving a rounded flat base, puberulous on the outside. Ostiole 2-lipped, sometimes rather protruded, with none of the bracts visible from the outside; ostiolar bracts few, all descending into the receptacle, shortly subulate from a broad ovate-triangular base, submembranous, glabrous. Male flowers with 3 obtuse perianth-segments and a solitary stamen (*Warburg*). Female flower sessile: perianth similar to the male. Achene rounded, smooth; style very slender, about as long as the achene, with a small stigma.—*Mildbr. & Burret in Engl. Jahrb.* xlvi. 262. *F. bongoensis*, *Warb. in Engl. Jahrb.* xx. 166; *Mildbr. & Burret, l.c.* 256. *F. persicifolia*, vars. *depressa*, *longipes*, and *pubicarpa*, *Warb. ex Mildbr. & Burret, l.c.* 257, names only.

Upper Guinea. Senegal: Cayor, *Leprieur*! and without precise locality, *Perrottet*, 917! Northern Nigeria: Katagum district, *Dalziel*, 216! Sokoto, *Dalziel*, 398!

North Central. Baguirmi; near Mossenia, *Chevalier*, 9667! Niellims, Central Chari, *Chevalier*, 8522! Koufo, *Chevalier*, 8733!

Nile Land. Kordofan: Honira, near Kadugh, *Broun*, 1349! Jur: Ghattas' Seriba, *Schweinfurth*, 1509!

According to *Dalziel* this plant furnishes food for goats.

158. *F. depauperata*, *Sim, For. Fl. Port. E. Afr.* 98, t. xc. fig. B. Branchlets twiggy, slender, very minutely puberulous. Leaves oblanceolate, rounded at the apex, gradually narrowed to the base, 1-1½ in. long, 4-7 lin. broad, entire, thinly chartaceous, glabrous and dull on both surfaces; midrib slightly prominent on both surfaces, not continued quite to the apex of the blade; lateral nerves about 5 on each side of the midrib, visible on the upper surface, very numerous and more or less flabellate below, prominent; petiole slender, 2-3 lin. long, glabrous; stipules early deciduous. Receptacles in axillary pairs, pedunculate, globose, 2 lin. in diam., laxly reticulate when dry, glabrous; peduncle 1-1¼ lin. long, slender, softly puberulous. Basal bracts 3, persistent, broadly ovate, rounded at the apex, ½ lin. long, coriaceous, minutely puberulous outside. Ostiole depressed, wrinkled outside, 2-lipped; bracts all descending, the two nearest the ostiole longer than the others, linear, the others subulate, glabrous. Male flowers small, sessile; perianth-segments reddish, with membranous margins. Anther solitary, subsessile. Female flowers slightly larger than the male; style scarcely exerted, several stigmas often cohering.

Nile Land. British East Africa: between Mombasa and Witu, *Whyte!*

Mozamb. Distr. German East Africa: without precise locality, *Holtz, 2513!*

Occurs also in extra-tropical Portuguese East Africa.

159. *F. pseudomangifera*, *Hutchinson in Kew Bulletin*, 1915, 342. A large tree with almost globose crown; branches reaching down to the ground; young branchlets coarsely sulcate or angular, softly puberulous. Leaves oblong or oblong-elliptic, shortly and subacutely acuminate, obtuse or slightly rounded at the base, 3-6 in. long, 1-2 in. broad, entire, coriaceous, glabrous; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves 8-12 on each side of the midrib, diverging from it at an angle of 45°, slightly arcuate, looped near the margin, distinct on each surface, slightly more prominent below; tertiary nerves little less prominent than the lateral and following their direction, slightly prominent below, veins rather close and distinct below; petiole ½-1 in. long, about 1¼ lin. thick, glabrous; stipules deciduous, ovate-lanceolate, acuminate, 3 lin. long, appressed-villous on the outside. Receptacles axillary, solitary, pedunculate, subglobose, about 3½ lin. in diam., glabrous; peduncle stout, 1½ lin. long, tomentose. Basal bracts 2, rounded, membranous, glabrous. Ostiole 2-lipped, prominent; bracts all descending vertically into the receptacle, the two nearest the orifice larger and more fleshy than the others, linear-oblong, obtuse, 1-½ lin. long, the others subulate-lanceolate, all glabrous. Male flowers not seen, but no doubt with only one stamen. Female flowers sessile, their styles united. Gall flowers pedicellate.—*F. ottoniaefolia*, *Mildbr. & Burret in Engl. Jahrb.* xlvi. 232, excl. *Vogel, 176*, not of *Miq.*

Upper Guinea. Sierra Leone: near Sasseni. *Scott Elliot*, 4499! Liberia: Gola, *Bunting*, 13! Mano River, below Jai, *Bunting*!

Mozamb. Distr. German East Africa: Wau Island, in Lake Kivu. *Mildbræd*, 1145!

South Central. Belgian Congo: west shore of Lake Albert Edward, *Mildbræd*, 1967!

160. *F. mangiferoides*, *Hutchinson in Kew Bulletin*, 1915, 342. Branchlets fairly stout, angular and prominently marked with blackish lenticels when dry, slightly pubescent when young, at length glabrous. Leaves oblong or oblong-lanceolate, gradually and rather obtusely acuminate, rounded or slightly cordate at the base, $5\frac{1}{2}$ –12 in. long, $1\frac{1}{2}$ – $3\frac{1}{4}$ in. broad, entire, coriaceous, dull and glabrous on both surfaces or slightly shining above; midrib flat above, prominent below, $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the blade; lateral nerves numerous, 15–20 on each side of the midrib, diverging from it almost at right angles, slender, distinct on both surfaces, looped about $1\frac{1}{2}$ lin. from the margin; tertiary nerves only slightly less prominent than the lateral and parallel with them, distinct on both surfaces; veins fairly close below; petiole short, $\frac{3}{4}$ –1 in. long, $1\frac{1}{2}$ –2 lin. thick, slightly verrucose, glabrous; stipules caducous, lanceolate, acuminate, $\frac{3}{4}$ in. long, coriaceous, glabrous or nearly so. Receptacles axillary, pedunculate, depressed-globose, about $3\frac{1}{2}$ lin. in diam., slightly verrucose and very sparingly pubescent when dry; peduncle 4 lin. long, slender, glabrous. Basal bracts caducous, persistent at the base, slightly pubescent outside. Ostiole minute and pore-like; bracts all descending into the receptacle, linear-lanceolate, glabrous. Male flowers with a solitary stamen. Female flowers sessile. Gall flowers pedicellate. — *F. Barteri*, *Mildbr. & Burret in Engl. Jahrb.* xlvi, 231, partly, not of Sprague.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1690!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3352, partly!

161. *F. Barteri*, *Sprague in Gard. Chron.* 1903, xxxiii, 354. A small shrub, at first an epiphyte, at length a small self-supporting tree up to 25 ft. high; young branchlets about $\frac{1}{4}$ in. in diam., tinged with purple in a fresh state, glabrous. Leaves elongate-oblong-lanceolate or sometimes almost linear, gradually and acutely acuminate, narrowed and often cuneate at the base, $3\frac{1}{2}$ –14 in. long, $\frac{3}{4}$ – $2\frac{1}{4}$ in. (rarely 3 in.) broad, entire, coriaceous, green above, paler below, mostly with the nerves somewhat straw-coloured when dry, glabrous on both surfaces; midrib impressed above, prominent below, in the larger leaves about $1\frac{1}{4}$ lin. broad at the base, only slightly tapered to the apex, conspicuous and forming a keel to the acumen; lateral nerves numerous, 16–20 on each side of the midrib, diverging from it almost at right angles, slender, looped, the loops forming an

undulate intramarginal nerve 1 lin. distant from the margin; tertiary nerves often only slightly less conspicuous than the secondary and parallel with them; veins delicate and often straw-coloured below; petiole short for the size of the blade, $\frac{1}{2}$ – $1\frac{1}{2}$ (rarely 2) in. long, about 1 lin. thick, glabrous. Receptacles axillary, mostly in pairs, pedunculate, depressed-globose, 5–6 lin. in diam. when ripe, orange-coloured, glabrous; peduncle 4–5 lin. long, about $\frac{3}{4}$ lin. thick, glabrous. Basal bracts soon deciduous, connate at the base, membranous, glabrous. Ostiole pore-like, small, all the bracts descending vertically into the receptacle. Male flowers very few near the ostiole, with a solitary stamen. Female flowers sessile. Gall flowers pedicellate.—Mildbr. & Burret in Engl. Jahrb. xlv. 231, partly; De Wild. in Bull. Soc. Bot. Belg. lii. 200. *F. Laurentii*, Warb. in Warb. & De Wild. Fic. Fl. Congo, 21; Mildbr. & Burret, l.c. 231, partly; De Wild. l.c. 214.

Upper Guinea. Liberia: Sinoe, *Sim*, 10! Grand Bassa, *Dinklage*, 1834! Dahomey: near Zagnanado, *Poisson*, 38! near Sagou, *Poisson*, 23! Southern Nigeria: Onitsa, *Barter*, 294! Eppah, *Barter*, 3311! Bonny, *Kalbreyer*, 79!

Lower Guinea. Spanish Guinea: Uelleburg, *Tessmann*, 440!

South Central. Belgian Congo: Lusambo, *Laurent*! between Niangara and Dungu, *Seret*, 696! Eala, *Pynaert*, 1494! *Laurent*, 765!

Grown at Kew from plants collected at Old Calabar by Mr. J. H. Holland; cultivated also in the Serres coloniales, Lacken, Brussels.

162. *F. cyathistipuloides*, *De Wild. in Fedde, Repert.* xii. 194. Branchlets longitudinally sulcate, glabrous. Leaves oblanceolate, very obtusely and gradually acuminate, narrowed to the base, 3–5 in. long, 1– $1\frac{1}{2}$ in. broad, entire, coriaceous, dull and glabrous on both surfaces; midrib prominent on the lower surface, about 1 lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves about 8 on each side of the midrib, diverging from it at an angle of 45° , looped some distance from the margin, prominent below; tertiary nerves lax and slender, much branched; venation rather close and delicate, fairly evident below; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, about $\frac{3}{4}$ lin. thick, with a narrow V-shaped groove on the upper surface, glabrous; stipules deciduous, short. Receptacles axillary, solitary, pedunculate, globose, about $1\frac{1}{4}$ in. in diam., contracted into a cylindrical stipe about $2\frac{1}{2}$ in. long and $1\frac{1}{4}$ lin. thick, glabrous; peduncle about 4 lin. long and $1\frac{1}{4}$ lin. thick, glabrous. Basal bracts 2, deciduous. Ostiole slightly protruded, 2-lipped; orifice scarcely 1 lin. long. Bracts all descending into the receptacle, those nearest the orifice larger and more fleshy than the others, glabrous. Male flowers pedicellate; perianth-segments linear-lanceolate, acute, $1\frac{3}{4}$ lin. long, membranous, glabrous. Stamen solitary; filament broadly winged; anther-cells distinct, 1 lin. long, connective produced into a mucro above the anther. Female flowers few, sessile.

Style filiform. Gall flowers very numerous, pedicellate.—De Wild. in Bull. Soc. Bot. Belg. lii. 204.

South Central. Belgian Congo : Djongo, *Scriet*, 792 !

163. **F. ardisioides**, *Warb. in Engl. Jahrb.* xx. 171. Branchlets more or less angular, glabrous. Leaves elliptic or oblong elliptic, shortly and obtusely acuminate, obtuse at the base, $2\frac{1}{2}$ – $5\frac{1}{2}$ in. long, 1– $2\frac{1}{2}$ in. broad, entire, with slightly recurved margins, rigidly coriaceous, slightly shining and glabrous on both surfaces, prominently and closely reticulate especially below ; midrib not raised above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex ; lateral nerves about 5 on each side, looped some distance from the margin, distinct on both surfaces, prominent below ; veins forming a close network ; petiole $\frac{1}{4}$ in. to nearly $\frac{3}{4}$ in. long, sulcate, glabrous ; stipules caducous, lanceolate, subobtuse, about 2 lin. long, glabrous, ashy-grey. Receptacles axillary, 2–3 in each cluster, shortly pedunculate, globose, very slightly mammillate, about $\frac{1}{4}$ in. in diam., glabrous ; peduncle 2 lin. long, fairly stout, glabrous. Basal bracts 2, almost free from each other, ovate, obtuse, 1 lin. long and broad, submembranous, glabrous. Ostiole very small, 2-lipped, slightly prominent ; bracts all descending into the receptacle, lanceolate, acute, $\frac{1}{2}$ lin. long, membranous, glabrous. Male and female flowers with 3 perianth-segments. Stamen solitary ; anther obtuse. Style filiform, with an oblique acute stigma.—Mildbr. & Burret in *Engl. Jahrb.* xlv. 233.

South Central. Belgian Congo : Monbuttu ; Munza, *Schweinfurth*, 3352 !

164. **F. Scott-Elliottii**, *Mildbr. & Burret in Engl. Jahrb.* xlv. 234. Branchlets longitudinally sulcate when dry, glabrous. Leaves oblong-elliptic, rounded or very shortly and obtusely acuminate at the apex, acumen $\frac{1}{2}$ – $1\frac{1}{2}$ lin. long, rounded at or slightly narrowed to the base, $3\frac{1}{2}$ –6 in. long, $1\frac{3}{4}$ – $2\frac{1}{2}$ in. broad, entire, rigidly chartaceous, dull and glabrous on both surfaces ; midrib flat above, prominent below, about 1 lin. broad at the base, gradually tapered to the apex of the leaf or sometimes divided below the apex ; lateral nerves 5–6 on each side of the midrib, diverging from it at an angle of 45° – 70° , looped some distance from the margin, prominent but rather slender below and slightly raised above ; tertiary nerves very slender and laxly reticulate below ; veins finely reticulate, inconspicuous ; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, $1\frac{1}{4}$ – $1\frac{1}{2}$ lin. thick, glabrous ; stipules deciduous, lanceolate, obtuse, 5 lin. long, glabrous. Receptacles probably axillary, shortly pedunculate, subglobose, rounded at the base, $\frac{3}{4}$ –1 in. in diam., wrinkling like a dried plum when dry, glabrous ; peduncle 3–4 lin. long, $1\frac{1}{4}$ lin. thick, glabrous. Basal bracts 2, deciduous, ovate-orbicular, about $2\frac{1}{2}$ lin. broad, glabrous, connate at the base into an orbicular plate-like body which persists. Ostiole

slightly protruded, 2-lipped; bracts all descending into the receptacle, glabrous. Male flowers pedicellate; perianth-segments 3; stamen solitary. Female flowers with a slender style. Gall flowers pedicellate.—*F. Chevalieri*, Warb. ex Mildbr. & Burret, l.c. 235, name only.

Upper Guinea. Sierra Leone: Sasseni, *Scott Elliot*, 4522! French Guinea: Casamanze River, *Chevalier*!

165. *F. natalensis*, *Hochst. in Flora*, 1845, 88. A shrub or small tree; branchlets covered with greyish bark, glabrous. Leaves oblanceolate or obovate-oblanceolate, obtusely pointed or rounded at the apex, narrowed to the base, $1\frac{3}{4}$ – $3\frac{1}{4}$ in. long, $\frac{1}{2}$ – $1\frac{1}{4}$ in. broad, entire, chartaceous, glabrous and dull on both surfaces; midrib flat above, prominent below, gradually tapered to the apex of the blade; lateral nerves 8–9 on each side of the midrib, diverging from it at an angle of 45° or less, looped near the margin, prominent but rather slender below; tertiary nerves only slightly less prominent than the lateral and parallel with them; petiole comparatively short, $\frac{1}{3}$ –1 in. long, glabrous; stipules caducous, linear-lanceolate, acuminate, about 2 lin. long, coriaceous, glabrous. Receptacles axillary, mostly in pairs, pedunculate, obovoid-globose, stipitate at the base, about $\frac{1}{2}$ in. long, with a very large smooth ostiolar prominence, the rest wrinkling like a dried plum when dry; peduncle 2– $3\frac{1}{2}$ lin. long, rather slender, glabrous. Basal bracts early caducous, leaving behind the small persistent unilateral base, glabrous. Ostiole small and pore-like; bracts few, all descending into the receptacle, glabrous. Male flowers with a solitary stamen. Female flowers sessile. Gall flowers stalked.—*F. Columbarum*, *Hochst. l.c.*, name only. *F. Volkensii*, Warb. in *Engl. Jahrb.* xx. 167; Hiern in *Cat. Afr. Pl. Welw.* i. 1007; Mildbr. & Burret in *Engl. Jahrb.* xvi. 249. *F. Durbanii*, Warb. in *Viertelj. Naturforsch. Ges. Zürich*, li. 142. *F. chrysocerasus*, Welw. ex Warb. in *Engl. Jahrb.* xx. 167; Hiern in *Cat. Afr. Pl. Welw.* i. 1005. *F. Dekdekena*, Mildbr. & Burret, l.c. 255, partly, not of A. Rich. *F. natalensis*, var. *pedunculata*, Sim, *For. Fl. Port. E. Afr.* 98, t. xc. fig. A.

Upper Guinea. Gold Coast: Kwahu, *Johnson*, 639! near Aburi, *Brown*, 178! Cameroons: New Tegel, *Winkler*, 205! Fernando Po: on the beach, *Mann*, 252!

Nile Land. Uganda: Entebbe, *Dawe*, 108! Buddu; Sango, *Dawe*, 319! 962! Toro; near Mpanga, *Bayshawe*, 1186!

Lower Guinea. Angola: Libongo, in woods, *Welwitsch*, 6357! Golungo Alto: near Sange, *Welwitsch*, 6346!

Mozamb. Distr. Zanzibar, *Sacleux*, 1170! German East Africa: Derema, *Volkens*, 136! *Scheffler*, 115! Amani, *Zimmermann*, 902! 924! 964! *Busse*, 2243! behind Sadani, *Engler*, 1663! Uluguru Mountains, *Stuhlmann*, 8941! *Holtz*, 1270! Mhonda, *Holtz*, 1240! Dar-es-Salaam, *Stuhlmann*, 63a! *Engler*, 2200! Lindi district, *Busse*, 2881! Kibata, *Busse*, 3108! Masailand, *Hollis*! Nyasaland: Upper Shire Valley, *Kirk*, 5!

Occurs also in Natal and extratropical Portuguese East Africa.

According to *Dawe* this species, of which the vernacular name is "*Sango*," is

reputed to yield the best bark-cloth of Uganda, sold amongst the natives at R2 per piece.

Sim (l.c.) figures the receptacles of his var. *pedunculata* as hairy, but on his type specimen (5729) they are quite glabrous.

166. **F. Kirkii**, *Hutchinson in Kew Bulletin*, 1915, 343. A tree about 25 ft. high; branchlets somewhat angular when young, glabrous. Leaves obovate-oblongate or elliptic-obovate, very shortly and obtusely acuminate, narrowed to the base, $3\frac{1}{2}$ –6 in. long, $1\frac{1}{2}$ – $3\frac{1}{4}$ in. broad, entire, coriaceous, glabrous and dull on both surfaces; midrib flat above, prominent below, about $1\frac{1}{4}$ lin. broad at the base, gradually tapered to the apex of the leaf-blade; lateral nerves 8–10 on each side of the midrib, most of them diverging from it at an angle of 70° – 80° , scarcely visible above, prominent and straw-coloured below, prominently looped near the margin, the loops forming a prominent intramarginal nerve below; tertiary nerves very lax and few, slender, subparallel to the lateral; veins forming a close delicate network below; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, about $1\frac{1}{4}$ lin. thick, glabrous; stipules deciduous. Receptacles axillary, pedunculate, ovoid, with a very prominent protruding ostiole, $\frac{2}{3}$ – $\frac{3}{4}$ in. in diam., sometimes slightly warted, minutely pubescent or glabrous; peduncle 2– $3\frac{1}{2}$ lin. long, puberulous. Basal bracts small, connate at the base, soon falling away. Ostiole 2-lipped, gaping; bracts all descending into the receptacle, the pair nearest the ostiole more fleshy and larger than the others, linear, obtuse, 3 lin. long, $\frac{3}{4}$ lin. broad, the remainder subulate-linear, acutely acuminate. Male flowers long-pedicellate; pedicel 1 lin. long; perianth-segments 3, elliptic, subacute. Stamen solitary; filament $\frac{1}{2}$ lin. long, subterete; anther $\frac{1}{2}$ lin. long, with a thick connective. Female flowers sessile; style slender, longer than the achene. Gall flowers pedicellate, numerous.

Mozamb. Distr. Zanzibar, *Kirk! Sacleur*, 2020!

167. **F. excentrica**, *Warb. in Engl. Jahrb.* xx. 168. Branchlets covered with greyish or straw-coloured bark, glabrous except at the base of the petiole. Leaves obovate or obovate-elliptic, very shortly and obtusely acuminate, more or less cuneate at the base, 2–4 in. long, 1 – $2\frac{1}{4}$ in. broad, entire, chartaceous, dull and glabrous on both surfaces, often paler below; midrib flat above, prominent below, gradually tapered to the apex or nearly to the apex of the leaf-blade; lateral nerves about 8 on each side of the midrib, diverging from it at an angle of 65° – 75° , distinct on the lower surface, prominently looped near the margin; tertiary nerves and veins laxly reticulate below; petiole comparatively short, $\frac{1}{3}$ – $\frac{3}{4}$ in. long, with a ring of short hairs around the base; stipules caducous. Receptacles in axillary pairs or solitary, pedunculate, subglobose, about 5 lin. in diam., wrinkling when dry, glabrous; peduncle 3–4 lin. long, slender, glabrous. Basal bracts caducous, leaving a fairly

broad circular persistent base closely appressed to the base of the receptacle. Ostiole small and pore-like; bracts all descending into the receptacle, glabrous. Male flowers with a solitary stamen.—*F. Leprieuri*, Mildbr. & Burret in Engl. Jahrb. xlv. 246, partly, not of Miq.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 838! 1541 partly! 2428! Ebolowa district: between the River Jah and Sangmelima, *Mildbrad*, 5471! and without precise locality, *Buchholz*, 174!

Lower Guinea. Gaboon: Limbareni, *Buchholz*, 180!

168. *F. persicifolia*, *Welw. ex Warb. in Engl. Jahrb.* xx. 162. A singular tree, "with very bright flowers" (*Welwitsch*), when young parasitical after the fashion of *Viscum album*, Linn., growing on *Adansonia*, when adult throwing out its own roots close to the trunk of its host and becoming a tree, embracing with the lower flattened reticulate part of its trunk that of its host and somewhat confluent with its surface, but above separated from it and forming a cylindrical trunk; head dense, with its branches and glossy leaves emulating the form of its host; bark from whitish to grey, like that of the *Adansonia*. Leaves narrowly oblong-oblancoolate, gradually subacutely or obtusely acuminate, gradually narrowed to a broadly obtuse base, $1\frac{3}{4}$ – $5\frac{1}{2}$ in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. broad, entire, thinly chartaceous or submembranous, glabrous and dull on both surfaces, often darker coloured above; midrib often slightly impressed above, prominent below, about $\frac{1}{2}$ lin. broad near the base, becoming very slender towards the apex; lateral nerves about 15 on each side of the midrib, arising from the latter almost at right angles, distinct on both surfaces, slightly prominent below, looped near the margin; veins slender, distinct but not prominent below, rather close; petiole $\frac{1}{3}$ –1 in. long, channelled above, glabrous; stipules often persistent on the young leafy sterile shoots, caducous on the flowering ones, linear-lanceolate, acute, about $\frac{2}{3}$ in. long, submembranous, striate, glabrous, brown when dry. Receptacles axillary or in the axils of fallen leaves, usually two together, crowded, pedunculate, globose, resembling very small peas, 2– $2\frac{1}{2}$ lin. in diam., glabrous; peduncle rather slender, $1\frac{1}{2}$ –3 lin. long, very minutely puberulous. Basal bracts 3, connate at the base, broadly ovate, rounded at the apex, coriaceous, glabrous or nearly so, at length falling off and leaving an orbicular plate closely appressed to the receptacle. Ostiole small, not at all prominent; bracts few and small, all descending into the receptacle. Male flowers sessile; perianth-segments obovate, membranous, glabrous. Anther solitary, sessile. Female flowers sessile; perianth short. Achene subglobose, smooth; style shorter than the achene, with a large oblong stigma.—Engl. Pfl. Ost-Afr. C. 162, t. 8 G–J; Hiern in Cat. Afr. Pl. Welw. i. 1007; Warb. in Warb. & De Wild. Fic. Fl. Congo, 15, t. xiv. figs. 1–4, incl. vars. *glabripes* and *angustifolia*, Warb. l.c.; Mildbr. & Burret in Engl.

Jahrb. xvi. 260; Th. & Hël. Durand, Syll. Fl. Congol. 507. *F. darbandensis*, Warb. ex Mildbr. & Burret (*darbandensis*). Loc. name only.

North Central. Eastern Shari: between the Boro and Ndi, *Chuculer*, 7087!

Lower Guinea. Gaboon: near Libreville, *Klain*, 1609! Lower Congo: Kisantu, *Gillet*, 1034! Angola: Golungo Alto: various localities, *Währtsch*, 6337! 6386! 6412! 6417! Cazengo district, *Gossweiler*, 667!

South Central. Belgian Congo: Monbuttu; Munza, *Schweinfurth*, 3346! North frontier, *Schweinfurth*, 3564!

169. *F. gurichiana*, *Engl. in Engl. Jahrb.* xix. 130. Spreading habit; branches sulcate, covered with yellowish glabrous deciduous bark. Leaves oblong or oblong-lanceolate, rounded at the apex, obtuse or rounded and sometimes almost subcordate at the base. $1\frac{1}{4}$ –4 in. long, $\frac{1}{2}$ – $1\frac{1}{2}$ in. broad, entire, chartaceous, with a narrowly cartilaginous margin, finely reticulate and glabrous on both surfaces; midrib flat above, prominent below, about $\frac{1}{2}$ lin. broad at the base, bifurcate near the apex; lateral nerves 9–12 on each side, at an angle of about 70°, slender, looped and branched some distance from the margin, sometimes slightly impressed but more often raised above; petiole $\frac{1}{3}$ – $\frac{3}{4}$ in. long, about $\frac{2}{3}$ lin. thick, narrowly grooved on the upper surface, glabrous, straw-coloured or reddish when dry; stipules deciduous. Receptacles solitary or geminate, axillary, pedunculate, subglobose, about 3 lin. in diam., with a gaping slightly prominent ostiole, minutely puberulous; peduncle 2 lin. long or less, glabrous or minutely puberulous. Basal bracts 2 (or 3?) ovate, obtuse, $\frac{3}{4}$ lin. long, glabrous, deciduous. Ostiolar bracts all pointing straight into the receptacle, the middle two subulate from an ovate base, fleshy, 1 lin. long, the remainder subulate or linear-subulate, $\frac{3}{4}$ lin. long, membranous. Male flowers with 3 perianth-segments and a solitary stamen. Achene subglobose; style nearly twice the length of the achene.—Mildbr. & Burret in *Engl. Jahrb.* xvi. 246.

Lower Guinea. Damaraland: Kamelneck, on the Bockberg, *Gurich*, 59! Spitzkopjes, *Dinter*, 81! Okahandya, *Dinter*, 270! Eros, *Dinter*, 1346! Tiras, *Range*, 473!

Occurs also in Little Namaqualand.

170. *F. Dekdekena*, *A. Rich. Tent. Fl. Abyss.* ii. 268. A tree, or sometimes epiphytic; young branchlets glabrous or slightly pubescent, leafy towards the apex. Leaves oblanceolate or narrowly oblong-oblanceolate, rarely obovate, rounded or very shortly and obtusely acuminate, narrowed to an obtuse or subacute base, 2– $6\frac{1}{2}$ in. long, $\frac{1}{2}$ –2 in. broad, entire, rigidly chartaceous, glabrous on both surfaces or very finely verruculose on the upper; midrib flat above, rounded and slightly prominent below, about $\frac{1}{2}$ lin. broad at the base, gradually tapered to the apex; lateral nerves 9–14 on each side of the midrib, diverging at an angle of 45°–75°, slightly raised or a little impressed on the upper surface, prominent but very slender below.

looped near the margin; tertiary nerves and veins distinctly reticulate below, often impressed above; petiole slender, $\frac{3}{4}$ – $2\frac{1}{2}$ in. long with a single very narrow groove on the upper side, glabrous; stipules deciduous, ovate-lanceolate, subacute, about $\frac{1}{4}$ in. long, membranous, densely ciliate, otherwise glabrous, reddish-brown when dry. Receptacles axillary, often crowded together on the young shoots, mostly in pairs, pedunculate or nearly sessile, globose or ovoid-globose, 3–4 lin. in diam., glabrous or very obscurely puberulous; peduncle 1–2 (rarely up to 4) lin. long, angular, glabrous or nearly so. Basal bracts 3, connate at the base, ovate, obtuse, about $\frac{1}{2}$ lin. long, finely puberulous outside. Ostiole small, 2-lipped, with no bracts visible from the outside; bracts all descending into the receptacle, the middle pair nearest the orifice larger than the others and oblong, rounded at the apex, membranous, about $\frac{1}{6}$ lin. long, the others subulate-lanceolate, acute, membranous, all glabrous. Male flowers few; perianth-segments oblong-lanceolate, acute. Stamen solitary. Female flowers subsessile; perianth rather short, membranous. Achene smooth; style lateral, slender, about as long as the achene, with an oblong thickened stigma.—Mildbr. & Burret in Engl. Jahrb. xvi. 255. *F. Tsjela*, Hochst. ex Miq. in Hook. Lond. Journ. vi. 558 (spelt *Tjiela*). *F. acrocarpa*, Steud. ex Miq. l.c. 557. *F. saligna*, Hochst. ex Miq. l.c. 558. *F. Bequaertii*, De Wild. in Bull. Soc. Bot. Belg. lii. 200. *Urostigma Dekdekena*, Miq. in Hook. Lond. Journ. Bot. vi. 558. *U. acrocarpum*, Miq. l.c. 557, t. xxii. b, incl. var.

Upper Guinea. Gold Coast, *Evans*, 4! Northern Nigeria: Yola, *Dalziel*, 148! Maigana, near Zaria, *Lamb*, 62! Cameroons: Musgu, *Vogel*, 54!

Nile Land. Eritrea: Anseba River, near Keren, *Schweinfurth*, 761! gorge of the Degerra River, *Schweinfurth & Riva*, 887! Abyssinia: Sholoda Mountains, *Schimper*, 220! near Mai Dogale, *Schimper*, 627! 629! near Ferrokoba, *Schimper*, 709! Mennewa, *Schimper*, 264! Sudan: Roseires, *Cienkowski*, 130! *Muriel*, 21! Kordofan: Fazokl, *Kotschy*, 473! Singukai, *Muriel*, 151! Khor Ganna, near Dilling, *Brown*, 1313! 1314! Uganda: Entebbe, *Bagshawe*, 689!

Lower Guinea. Angola: between Gambos Fort and the Mission station, *Pearson*, 2455!

South Central. Belgian Congo: Elizabethville, *Bequaert*, 449!

171. *F. Mildbrædii*, *Hutchinson in Kew Bulletin*, 1915, 344. A large epiphytic shrub; branchlets angular, about $\frac{1}{4}$ in. in diam. near the apex, glabrous. Leaves oblong or oblong-obovate, caudate-acuminate (acumen obtuse or subacute, $\frac{1}{4}$ – $\frac{1}{2}$ in. long), narrowed to an obtuse base, 4– $6\frac{1}{2}$ in. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. broad, entire, rigidly coriaceous, dull and glabrous on both surfaces; midrib flat above, very prominent and straw-coloured below, $1\frac{1}{4}$ lin. broad at the base, gradually tapered and fading away towards the apex of the blade; lateral nerves 9–11 on each side of the midrib, diverging from it almost at right angles, slender, distinct below, looped about $1\frac{1}{2}$ lin. from the margin; tertiary nerves and veins forming a close somewhat straw-coloured reticulation below; petiole $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, fairly stout,

angular when dry, glabrous; stipules caducous. Receptacles axillary, pedunculate, ovoid-globose, about $\frac{1}{2}$ in. in diam., with a prominent ostiole, glabrous; peduncle stout, 3-5 lin. long, glabrous. Basal bracts deciduous, their connate persistent bases one-sided and closely appressed to the base of the receptacle. Ostiole pore-like; bracts all descending into the receptacle, glabrous. Male flowers with a solitary stamen. Female flowers sessile. Gall flowers pedicellate.

Upper Guinea. Cameroons: Molundu district, *Mildbraed*, 4262!

172. *F. burretiana*, *Mildbr. & Hutchinson in Kew Bulletin*, 1915, 344. Branchlets twiggy, obscurely angled, glabrous. Leaves oblanceolate or oblong-elliptic, shortly and obtusely acuminate, obtusely cuneate at the base, 2-3 $\frac{1}{2}$ in. long, 1-1 $\frac{3}{4}$ in. broad, entire, subcoriaceous, glabrous and dull on both surfaces; midrib moderately prominent on both surfaces, gradually tapered to the apex of the blade; lateral nerves 11-12 on each side of the midrib, close, diverging from it at an angle of about 45°, nearly straight, looped about 1 lin. from the margin, slender, slightly prominent below; tertiary nerves only slightly less prominent than the lateral and following their direction; veins lax and inconspicuous; petiole $\frac{1}{4}$ -1 $\frac{1}{2}$ in. long, blackish-purple when dry, glabrous; stipules caducous, those surrounding the terminal bud lanceolate, acute, $\frac{1}{4}$ in. long, fleshy, glabrous. Receptacles in axillary pairs, pedunculate, globose, 4-4 $\frac{1}{2}$ lin. in diam., glabrous; peduncle 4-5 lin. long, sparingly and very minutely puberulous. Basal bracts soon deciduous and leaving a thick circular saucer-like cup closely appressed to the receptacle. Ostiole slightly protruded, 2-lipped; bracts not visible from the outside, all descending into the receptacle, the two nearest the orifice much larger and more fleshy than the others. Male flowers pedicellate; perianth-segments 4, linear, with membranous margins. Stamen solitary; filament short and thick; anther oblong, nearly $\frac{1}{2}$ lin. long. Achene ovoid, smooth; style slender, nearly as long as the achene.

Upper Guinea. Cameroons: Molundu district; between Bange and Jukaduma, *Mildbraed*, 4611!

One of the terminal buds of Mildbraed's specimen has been attacked by a gall-insect and the swelling bears a striking resemblance to the figs.

173. *F. neriifolia*, *A. Rich. Tent. Fl. Abyss.* ii. 267. Young branchlets fairly stout, with close internodes, glabrous. Leaves linear-lanceolate, obtuse at the apex, narrowed to the base, 1 $\frac{1}{2}$ -2 $\frac{1}{4}$ in. long, $\frac{1}{2}$ in. broad or less, chartaceous, dull and glabrous on both surfaces; lateral nerves about 7 on each side of the midrib, looped and forming an intramarginal nerve, prominent below; veins fairly close and prominent below; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long, slender, glabrous. Receptacles (according to *Richard*) globose, very shortly

pedunculate, glabrous, about the size of a grape, involucrate at the base.

Nile Land. Abyssinia: near Mai Gouagoua, *Quartin Dillon*; near Adowa, *Petit*!

Mildbraed and Burret knew this plant only from description, and suggested that it might be identical with *F. salicifolia*, Vahl.

174. *F. elasticoides*, *De Wild. in Fedde, Repert.* xii. 302. A tree with thick fissured lenticellate bark. Leaves obovate or obovate-elliptic, shortly and subacutely acuminate, cuneate at the base, 5–10 in. long, $2\frac{3}{4}$ –4 in. broad, entire, coriaceous, glabrous on both surfaces; midrib slightly convex above, prominent below, about $\frac{3}{4}$ lin. broad at the base, gradually tapered to and very slender at the apex of the blade; lateral nerves very numerous, about 25 on each side of the midrib, diverging from it at a wide angle, nearly straight, looped about $1\frac{1}{4}$ lin. from the margin, the loops forming a crenate intramarginal nerve distinct on both surfaces; tertiary nerves only slightly less prominent than the lateral and following their direction; veins rather lax and somewhat indistinct; petiole longitudinally wrinkled, $1\frac{1}{4}$ – $2\frac{3}{4}$ in. long, glabrous; stipules not seen, probably early deciduous. Receptacles in axillary pairs, pedunculate, globose, greenish-yellow with white spots, slightly more than $\frac{1}{2}$ in. in diam., glabrous; peduncle $2\frac{1}{2}$ lin. long, puberulous. Basal bracts soon falling away and leaving behind a large circular finely tomentose portion. Ostiole 2-lipped, not prominent; bracts all descending into the receptacle. Male flowers with a solitary stamen, not seen in a perfect condition.—*De Wild. in Bull. Soc. Bot. Belg.* lii. 207.

Upper Guinea. Ivory Coast: Aboisso, *Chevalier*, 16293! Cameroons: Molundu district; old French frontier between 3.35° and 4° N., *Mildbraed*, 4768! between Lokomo, Bumba and Bange, *Mildbraed*, 4357! 4444!

Lower Guinea. Belgian Congo: Illongonga, *Sapin*! Lukulela, *Laurent*!

Imperfectly known species.

175. *F. Afzelii*, *Don in Loud. Hort. Brit.* 416, name only.

Upper Guinea. Sierra Leone.

This is probably *F. eriotryoides*, Kunth & Bouché.

176. *F. argentea*, *Miq. in Ann. Mus. Lugd.-Bat.* iii. 220.

Described from a garden plant, West Africa being suggested as the native country; evidently closely allied to *F. eriotryoides*, Kunth & Bouché. I have not seen a specimen.

177. *F. Cabræ*, *Warb. in Warb. & De Wild. Fic. Fl. Congo*, 9. A tree. Leaves elliptic or oblong-elliptic, shortly and obtusely acuminate, rounded at the base, 9–10 in. long, 4– $4\frac{1}{2}$ in. broad,

entire, subcoriaceous, dull on both surfaces, glabrous and closely reticulate above, shortly pubescent on the veins beneath; midrib flat above, very thick below, about $2\frac{1}{4}$ lin. broad at the base, gradually narrowed to the apex; lateral nerves 9-10 on each side, spreading at an angle of about 60° , looped, prominent below, distinct above; tertiary nerves wavy; veins very close and prominent below, of the same colour as the epidermis of the leaf; petiole about 2 in. long on the specimen seen but probably longer, about $\frac{1}{4}$ in. thick, minutely puberulous. Further characters not known.

South Central. Belgian Congo: Simate village, *Cabra*. 36!

Described by the author from two leaves only; evidently allied to *F. Babu*, Warb.

178. *F. citharexifolia*, Kotschy ex Miq. in *Ann. Mus. Lugd.-Bat.* iii. 232.

Described from a garden plant, Africa being suggested by Miquel as its place of origin.

179. *F. lutea*, Vahl, *Enum.* ii. 185. A rather tall tree, spreading; branches sparse or somewhat whorled; branchlets glabrous. Leaves sparse, ovate-oblong, acuminate, submarginate at the base, 4-8 in. long, coriaceous, with whitish nerves, finely reticulate, pale green below, glabrous; petiole about one-third the length of the leaves. Receptacles axillary, paired, globose, sessile, scarcely the size of a cherry, with a bifid umbo at the apex, yellow. Basal bracts 4.

Upper Guinea: without precise locality, *Thonning*.

The type of this species appears to have been lost.

180. *F. rugosa*, G. Don in *Loud. Hort. Brit.* 416. *name only*. Africa suggested as native country.

181. *F. rupium*, Dinter, *Deutsch. Süd. Afr.* 54. A tree up to 40 ft. high with grey-white stem. Leaves like those of a cherry, but long-acuminate, drooping. Two-year-old wood often thickly covered with edible figs the size of a strawberry.

Lower Guinea. Damaraland: Salem, Loakop River, Okahandja and other places, *Dinter*.

No specimen seen at Berlin and not accounted for in Mildbraed & Burret's revision; probably one of the group *Fasciculatae*.

9. **BOSQUEIOPSIS**, De Wild. in *Bull. Herb. Boiss.* 2me sér. i. 839; *Engl. in Engl. Jahrb.* li. 435.

Flowers monœcious, inserted inside a globose-campanulate open androgynous or unisexual receptacle. Male flowers crowded, mixed

with peltate scales. Perianth-segments 2-4, small. Stamens 2; filaments sometimes connate at the base; anthers ovoid, with oblong cells dehiscing extrorsely. Rudimentary sterile female flower sunk in the middle of the receptacle. Fertile female flower similarly placed; ovule pendulous; style exerted, mostly 2-lobed. Fruit inferior, adnate to the receptacle, oblique, crowned at the apex by the remains of the bracts and stamens. Seeds with fleshy endosperm.—Trees or shrubs. Leaves alternate, petiolate, entire, penninerved; stipules intrapetiolar, amplexicaul, caducous. Receptacles axillary, shortly pedunculate, solitary.

Species 4, endemic.

Receptacles unisexual, sometimes with the rudiments of a female in the middle.

Leaves 2-3 $\frac{1}{4}$ in. long; stamens exerted ... 1. *B. carvalhoana*.

Leaves 1-1 $\frac{1}{2}$ in. long; stamens hidden by the overtopping peltate scales ... 2. *B. parvifolia*.

Receptacles bisexual.

Leaves usually less than 3 in. long; peduncle $\frac{1}{2}$ -1 $\frac{1}{4}$ in. long ... 3. *B. Gilletii*.

Leaves usually over 3 in. long; peduncle 1-2 lin. long ... 4. *B. Lujre*.

1. *B. carvalhoana*, *Engl. in Engl. Jahrb.* li. 436, fig. 3. A shrub (?); branchlets slender, covered with brown bark; internodes $\frac{1}{4}$ -1 $\frac{1}{4}$ in. long. Leaves oblong, subacute at the base, shortly acutely acuminate at the apex, 2-3 $\frac{1}{4}$ in. long, $\frac{3}{4}$ -1 $\frac{1}{3}$ in. broad, subcoriaceous, shining above, dull below, glabrous; lateral nerves 3-4 on each side of the midrib, the basal pair extending within the margin to above the middle of the blade, the upper ones spreading and distant from the lower; petiole 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lin. long. Receptacles unisexual, shortly pedunculate, disc-like, 2 $\frac{1}{2}$ lin. in diam.; outer bracts ovate, those of the disc peltate and shortly stipitate; peduncle $\frac{1}{2}$ lin. long. Male flowers with very small obovate or ovate perianth-segments. Stamens 2-3 times as long as the bracts, often two connate at the base; anthers ovate. Bisexual or female receptacles not known.

Mozamb. Distr. Portuguese East Africa: coastland, *Carvalho*.

2. *B. parvifolia*, *Engl. in Engl. Jahrb.* li. 437. A densely branched shrub; young branchlets slender, minutely puberulous when young, at length glabrous; internodes often shorter than the petioles. Leaves oblong-ovate, acute or shortly acuminate at the apex, 1-1 $\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad, subcoriaceous, slightly shining above, dull below; lateral nerves about 5 on each side of the midrib, looped towards the margin and arcuate, prominent below; veins strikingly reticulate, slightly prominent; petiole slightly channelled above, about 2 lin. long; stipules soon falling off, ovate, acute, 1 $\frac{1}{2}$ lin. long. Receptacles mostly solitary in the leaf-axils, nearly sessile, about 1 $\frac{1}{2}$ lin. in diam.,

some male with a rudiment of a female immersed in the middle, others bisexual, with an inferior central female flower and a single undivided style (from Engler's figures); peltate bracts orbicular, very minutely ciliate.

Mozamb. Distr. German East Africa: Amani, *Koerner in Herb. Amani*, 2259.

3. *B. Gilletii*, *De Wild. & Durand in Bull. Herb. Boiss. 2me sér.* i. 840. A tree or shrub; branches terete, sparingly pilose when young, at length glabrous, shining, brown, with peeling bark. Leaves elliptic, rounded-cuneate at the base, shortly obtusely acuminate at the apex, $1\frac{1}{2}$ –3 in. long, $\frac{3}{4}$ – $1\frac{1}{2}$ in. broad, mostly unequal-sided, brown above in the dried state, paler below; lateral nerves about 5 on each side of the midrib, the basal pair distant from the upper ones and anastomosing towards the margin, with the veins prominent below; petiole 3–4 lin. long, sparingly pilose. Receptacles axillary, shortly pedunculate, shortly pubescent outside; peduncle $\frac{1}{3}$ – $1\frac{1}{4}$ in. long, pubescent. Bracts peltate, shortly ciliate. Stamens longer than the bracts; filaments free (according to *De Wildeman*), or (according to *Engler*) connate at the base, about 1 lin. long; anthers very small. Ovary subcentral, inferior; style erect, about $1\frac{1}{2}$ lin. long, 2-lobed at the apex. Fruit adnate to the receptacle, oblique, about $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. thick.—*Engl. in Engl. Jahrb.* li. 436.

Lower Guinea. Lower Congo: Kimuenza, *Gillet*, 1742; *Mildbraed*.

4. *B. Lujæ*, *De Wild. Pl. Herb. Hort. Thén.* i. 239, t. lvi. A tree; branches terete, densely but shortly pilose when young, at length glabrous with sulcate bark. Leaves elliptic or ovate, rounded at the base, acuminate at the apex, acumen obtuse or apiculate, $2\frac{1}{2}$ –5 in. long, 1–2 in. broad, slightly unequal-sided, dull brown above when dry, paler below; lateral nerves about 4 on each side of the midrib, the basal pair long distant from the upper ones, extending within the margin to well above the middle of the blade; veins slightly prominent below. Receptacles axillary, shortly pedunculate, shortly pubescent outside; peduncle 1–2 lin. long. Flowers and fruit as in *B. Gilletii*.

South Central. Belgian Congo: forest of the Sankuru River, *Luja*, 78.

10. **BOSQUEIA**, Thouars ex Baill.; Benth. & Hook. f. *Gen. Pl.* iii. 370 (*Bosquiea*).

Flowers monœcious, inserted in a campanulate or obconic androgynous receptacle. Male flowers covering the inner face of the receptacle. Perianth 0. Stamens intermixed with bracts; filaments slender; anthers erect, oblong or ellipsoid, obtuse or

apiculate. Female flower solitary and sunk in the middle of the receptacle. Perianth 0. Style exserted, 2-3-lobed; ovule pendulous from the apex of the cell. Fruit inferior; pericarp composed of the adnate persistent receptacle; pyrene rhomboid, 4-angled, beaked by the persistent style. Mature seed not seen.—Trees. Leaves alternate, shortly petiolate, entire, coriaceous, penninerved; stipules intrapetiolar, caducous. Receptacles solitary in the leaf-axils, subsessile or shortly pedunculate, margin shortly lobed.

A genus of 5 species, two from Madagascar, one from the Seychelles, and two in Tropical Africa.

Anthers mucronate, $\frac{3}{4}$ lin. long, as long as the filaments; leaves mostly somewhat obovate ... 1. *B. angolensis*.

Anthers not mucronate, scarcely $\frac{1}{3}$ lin. long, very many times shorter than the filaments; leaves mostly elliptic 2. *B. Phoberos*.

1. *B. angolensis*, *Ficalho, Pl. Uteis*, 271. A tree 20-50 ft. high or sometimes more, often with the trunk quite bare of branches up to nearly half its height; head loosely pyramidal; branches and branchlets spreading; young branchlets terete, ashy-grey when dry, glabrous. Leaves elliptic or slightly obovate-elliptic, very shortly cuneate at the base, obtusely acuminate, 2-6 $\frac{1}{2}$ in. long, 1-3 in. broad, entire, rigidly coriaceous, glabrous on both surfaces, shining and darker above, pale beneath; midrib prominent on both surfaces, tapering towards the apex; lateral nerves about 7 on each side of the midrib, nearly equally prominent on both surfaces, very arcuate, looped; veins lax, distinct; petiole 4-5 lin. long, glabrous; stipules caducous, lanceolate, obtuse, about 4 lin. long, coriaceous, glabrous. Receptacles axillary, solitary, pedunculate; bract at the base of the peduncle cupular, enclosing the head of flowers when young, at length bursting on one side, coriaceous, about $\frac{1}{4}$ in. long, glabrous; peduncle $\frac{1}{4}$ in. long, fairly stout, glabrous. Involucre cupular, fleshy at the base, membranous towards the margin, variously cleft, glabrous. Bracts between the stamens oblong-ob lanceolate, laciniately cleft at the apex, membranous, exceeding the anthers, glabrous. Filaments $\frac{3}{4}$ lin. long, glabrous; anthers $\frac{3}{4}$ lin. long, apiculate. Female perianth short and tubular, acutely 5-cleft at the apex. Ovary immersed in the receptacle; style stout, deeply bifurcate, branches flattened, variously twisted, rosy-velvety and stigmatose on the inner face. Fruit drupaceous, about $\frac{3}{4}$ in. long, obliquely ellipsoid, striate, glabrous.—Hiern in *Cat. Afr. Pl. Welw.* i. 1019; De Wild. & Durand in *Bull. Herb. Boiss.* 2me sér. i. 839. *Centrogynne angolensis*, Welw. ex Benth. & Hook. f. *Gen. Pl.* iii. 370. *Bosqueia Welwitschii*, Engl. *Monogr. Morac. Afr.* 36, and in *Engl. Jahrb.* li. 439, fig. 5, A-E.

Upper Guinea. Cameroons: forest of Compenda near Mundame, *Buesgen* (fide *Engler*).

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 930. Angola: Golungo

Alto; base of the Serra de Alto Queta, *Welwitsch*, 456! banks of the River Cuango near Sange, *Welwitsch*, 457! 458! Cazengo district, *Gossweiler*, 608! 754! 4513! 4867!

South Central. Belgian Congo: Kasai district: on the Sankuru River, *Ledermann* (fide *Engler*).

In all probability the genus *Pontya*, A. Chevalier (*P. excelsa*, A. Cheval. Veget. Ut. Afr. Franç. fasc. v. 263, name only, and in Bull. Soc. Bot. France, 1911, Mém. viii. d. 210), is a *Bosqueia* and perhaps the same as *B. angolensis*. Chevalier's generic description is not quite definite, but he assigns the genus to the tribe *Artocarpeæ*, and the description of the species seems to tally with *B. angolensis*, though this plant had not hitherto been gathered north of the Cameroons.

We have not been able to examine any of the specimens of *Pontya*, collected by Chevalier in the following localities:—

Upper Guinea. French Guinea: in the forest between Lola and Nzo *Chevalier*, 20990; Kissi district; between Ouria and the Doffé River, *Chevalier* 20765. Ivory Coast: Morenou, *Chevalier*, 22480; Indenic, Zaranou, *Chevalier*, 16278. Dahomey: near Savalou, Pira, *Chevalier*, 23748; Savalou, between Cabole and Bassila, *Chevalier*, 23785; near Djougou, *Chevalier*, 23885.

2. **B. Phoberos**, *Baill. Adansonia*, viii. 72, t. iv. A large tree, up to 80 ft. high; branches and branchlets terete, covered with a light grey glabrous bark. Leaves elliptic or oblong-elliptic, rounded or obtuse at the base, shortly and very obtusely acuminate, $2\frac{1}{4}$ –4 in. long, 1–2 in. broad, entire, chartaceous, shining on the upper surface, glabrous; midrib prominent on both surfaces, gradually tapered to the apex; lateral nerves 5–6 on each side of the midrib, diverging at an angle of about 65° , looped some distance from the margin, slender, distinct on both surfaces; veins very lax and indistinct; petiole 4–5 lin. long, concave on the upper surface, glabrous; stipules caducous, the terminal one enclosing the young bud, lanceolate, 3–4 lin. long, glabrous. Receptacles axillary, solitary, shortly pedunculate; bract at the base of the peduncle cupular, enclosing the head of flowers when young, soon falling away, about 2 lin. long, coriaceous, glabrous; peduncle $1-1\frac{1}{2}$ lin. long, glabrous. Involucre fleshy at the base with the ovary immersed in it, with membranous toothed limb, glabrous. Male flowers numerous. Filaments slender, filiform, about 2 lin. long, glabrous; anthers very small, creamy white, purple around the styles, elliptic, obtuse, scarcely $\frac{1}{2}$ lin. long. Bracts surrounding the style connate into a tube nearly as long as the stamens, laciniately toothed on the margin, submembranous, glabrous. Style exerted, stout, deeply 2-lobed or rarely 3-lobed; lobes about $1\frac{3}{4}$ lin. long. Fruit pedunculate, obliquely ellipsoid, $\frac{2}{3}$ in. long.—*Engl. Monogr. Morac. Afr.* 36; Rendle in *Journ. Linn. Soc.* xl. 206. *B. cerasiflora*, Volk. ex *Engl. l.c.* and in *Engl. Jahrb. li.* 439, fig. 5, F–H.

Nile Land. Uganda: Kirgema, *Dümmer*, 197! British East Africa: Mombasa, *Bovin*.

Mozamb. Distr. Zanzibar: *Bovin*, *Lyne*, 96! German East Africa: Shira, *Volkens*, 1935! Portuguese East Africa: Gazaland: Mount Maruma, 3500 ft. *Swynnerton*, 687!

11. SCYPHOSYCE, Baill. ; Benth. & Hook. f. Gen. Pl. iii. 371.

Flowers monœcious, inclosed in tubular-campanulate bisexual receptacles. Male flowers numerous, inserted at the base of the receptacle. Perianth narrowly tubular, obtusely 2-4-dentate. Stamen 1, exserted; filament straight, slender; anther oblong, erect, 2-celled. Rudimentary ovary 0. Female flower solitary in the middle of the receptacle, sessile. Perianth as long as that of the male, with 2 free imbricate ovate-lanceolate segments closely enveloping the pistil. Ovary superior; style slender, lateral, with two exserted stigmatose branches; ovule solitary, pendulous. Young fruit ovoid, surrounded at the base by the receptacle and the persistent male flowers, not seen in a mature state.—Perennial rather woody herbs with simple stems up to nearly 1 ft. long, often rooting from the nodes towards the base. Leaves alternate, crowded in the upper part of the stem, shortly petiolate, acuminate, entire or denticulate, sub-chartaceous, penninerved; stipules free, narrow, scaly. Receptacles small, axillary, pedunculate, fleshy towards the base, 4-5-lobed.

Species 2, endemic.

Branchlets shortly hispid; leaves gradually narrowed to the base, abruptly caudate-acuminate 1. *S. manniana*.

Branchlets glabrous, with brown transversely splitting bark; leaves abruptly narrowed to the base from about the middle, broadly ovate in the upper part and gradually pointed 2. *S. pandurata*.

1. *S. manniana*, Baill. *Adansonia*, xi. 293. A small woody herbaceous plant up to 9 in. high; stem simple, leafy towards the apex, shortly hispid with blackish hairs, with rather short internodes. Leaves oblanceolate, obtusely caudate-acuminate, acumen $\frac{1}{3}$ - $\frac{1}{2}$ in. long, gradually narrowed to a rounded or subcordate base, 2-5 in. long, $\frac{3}{4}$ - $1\frac{3}{4}$ in. broad, denticulate or subentire, thinly chartaceous, glabrous above, very shortly and sparingly pubescent on the midrib and lateral nerves beneath; midrib prominent on both surfaces; lateral nerves 11-12 on each side of the midrib, diverging from it at a wide angle, arcuate, prominently looped some distance from the margin, equally raised on both surfaces; tertiary nerves lax and rather faint; petiole 2-3 lin. long, rather densely hispid with black hairs; stipules lanceolate, long-acuminate, acute, 3-5 lin. long, blackish, puberulous outside, glabrous within. Receptacles axillary, pedunculate, campanulate-obconic, about 1 lin. long, glabrous; lobes 4, very broadly ovate, rounded at the apex, $\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, thinly coriaceous, glabrous; peduncle 2-3 lin. long, about $\frac{1}{4}$ lin. thick, glabrous. Male flowers stipitate, slender, 3 lin. long from the base to the apex of the perianth; perianth very narrowly obconic, 2-4-dentate, teeth rounded, shortly pubescent. Filament $\frac{3}{4}$ lin. long, slender, glabrous; anther narrowly oblong, $\frac{1}{3}$ lin.

long. Female flower solitary, sessile in the bottom of the involucre ; perianth-segments 2, free, ovate-lanceolate, obtuse, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, submembranous, strongly 6-ribbed on the back, slightly puberulous in the upper part outside, minutely ciliate in the upper half. Ovary narrowly ovoid, glabrous ; style laterally inserted, reaching to the middle of the anthers, glabrous, 2-lobed, lobes spreading, papillose. Fruit ovoid, about 2 lin. long, smooth.—Baill. Hist. Pl. vi. 207 ; Engl. Monogr. Morac. Afr. 30. *Cyathanthus Zenkeri*, Engl. in Pflanzenfam. Nachträge, i. zu ii.-iv. 120. *Scyphosyce Zenkeri*, Engl. Monogr. Morac. Afr. 31, t. x.

Lower Guinea. Gaboon : Sierra del Crystal, *Mann*, 1727 !

Upper Guinea. Cameroons : Bipinde ; in deep shady forest near Undua, *Zenker*, 905 ! 2700 ! 3961 !

I have not succeeded in discovering any tangible difference between the type of *S. manniana* and the plant described by Engler as *S. Zenkeri*. Engler says that his plant is more hairy and has larger leaves and stipules than in *S. manniana*, but no such differences are evident in the Kew specimens.

Engler figures the filaments of *S. Zenkeri* as being papillose, but he does not mention the fact in his description ; in the type number at Kew they are quite glabrous.

2. *S. pandurata*, *Hutchinson in Kew Bulletin*, 1917, *ined.* Branchlets fairly slender, glabrous, with transversely peeling bark, sulcate. Leaves pandurate, broadly ovate in the upper half and gradually and obtusely pointed, abruptly narrowed to the base from about the middle, 4-5 in. long, $1\frac{1}{2}$ -2 in. broad, chartaceous, entire, light green above, paler below, glabrous and dull on both surfaces ; lateral nerves about 10 on each side of the midrib, spreading from it at a wide angle, looped and branched within the margin ; veins lax below, straw-coloured ; petiole 2-3 lin. long, curved, glabrous ; stipules persistent, lanceolate, acutely acuminate, 3 lin. long, $1\frac{1}{2}$ lin. broad, submembranous, purplish-brown when dry, glabrous. Receptacles axillary, solitary, pedunculate, ellipsoid-obconic, about 2 lin. long, glabrous ; peduncle $2\frac{1}{2}$ -4 lin. long, minutely puberulous. Anthers exerted from the receptacle, about $\frac{1}{3}$ lin. long.

Upper Guinea. Southern Nigeria : Oban, *Talbot*, 1315 ! 2317 !

12. MESOGYNE, Engl. in Engl. Jahrb. xx. 147.

Flowers monœcious in unisexual receptacles. Male: perianth 3-1-lobed. Stamens as many as and opposite to the perianth-lobes which they exceed, free, erect in bud ; anthers cordate, cells parallel, opening longitudinally. Female without perianth ; ovary included in the receptacle with which it is united in the lower portion ; style terminal, bearing a pair of stigmas which spread from the mouth of the receptacle. Ovule solitary, pendulous from the apex of the cell. Fruit adnate to the receptacle, globose or ellipsoid, narrowing

below into a stalk-like portion, common wall thin, tough. Seed conforming to the fruit-cavity with a thin testa, filled with the embryo which has a short radicle, one short roundish cotyledon, and one very thick cotyledon which almost fills the seed.—Shrubs or trees, with alternate shortly stalked acuminate leaves; stipules lanceolate, deciduous. Inflorescences on a reduced branch in the leaf-axils, 2-4 male consisting of a short stalk bearing a dense head of flowers subtended by several spreading ovate bracts; female generally between a pair of males, rarely solitary, sessile, consisting of an ovoid receptacle bearing small bracts at the base and on the sides and upper margin, and enveloping one, rarely 2, flowers.

Species two, endemic.

Female receptacle bearing a few bracts on the sides, 5 lin.

long; fruit ellipsoid 1. *M. insignis*.

Female receptacle covered from base to apex with bracts,

2½ lin. long; fruit globose 2. *M. Henriquesii*.

1. *M. insignis*, *Engl. in Engl. Jahrb.* xx. 148, fig. 5, *M-W*. A shrub or tree; branchlets slender, brown, those of the last order reaching 1½ lin. in thickness, with internodes generally 1-1¾ in. long. Leaves elliptic, often tapering below the middle to a cuneate base, apex abruptly acuminate, ½-¾ in. long, tip blunt, base sometimes unequal, blunt to acute, margin undulate, somewhat crisped when dry. 4½-8 in. long. 1½-3½ in. wide, membranous, shining above, paler beneath, glabrous; lateral nerves 9-11 on each side, ascending slightly then curving upwards and uniting within the margin, prominent beneath as is also the reticulate venation; petiole channelled above, rough, the skin peeling in brown flakes, 2-3 lin. long. Stipules ovate, acute, 3 lin. long, deciduous. Inflorescences axillary, a pair male with a female between standing in each axil. sometimes 3 or 4 male and no female, sometimes a solitary female. Peduncle of male inflorescence slender, ¼-½ in. long; head of flowers 2 lin. in diam., subtended by 4 ovate-triangular bracts about 1 lin. long; perianth 3-4-lobed, about ½ lin. long; lobes bluntly ovate; stamens 3-4, opposite the perianth-lobes, barely 1 lin. long. Female inflorescence narrowly ovoid, about 5 lin. long and 2½ lin. in diam., bearing several ovate bracts at the base, about ¾ lin. long, and a few on the sides and upper edge, the latter being smaller, ½ lin. long. Fruit with adnate receptacle ellipsoid, narrowing below into a stalk-like portion, 10 lin. long, 5 lin. in diam.—*Engl. Monogr. Morac. Afr.* 30, t. xi. c.

Mozamb. Distr. German East Africa: Usambara; forest of Nguelo and in the Nderema valley, 3300 ft., *Holst*, 2270, 2290; Nderema, 3100 ft., *Heinsen*, 2! sources of the Wuruni River, 4000 ft., *Buchwald*, 495! Nguelo, *Scheffler*, 22! Amani, *Warnecke*, 461! *Busse*, 2219!

2. *M. Henriquesii*, *Engl. in Engl. Jahrb.* xx. 148. Branches flexuous; internodes on the ultimate branchlets 1½-2¼ in. long.

Leaves elliptic, apex acuminate (5 lin. long), base obtuse, 8-9 in. long, $3\frac{1}{4}$ -4 in. wide, stiff, somewhat shining on both surfaces; lateral nerves 10-12 on each side, spreading and curving to unite near the margin, very prominent beneath as is the reticulate venation; petiole short, channelled above, 5 lin. long, densely covered with very short hairs. Male inflorescences 4 in a leaf-axil with one female; peduncle of male $2\frac{1}{2}$ - $3\frac{1}{2}$ lin. long, diameter of head 2 lin.; bracts ovate. Female inflorescence sessile, $2\frac{1}{2}$ lin. long, ovoid, covered from the base to the apex with ovate bracts; ovary subglobose; style rather long; stigmas filiform, exserted. Fruit globose.—Engl. Monogr. Morac. Afr. 30.

Lower Guinea. Island of St. Thomas: near Angolares, *Quintus*, 164.

13. ANTIARIS, Lesch.; Benth. & Hook. f. Gen. Pl. iii. 371.

Flowers in the extra-African species monœcious, in the African species diœcious or subdiœcious, the male densely capitate, the female solitary. Male flower: Perianth 3-4-partite; segments spatulate, imbricate. Stamens 4 or 3, with free short filaments; anthers oblong. Rudimentary ovary 0. Female flower: Perianth 0. Ovary included in and adnate to the receptacle; style 2-partite. branches subulate, exserted, recurved, stigmatose; ovule pendulous from the apex. Fruit fleshy; pericarp merged with the receptacle. Seed pendulous, with a crustaceous or indurated testa; albumen 0; embryo subglobose, with equal fleshy cotyledons; radicle small, superior.—Latex-producing trees or shrubs. Leaves alternate, petiolate, penninerved, entire or serrate. Stipules lateral or connate within the petiole, small, caducous. Receptacles shortly pedunculate in the leaf-axils or in the axils of fallen leaves, male often geminate or few together, female solitary.

Species about 9; five or six in the Indian and Malayan region, the following three confined to Tropical Africa.

- | | |
|--|-----------------------------|
| Veins of the leaves very prominently reticulate on the lower surface | 1. <i>A. africana</i> . |
| Veins of the leaves rather faint; leaves $2\frac{3}{4}$ - $3\frac{1}{2}$ in. broad | 2. <i>A. usambarensis</i> . |
| Veins of the leaves very faint and lax on the lower surface; leaves 1- $2\frac{1}{4}$ in. broad | 3. <i>A. Welwitschii</i> . |

1. *A. africana*, Engl. in Engl. Jahrb. xxxiii. 119. A very large pyramidal tree; young branches leafy, flexuous, longitudinally grooved and wrinkled, shortly and densely rusty-tomentose. Leaves of two kinds; those on the saplings and perhaps also on the young barren shoots elliptic or obovate-elliptic, unequal-sided and subcordate at the base, acutely acuminate at the apex, 4-9 in. long, $1\frac{1}{2}$ - $3\frac{1}{2}$ in. broad, submembranous, denticulate, with several setose hairs on

the teeth, setose-scabrid on the upper surface, setose-pilose below; leaves of the young flowering shoots obovate-elliptic, unequal-sided and rounded or slightly cordate at the base, 2-5 in. long, $1\frac{1}{2}$ - $3\frac{1}{2}$ in. broad, entire, with a recurved cartilaginous margin, rigidly chartaceous or subcoriaceous, scabrous above, shortly scabrid-pubescent below; lateral nerves 6-11 on each side of the midrib, diverging from it at an angle of 45° - 70° , straight or slightly arcuate, very prominent below; veins deeply and densely reticulate below, very prominent; petiole 2-4 lin. long, shortly rusty-tomentose; stipules caducous, broadly ovate; subacute, about $1\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, coriaceous, shortly tomentose outside. Flowers diœcious or submonœcious. Male receptacles pedunculate, flattened, 3-4 lin. in diam.; peduncle slender, slightly thickened towards the apex, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, finely tomentose. Female flowers shortly pedicellate. Style 2-lobed; lobes subfiliform, about $1\frac{3}{4}$ lin. long, puberulous. Fruit drupaceous, shortly stalked, ellipsoid, a little over $\frac{1}{2}$ in. long, very finely mealy-tomentose.

Upper Guinea. Sierra Leone: Scarcies River, *Scott Elliot*, 5892! Gold Coast: Aburi Sandons, *Johnson*, 460! Tanosu, *Chipp*, 97! Togo: near Lome, *Warnecke*, 336! Difala, *Kersting*! Dahomey: Quidat, *Poisson*. Northern Nigeria: Nupe, *Barter*, 1102! 1129! Agaia, *Yates*, 19! 19b! Yola, *Dalziel*, 177! Southern Nigeria: Idda, *Barter*, 1674! Lagos, *Moloney*! Ibadan forest reserve, *Punch*, 111! and without precise locality, *Dodd*, 399! Fernando Po, *Barter*!

2. *A. usambarensis*, *Engl. in Engl. Jahrb.* xxxiii. 119. A large tree with a broad crown and whitish wood; internodes of the young branchlets about $2\frac{1}{2}$ lin. long, covered with dark rusty-brown hairs. Leaves obliquely ovate, 4-5 in. long, $2\frac{3}{4}$ - $3\frac{1}{2}$ in. broad, subcoriaceous, scabrous on the midrib and nerves, the latter and the transverse veins prominent below; lateral nerves 7-8 on each side of the midrib. Fruiting receptacles pedunculate, a little over $\frac{1}{2}$ in. long, about $\frac{1}{3}$ in. across, dark blood-red, hairy. Seed about $\frac{1}{3}$ in. long and $3\frac{1}{2}$ lin. thick.

Mozamb. Distr. German East Africa: Usambara; near Derema, *Scheffler*, 216.

I have not seen an authentic example of this species. According to Engler it differs from *A. africana* in its larger leaves with less prominent venation and larger fruiting receptacles, but an imperfect specimen in the British Museum collected by Zimmermann (921) near Amani and named *A. usambarensis* has very prominent venation.

A specimen collected by Dawe (842) in Uganda may possibly belong here; it is described as an immense tree affording a bark cloth and common in Uganda; the native name is *Kirundo*.

3. *A. Welwitschii* *Engl. in Engl. Jahrb.* xxxiii. 118. A handsome tree with the aspect of a large *Alnus*, 30-60 ft. high or sometimes taller and the trunk reaching 3- $3\frac{1}{2}$ ft. in diameter at the base;

head depressed-dilated, very ample and majestic, evergreen; trunk straight, bare of branches up to 15–20 ft. from the ground, patently branched above, lower branches almost horizontal or even drooping, the upper erect-spreading; young branchlets flexuous, coarsely ribbed when dry, very slightly pubescent. Leaves oblong-elliptic, rounded or very shortly acuminate at the apex, slightly unequal and rounded or truncate at the base, 2–4 in. long, 1–2½ in. broad, entire, chartaceous, minutely puberulous and coppery-red below; lateral nerves 7–11 on each side of the midrib, diverging from it at an angle of 45° or more, arcuate, prominent below; veins very lax; petiole 3–4 lin. long, finely puberulous; stipules caducous. Flowers diœcious. Male receptacles borne on the young annual shoots, shortly pedunculate, discoid with many bracts on the margin. Anthers sessile, ovate. Female receptacles borne on the young shoots, shortly pedunculate. Young fruits greenish, tipped with a long 2-fid style or rarely with several styles; ripe fruits drupaceous, obovoid, about ¾ in. long and ½ in. in diam., shortly pedunculate, mucronate, one-seeded, softly velvety-tomentose, orange-red when fresh; embryo large, white; all parts of the tree, especially the fruit, exuding a viscid resinous whitish milk.—*Ipo toxicaria*, Hiern in Cat. Afr. Pl. Welw. i. 1020, excl. syn., not of Pers.

Lower Guinea. Angola: Golungo Alto; forests of the Alto Queta Mountains, *Welwitsch*, 2593!

The description of the habit of this tree has been taken from the *Welwitsch Catalogue*, and that of the male receptacles from *Engler*.

14. **TRECULIA**, Decne; Benth. et Hook. f. Gen. Pl. iii. 374.

Flowers diœcious, capitata in both sexes, arranged on the outside of and densely surrounded by the bracts of the fleshy receptacle, the head shortly stalked with a few bracts at the base. Male flowers: Perianth tubular, membranous, 2–4-fid at the apex or dentate, thickened at the base. Stamens 2–4, often 3, sometimes one imperfectly developed; anthers oblong or ovate, erect, exerted. Rudimentary ovary 0. Female flowers: Perianth 0. Ovary ovoid, enclosed by the fleshy receptacle or the bracts; style subulate, with stigmatose exerted filiform branches; ovule pendulous from the apex. Fruit a syncarp, globose, sometimes very large, bristly with the bracts surrounding the flowers; achenes in an indefinite series in the fleshy part of the syncarp; pericarp membranous. Seeds ovoid or ellipsoid, with a membranous testa; albumen 0; embryo with unequal cotyledons.—Trees or shrubs, glabrous or hairy. Leaves alternate, shortly petiolate, entire, coriaceous or chartaceous, penninerved; stipules lanceolate, caducous. Flower-heads in the leaf-axils or at leafless nodes, sessile or shortly pedunculate. Bracts below the head few, small, sub-2-seriate, not forming

a true involucre ; bracteoles on the capitula surrounding the flowers peltate or rounded at the apex.

Species 7, one in Madagascar, the others endemic in Tropical Africa.

Male flower-heads $1\frac{1}{2}$ – $2\frac{1}{4}$ in. in diam. ; anthers 1 – $1\frac{1}{2}$ lin. long ; fruits very large 1. *T. africana*.

Male flower-heads less than $\frac{1}{2}$ in. in diam. ; anthers less than $\frac{1}{2}$ lin. long ; fruits (where known) small.

Floral bracts of the male ovoid or subelavate at the apex, without a terminal peltate appendage.

Male receptacles globose 2. *T. acuminata*.

Male receptacles ellipsoid or obovoid 3. *T. obovoidea*.

Floral bracts of the male with a flat peltate appendage at the apex.

Stamens 2.

Leaves glabrous 4. *T. Zenkeri*.

Leaves softly pubescent below 5. *T. mollis*.

Stamen 1 ; leaves glabrous 6. *T. parva*.

1. *T. africana*, Decne in *Ann. Sci. Nat.* 3me sér. viii. 109, t. iii. fig. 86–99. A lofty tree up to 80 ft. high, exuding a whitish latex ; trunk straight, 1–2 ft. in diam. at the base, bare below up to two-thirds of its height, loosely branched above ; branches spreading horizontally or slightly deflected, long and strong, tortuous ; young branchlets dark-purple, glabrous. Leaves elliptic or ovate-elliptic, shortly and obtusely pointed at the apex, rounded and oblique at the base, usually about 3–8 in. long and $1\frac{1}{4}$ –4 in. broad, coriaceous, some (probably from young and vigorous shoots) unequally cordate at the base, up to 17 in. long and $7\frac{1}{2}$ in. broad, and then thinly chartaceous, all glabrous, reddish-brown when dry ; lateral nerves in the smaller leaves about 6 on each side of the midrib, arcuate, looped within the margin, prominent below, in the larger leaves up to about 15 on each side of the midrib ; tertiary nerves and veins loosely reticulate below ; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long ; stipules caducous, lanceolate, acute, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, submembranous, often minutely puberulous outside. Flowers dioecious. Male heads axillary, very shortly pedunculate, globose or slightly ellipsoid, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. in diam. when the anthers are ripe, beset with peltate densely crowded puberulous scales between which the anthers emerge. Perianth usually 2-fid ; lobes erect, ciliolate, closely embracing the filaments. Stamens 2–4, when 2, then often the third inclined to be rudimentary, similarly when 3 some of the flowers have 4 stamens and the anther of the fourth is often much smaller than the others ; filaments stout and glabrous ; anthers 1 – $1\frac{1}{2}$ lin. long. Fruit a syncarp, more or less globose, as large as to twice as large as a man's head, yellowish outside when ripe, very rough with the knob-like tops of the perianth-segments ; style with two exerted lobes, slender,

glabrous. Seeds numerous, embedded in the syncarp, according to Welwitsch sometimes more than 1500 in a single fruit, ellipsoid, about 4 lin. long and 3 lin. in diam., with thin and smooth coats.—Walp. Ann. i. 658; Hook. f. in Bot. Mag. t. 5986; Ficalho, Pl. Uteis, 272; Henriques in Bolet. Soc. Brot. x. 162; Engl. Monogr. Morac. Afr. 32, tt. xii.—xiv. fig. B; Hiern in Cat. Afr. Pl. Welw. i. 1022. *Myriopeltis edulis*, Welw. ex Hook. f. l.c., name only. *Ficus Welwitschii*, Miq. ex Hook. f. l.c., name only, not of Warb. *Treculia affona*, N.E.Br. in Kew Bulletin, 1894, 360, and in Hook. l.c. Pl. t. 2353. *T. africana*, var. *nitida*, Engl. l.c. 33. *T. Dewevrei*, De Wild. & Durand, Contrib. Fl. Congo, i. 54, and Ill. Fl. Congo, 139, t. lxx. *Ficus Whytei*, Stapf in Johnston, Liberia, ii. 650; Mildbr. & Burret in Engl. Jahrb. xlv. 269.

Upper Guinea. Senegambia, *Heudelot*. Sierra Leone: Searcies Valley; woods near Tawia, *Scott Elliot*, 4477! Liberia: Sinoe Basin, *Whyte*, 21! Southern Nigeria: Onitsa, also with a range from the Niger Delta to 30 miles above the confluence of the Niger and Benue Rivers, *Barter*, 432! Oloke Meji, *Forster*, 150! Yoruba, *Millson*! Cameroons: Ambas Bay, *Mann*, 773! Bipinde, *Zenker*, 3404! Batanga, *Dinklage*, 1411! and without precise locality, *Lchmbach*, 3a.

Nile Land. Niamniam: near Kulenjo, *Schweinfurth*, 2869! Uganda: Busiro, *Dawe*, 145! Buvuma Island, Victoria Nyanza, *Bagshawe*!

Lower Guinea. Princes Island, *Barter*, 2001! St. Thomas Island, *Quintas*, 169! *Welwitsch*, 2589! Gaboon: probably introduced from St. Thomas Island, *Klaine*, 2097! Angola: Barra do Dande; cultivated on Fazenda do Bombo, on the right bank of the River Dande, *Welwitsch*, 2588! Golungo Alto: Alto Queto Mountains, *Welwitsch*, 2587!

South Central. Belgian Congo: Niamniam; on the Yuru River, *Schweinfurth*, 3340! Assika River, *Schweinfurth*, 3318! Monbuttu; Bumba River, *Schweinfurth*, 3586; Umangi, *Dewèvre*.

Mozamb. Distr. Nyasaland: west shore of Lake Nyasa, *Kirk*!

De Wildeman (*Contrib. Fl. Congo*, i. 55) has laid considerable stress on the value of the number of stamens as a specific character, having found only 2 in the plant described by him as *T. Dewevrei*, pointing out that the type specimen of *T. africana* from Senegambia was described as having 3-4 stamens. The number of stamens seems to be of little account, for in the same head may be found flowers with either 2 or 3 stamens, one of the anthers being often smaller than the others, whilst in other heads there are some flowers with 3 and others with 4 stamens.

According to Barter, *T. africana* is the "Bread-tree" of the Lower Niger; the fruit weighs from 18 to 30 lbs.; the seeds are ground by the natives and used as meal.

Forster on his label states that the "fruits are poisonous to horses."

According to Millson the fruits are placed in heaps and fermented; the seeds are afterwards gathered, ground into a paste and cooked by frying in palm oil. Although the fruits are regarded as poisonous to horses, sheep and goats, they are, according to Millson, the favourite food of elephants.

In Prince's Island Barter states that the plant is known as *Oque* by the Eboe tribe.

Welwitsch (cf. Hiern, l.c. 1023) states that in Angola the seeds are "edible when cooked, as large as *Pinus Pineae*, L., and not dissimilar in taste, sometimes boiled, sometimes roasted or prepared like sweetmeats and so eaten by negroes, especially by the Mahungos and also by the colonists, and used in the preparation of a kind of almond-milk which is truly refreshing drink in these hot countries, and alleviates in a very great degree the thirst of those stricken down with fever."

2. *T. acuminata*, Baill. in *Adansonia*, xi. 292. A shrub 8–10 ft. high; young branches slender, shortly pubescent. Leaves elliptic or oblong-obovate, subabruptly but obtusely caudate-acuminate, slightly narrowed or rounded to a very obtuse or rounded base, 3–7 in. long, $1\frac{1}{4}$ – $2\frac{3}{4}$ in. broad, acumen $\frac{1}{2}$ –1 in. long, chartaceous, glabrous and dull on both surfaces; lateral nerves 8–10 on each side of the midrib, spreading from it at an angle of about 60° , prominently looped and branched well within the margin; tertiary nerves and veins forming a loose conspicuous network below; petiole 1–2 lin. long, wrinkled; stipules subpersistent, linear-lanceolate, acute, about $\frac{1}{4}$ in. long, nearly glabrous, purplish. Male heads very shortly pedunculate, axillary, about 2 lin. in diam.; basal bracts closely appressed to the receptacle, ovate, about $\frac{2}{3}$ lin. long, slightly pubescent outside; floral bracts confluent nearly to the apex, the small short free tips ovoid or subclavate, tomentose. Perianth very small; stamens 2. Female heads globose, about $\frac{1}{4}$ in. in diam. when in flower, rough with the shortly tomentose tips of the floral bracts and the long exerted style-arms; basal bracts similar to the male but more hairy. Floral bracts of two kinds, free for half their length, the outer shortly clavate and obtuse, the inner thickly awl-shaped and bristly; style-arms $\frac{1}{2}$ –1 lin. long. Immature fruiting head about $\frac{3}{4}$ in. in diam., bristly with the persistent bracts.—N. E. Br. in *Kew Bulletin*, 1894, 360; *Engl. Monogr. Morac. Afr.* 34.

Lower Guinea. Gaboon: Mount John on the River Kongui, *Mann*, 1804! near Libreville, *Klaine*, 992! 2174!

3. *T. obovoidea*, N. E. Br. in *Kew Bulletin*, 1894, 361. A tree 30 ft. high; young branchlets at first very minutely puberulous. Leaves oblong or oblong-elliptic, obtusely and rather abruptly acuminate, slightly narrowed to or subcuneate at the apex, 3–7 in. long, 1 – $3\frac{1}{2}$ in. broad, chartaceous, glabrous on both surfaces; lateral nerves, veins, petiole and stipules as in *T. acuminata*. Male heads and bracts as in *T. acuminata*, but the former ellipsoid or obovoid, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, up to 5 lin. in diam. Basal bracts rather lax and distant, ovate, acute, closely puberulous outside, ciliolate. Perianth tubular, lobed at the apex, lobes acute, shortly ciliate. Stamens mostly 3.—*T. Staudtii*, *Engl.* in *Pflanzenfam. Nachtr.* i. zum ii.–iv. 120, and *Monogr. Morac. Afr.* 33, t. xiv. fig. A. *T. Staudtii*, var. *angustifolia*, *Engl. l.c.* 34.

Upper Guinea. Southern Nigeria: Old Calabar River, *Mann*, 2303! *Thomson*, 104! Oban, *Talbot*, 2316a! 2321! 2335! Cameroons: Johann Albrechtshöhe, *Staudt*, 633! 685! 934! Lolodorf, *Staudt*, 270! Bipinde, *Zenker*, 2526! 3776!

I have not seen an example of the genus *Acanthotreculia*, *Engl.* in *Engl. Jahrb.* xl. 546 (*A. Winkleri*, *Engl. l.c.* 548, fig. 2), founded on female material collected by Winkler (1283) and Zenker (2295) in the Cameroons; but Engler's figure depicts a plant which I have little doubt is the female of *Treculia obovoidea*, N. E. Br. The same prickly female receptacle occurs in *T. acuminata*, Baill.,

but in that species, as in the male heads, it is globose and not ellipsoid as in Engler's plant. The male receptacles of *T. obovoidea* are, however, ellipsoid or obovoid, and a corresponding shape might be expected in the case of the female, a condition which is fulfilled in Engler's *Acanthotreculia*.

4. *T. Zenkeri*, *Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. i. zum ii.-iv.* 121. A slender shrub 6-8 ft. high; young branchlets wiggly, minutely puberulous. Leaves oblong-elliptic or obovate-elliptic, abruptly and obtusely caudate-acuminate, narrowed or rounded to the base, 4-8½ in. long, 1-3 in. broad, chartaceous, glabrous on both surfaces, with prominent straw-coloured venation below; midrib slightly impressed above, very prominent below; lateral nerves 6-12, diverging from the midrib at a wide angle, prominently looped and branched well within the margin, sometimes slightly impressed above, prominent below; venation slender and rather loose, conspicuous below; petiole 2-3 lin. long, wrinkled and minutely puberulous; stipules subsistent, parallel with the shoot, lanceolate, acute, 2-3 lin. long, somewhat rigidly chartaceous, finely puberulous outside. Male flower-heads at the apex of a short axillary bracteate peduncle, globose, in the young state about 1½ lin. in diam., at length 3 lin. in diam., with a conspicuous covering of peltate tipped puberulous bracts. Male perianth-lobes shortly ciliate; stamens 2; filaments exerted, glabrous; anthers ¼ lin. long, broadly ellipsoid. Female heads not known.—*Engl. Monogr. Morac. Afr.* 34. t. xv. fig. A.

Upper Guinea. Southern Nigeria: Oban district, *Talbot*, 654! 1506! Cameroons: Efulen, *Bates*, 393! Bipinde, *Zenker*, 1045!

5. *T. mollis*, *Engl. in Engl. Jahrb.* xl. 546. A tree 50-70 ft. high; young branchlets pubescent, about 1¾ lin. thick; internodes ½-1 in. long. Leaves elliptic or oblong-elliptic, subcordate and very unequal-sided at the base, caudate-acuminate at the apex, 6-9 in. long, 3-3½ in. broad, acumen subobtuse, ¾ in. long, rigidly chartaceous, glabrous above, pilose-pubescent below; midrib very prominent below, about 1¼ lin. broad at the base, pubescent; lateral nerves about 13 on each side of the midrib, diverging from it at an angle of about 65°, curved, looped close to the margin, very prominent below; tertiary nerves lax and slender; petiole about ½ in. long, pubescent; stipules caducous, lanceolate, acute, 4 lin. long, very shortly puberulous. Male inflorescence globose, about ¾ in. in diam., very shortly pedunculate, with suborbicular bracts at the base; floral bracts with peltate apices about ¾ lin. in diam. Stamens 2; anthers linear, obtuse. Female flowers not known.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 635! Cameroons: Bipinde, *Zenker*, 3333!

6. *T. parva*, *Engl. in Pflanzenfam. Nachtr. i. zum ii.-iv.* 121. A small shrub up to 3½ ft. high; young branchlets slender, subterete.

minutely tomentose, at length glabrous. Leaves oblong or slightly oblong-oblongeolate, caudate-acuminate, acumen $\frac{1}{2}$ in. long. obtuse, subcuneate and unequal-sided at the base, 2–3 $\frac{1}{2}$ in. long. $\frac{3}{4}$ –1 $\frac{1}{4}$ in. broad, thinly chartaceous, glabrous and rather dull on both surfaces; lateral nerves about 7 on each side of the midrib, diverging from it at an angle of about 65°, prominent below and conspicuously looped and branched well within the margin; veins fairly loose but distinct below; petiole curved, about 2 lin. long, shortly puberulous; stipules subsistent, linear-lanceolate, acute, 2 $\frac{1}{2}$ lin. long, glabrous. Male inflorescence not seen, according to Engler subglobose, small, with ovate ciliolate bracts at the base; peduncle at first about as long as the petiole, at length 2–3 times as long, bearing numerous subovate shortly silky-pilose bracts. Floral bracts with an orbicular peltate apex. Male flowers with 1 stamen, the perianth overtopping the bracts; stamen elongate-clubshaped, 1 $\frac{1}{2}$ times as long as the perianth; anthers ovoid.—Engl. Monogr. Morac. Afr. 34, t. xv. fig. B.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 983! 4907!

15. **MYRIANTHUS**, P. Beauv.; Benth. et Hook. f. Gen. Pl. iii. 379.

Flowers diœcious. Male flowers small, yellow. Perianth deeply divided into 3 or 4 obovate concave segments. Stamens generally equal in number and opposite to the perianth-segments, free or some or all more or less united by their filaments; filaments narrow; anthers generally slightly exerted, ellipsoidal. Rudimentary ovary absent. Female flowers: Perianth obovoid or ovoid, forming round the ovary a sac with a narrow mouth. Ovary ovoid, passing above into a short cylindrical style which bears a single broad stigma just above the mouth of the perianth; stigma densely covered with brown hairs on the upper face; ovule erect from the base. Fruits ovoid, enveloped in the persistent fleshy perianth, crowded in a spherical or ovoid head on the slightly or much swollen receptacle, connate below the middle or at the base; endocarp hard, enclosing the seed. Seed-coat thin; albumen absent; cotyledons thick, plano-convex, equal.—Shrubs or trees. Leaves alternate, simple, 3–5-lobed or palmately compound with 5 or more leaflets; leaves or leaflets elliptical to oblanceolate, with a pointed apex and generally sharply-toothed margin; under face generally covered with a dense short whitish tomentum between the conspicuously reticulated veinlets; petioles generally long, but usually shorter than the blades. Stipules united to form a conical covering round the apical bud, densely hairy. Inflorescences in pairs in the leaf-axils; bracts on the axis and branches small and soon falling. Male: Peduncle stout, generally shorter than the petiole, dividing into 3 or more spreading branches which fork repeatedly; flowers borne on the short

branches of the last few grades which they generally cover with a continuous mass; bracteoles associated with the flowers somewhat similar to but narrower than the perianth-segments. Female: Peduncle short, bearing a spherical head of crowded flowers, among which are narrower shorter bracteoles; peduncle increasing in length and thickness in fruit.

Species 10 in Tropical Africa, chiefly western.

Perianth of the female flower becoming thicker above.

Receptacle much enlarged in fruit (Sect. **Eumyrianthus**).

Male flowers more or less completely covering the short branchlets of the ultimate grades of the inflorescence. Leaves with 5-7 leaflets.

Leaflets sessile or subsessile: a tree 1. *M. arboreus*.

Leaflets distinctly stalked; a shrub or small tree.

Leaf-margin sharply serrate-dentate 2. *M. gracilis*.

Leaf-margin entire 3. *M. elegans*.

Median leaflet shortly stalked, the others sessile... 4. *M. Laurentii*.

Male flowers in subglobose clusters which do not coalesce to form a continuous covering of the branchlets of the inflorescence 5. *M. Percussii*.

Perianth of the female flower ovoid, tapering above.

Receptacle only slightly enlarged in fruit (Sect. **Dicranostachys**).

Leaves entire or 3-lobed (sometimes divided into sessile or subsessile leaflets in *M. Holstii*).

Branchlets of male inflorescence of highest grades covered with a continuous mass of flowers.

Female flowers 7-15. Western species.

A tree; leaf-base acute to obtuse 6. *M. serratus*.

A shrub or small tree; leaf wedge-shaped below, with truncate base 7. *M. cuneifolius*.

Female flowers 20 or more. Eastern species... 9. *M. Holstii*.

Male flowers in oblong or roundish clusters on the ultimate branchlets 8. *M. libericus*.

Leaves with 5-8 distinctly stalked leaflets... .. 10. *M. Talbotii*.

The species numbered 2 to 5 are based on material from male plants only; I have seen no specimens and have followed the authors of the species in including them in the section *Eumyrianthus*.

1. *M. arboreus*, *P. Beauv. Fl. Owar.* i. 17, t. 11. A small or large tree 6½-65 or 80 ft. high,—“ 20-25 ft. high, with the trunk 1½-2 ft. in diam. at the base, branching shortly above the base, with spreading branches ” (*Welwitsch*); branchlets and petioles bearing soft short hairs with longer hairs intermixed, branchlets cylindrical, internodes 1¼-2 in. long, ½-1¼ in. thick, when young containing a soft pith in which as in the primary cortex are solitary large mucilage cells, ultimately hollow and inhabited by ants which penetrate by means of small openings. Leaves generally with 5-7 leaflets; leaflets subcoriaceous, sessile, subsessile or shortly stalked, lanceolate

becoming wedge-shaped below, or sometimes broader and elliptical to obovate-elliptical, the median one larger, the lateral gradually smaller, apex generally shortly sometimes abruptly acute, base generally obtuse, margin serrate-dentate often unequally, the median segments 8–20 in. long, $3\frac{1}{2}$ –8 in. wide, the outside segments about half as long as the median, upper face sparsely pilose, lower with short hairs on the veins and cobwebby-hairy in the meshes; secondary nerves numerous, regular, ascending, prominent beneath. Leaves of seedling simple, ovate-elliptical. Petiole short, longitudinally furrowed, generally shorter than the leaf. Stipules ovate-acute, forming a pointed cap $\frac{3}{4}$ – $1\frac{1}{4}$ in. long round the young leaves, densely covered with silky hairs, caducous. Male inflorescences axillary, ferruginously hairy, hairs very short; bracts small, ovate-acute, soon falling; peduncle varying very much in length from barely 2 to 7 in., dividing into usually 4 shorter branches which subdivide repeatedly in an irregularly dichotomous manner; branchlets of the last few grades $\frac{1}{2}$ in. or less in length, cylindrical, the surface forming a continuous mass of flowers which are at first yellow but after the dehiscence of the anthers brownish-gold; floral bracts obovate-cuneate, curving upwards and partially covering the flower; perianth generally 4-partite, about $\frac{1}{2}$ lin. long, segments broadly obovate, concave; stamens about as long as the perianth, free or filaments sometimes more or less united. Female inflorescences in pairs, subglobose, about $1\frac{1}{4}$ in. in diam.; peduncle stout, to about 2 in. long and 5 lin. thick; bracts at base of stalk ovate-lanceolate, 2– $2\frac{1}{2}$ lin. long, at base of head shortly ovate, 1 lin. long, soon falling; flowers densely crowded; floral bracts linear-spathulate, irregularly arranged among the flowers, a little shorter than the perianth; perianth obovoid, 4–6-angled, with depressed or truncate upper portion covered with small warts and short conical hairs surrounding the narrow mouth, 2– $2\frac{1}{2}$ lin. high, fleshy, becoming thicker upwards (to 1 line). Ovary shortly ovoid, about 1 lin. long, passing above into a cylindrical style of about the same length which bears a broad lanceolate stigma recurving from the mouth of the perianth, $1\frac{1}{4}$ lin. long. Ripe compound fruit yellow, large, depressed globose or excentrically ovoid, to about 4 in. in diam.; perianth thick and fleshy, minutely warted above, about 7 lin. across and $3\frac{1}{2}$ –4 lin. thick in the upper portion; fruit $\frac{3}{4}$ in. long and about half as thick, outer wall very thin; endocarp $\frac{1}{2}$ – $\frac{3}{4}$ lin. thick, enclosing the ovoid seed; testa thin, brown; cotyledons of equal length, thick, plano-convex.—R. Br. App. to Capt. Tuckey's Narrative, 453; Spreng. Syst. iii. 19; Ficalho, Pl. Uteis, 273; Engl. Pf. Ost-Afr. B. 181, 293, C. 162, and Monogr. Morac. Afr. 37, t. 16; Hiern in Cat. Afr. Pl. Welw. i. 995; Rendle in Journ. Linn. Soc. xxxvii. 214; De Wild. & Durand. Contrib. Fl. Congo, i. 54, ii. 58, and in Bull. Herb. Boiss. 2me sér. i. 49; De Wild. Miss. É. Laurent, 71, 377, and Études Fl. Bas- et Moyen-Congo, ii. 31, iii. 66; Th. & Hél. Durand, Syll. Flor. Congol. 510;

Mildbraed, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8*, ii. 182.

Upper Guinea. Sierra Leone: Fofui, *Pool*, 43! Kambui Reserve, *Pool*, 332! Gold Coast: Aburi, *Brown*, 939! Anobelao, *Chipp*, 125! Ashanti; near Dunquali, *Cummins*, 7! Togo: near Misahohe, *Baumann*, 430; Bismarckburg, *Büttner*, 44. Dahomey, *Le Testu*, 240! Northern Nigeria: Lapai, *Yates*, 34! Southern Nigeria: Lagos, *Moloney*! Ajilete, *Millen*, 117! Yoruba, *Millson*, *Barter*, 3407! Onitsa, *Barter*, 1677! Benin, *Beauvois*; *Uwain*, 40! Cross River, *McLeod*! Botanic Gardens, Old Calabar, *Holland*! Cameroons: Yaunde, *Zenker*, 185! Abo, *Buchholz*; Amba Bay and Cameroon River, *Mann*, 716!

Nile Land. British East Africa: Fort Hall, 4000-5000 ft. *Battiscombe*, 7! *Hutchins*! Uganda: Kivuvu, 4000 ft., *Dümmer*, 421! Mouth of Kagera River, *Bagshawe*, 159! Lendu Plateau, 4000 ft., *Stuhlmann*, 2706.

Lower Guinea. Gaboon: Dongkila, *Klaine*, 2700! Lower Congo, *Smith*! Mayumbe. Districts of the Cataracts and Stanley Pool, *Laurent*; Mayunbe, *De Bricy*, 49! Kisantu, *Gillet*, 156. Angola: Golungo Alto; forests about Sange and in the Alto Queta and Cungulungulo Mountains, *Welwitsch*, 2590! and fruit, 901! Pungo Andongo; forests of Mata de Pungo, *Welwitsch*, 2591! Cazengo, *Gossweiler*, 578!

South Central. Belgian Congo: Monbuttu; by the Kussumbo River, *Schweinfurth*, 3138! Wabado Forest, *Stuhlmann*, 2660; Ituri River region, 3000 ft., *Stuhlmann*, 2629; between Beni and Irumu at 3700 ft., *Mildbraed*, 2765, 2793. Bashilange district; near Mukenge, *Pogge*, 1386; Valleys of the Feni and Basoko, *Laurent*; Eala, *Laurent*, 791; River Sankuru, *Demicuse*; Munungu, *Laurent*; Sankuru and Madibi, *Sapin*.

Mozamb. Distr. German East Africa: Mpororo, 6700 ft., *Stuhlmann*, 3152; Usambara; Silai, *Holst*, 2302!

2. *M. gracilis*, *Engl. in Engl. Jahrb.* xx. 150. A shrub or small tree 5-6 ft. high, branchlets and petioles with very short hairs. Leaves with 7 leaflets which are thin, lanceolate, apex long and very sharply acuminate, base acute, margin sharply serrate-dentate, very unequal, the median which are $2\frac{1}{2}$ times as long as the outermost from 6-11 in. long, 2-3 in. wide, narrowing cuneately from the upper third down to the stalk which is 7 lin. long, apex 7-10 lin. long, very densely net-veined and very shortly tomentose between the nerves; petiole slender, furrowed, 6-8 in. long. Stipules broadly ovate, with appressed hairs on the outside. Male inflorescence much branched, covered with short greyish hairs, more than 4 in. long, branches $1\frac{1}{4}$ -2 in. long, the ultimate branchlets bearing oblong more or less confluent flower-clusters $2\frac{1}{2}$ -5 lin. long and 2 lin. broad. Flowers 3-4-merous; sepals obovate, ciliolate; stamens rather broadly linear, overtopping the sepals. Female flowers and fruit unknown.—*Engl. Monogr. Morac. Afr.* 39, t. xvii. B.; Mildbraed, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8*, ii. 182.

Upper Guinea. Cameroons: forest between Barombi-ba-Ubu and Kake, *Preuss*, 478.

South Central. Beni: Muera, north-west of Fort Beni, *Mildbraed*, 2248.

3. *M. elegans*, *Engl. in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 182. A shrub 6-10 ft. high; branchlets slender, when young bearing like the petioles and inflorescences

minute grey hairs, ultimately glabrous. Leaves with 5 leaflets, membranous, lanceolate, with a long sharply acuminate apex, 1-1½ in. long, acute base and entire margin, glabrous on the upper face, covered with a minute grey tomentum beneath, the three median leaflets 8¾-10¾ in. long, 2¼-3¼ in. wide, narrowing gradually from the upper third to the 7-10 lin.-long stalk; the lateral leaflets about 4 in. long with a stalk 5 lin. long; petiole 4-6½ in. long. Male inflorescences much branched, about 4 in. long and broad, the ultimate branchlets bearing more or less confluent nearly globular clusters of flowers ¾-1 lin. in diam. on pedicels ½-1 lin. long. Flowers 3-4-merous; perianth-segments obovate, ciliate, shorter than the stamens; anthers didymous. Female plant unknown.

South Central. Beni: forest of Muera, north-west of Fort Beni, *Mildbraed*, 2260.

Near *M. gracilis*, Engl., but distinguished by the entire leaf-margin and the small spherical flower-clusters.

4. *M. Laurentii*, *De Wild. Études Fl. Bas- et Moyen-Congo*, iii. 68. Branchlets and petioles covered with short appressed hairs, cortex brownish, longitudinally striate; internodes about 2 in. long. Leaves with 5 leaflets which are oblong or obovate-oblong, acuminate at the apex with a long sharp point, base wedge-shaped, margin sharply serrate-dentate. 5½-9 in. long, 1¾-3¼ in. wide, sessile except the median which is shortly stalked, glabrous on the upper face, with a short whitish tomentum beneath; lateral nerves about 20 on each side, more prominent beneath, network between the secondary veins more apparent on the upper face; the lateral basal leaflets are very slightly asymmetrical; petiole furrowed, 4-4¾ in. long and about 1½ lin. thick. Male inflorescences in pairs; peduncle about 2 in. long, hairy like the branchlets; inflorescence about 3 in. in diam.; flowers in small more or less confluent balls about 1½-2 lin. in diam.; perianth about as long as the stamens, lobes with ciliate margin. Female flowers and fruit unknown.

South Central. Belgian Congo: Eala, *Laurent*, 2002.

Near *M. Preussii*, Engl., but differs in having the leaves more narrowly wedge-shaped at the base and with shorter stalks, sometimes even sessile or subsessile.

5. *M. Preussii*, *Engl. in Engl. Jahrb.* xx. 149. Branchlets and petioles covered with short appressed hairs, the former cylindrical about 2½-4½ lin. thick with hollow internodes ¾-1¼ in. long. Leaves with 5-7 leaflets, which are oblanceolate-oblong, the median 6-10 in. long and 2¼-3¼ in. wide, passing into a very long (7 lin.) narrow acute apex, base acute passing into the petiole which is 5-10 lin. long, margin sharply serrate-dentate, covered with a short grey tomentum on the under face between the close network of veins, lateral nerves numerous on each side, curving upwards; petiole 6 in. or more in length, with a longitudinal furrow. Stipules large, ovate,

very acute, 7 lin. long and about as broad at the base. Male inflorescences in pairs in the leaf-axils, spreading, equal to or longer than the petiole, covered with stiff hairs, 4 in. long, much branched, branches spreading at a right angle, 2-3¼ in. long, ultimate branchlets 2½-5 lin. long; bracts at base of the branches narrow-lanceolate, blunt, caducous; clusters of flowers subglobose, 2-2½ lin. in diam., aggregated at the end of branches of the third or fourth order, but never coalescing as in *M. arboreus*. Flowers 3-4-merous; sepals obovate, ciliate, barely ½ lin. long; stamens rather broadly linear, anthers just exerted. Female flowers and fruit unknown.—Engl. Monogr. Morac. Afr. 40, t. xvii. A. *M. Sereti*, De Wild. Études Fl. Bas- et Moyen-Congo, iii. 68 (?).

Upper Guinea. Cameroons: Barombi, *Preuss*, 478, partly.

South Central. Belgian Congo: Gumbari, *Seret*, 590.

I can find no character in De Wildemann's description to distinguish *M. Sereti*.

6. *M. serratus*, *Benth. et Hook. f. Gen. Pl.* iii. 379. A tree 30-60 ft. in height with an erect cylindrical trunk; branchlets cylindrical, when young bearing short appressed dull brown hairs, ultimately glabrous, ¾-1¾ in. long, 2-3 lin. thick, becoming hollow, bearing the ring-shaped scar of the stipule. Leaves leathery, elliptical to obovate-elliptical or oblong-elliptical, sometimes 3-lobed, the lateral lobes being much smaller than the main lobe, apex more or less sharply acute, base acute to blunt or rounded, sometimes unequal, margin sharply and unequally serrate, teeth pointing upwards, becoming fewer or absent at the base, 6-20 in. long, 4-10 in. wide, or in the lobed leaves to 14 in. wide, when young sparsely hairy above, ultimately glabrous and shining, tomentose on the lower face, midrib and ascending lateral veins prominent beneath, lateral veins 10-12 on each side, the lowest pair often strong and in the lobed leaves forming the mid-vein of the lobe; petiole hairy like the stem when young, becoming sparsely hairy later, varying much in length but shorter than the blade, 1-6 in. long. Stipules broadly ovate, acute, silky hairy, about ¼ in. long. Male inflorescences in pairs in the leaf-axils, equal to or shorter than the leaf-stalk; peduncle hairy like the young stem, ¾-2¾ in. long, repeatedly forking or passing into three secondary branches which in turn are forked, the branchlets of the 3rd to 5th degree about 1½ lin. thick and closely beset with flowers; bracts at the base of the branches broadly triangular-ovate, densely hairy, soon falling, barely ½ lin. long; flowers white, fragrant; bracteoles minute, obovate or cuneate; perianth with 4 very obtuse concave segments, ciliate above; stamens 4, scarcely exceeding the perianth. Female inflorescences in pairs; peduncle barely ¼ in. long, bearing a head of 7-15 flowers; perianth ovoid, covered with short grey hairs, about 1¼ lin. long and 1 lin. in diam., with a very small mouth through which protrudes the long spatulate stigma. Peduncle lengthening to ¾-1 in. long in fruit; fruits

ovoid, about 7 lin. long and 5-6 lin. in diam., fleshy wall of perianth about 1 lin. thick, endocarp about $\frac{1}{2}$ lin. thick.—Engl. Mon. Morac. Afr. 40, t. xvii. fig. C. *Dicranostachys serrata*, Trécul in Ann. Sci. Nat. sér. 3, viii. 85, t. 1, figs. 1-8.

Upper Guinea. French Guinea: near Futa Jallon, *Heudelot*, 840! Ditinn, *Chevalier*, 12971! Sierra Leone: various localities, *Scott Elliot*, 4439! 4560! 4811! 5059! 5267! 5881! *Thomas*, 157! 181! 2128! 3438! 3782! 6545! 6632! 6682! 8243! 8653! 8747! 9459! 9720! 9736! 10124! 10490! Liberia: Sinoe Basin, *Whyte*! Ivory Coast: Zaranou and Yaou, *Chevalier*, 162761! Gold Coast: Atanaso, *Chipp*, 229! Tano River, *Chipp*, 341! Togo: Bismarckburg, *Büttner*, 689. Nigeria: various localities, *Vogel*! *Barter*, 1100! *Mann*, 2273! *Dalziel*, 915!

7. *M. cuneifolius*, *Engl. Monogr. Morac. Afr.* 40, t. xvii. D. A bush or small tree "12 ft. high" (*Mann*); branchlets cylindrical, clothed when young, like the petioles and inflorescence, with short stiff pointed upcurved hairs; internodes $\frac{3}{4}$ -2 in. long, $\frac{1}{3}$ in. thick, becoming hollow. Leaves leathery, elliptical-oblong, apex acuminate, narrowing below the middle to the obtuse somewhat truncate base, sometimes deeply 3-5-lobed, the two outer lateral lobes much smaller than the median, margin sinuate-dentate, teeth short, pointing upwards, becoming fewer at the base, varying greatly in size, 6-14 in. long, $2\frac{1}{2}$ -6 in. wide, in the lobed leaves the median lobes to 16 in. long, $4\frac{3}{4}$ in. wide, the lateral lobes to 9 in. long and $2\frac{3}{4}$ in. wide, upper face glabrous and shining, with a dense white tomentum beneath, midrib with ascending lateral veins (about 15 on each side) and connecting veinlets prominent beneath; petioles reddish when dry, very unequal but much shorter than the blade, $2-4\frac{3}{4}$ in. long. Male inflorescences as in *M. serratus*, peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in. long, the short branches of the last two grades, 3-5 lin. long, bearing a continuous mass of flowers; bracteoles overtopping the flower-buds, somewhat club-shaped, the broad concave upper part ciliolate; flowers 2-4-merous; segments of perianth distinct, with a broad base and a broader rounded concave upper part which is ciliolate on the back; stamens with filaments sometimes united. Female inflorescence and flowers as in *M. serratus*, the ovoid perianth covered with stiffish appressed upwardly directed brown hairs.—*M. serratus*, var. *cuneifolius*, *Engl.* in *Engl. Jahrb.* xx. 150.

Lower Guinea. Spanish Guinea: Kongui River, *Mann*, 1819! Gaboon: River Gaboon, *Mann*, 1051! Sibange, *Soyaux*, 381!

8. *M. libericus*, *Rendle in Journ. Bot.* 1915, 354. A bush; young branchlets, petioles and inflorescence bearing a greyish-brown pubescence. Leaves thinly leathery, broadly oblong-elliptical or 3-fid with a large elliptical-oblong middle segment and small lateral segments, apex abruptly and sharply acuminate, base obtuse, margin unequally toothed, teeth sharp, pointing upwards, 11-12 in. long, $5\frac{1}{4}$ in. wide, upper face sparsely hairy, lower tomentose as in *M.*

serratus, midrib and veins prominent beneath, lateral veins about 10 on each side, strongly ascending; petiole about half as long as the leaf. Stipules protecting the bud densely silky-hairy, $\frac{1}{4}$ in. long. Male inflorescences in pairs, about $2\frac{1}{2}$ in. broad; peduncle 2- $2\frac{3}{4}$ in. long, barely 1 lin. thick, dividing into 3 or 4 repeatedly forking slender branches; ultimate branchlets, of the 5th or 6th grade, densely covered with flowers forming oblong or roundish clusters, 2-3 lin. long, which are sometimes confluent at the base. Bracteoles narrower than the perianth-segments, concave and ciliate above; perianth divided to the base; segments 4, with a broad blunt thickened concave apex, ciliate on the back, and tapering below to the base; stamens 3-4, filaments united. Female plant unknown.

Upper Guinea. Sierra Leone, *Unwin & Smythe*, 2! Liberia: Mount Barclay, *Bunting*!

Allied to the last two species but distinguished by the larger male inflorescence with slender branches and small more or less distinct clusters of flowers on the ultimate branchlets.

9. M. Holstii, *Engl. Monogr. Morac. Afric.* 41, t. xvii. E. A tree 30 ft. or more high, the young portions densely covered with fine brown hairs; internodes of branches 7-10 lin. long, 3-5 lin. thick. Leaves leathery, more or less deeply 3-5-lobed, lobes elliptical-oblong, or completely divided into 5 or 7 oblong-elliptical or elliptical-oblancheolate to obovate leaflets, apex of lobes shortly acuminate, base truncate or subcordate, margin serrate-dentate, teeth small, upper face smooth, densely tomentose beneath between the closely reticulate veins, segments or leaflets 8-20 in. long and 3-7 in. broad, the median lobe and leaflet longer and slightly broader than the lateral, secondary nerves springing from the main nerve of the leaf-lobe at an angle of 45° and 5-7 lin. apart; petiole about half to three-quarters the length of the leaf, slightly furrowed. Male inflorescence with a peduncle $1\frac{1}{2}$ -4 in. long, about 4 in. broad; branches slender, those of the last two grades covered with a continuous mass of flowers, ultimate branchlets with flowers $2\frac{1}{2}$ - $3\frac{1}{2}$ lin. long and $2\frac{1}{2}$ lin. thick; flowers generally 4-merous; sepals about $\frac{1}{2}$ lin. long, broadly obovate, about equal in length to the narrower bracteoles; stamens with narrowly linear filaments, overtopping the perianth. Female inflorescences with a stalk to $1\frac{1}{4}$ in. long, and a head 7 lin. in diam., many-flowered. Head of fruit $1\frac{1}{2}$ -2 in. in diam., stalk 2 in. long; fruits numerous, ovoid, slightly compressed, enclosed in the fleshy perianth, about 5 lin. long and 4 lin. broad.—*Var. quinquesectus*, *Engl. in Engl. Jahrb.* xxx. 295. *M. arboreus*, S. Moore in *Journ. Linn. Soc. Bot.* xl. 206 (not of Beauv.).

Mozamb. Distr. German East Africa: Usambara: Lutendi Forest, 5000 ft., *Holst*, 3308! near Muafa, 3500 ft., *Buchwald*, 26! Nderema, 3000 to 3300 ft., *Volkens*, 119! Kondeland, *Goetze*, 1312! Nyasaland: Milanji, *Brown*! Shire Highlands, *Buchanan*, 69! Gazaland: Chirinda Forest, 3700-4000 ft., *Swynnerton*, 111! Mount Pene Forest, 6500-7000 ft., *Swynnerton*, 1052!

10. *M. Talbotii*, Rendle in *Journ. Bot.* 1915, 354. Leaf-bearing twigs with long hollow cylindrical internodes, $\frac{1}{4}$ in. thick, bearing in the young state short whitish appressed hairs. Leaves with 5-8 stalked leaflets; leaflets membranous when dry, broadly oblanceolate or oblong-elliptical, apex sharply acuminate, base acute passing into the stalk, margin more or less sharply toothed, teeth upcurved. 9 in. to $1\frac{1}{2}$ ft. long, including the stalk which is $\frac{1}{2}$ -1 in. long, 3-5 in. wide, the lateral pair much smaller, upper face smooth and shining, lower face whitish with the short tomentum which occupies the interstices of the veins, midrib and numerous ascending secondary veins prominent; petiole with long slender furrows and bearing short appressed hairs, nearly or quite as long as the leaf. Stipules broadly ovate, acuminate, shortly hairy, 7-8 lin. long. Inflorescences in pairs; male when fully developed 9 in. broad, on a stout stalk 7 in. long and 2 lin. thick; bracts caducous; branches (4-5) repeatedly forked, the short branchlets of the last two or three grades densely and continuously covered with the male flowers, and 2-4 lin. long and 1 lin. thick; perianth-segments 4, free nearly to the base, obovate, concave and stouter above, barely 1 lin. long; stamens 3-4, free, as long as the perianth; bracteoles shorter than the perianth, broadly spatulate, ciliolate on the back above. Female flowers about 20 in a spherical head $\frac{1}{2}$ - $\frac{2}{3}$ in. in diam., on a stalk about $\frac{1}{2}$ - $1\frac{1}{4}$ in. long; bracteoles narrowly oblong to oblanceolate, tapering to the base, densely shortly hairy on the back, a little over 1 lin. long; perianth narrowly ovoid, $2\frac{1}{2}$ -3 lin. long, hirtellous, narrowing to the mouth through which projects the long brown-haired stigma. Head of fruits $1\frac{1}{3}$ -2 in. in diam. on a stout stalk $1\frac{1}{2}$ -2 in. long; fruits 4-10, ovoid, united below, beaked with the narrow mouth of the persistent perianth.

Upper Guinea. Southern Nigeria: Oban and Eket districts, *Talbot!* Cameroons: Bipinde, *Zenker*, 1100!

16. **MUSANGA**, R. Br.; Benth. et Hook. f. *Gen. Pl.* iii. 379.

Flowers dioecious. Male flowers: Perianth obovoid-tubular with a narrow truncate or sometimes faintly 2-lobed mouth. Stamen one; filament straight, cylindrical; anther short, ellipsoidal, exserted, dehiscing longitudinally. Rudimentary ovary absent. Female flowers: Perianth narrow-tubular, constricted below the middle above the ovary, above which it becomes much thicker and closely invests the style. Ovary ovoid with a long slender terminal style, projecting at the narrow mouth of the perianth where it bears a spreading brush-like stigma. Ovule erect from the base of the ovary. Fruit enveloped in the persistent somewhat fibrous perianth, exocarp thin, endocarp crustaceous, hard, shiny. Seed conforming to the endocarp; seed-coat thin; albumen scanty; cotyledons large, plano-convex, radicle superior.—A small tree. Leaves alternate,

long-stalked, large, divided almost to the base into numerous radiately spreading segments; segments entire, narrow, wedge-shaped, rounded above and abruptly shortly acuminate, penni-veined, folded in bud lengthwise along the midrib with several transverse folds in the upper part. Stipules large, connate, enclosing the young bud and the inflorescence, soon falling. Male inflorescences solitary or in pairs in the leaf-axils; peduncle bearing several repeatedly forked branches; flowers in numerous small round heads each of which terminates a short ultimate branch. Among the flowers are scattered slender long-stalked bracts ending in a small round or half-round blade. Female inflorescences in pairs in the leaf-axil; flowers minute, very numerous, densely arranged on all sides of a somewhat compressed ovate or oblong disc borne erect on a stiff stalk, with interspersed threadlike bracts which are united below with the perianth.

Species 1, tropical Africa.

1. *M. Smithii*, *R. Br. App. Tuck. Congo*, 453. Stem often unbranched and reaching 30 ft. in height, or branched forming a large crown when it may reach over 40 ft. with a diameter of 16-20 inches, or according to Gossweiler 80 ft. with a trunk diameter of 5 ft.; prop-roots often occur round the base. The upper ends of the leafy stem and branches stout, to $1\frac{1}{2}$ in. thick, fully elongated internodes $1-1\frac{1}{4}$ in. long with a stout pith. Large groups of mucilage-cells and mucilage-spaces occur in pith and cortex. Leaf-segments to 16 in. long, $2-3\frac{3}{4}$ in. wide below the top, polished and green above, greyish with the short tomentum beneath; lateral nerves numerous, regular, somewhat ascending, from 2-4 lin. apart, very conspicuous on the lower face and joined by numerous regular subparallel veinlets; petiole to 2 ft. long, sometimes with a few long hairs. Stipular sheaths 6-8 in. long, $1-1\frac{1}{2}$ in. wide, scarlet outside and densely hairy. Peduncle of male inflorescence about 4 in. long: heads of flowers about 2 lin. in diam.; bracteoles about as long as the perianth, $\frac{3}{4}$ lin.; perianth hairy below the apex. Female inflorescence $\frac{2}{3}-\frac{3}{4}$ in. long, and about $\frac{1}{4}$ in. thick, with a peduncle 2-5 in. long, in the mature fruit yellowish-green, succulent, $2\frac{1}{2}-5$ in. long, $1\frac{1}{3}-2$ in. broad. Endocarp narrowly ovoid, pale brown, about 1 lin. long.—*Engl. Pfl. Ost-Afr. B.* 181, 292, C. 162, and *Monogr. Morac. Afr.* 42, t. 18; *Durand & Schinz. Études Fl. Congo*, i. 250; *De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i.* 49; *De Wild. Not. Pl. Utiles &c. du Congo*, 11. and *Miss. É. Laurent*, 72; *Th. & Hél. Durand, Syll. Flor. Congol.* 511; *Mildbraed, Wiss. Ergebn. Deutsch. Zentr. Afr. Exped. 1907-8*, ii. 182.

Upper Guinea. Sierra Leone, *Afzelius!* *Vohsen!* *Smythe*, 222! *Clements!* *Barter!* Liberia: *Tappi, Bunting*, 34! 35! Ashanti, *Teddie!* *Coomassie, Cummins*, 108! Togo: Agome Mountains, *Baumann*, 200! Gold Coast: Tano River, *Chipp*, 337! *Burton & Cameron!* Cameroons: River Ja, *Bates!*

Batanga, *Braun*, 22! Southern Nigeria: Ikpoba River, *Farquhar*, 44! Fernando Po, *Mann*, 44! 45! *Barter*, 2067! and fruit, 5!

Nile Land. Uganda: Semliki Forests, *Dawe*, 642!

Lower Guinea. Island of St. Thomas, at 1000–2800 ft., *Wielwitsch*, 2592! *A. Moller*, 139. Spanish Guinea: Nkolentangan, *Tessmann*, 113! Gaboon, Sibange, *Soyaux*, 1! Lower Congo: *Smith*! Kisantu, *Gillet*, 617; River Lukula, *Laurent*. Angola: Cazengo; Valle de Londo, *Gossweiler*!

South Central. Belgian Congo: Monbuttu; by the Kussumbo River, *Schweinfurth*, 3205! Aruwimi Distr., *Laurent*; Mukenge, *Pogge*, 1357; River Lulua, *Pogge*, Upper Ituri River, at 3300 ft., *Stuhlmann*, 2652; Beni, Mucra Forest north-west of Fort Beni, *Mildbraed*, 2389, 2766.

ORDER CXXIIIc. URTICACEÆ.

(By A. B. RENDLE.)

Flowers unisexual, monoëcious or diëcious (polygamous in *Parietaria*), regular or, especially in the female, irregular. Male flower: Perianth generally 4–5-partite, more rarely monophyllous, calycine; segments concave, sometimes mucronate or appendaged beneath the apex, valvate or imbricate; stamens generally equal in number and opposite to the sepals (solitary in *Forskohleæ*), inflexed in bud; anthers 2-celled, introrse, opening longitudinally; rudiment of ovary variously developed. Female flower: Perianth 3–5-lobed or partite with equal or unequal segments, or tubular, calycine, persistent and very often increasing after pollination; ovary free or sometimes adherent to the tubular perianth, 1-celled; ovule solitary, attached at or near the base of the cell, erect or ascending, orthotropous; style rarely developed, simple; stigma capitate and tuft-like or penicillate, or more or less elongated; staminodes absent or scale-like and inflexed, opposite the sepals. Fruit small, an achene, invested at the base or more or less enveloped by the persistent perianth, which is generally dry and membranous, sometimes succulent; albumen scanty or absent; embryo straight, with thick flat, generally broad cotyledons.—Annual or perennial herbs, shrubs, sometimes climbing, or more rarely trees, sometimes with stinging or sharply pointed hairs, often with dot-like or linear cystoliths. Leaves alternate or opposite, the members of a pair often unequal, simple, generally penninerved; stipules 2, persistent or deciduous, lateral or axillary, free or united, absent in *Parietaria*. Flowers small, cymose, often in small clusters which are sessile or arranged in lax inflorescences, sometimes crowded on a fleshy or open receptacle, sometimes subtended by an involucre of bracts.

Species about 500, natives of temperate and tropical regions, especially the latter

TRIBE I. UREREÆ.—*Perianth of male flower 4-5-partite. Female flower generally with unequally 4-lobed or -partite perianth, rarely 2-partite or sac-like, free from the ovary; rudimentary stamens absent. Stigma various, penicillate, linear, subulate, sometimes relatively broad. Achene ovate or rounded, sometimes oblique, invested below or more or less enveloped by the persistent membranous or succulent perianth. Embryo with rounded often emarginate cotyledons; albumen scanty. Herbs or shrubs, in the latter case sometimes climbing, rarely trees; stinging or sharply pointed hairs frequent; cystoliths dot-like or linear. Leaves alternate, more rarely opposite.*

- Leaves opposite 1. URTICA.
- Leaves alternate.
- Stipules free, lateral. Perianth enlarged and membranous in fruit 2. OBETIA.
- Stipules united, interpetiolar.
- Annual herbs; cystoliths linear 3. FLEURYA.
- Perennial herbs, shrubs or trees.
- Female perianth of 4 imbricate segments which are unchanged in fruit; stigma linear.
- Cystoliths dot-like 4. LAPORTEA.
- Female perianth 4-lobed, fleshy in fruit; stigma penicillate 5. URERA.
- Female perianth of 2 very unequal lobes, the larger concave and spathe-like; stigma subulate. Leaves large, grossly serrate, often lobed 6. GIRARDINIA.

TRIBE II. PROCRIDÆ.—*Perianth of male flower generally 4-partite, segments often with a subapical process. Female flower with generally 3-partite perianth, segments often unequal, sometimes very small, free from the ovary; staminodes flat, scale-like. Stigma penicillate. Generally herbs without stinging hairs and with linear cystoliths. Leaves opposite or apparently alternate from the suppression of one member in each pair.*

- Leaves opposite, those of a pair sometimes unequal.
- Flowers in paniced clusters or in heads, sometimes laxly paniculate 7. PILEA.
- Flowers sessile on a disc-like receptacle 8. LECANTHUS.
- Leaves of each pair at slightly different levels, one represented by a small blade or stipule or quite suppressed.
- Female flowers in a receptacle formed by union of bracts 9. ELATOSTEMA.
- Female flowers on a fleshy spherical receptacle ... 10. PROCRIS.

TRIBE III. BŒHMERIÆ.—*Perianth of the male flower 4-5-partite, segments without appendages. Female flower with tubular-ventricose 2-4-toothed perianth, united with or free from the ovary, membranous or succulent in fruit. Stigma linear or penicillate. Generally woody plants without stinging hairs and with usually dot-like cystoliths. Leaves opposite or alternate.*

- Perianth of the female flower free from the ovary, dry or membranous in fruit. Stigma long, linear.
- Stigma persistent in fruit; leaf-margin serrate ... 11. BŒHMERIA.
- Stigma not persistent in fruit; leaf-margin generally entire 12. POUZOLZIA.
- Perianth of the female flower united with the ovary, fleshy in fruit. Stigma penicillate 13. DEBREGASIA.

TRIBE IV. PARIETARIEÆ.—*Flowers polygamous in Parietaria. Perianth of the ♂ flower 4-partite, of the female flower tubular, 4-lobed, free from the ovary. Fruit enclosed in the dry perianth. Annual or perennial herbs (in Parietaria), without stinging hairs and with dot-like cystoliths. Leaves alternate, entire, erastipulate. Female inflorescence enclosed by bracts.*

Only tropical African genus 14. PARIETARIA.

TRIBE V. FORSKOHLEÆ.—*Male flower with a tubular or cup-like perianth and one stamen. Female flower with tubular perianth enclosing the achene. Herbs or undershrubs without stinging hairs and with dot-like cystoliths. Leaves alternate or opposite, generally toothed. Flowers very small, generally enclosed within an involucre of bracts.*

Flowers enclosed in a cup-like involucre of bracts and generally surrounded by woolly hairs.

Bracts of the involucre more or less distinct; stem roughly hairy 15. FORSKOHLEA.

Bracts of the involucre united; stem smooth ... 16. DROGUETIA.

Flowers not enclosed in a cup-like involucre 17. AUSTRALINA.

1. URTICA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 381.

Flowers monœcious or diœcious in cymose clusters arranged in spikes, racemes or panicles. Male flowers: Perianth deeply divided into 4 ovate concave lobes which are imbricate in the bud. Stamens 4: rudimentary ovary cup-shaped. Female flowers: Perianth with 4 unequal segments, the outer generally much smaller, flat. Ovary ovoid bearing a sessile (or more rarely with a short style), penicillate stigma; ovule erect from the base. Achene compressed, enveloped in the membranous or sometimes fleshy persistent perianth; pericarp membranous or slightly crustaceous. Seed-coat membranous; albumen scanty; cotyledons roundish.—Annual or perennial herbs, sometimes shrubby at the base, with stinging hairs. Leaves opposite, petioled, simple, toothed or cut, palmately nerved. Stipules lateral, free or connate. Inflorescences unisexual or androgynous, in pairs in the leaf-axils; clusters of flowers with a bract at the base; flowers generally ebracteate.

Species about 35, widely dispersed throughout the world but especially in temperate and subtemperate countries.

Monœcious; leaves ovate or elliptic-ovate, 1-1½ in.

long 1. *U. urens*.

Diœcious; leaves ovate-cordate, 2-3½ in. long ... 2. *U. simensis*.

1. *U. urens*, Linn. *Sp. Pl. ed. i.* 984. Monœcious, annual, glabrous except for the stinging hairs; stem erect or ascending, 1-2 ft. high, branched. Leaves petioled, membranous, ovate or elliptic-ovate, base rounded, cuneate or truncate, margin deeply serrate, with a narrowly oblong apical tooth, 3-5-nerved from the base, 1-1½ in. long, and about half as wide, sparsely beset with stinging hairs especially on the nerves, dotted with cystoliths; petiole slender, ¼-½ in.

long; stipules free, triangular, ciliate. Inflorescences ascending or spreading, usually shorter than the petiole, bearing male and female flowers, the female flowers more numerous than the male, pedicels very short, about $\frac{1}{6}$ lin. long. Male flowers with spreading perianth-segments, about $1\frac{1}{4}$ lin. across; filaments about equal in length to or slightly exceeding the segments. Female flowers; outer segments minute, about half the length of the broad ovate inner segments which are about $\frac{3}{4}$ lin. long and bear a few stiff hairs on the apex and margin and a larger median dorsal stinging hair. Achene compressed-ovoid, obtuse, pale brown, about 1 lin. long, enveloped in the membranous persistent inner perianth-segments. — Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 260; Wedd. in DC. Prodr. xvi. i. 40; Engl. Hochgebirgsfl. Trop. Afr. 192; Almagia in Ann. Istit. Bot. Roma, viii. 117.

Nile Land. Eritrea: Saganciti, 7300 ft., *Schwainfuoth & Riva*, 1262! Assaorta, *Scotti*; Amasen, Ghinda-Baresa at 3250 ft., *Terracciano & Pappi*, 81, 82. Abyssinia: by dwellings: Jenausa, *Schimper*, 843! Asfaha, 8000 ft., *Schimper*, 663! Galla Highlands, *Stuedner*, 1339. Somaliland: without locality, *Lort Phillips*! Habrawal, Gan Liban, 5800 and 5900 ft., *Donaldson Smith*!

A widely distributed weed of cultivation.

2. **U. simensis**, *Hochst. ex Steud. in Flora*, 1850, 259. Diacious, perennial from a woody rhizome about $\frac{1}{4}$ in. thick; stem erect, woody and rooting below, hollow, 5 lin. or less in thickness, finely pubescent, ultimately becoming glabrous, hirsute, especially in the younger parts, with spreading white stinging hairs, up to 4 ft. high. Leaves petioled, membranous, ovate, apex generally broadly acuminate, base cordate, margin grossly serrate, 5-nerved from the base, the lower pair of nerves weak, 2–3 $\frac{1}{2}$ in. long, 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in. wide, surface obscurely dotted with cystoliths, pubescent and with a few short stinging hairs especially beneath and on the veins; petiole more or less beset with stinging hairs, 1–1 $\frac{1}{2}$ in. long; stipules free, herbaceous, broadly ovate-triangular, $\frac{1}{4}$ – $\frac{1}{3}$ in. long. Inflorescences erect, longer than the petioles. Female flowers in dense clusters arranged racemously on the main axis; outer pair of perianth-segments minute, broadly ovate, glabrous, inner pair broadly elliptic, $\frac{1}{2}$ lin. long, glabrous, with 1–3 large dorsal stinging hairs. Achene compressed, ovate, pale brown, a little over 1 lin. long, enveloped in the persistent dry membranous inner perianth-segments. — A. Rich. Tent. Fl. Abyss. ii. 260; Wedd. in DC. Prodr. xvi. i. 54; Engl. Hochgebirgsfl. Trop. Afr. 192.

Nile Land. Abyssinia: Dibill and mountain villages, 8200–11,000 ft., *Schimper*, 1283! Gaffat and Wogera, *Schimper*, 1284! near Abbena, on the Ataba, *Stuedner*, 1343! on the Ghaba River, *Stuedner*, 1331; Gondar, *Stuedner*, 1338; Etchel Teat, *Quartin-Dillon & Petit*, 81! and without precise locality, *Schimper*, 743! British East Africa: Ruwenzori, 7000–8000 ft., *Dawe*, 723! Kivata, 8600 ft., *Scott Elliot*, 7739 partly! Uganda: Entebbe, at 3900 ft., *Brown*, 385! Aberdare Mountains, *James*! Karagwe, *Speke & Grant*, 470!

Eaten as a pot herb. Native name in Abyssinia, *Sama*.

2. **OBETIA**, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 382.

Flowers diœcious in small cymose clusters on a much branched axillary panicle. Male flowers : Bud depressed globose. Perianth divided into 5 concave lobes which are valvate in bud ; stamens 5, with a central ovary-rudiment. Female flowers : Perianth with 4 broad segments, an outer smaller and an inner larger pair, increasing in fruit. Ovary ovoid, bearing a shortly penicillate stigma on the upper oblique portion ; ovule erect from the base. Achene compressed, ovoid to orbicular, partially enveloped in the thinly membranous persistent perianth. Seed-coat membranous, conforming to the thin pericarp ; albumen scanty ; cotyledons broad, rounded.—Shrubs or small trees with thick branches, the younger portion bearing stinging hairs. Leaves alternate, petioled, simple, often palmately or pinnately lobed, base cordate, margin toothed or crenate, softly hairy especially on the under face. Stipules lateral, foliaceous, persistent. Bracts linear.

Species 5, in Madagascar and Tropical Africa.

Leaves deeply pinnatifid ; eastern 1. *O. pinnatifida*.

Leaves cordate, sometimes partially lobed ; western... 2. *O. carruthersiana*.

1. ***O. pinnatifida***, *Baker in Journ. Linn. Soc.* xx. 264. A bush or small tree up to 20 ft. high, with a simple fleshy stem and the habit of an unbranched Araliad or a *Carica* with a perennial crown (*Dawe and Evans*), or with ultimate branchlets as thick as a man's little finger, with leaves crowded at the top (*Baker*). Leaves stalked, ovate-cordate in general outline but deeply pinnatifid, with the primary segments again pinnately lobed, apex of leaf and segments long-acuminate, base deeply cordate, margin coarsely crenate, up to about a foot wide and nearly as long, upper face dark green, hispidulous and with stinging hairs on the prominent veins and sparsely scattered over the surface, lower face matted with a whitish velvety tomentum ; petioles stout, 3–6 in. long, shorter than the blade, tomentose and beset with deflexed stinging hairs. Stipules large, persistent, ovate, shortly acuminate, brown, reaching 1 in. in length. Male panicle (one only seen) much smaller than the female, about 4 in. long with short branches bearing the densely clustered flowers ; flower-buds about $1\frac{1}{2}$ lin. in diam. ; perianth-segments hispidulous, sometimes with the characteristic stinging hairs on the back. Female panicle dense, very much branched, half-a-foot or more long, the short peduncles and slender branches sparsely armed with deflexed stinging hairs. Accrescent perianth-lobes broadly elliptic to orbicular, greenish-brown or pale brown, the larger pair about 1 lin. broad. Achene broadly ovoid, greenish or pale brown, about $\frac{1}{2}$ lin. long, narrowly winged, faces obscurely warted.—Engl. in *Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907–8, ii. 190, and in *Engl. Jahrb.* li. 423, fig. 1.

Nile Land. Uganda : Toro ; near Durro forest, 4000 ft., *Bagshawe*, 1080 ! Busoga ; banks of Nile, 3900 ft., *Dawe*, 88 ! British East Africa : near Amala, 5500 ft., *Evans*, 772 !

South Central. Belgian Congo : Kwiji Islands in Lake Kivu, *Mildbraed* ; West of Lake Albert Edward, 4000 ft., *Mildbraed*, 1950.

Mozamb. Distr. German East Africa : Mucunu Steppe, near Lake Victoria, *Conrads*, 279 ! Muansa, *Stuhlmann* ; Kagehi, *Fischer*.

2. *O. carruthersiana*, *Rendle*. An arborescent shrub up to 13 ft. high or a small tree 10 to 20 ft. in height with a stem as thick as a man's leg and several branches sharply ascending from the base, or often with a short trunk 5 in. in diam. ; branchlets ascending and bearing towards the tips bright red leafy twigs 5 to 10 lin. thick ; internodes up to 2 in. long below, $2\frac{1}{2}$ –5 lin. long towards the apex, rather closely beset with long 1-celled very sharp stinging hairs with a bulb-like warted base. Leaves cordate or somewhat reniform, sometimes partially lobed, margin coarsely serrate, teeth up to 5 lin. broad, lateral nerves 4–5 on each side curving upwards, the basal pair emitting 4–5 secondary nerves, up to 9 in. long and 6 in. wide, bearing especially on the nerves and veins long scattered hairs, and thinner shorter hairs, verrucose on upper face, densely reticulate between the veins beneath ; petiole generally shorter than the leaf ; stipules rather large, broadly lanceolate, pale brown, soon falling, 5 lin. long and $1\frac{1}{2}$ lin. wide. Inflorescences numerous, generally on leafless branches, sometimes in the leaf-axils, equal in length to the petiole, several times forked and passing into 1-sided cymes, up to 3 in. long and $2\frac{3}{4}$ in. broad, bearing long scattered hairs and intervening shorter hairs ; bracts at the base of the branchlets brown, soon falling. Male flowers shortly stalked, about 1 lin. in diam. in bud ; perianth deeply 5-partite ; segments elliptic, minutely hispidulous with a few long hairs on the prominent median nerve on the back ; filaments a little longer than the perianth ; rudiment of pistil very short, ending in a dense mass of short hairs. Female flowers : lateral segments of perianth broadly elliptic-ovate, about $\frac{1}{2}$ lin. long, equal to the ovary, posterior slightly smaller, the anterior much smaller ; achene ovoid-orbicular, brown, $\frac{1}{2}$ lin. long, minutely scrobiculate ; persistent membranous perianth 1 lin. long.—*O. australis*, Engl. in Engl. Jahrb. li. 424, fig. 2. *Urticastrum carruthersianum*, Hiern in Cat. Afr. Pl. Welw. i. 987. *Laportea carruthersiana*, K. Schum. in Just, Jahresber. xxviii. i. 463.

Lower Guinea. Angola : Golungo Alto ; Delamboia, *Welwitsch*, 6267 ! Mount Kileba, *Gossweiler*, 1707 ! Huilla, *Antunes*, 241. Damaraland : Gaub, *Dinter & Engler* ; near Otavi, *Dinter*, 629 ; Otyimbingue, *Fischer* ; near Okahandja, *Dinter*.

3. *FLEURYA*, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 382.

Flowers monœcious or diœcious in cymose clusters arranged in panicles or interrupted racemes or spikes. Male flowers : Perianth

deeply divided into 4 or 5 ovate concave lobes which are valvate or slightly imbricate in bud. Stamens 4 or 5; filaments slightly exceeding the perianth-segments. Ovary rudimentary. Female flowers: Perianth with 4 more or less unequal imbricate segments. Ovary at length oblique; stigma ovate to linear, sometimes with a pair of basal appendages, ultimately hooked; ovule erect from the base. Achene oblique, compressed, protruding from the persistent perianth; pericarp membranous. Seed-coat membranous; albumen very scanty; cotyledons broad.—Annual herbs, often with stinging hairs. Leaves alternate, petioled, toothed, 3-nerved at the base, penninerved above. Stipules connate into one 2-fid intrapetiolar structure. Inflorescences solitary, axillary; clusters of flowers unisexual or androgynous.

Species about 12, widely distributed throughout the tropics; also in South Africa.

Leaves ovate, rarely orbicular-ovate.

Inflorescence typically bisexual, exceeding the leaves.

Inflorescence a spreading panicle 1. *F. æstuans*.

Inflorescence narrow, interrupted spike-like 4. *F. interrupta*.

Inflorescence unisexual, relatively few-flowered, generally shorter than the leaf.

Male inflorescence dichotomously branched; achene $\frac{3}{4}$ lin. long 5. *F. capensis*.

Male flowers in dense roundish clusters on long peduncles; achene $1\frac{1}{2}$ -2 lin. long 7. *F. podocurpa*.

Leaves elliptic to elliptic-ovate; plants dioecious; inflorescence many-flowered, shorter than the leaves... .. 2. *F. urticoides*.

Leaves large, ovate-lanceolate, 6-7 in. long 3. *F. lanceolata*.

Leaves deltoid, grossly toothed... .. 6. *F. mooreana*.

1. *F. æstuans*, *Gaud. in Freyc. Voy. Bot.* 497. A bright green herb; stem erect or ascending, from a few in. to 4 or 6 ft. high, generally but little branched, becoming leafless in the lower portion, more or less furnished with rather stiff hairs in addition to which delicate longer frequently gland-tipped hairs may be present especially on the younger parts, sometimes almost or quite glabrous. Leaves long-petioled, membranous, ovate, sometimes very broadly ovate, acute, base very blunt, truncate or somewhat cordate, margin dentate, teeth regular, broad and blunt, nerves as in the genus, $1\frac{3}{4}$ -6 in. long, 1-6 in. wide, sometimes even smaller or larger, with stiffish appressed hairs on both faces especially on the veins beneath; petiole $\frac{3}{4}$ -10 in. long, generally shorter, sometimes longer than the leaf-blade; stipules persistent, thinly membranous, 2-5 lin. long, segments narrowly subulate. Inflorescence generally a long-stalked spreading panicle exceeding the subtending leaf; the small clusters bisexual and female on the same panicle, rarely the male flowers on distinct peduncles. Male flowers shortly stalked, bud globular-compressed; perianth deeply divided into 4 (or 5) elliptic-ovate blunt

segments, often with a few short stiffish hairs on the back below the apex, or one or more longer hairs, which are sometimes gland-tipped; open flower about $1\frac{1}{2}$ lin. across. Female perianth deeply divided into 4 segments, 2 larger broadly ovate and nearly equal in length to the ovary with an alternating inconspicuous pair; stigma short, simple. Achene deflexed, brown, ovate to pyriform, central area depressed, with a few confluent tubercles, $\frac{1}{2}$ to barely 1 lin. long; stalk slightly dilated above the articulation.--Wedd. Monogr. Urtic. 112, and in DC. Prodr. xvi. i. 71 (vars. *linneana* and *glandulosa*): Oliv. in Trans. Linn. Soc. xxix. 150; Henriques in Bolet. Soc. Brot. x. 162; Engl. Glied. Veg. Usambara, 55. and Pf. Ost-Afr. C. 163; Durand & Schinz, Études Fl. Congo, 250; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 145; Hiern in Cat. Afr. Pl. Welw. i. 988; De Wild. Études Fl. Katanga, 29, and Études Fl. Bas- et Moyen-Congo, ii. 37, t. 29; Thonner, Blütenpfl. Afr. t. 32; Almagia in Ann. Istit. Bot. Roma, viii. 118; R. E. Fries, Rhod.-Kongo Exped. i. 18. *F. cordata*, Gaud. in Freye. Voy. Bot. 497, and in Voy. Bonite. t. 83; Wedd. Monogr. Urtic. 110, t. 1 A, figs. 4-6. *F. glandulosa*, Wedd. in Ann. Sci. Nat. 3me sér. xviii. 205. *F.* spp. nos. 2 & 3, Benth. in Hook. Niger Fl. 517. *Urtica æstuans*, Linn. Sp. Pl. ed. ii. 1397. *U. schimperiana*, Hochst. ex Steud. in Flora, 1850, 259; A. Rich. Tent. Fl. Abyss. ii. 261.

Upper Guinea. Sierra Leone: Bafodeya, *Scott Elliot*, 5597! Liberia: Sinoe Basin, *Whyte*! Gold Coast: Aburi, *Brown*, 413! Ashanti: *Tedlie*! Togo: near Lome, *Warncke*, 206! Northern Nigeria: Lokoja, *Dalziel*, 150! Ilorin; Aguji, *Thornton*! Mount Patteh, *Vogel*, 193! Confluence, *Barter*! Southern Nigeria: Lagos; Ogun River, *Millen*, 130! Aguku, *Thomas*, 913! Awka, *Thomas*, 668! Oban, *Talbot*, 632! Old Calabar, *Robb*! *Holland*, 40! Cameroons: Batanga, *Bates*, 34! Bipinde, *Zenker*, 872! Yaunde, *Zenker & Staudt*, 510! *Staudt*, 914!

Nile Land. Eritrea: Ailet, *Schweinfurth & Riva*, 475! Lawa-Valley, 4000 ft., *Schweinfurth & Riva*, 1661! Assaorta; Ambatocam, 2000 ft., *Pappi*, 4019, 4055; Ocule Cusai; Moga at 4000 ft., *Pappi*, 4159; Damas, *Pappi*, 4117; Monte Idet, *Terracciano & Pappi*, 31; Adeita-Cualo, at 650 ft., *Pappi*, 3011; Dalac, *Ehrenberg*, 43! Abyssinia: Modat, *Schimper*, 1730! and without precise locality, *Schimper*, 1726! Bongo: Gir, *Schweinfurth*, 2499! Uganda: Kipayo, 4000 ft., *Dümmer*, 968! Lake Albert Edward: Kasindi, *Fries*, 1894; Madi Woods, *Speke & Grant*! British East Africa: Kui, *Kaessner*, 670! Kibwezi, *Scheffler*, 123! Mombasa, *Hildebrandt*, 2040!

Lower Guinea. St. Thomas Island, *Don*; *Moller & Quintas*. Gaboon: *Tedlie*! Angola: Golungo Alto; bank of River Coango, *Welwitsch*, 6261! Ambriz; Maladi, *Monteiro*! Cazengo; Granja de S. Luiz, *Gossweiler*, 4568!

South Central. Belgian Congo: Msuata, *Büttner*; Bangala, *Hens*, 131! Katanga; Mulenga, *Kaessner*, 2632! Lukafu, *Verdick*, 379; Monbuttu; Munza, *Schweinfurth*, 3420!

Mozamb. Distr. Nyasaland: Nyika Plateau, *McClonnie*, 93! Zomba Rock, *Whyte*! Songue and Karonga, 1700-2000 ft., *Whyte*! Kondowe to Karonga, 2000-6000 ft., *Whyte*! Lower Milanji, *Scott*! and without precise locality, *Buchanan*, 345! Portuguese East Africa: Zambesi; below Shigogo, *Kirk*! Boruma, *Menyharth*, 574!

2. *F. urticoides*, *Engl. in Engl. Jahrb.* xxxiii. 122. Dioecious; stem erect from an ascending base, 3-5½ ft. high, somewhat angular and

with internodes $\frac{3}{4}$ in. to 2 in. long, densely hispidulous, with longer, often deflexed stinging hairs intermixed. Leaves shortly stalked, elliptic to elliptic-ovate, acute, base subcordate, margin closely serrate-dentate, the tooth ending in a stinging hair, $2\frac{1}{2}$ – $3\frac{1}{2}$ in. long, $1\frac{1}{4}$ –2 in. wide, bearing hairs similar to those of stem and petiole sparsely on the upper face, more densely beneath especially on the nerves, 3-nerved below, with 3–4 ascending lateral nerves on each side above; petiole $\frac{1}{2}$ –1 in. long; stipules narrowly lanceolate, about 3–5 lin. long. Male flowers in axillary panicles which are longer than the petioles; flowers clustered in glomerules on the short lateral branches of the first or second degree; pedicels about $\frac{1}{2}$ in. long. Perianth 4-partite, segments densely hispidulous on the back, a little over $\frac{1}{2}$ lin. long.

Upper Guinea. Cameroons: Buea, 3000–8000 ft., *Preuss*, 916! *Deistel*, 388.

Var. *glabrata*, Rendle in Journ. Bot. 1917, ined. A glabrate form, bearing only the longer deflexed stinging hairs, but lacking the characteristic hispid indumentum of the species except on the inflorescence and male flowers.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, at 8700 ft., *Folkens*, 980!

3. *F. lanceolata*, *Engl. Glied. Veg. Usambara*, 37, and *Pfl. Ost-Afr. C.* 163. A dicocious herb; stem tall, erect, $2\frac{1}{2}$ ft. high, 2 lin. thick at the base, sparsely clothed with short stinging hairs. Leaves membranous, ovate-lanceolate, apex acuminate, base subacute to obtuse, margin coarsely serrate-dentate, 6 – $7\frac{1}{2}$ in. long, 2–3 in. wide, bearing a few appressed stinging hairs, especially on the nerves beneath; petiole much shorter than the leaf, $1\frac{1}{2}$ –3 in. long, hairy like the stem. Inflorescences: male in short cymes, flower-buds depressed-globose; female on the short branches of lax axillary panicles, which are shorter or longer than the petiole. Female perianth 4-partite, the lateral segments ovate, much larger than the antero-posterior, and enveloping the young fruit; stigma lanceolate, as long as the ovary. Achene very small, obliquely broadly ovoid, acute, with a broad central pit on each side, $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Usambara; Masheua, *Holst*, 8833! North East Uluguru; near Mbore, at 3000 ft., *Stuhlmann*, 9012; Central Uluguru, 7000 ft., *Stuhlmann*, 9223.

4. *F. interrupta*, *Gaud. in Freyc. Voy. Bot.* 497. Stem erect, 8 in. to 3 ft. high, slender, about 1 lin. or less thick, scarcely branched, with a few stinging hairs or almost glabrous. Leaves with long slender petioles, membranous, ovate, acuminate, base broadly obtuse to somewhat truncate, margin rather broadly serrate, or crenate-serrate, $1\frac{1}{2}$ – $3\frac{1}{2}$ in. long, 1–2 in. wide, with a few stiffish appressed hairs on both faces especially on the veins beneath, and numerous short linear cystoliths on the lower face; petiole of varying lengths, sometimes rather shorter, sometimes longer than the leaf-

blade; stipules joined to about the middle, free limb linear-subulate, ciliolate, about $\frac{1}{3}$ in. long. Inflorescences narrow, generally longer than the leaves, bearing sessile clusters at intervals on the long slender stalk or its few short branches, clusters bisexual, male flowers few, soon falling. Male perianth 4-partite, segments hispid on the outside, "whitish or rosy with a median green nerve" (Weddell). Female perianth 4-partite, the anterior segment smaller than the other three, the lateral pair becoming ultimately largest, margin minutely ciliolate, the upper keeled and passing into the short dilated joint of the pedicel; stigma about half the length of the ovary, obscurely branched at the base. Achene deflexed, pale brown, compressed, ovate, narrowly winged, the median area depressed and more or less minutely warted, about $\frac{3}{4}$ lin. long.—Wedd. Monogr. Urtic. 115, t. 1 A, fig. 9, and in DC. Prodr. xvi. i. 74; Wight, Ic. t. 1975; Schlechter, Westafr. Kautschuk-Exped. 286. *Urtica interrupta*, Linn. Sp. Pl. ed. i. 985. *U. lomatarcarpa*, Hochst. ex Steud. in Flora, 1850, 260; A. Rich. Tent. Fl. Abyss. ii. 261.

Nile Land. Abyssinia: Mai-Mezano, *Schimper*, 1471! Hamedo, 4700 ft., and near Bellitschen, 4000 ft., *Schimper*, 88! British East Africa: Nyika country; *Wakefield*!

Lower Guinea. Belgian Congo: near Leopoldville, *Schlechter*, 12537.

5. *F. capensis*, *Wedd. Monogr. Urtic.* 117, t. 1 A, figs. 7, 8, but not in *Ann. Sci. Nat.* 4me sér. i. 183. Monœcious or diœcious. Stems erect from a slender creeping rhizome about 1 lin. thick, 1-3 ft. high, slender with the habit of *F. interrupta*, with a few stinging hairs, pubescent in the younger portions. Leaves with long slender petioles, very similar to those of *F. interrupta*, margin serrate, teeth broad, acute or subacute, hairs and cystoliths as in *F. interrupta*; petiole generally rather shorter than the blade; stipules as in *F. interrupta*. Inflorescences unisexual: male generally longer than the petiole, generally forked twice or thrice and bearing small round heads of subsessile flowers on the short branchlets; flower-bud globular-depressed, about $1\frac{3}{4}$ lin. in diam.; perianth-segments 5, pale-coloured with a greenish central line, passing into a blunt keel beneath the apex, sparsely hairy or glabrate. Female in few-flowered sessile clusters at intervals on a slender peduncle or its few branches, the inflorescence sometimes shorter, sometimes longer than the petiole; perianth 4-partite, the dorsal segment ultimately about half the length of the lateral pair, keeled, the keel passing into the short dilated joint of the pedicel, lateral segments about half the length of the achene, anterior segment very small, margin of segments minutely glandular-ciliate; stigma simple, ovate-lanceolate. Achene broadly ovate, about $\frac{3}{4}$ lin. long, smooth, not winged, crowned with the long persistent recurving stigma (about two-thirds the length of the achene).—Moore in *Journ. Linn. Soc. Bot.* xl. 206; Wood, *Natal Pl.* vi. t. 577. *F. mitis*, *Wedd.* in *Ann. Sci. Nat.* l.c. (name).

F. peduncularis, Wedd. in DC. Prodr. xvi. i. 75. *Urtica peduncularis*, E. Meyer in Drège, Zwei Pfl. Documente, 143 (name).

Mozamb. Distr. German East Africa: Kwa Mshuza, Engler, 9019! Kilimanjaro; Marangu, 5300 ft., Volkens, 2319! Gazaland: Chirinda Forest, 3700–4000 ft., Swynnerton, 338! 793!

Also in South Africa.

6. *F. mooreana*, Rendle. An annual violently stinging herb, 3–5 (more rarely 6) ft. high; stem erect or ascending and rooting at the base, branching above, slender, 2 lin. or less thick, bearing numerous spreading stinging hairs, each on a prominent base, 2–3 lin. long, otherwise glabrous. Leaves with long petioles, thin and papery when dry, deltoid, apex long-acuminate, base apparently truncate, but split for 2–3 lin. with overlapping rounded edges giving the appearance of a peltate base, margin grossly toothed, the teeth becoming larger below, the lowermost recurved, 3–5 in. long, 2–3½ in. wide, glabrous above, with short appressed hairs on the lower face, especially on the veins; petiole longer or sometimes shorter than the leaf, 2½–5 in. long, hairy like the stem; stipules small, lanceolate, acuminate, about 1½ lin. long, caducous. Inflorescences unisexual, lax, much elongated and narrowly pyramidal in outline, 6–7 in. long, the upper female, far exceeding the smaller subtending leaves and bearing the loosely clustered flowers on short lateral branches, the lower male, equal to or sometimes exceeding the larger leaves, the flowers in small roundish clusters on the slender main axis or in the lower half on the slender horizontally spreading branches, the lowermost of which are 1–1¼ in. long. Male flowers in bud depressed-globose and a little over 1 lin. in diam.; perianth 4-partite, segments with a small subapical umbo in the bud. Female flower: lateral perianth-lobes broadly ovate, blunt, with minutely ciliate margin enveloping the ovary, anterior lobe very small, posterior minute or obsolete; stigma broadly linear, subapical, nearly as long as the ovary. Achene sharply deflexed at the end of the slender stalk which is equal to or twice its length, pale brown, compressed, obliquely pyriform in outline with a marginal wing, and a central depressed minutely warted area, a little over ½ lin. long; the lateral perianth-lobes short, covering only the base of the achene.—*F. grossa*, Hiern in Cat. Afr. Pl. Welw. i. 989; not of Wedd. *Adicca mooreana*, Hiern, l.c. 991. *Pilea mooreana*, K. Schum. in Just, Jahresber. xxviii. i. 463.

Lower Guinea. Angola: Pungo Andongo; Welwitsch, 6276! Catete, Welwitsch, 6273! primary forests of Mata de Pungo, Welwitsch, 6256! 6295 partly!

Distinguished from *F. grossa*, Wedd., a South African species, by the much elongated inflorescences and the rather broadly winged compressed warted achenes.

Nos. 6256, 6276 of Welwitsch are *Adicca mooreana*, Hiern, which is apparently

a starved form remarkable for having the leaves generally opposite. Hiern was presumably misled by this character to assign the plants to the genus *Adicea* (*Pilea*), as he describes the leaves as opposite though in one of the specimens they are alternate only. In other characters of leaf, flower and fruit the plants are identical with *Fleurya mooreana*; the linear-subapical style is typically that of *Fleurya*. Hiern describes the plants as dioecious, but of four flower-bearing specimens three have both male and female flowers.

7. *F. podocarpa*, Wedd. in DC. *Prodr.* xvi. i. 76. A stoloniferous herb, sometimes almost an undershrub, 1-5 ft. high; stem, petioles and peduncles more or less densely covered with whitish spreading or appressed stinging hairs, or glabrate; stolons creeping beneath or on the surface of the soil. Leaves on shorter or longer petioles, membranous, ovate to deltoid-ovate, acuminate, base subtruncate to bluntly wedge-shaped, margin dentate to crenate-dentate, teeth blunt, 3-nerved at the base, with 4-6 ascending lateral nerves on each side above, 2-4 in. long, $1\frac{1}{4}$ - $2\frac{1}{2}$ in. wide, or smaller on the stolons, more or less hairy to glabrate, hairs white and appressed, more frequent on the lower face, with short linear cystoliths conspicuous on the lower face; petiole generally shorter but sometimes longer than the blade, up to $3\frac{1}{2}$ in. long; stipules 3-6 lin. long, the free portions lanceolate-subulate. Inflorescences unisexual, rarely androgynous, the male forming dense roundish clusters on long peduncles which spring directly from the underground stem as naked scapes or are axillary; peduncle fleshy, rosy or purplish, limp, erect-spreading or ascending, but generally much exceeding the petiole, 1-12 in. long; inflorescence $\frac{1}{2}$ to $10\frac{1}{2}$ in. long, sometimes with a few short branches in the lower part; flower clusters 2 to 6 lin. in diam., subsessile or on short pedicels; male perianth usually 5- (rarely 4-), partite, segments elliptic-ovate, 1 lin. long, whitish-green, rosy outside, and sparingly hispid, "anthers dehiscing explosively with a momentary development of heat" (*Welwitsch*). Female cymes inconspicuous, loosely few-flowered in the lower leaf-axils or on the stolons, weak, becoming reflexed, shorter than the petioles; perianth campanulate, 4-lobed to below the middle, the anterior segment smaller than the remaining three; stigma linear-tapering, recurving, 1 lin. long, with a pair of shorter (about $\frac{1}{2}$ lin. long), basal linear appendages. Achenes often produced underground, compressed-ovate, $1\frac{1}{2}$ -2 lin. long, with a pyriform obscurely tuberculate central area, enveloped at the base by the persistent perianth. - Engl. Pfl. Ost-Afr. C. 163 (including var. *amphicarpa*, Engl.), and in *Mildbraed*, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 190; *Th. & Hël. Durand*, *Syll. Fl. Congol.* 511; var. *fulminans*, Hiern in *Cat. Afr. Pl. Welw.* i. 989. *Fleurya* sp. no. 1, Benth. in *Hook. Niger Fl.* 517. *Haynea ovalifolia*, Schumacher, in *Schumacher & Thonn. Beskr. Guin. Pl.* 406.

Upper Guinea. Liberia: Cape Palmas, *Ansell*! Ashanti: Assin Yan Kumassi, *Cummins*, 173! 232! Togo: near Lome, *Warmecke*, 438! and without precise locality, *Baumann*, 182! Southern Nigeria: Nun River,

Mann, 476! Angiama, *Barter*, 92! Obu, *Thomas*, 384! Aguku, *Thomas*, 761! Oban, *Talbot*, 690! Old Calabar, *Robb*! Cameroons: Bipinde, *Zenker*, 1105! 3798! Efulen, *Bates*, 415! 424! Fernando Po; *Barter*! at 1000 ft., *Mann*, 313!

Nile Land. Uganda: Sesse Islands, in Lake Victoria, *Carpenter*, 14! Entebbe, *Bagshawe*, 744! and without precise locality, *Scott Elliot*, 7338! Ruwenzori; Wimi Valley, *Scott Elliot*, 7891! E. Ruwenzori, 5000 ft., *Wollaston*!

Lower Guinea. Loango: near Chinchosho, *Soyaux*, 222! Angola: Golungo Alto; River Cuango, *Welwitsch*, 6266! 6296! Mata de Quisuculo, *Welwitsch*, 6265! Cazengo; Granja de S. Luiz, *Gossweiler*, 4625!

South Central. Belgian Congo: between Fort Beni and Ruwenzori, *Mildbraed*, 2465.

A specimen from Fernando Po (*Barter*), consisting of male scapes and a stolon bearing fruit, has crowded, smaller, less compressed smooth achenes about 1 lin. long, which were apparently completely buried.

Var. *Mannii*, Wedd. l.c. A herb more than 5 ft. high, with glabrescent branches and petioles. Leaves long-stalked, larger and proportionately narrower than in the species, $4\frac{1}{2}$ –6 in. long, $2\frac{1}{2}$ – $3\frac{1}{4}$ in. wide, with a few white appressed hairs on both faces; petiole slender, more than half as long as the leaf. Stipules 6–7 lin. long. Inflorescences: male not seen; female consisting of a small 6–10-flowered cluster of almost sessile flowers on a thread-like axillary peduncle barely $\frac{3}{4}$ in. long. Stigma 2 lin. long, with the pair of basal linear appendages $1\text{--}1\frac{1}{2}$ lin. long.

Upper Guinea. Cameroons: Cameroon Mountain, 2500 ft., *Mann*, 1950!

4. LAPORTEA, Gaud.; Benth. et Hook. f. Gen. Pl. iii. 383.

Flowers monœcious or diœcious in cymose clusters in a branched paniculate inflorescence. Male flowers: Perianth divided into 4 to 5 ovate segments, bud depressed. Stamens 4 or 5; ovary rudimentary. Female flowers: Perianth of 4 more or less unequal imbricate segments. Ovary soon becoming oblique; stigma linear, ultimately reflexed and persistent; ovule erect from the base. Achene very oblique, compressed, the lower portion partly covered with the persistent unchanged perianth. Seed conforming to the membranous pericarp; albumen very scanty; cotyledons broad.—Perennial herbs, shrubs or trees, generally beset with stinging hairs. Leaves alternate, petioled, generally toothed, 3-nerved at the base with a few ascending lateral nerves above; cystoliths dot-like. Stipules more or less united into a single intrapetiolar structure, deciduous. Inflorescences solitary, axillary, unisexual.

Species about 25, widely distributed through the warmer regions of the Old World; a few in North and Central America.

This genus is very near to *Fleurya*; it is distinguished by its perennial habit and dot-like cystoliths.

1. *L. alatipes*, Hook. f. in *Journ. Linn. Soc.* vii. 215. A herb 3 ft. high, beset with stiff spreading stinging hairs, and short appressed hairs. Leaves ovate, sometimes elliptic, acuminate, base rounded or obsoletely cordate, sometimes cuneate; margin rather coarsely dentate, teeth unequal, becoming smaller in the lower part of the

blade, 3-nerved at the base, with a few (up to 6) rather weak alternate ascending lateral nerves above, 3-7 in. long, 2-3 in. wide, with numerous dot-like cystoliths (especially above) and short appressed hairs on both faces and larger hairs similar to those on the stem on the veins beneath; petiole slender, $1\frac{1}{4}$ - $1\frac{3}{4}$ in. long, rarely shorter, hairy like the stem. United stipules membranous, broadly lanceolate, 2-fid, $\frac{1}{3}$ in. long, caducous. Male inflorescence not or scarcely equalling the petioles; peduncle short, $\frac{3}{4}$ - $1\frac{1}{2}$ in. long, branches few, spreading, bearing distinct or approximated sessile clusters of flowers; flower-buds 1 lin. in diam.; flowers stalked and soon falling; pedicels up to $1\frac{1}{2}$ lin. long; perianth 4-partite, hispidulous. Female inflorescence equal to or exceeding the leaves; peduncle 2-4 in. long, stout and densely beset with stinging hairs, dichotomously paniculate, branches and branchlets short, spreading, pedicels ultimately broadening to form wing-like lamellæ which are connate below; flower placed obliquely on the top of the pedicel. Inner segments of perianth ovate, $\frac{1}{2}$ lin. long, covering the ovary, but not increasing in fruit, outer segments unequal, the upper concave about half the length of the inner segments, the lower minute. Stigma linear with an apical tuft, $\frac{1}{2}$ lin. long. Achene flattened, obliquely suborbicular, on a short reflexed stalk, brown with a narrow red-brown margin, $1\frac{1}{2}$ lin. in diam., sides obscurely granulate, bearing at the apex the persistent deflected stigma.—Wedd. in DC. Prodr. xvi. i. 79; Engl. Hochgebirgsfl. Trop. Afr. 193.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1973!

Nile Land. Uganda: Ruwenzori; Kivata, *Scott Elliot*, 7739! second day's march from Eldama Ravine, *Whyte*!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 6700 ft., *Volkens*, 1495!

Near the Himalayan species *L. evitata*, Wedd.

The plant described by Engler (*Jahrb.* xxxiii. 123) as *Girardinia marginata* from the Cameroons (west of Buca, *Preuss*, 618) may be referable to the above. The description agrees with this except for a slight difference in the leaves which are "oblong becoming narrowed above with a subacute base." The two obliquely obovate sepals of the female flower suggest *Laportea* but are inconsistent with *Girardinia*.

5. URERA, Gaud.; Benth. et Hook. f. Gen. Pl. iii. 383.

Flowers diœcious in laxly paniced cymose clusters. Male-flowers: Perianth deeply divided into 4 or 5 ovate concave lobes, which are slightly imbricate in bud, which is generally somewhat depressed. Stamens 4 or 5; rudimentary ovary present, generally in the form of a shallow open cup on a short stalk. Female flowers: Perianth of 4 unequal segments, two larger lateral and two minute outer, or bluntly 4-toothed or -lobed or sac-like, more or less completely enveloping the young ovary. Ovary ovoid, bearing a dense short sessile penicillate stigma; ovule erect from the base. Achene generally slightly oblique, somewhat compressed, enveloped in the succulent

persistent perianth; pericarp thinly crustaceous. Seed-coat thin, conforming to the pericarp; albumen very scanty; cotyledons broad, flat.—Climbing shrubs or small trees, often with stinging hairs, which are sometimes borne on simple or compound protuberances. Leaves alternate, petioled, simple, entire, toothed or crenate, 3-nerved at or just above the base, penninerved above. Stipules connate, 2-nerved, more or less divided above, generally falling early. Inflorescences solitary in the axils of existing or fallen leaves, generally with a short but sometimes a long peduncle; bracts small.

Species about 30, in tropical America and Africa, and in the Mascarene and Pacific Islands.

Plant neither densely hairy nor with slender creeping stem.

- | | |
|--|------------------------------|
| Leaves ovate or rotund-ovate, many-nerved (with 3-5 pairs of lateral nerves above the basal nerves) | 1. <i>U. hypseloden-</i> |
| [dron. | |
| Leaves with 2-3 pairs of lateral nerves above the basal nerves (see also no. 12), rarely only one pair (sometimes in no. 5). | |
| Leaves elliptic to oblong-elliptic, on long slender stalks; stem armed or unarmed. | |
| Leaf margin minutely serrate; female inflorescence arising in the leaf-axils | 2. <i>U. oblongifolia</i> |
| Leaf margin entire; female inflorescence arising in the axils of fallen leaves... .. | 3. <i>U. Thonneri.</i> |
| Leaves obovate to elliptic-obovate, short-stalked; stem armed. | |
| Leaves with 3 pairs of lateral nerves above the base; perianth not completely enveloping the ovary | 4. <i>U. obovata.</i> |
| Leaves with 1 or 2 pairs of lateral nerves above the base; perianth completely enveloping the ovary | 5. <i>U. Elliotii.</i> |
| Leaves elliptic to ovate-elliptic. | |
| Base emarginate to shallowly cordate, margin entire or obscurely crenate. | |
| Stem unarmed | 6. <i>U. Balesii.</i> |
| Stem profusely armed | 7. <i>U. Talbotii.</i> |
| Base cordate, margin crenate-dentate... .. | 8. <i>U. Mannii.</i> |
| Leaves ovate-cordate, margin undulate; stem armed | 9. <i>U. cordifolia.</i> |
| Leaves cuneate, with 3-4 pairs of nerves above the basal | 10. <i>U. cuneata.</i> |
| Leaves elliptic, with 1 pair of nerves (sometimes 2 in no. 12) above the base. | |
| Leaves 3-6 in. long. | |
| A climbing shrub; branches unarmed | 11. <i>U. cameroonensis.</i> |
| A tree; branches armed... .. | 12. <i>U. arborea.</i> |
| Leaves 2½ in. long or less | 13. <i>U. usambarensis.</i> |
| Plant very hairy; lower face of leaves tomentose | 14. <i>U. sansibarica.</i> |
| Plant with slender creeping stem and cordate leaves... .. | 15. <i>U. repens.</i> |

1. *U. hypselodendron*, Wedd. in *Ann. Sci. Nat.* 3me sér. xviii. 203. A large perennial with a woody stem scrambling over bushes, trees and rocks, ultimate branches hanging, or a tree reaching 40 ft. in height (*Scott Elliot*), branchlets smooth, reddish-brown, glabrous or puberulous. Leaves ovate or rotund-ovate, abruptly acuminate, base blunt, truncate or subcordate, margin crenulate but generally entire near the base, with 3 to 5 ascending lateral nerves on each side above the 3-nerved base, connecting veins numerous, subparallel, conspicuous on the lower face, $2\frac{1}{2}$ – $6\frac{1}{2}$ in. long, $1\frac{1}{2}$ –5 in. wide, upper face glabrous, and when dry closely dotted with cystoliths, lower face glabrate or sparsely puberulous or shortly hairy on the midrib and nerves, cystoliths shortly linear; petiole shorter than the leaf. United stipules broadly triangular-lanceolate, shortly hairy on the edges and nerves, soon falling. Flowers diœcious. Male inflorescence shorter or sometimes longer than the petiole, rather laxly flowered, the short peduncle and spreading branches puberulous, flowers stalked, pedicel about 1 lin. long, perianth-segments 4, minutely puberulous. Female inflorescence similar to the male but the spreading branches shorter; flowers sessile in clusters at the ends of the short branchlets; perianth with 2 larger elliptic inner lateral lobes equal to the ovary; and two minute outer lobes; stigma roundish, densely and shortly penicillate. Achene slightly obliquely ovate, compressed, pale brown with dark brown spots, about equal to the somewhat ventricose lateral perianth-lobes, the surface of which is minutely granular.—Wedd. in DC. Prodr. xvi. i. 96; Engl. in Engl. Jahrb. xxviii. 379, and in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–8, ii. 189. *U. Schimperii*, Wedd. Monogr. Urtic. 158. *Urtica hypselodendron*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 260.

Nile Land. Abyssinia: Samen; below Enschedcap, *Schimper*, 1136! Met-taro, 8300 ft., *Schimper*, 342! Adowa, *Petit*, 106! Shireh, *Quartin Dillon*; and without precise locality, *Roth*! British East Africa: Uganda; Ruwenzori, 8000 ft., *Scott Elliot*, 7806! Kivata, *Scott Elliot*, 7774! third day's march from Eldama Ravine, *Whyte*!

South Central. Belgian Congo: Rugege, *Mildbraed*, 1057; Bugoyer, N.E. of Lake Kivu, *Mildbraed*, 1492.

Mozamb. Distr. German East Africa: Usambara: Lutindi, *Holst*, 3427! Central Uluguru; Lukwangula, 6800 ft., *Stuhlmann*, 9110. Nyasaland: Mount Malosa, 4000–6000 ft., *Whyte*! and without precise locality, *Buchanan*, 1465!

2. *U. oblongifolia*, *Benth.* in *Hook. Niger Fl.* 515. A dioecious glabrous shrub, climbing by means of adventitious roots on the slender branches; branches unarmed, reddish-brown. Leaves long-stalked, papery to membranous when dry, elliptic or oblong-elliptic, somewhat abruptly acuminate, the tip obtuse, 3–5 lin. long, base blunt or rounded, margin almost entire, very slightly serrate, with a lateral pair of nerves immediately above the base and 3 on each side above, all ascending and curving to unite below the margin, conspicuous on the lower face, 2–4 in. long, 1 – $1\frac{3}{4}$ in. wide, lower face

much lighter than the upper, both marked with numerous cystoliths resembling short slender hairs; petiole slender, generally 1–2 in. long, closely marked with short white cystoliths. Stipules caducous. Male inflorescence panicle-like, rather long-stalked, sometimes exceeding the leaf; flowers in clusters on the ultimate branchlets, $\frac{3}{4}$ lin. across, pedicel very short; perianth 5-partite. Female inflorescence much forked, generally corymbose, denser than the male, shorter than the leaf, generally about 2 in. long including the peduncle (1 in. long); flowers about $\frac{1}{2}$ lin. long, shortly pedicelled, clustered on the short ultimate flattened branchlets, which bear stinging hairs on shorter or longer slender protuberances; perianth somewhat obliquely ovoid, sac-like, nearly or quite enveloping the ovary; stigma red, rounded, projecting above the perianth. Perianth fleshy and orange-red in fruit, closely surrounding the achene, a little over 1 lin. long.—*U. obovata*, var. *longifolia*, Wedd. in DC. Prodr. xvi. i. 97.

Upper Guinea. Sierra Leone, *Vogel*, 73! 74! 114! *Afzelius*! *Barter*! Liberia: Mount Barclay, *Bunting*, 160!

3. U. Thonneri, *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxviii. 48. A shrub climbing widely and high by means of adventitious roots; stem exuding a watery sap, dingy purple, furrowed, angular, at first erect, soon dividing into spreading sarmentose branches which are reddish-brown when dry and armed especially in the younger parts with short spine-like protuberances bearing stinging hairs, or unarmed; internodes up to $1\frac{3}{4}$ in. long. Leaves fleshy, rigid, brittle, dark green and shining above, greyish beneath, oblong-elliptic to elliptic, abruptly long-acuminate, the tip narrow, obtuse, about $\frac{1}{2}$ in. long and 1 lin. broad, base obtuse, rounded or very slightly cordate, margin entire, slightly undulate, 3-nerved just above the base, with 2 or 3 lateral nerves above on either side which are generally subopposite, sometimes alternate, ascending and curving to unite just beneath the margin, conspicuous on the lower face and connected by somewhat parallel veins, 3–5 $\frac{3}{4}$ in. long, $1\frac{1}{2}$ –3 in. wide, upper face rough with dot-like cystoliths, lower face sparsely puberulous on the veins which are followed by numerous short linear conspicuous cystoliths; petiole slender (when dry) armed like the stem or unarmed, puberulous, $\frac{1}{2}$ –2 in. long. Stipules triangular-lanceolate, hairy on the back and margin, $\frac{1}{4}$ in. long, caducous. Inflorescences arising in the axils of the fallen leaves; male with laxly spreading branches, long-stalked, the branchlets armed here and there with stinging hairs, 4 in. long and about half as broad; perianth green, 5-partite, about $1\frac{1}{4}$ lin. long; female much shorter than the leaves, very much branched, dense, corymbose, about $\frac{3}{4}$ in. high (Angolan specimens) or somewhat pyramidal, 2 in. high (Congo specimen), minutely puberulous, peduncle short, about $\frac{1}{4}$ in. long; flowers shortly stalked, crowded, placed laterally on the short ultimate

branches which end in one or more thick fusiform pellucid protuberances bearing stinging hairs; perianth sac-like, completely enveloping the narrow elliptic-ovoid ovary; ovary $\frac{1}{2}$ lin. long; stigma ferruginous, rounded, projecting from the mouth of the perianth. Achene compressed, ovate, about 1 lin. long.—De Wild. & Durand, Pl. Thonner. Congol. 11, t. 18; Th. & Hél. Durand, Syll. Fl. Congol. 512. *U. Dewevrei*, De Wild. & Durand in Comptes-rendus Soc. Bot. Belg. xxxviii. 49, and Reliq. Dewevr. 219; Th. & Hél. Durand, l.c. *U. Henriquesii* and *U. Dinklagei*, Engl. in Engl. Jahrb. xxxiii. 121. *U. obovata*, Benth., var. *Jihefo*, Hiern in Cat. Afr. Pl. Welw. i. 986, partly.

Upper Guinea. Cameroons: Batanga, *Dinklage*, 671. Fernando Po: *Mann*!

Lower Guinea. Angola: Golungo Alto; woods on the banks of the streams of Quisucula, *Welwitsch*, 6268! Dense forest by the River Delamboa, near Sange, *Welwitsch*, 6279!

South Central. Belgian Congo: Bangala Distr.; Ngali, *Thonner*, 29; Aruwimi Distr.; forests of Lokandu, *Dewevre*, 1116.

I have seen no authentic specimen of *U. Thonneri*, De Wild., but from the description and figure do not hesitate to regard the Angolan specimens as conspecific. Nor can I find in the description of *A. Dinklagei* any distinctive character; Engler distinguishes it from the Angolan plant by the glabrous stem and leaves, but this character is not constant in our series of specimens from Angola, and the Congo specimen has also unarmed glabrous branches and glabrous leaves. De Wildeman's description of *U. Dewevrei* coincides with that of *U. Thonneri*, except that the former has only male and the latter only female flowers; the specimens from Angola and Cameroons are also represented only by female flowers.

U. congolensis, De Wild. & Durand (in Comptes-rendus Soc. Bot. Belg. xxxviii. 50), as described, differs only in the shorter male inflorescence, the flowers in which have a perianth only $\frac{3}{4}$ lin. long. The authors state, however, that they saw only a single detached panicle; this perhaps was not fully developed and in view of the striking coincidence of the description with our Angolan specimens which De Wildeman had not, I believe, the opportunity of seeing, I am inclined to regard the plants as conspecific.

4. *U. obovata*, Benth. in Hook. Niger Fl. 516. A dioecious climbing shrub; young branches armed with short simple or forked protuberances which end in stinging hairs, hollow, up to $\frac{1}{4}$ in. thick at a distance of 8 in. from the tip. Leaves short- or long-stalked, thinly membranous when dry, obovate to elliptic-obovate, shortly and abruptly acuminate, base bluntly rounded to emarginate, margin crenate, at least in the upper half, becoming entire below the middle, base 3-nerved, with 3 additional nerves on each side ascending and uniting below the margin, nerves conspicuous on the lower face as are also the somewhat parallel cross-nerves, 3-6 in. long, 2-3 $\frac{1}{2}$ in. wide, upper face much darker than the lower with a few appressed stinging hairs, otherwise glabrous, both faces or especially the lower marked with short linear sometimes intermingled with dot-like cystoliths; petiole $\frac{1}{2}$ -5 in. long, sparsely armed with short simple protuberances which support a stinging hair. Stipules narrowly triangular-acuminate, caducous. Male inflorescence large, exceeding

the petiole, loosely paniculate, up to 6 in. long, including the slender peduncle ($2\frac{1}{2}$ in.), branches slender; flowers clustered at intervals on the densely puberulous ultimate branches; pedicels densely puberulous, a little over 1 lin. long; flowers puberulous, a little over $\frac{1}{2}$ lin. in diam.; perianth 5-partite. Female inflorescence in the axils of the foliage-leaves, exceeding the petiole but much smaller than the male and with shorter branches, puberulous, $1\frac{1}{2}$ –3 in. long; flowers several together on short stalks at the end of the short ultimate branchlets, surrounded by numerous stiff stinging hairs; perianth bluntly 4-toothed, reaching about half-way up the ovoid ovary; stigma an oblique circular tuft of short hairs. Perianth orange in fruit (*Vogel*).—Wedd. Monogr. Urtic. 159, and in DC. Prodr. xvi. i. 97 partly; Henriques in Bolet. Soc. Brot. x. 162. *Bochmeria* (*Procris*?) *rigida*, Benth. l.c. 519. *Urtica rigida*, Don in Herb.

Upper Guinea. Sierra Leone: Bulumba, 650 ft., *Thomas*, 1920! without precise locality, *Vogel*, 64! *Don*! S. Nigeria: Lagos; western interior, *Rowland*! Abeokuta, *Millen*!

Var. *Quintasii*, Engl. in Engl. Jahrb. xxxiii. 120. A liane; stem and petiole armed with numerous simple conical and 2- to 3-forked spines, which are sometimes $1\frac{1}{2}$ –2 lin. long. Leaf large, orbicular-ovate, long-acuminate, margin shortly and closely toothed, about 6–8 in. long and wide; petiole 4 to 5 times shorter than the blade, puberulous.

Upper Guinea. Cameroons: Barombi, in bush-wood, *Preuss*, 57; Victoria, *Preuss*.

Lower Guinea. Prince's Island: primary forest. *Quintas*, 159.
Fish-snares are made from the bast.

5. *U. Elliotii*, *Rendle in Journ. Bot.* 1916, 369. Young branches stout and apparently succulent, sparsely armed with slender protuberances bearing a small terminal stinging hair, a few shorter similar structures occur on the petiole and main nerves, shortly hispidulous, reddish-brown. Leaves elliptic-ovate, apex obscurely acuminate, base rounded, margin somewhat irregularly crenate-dentate, base 3-nerved, with one or two lateral nerves on each side above, nerves conspicuous as are also the transverse cross-unions and intervening network, 4–6 in. long, 3–4 in. wide, hispidulous on both faces, cystoliths short, linear, following the nerves and veins on the lower face; petiole stoutish, up to $1\frac{2}{3}$ in. long. Female inflorescence spreading, axis repeatedly forked, about 3 in. long, copiously armed with protuberances similar to but much smaller than those on the stem; flowers aggregated in small shortly stalked heads on the ultimate branchlets, associated with little groups of stinging hairs. Ovary completely enveloped in the younger flower in the sac-like almost tubular perianth which later becomes ellipsoid-ovoid, the somewhat flattened stigma protruding from the narrow mouth. Achene chestnut-brown, ovoid, 1 lin. long, enveloped in the succulent yellow perianth.

Upper Guinea. Sierra Leone: Limba Country; near Bafodeya, *Scott Elliot*, 5559!

6. *U. Batesii*, Rendle in *Journ. Bot.* 1916, 368. A shrub, trailing or climbing by rootlets; stems slender, purplish, 20 ft. long (*Mann*), unarmed and glabrous. Leaves elliptic to ovate-elliptic, apex shortly acuminate, blunt, base shallowly cordate, margin inconspicuously crenate or becoming almost entire especially below the middle, 3-nerved with 2-3 ascending lateral nerves on each side, lateral nerves joined by conspicuous parallel transverse veins, reticulation somewhat prominent, 4-5½ in. long, 2½-3½ in. wide, thinly membranous when dry, upper face much darker than the lower and with a few stinging hairs, otherwise glabrous, upper face densely covered with linear cystoliths, which closely follow the venation on the lower face; petiole rather slender, 1-3 in. long, greyish when dry from the densely crowded cystoliths. Stipules caducous. Inflorescences a little longer or shorter than the petioles; male 3 in. or less in length, with a short peduncle and a few compressed spreading branches bearing the flowers in a few separated clusters; pedicel about ½ lin. long, unopened flower about 1 lin. in diam.; perianth 5-partite, with a few short spreading hairs on the back; rudimentary ovary inverted-turbinate. Female inflorescence somewhat corymbosely paniculate, branches somewhat compressed; flowers in few-flowered clusters on the short branchlets accompanied by a few short stinging hairs; perianth shallowly 4-lobed, above which projects the ovoid ovary. Apex of ripe fruit projecting above the berry-like fleshy perianth which is about 1 lin. long.

Upper Guinea. Cameroons: Efulen, *Bates*, 364! 364a! Fernando Po: Clarence Peak, 1300 ft., *Mann*, 305!

A specimen, with young female inflorescence, from Yaunde (Cameroons) (*Zenker*, no. 673!) may be conspecific with the above. The leaves are larger, up to 7 in. long and 4½ in. wide, with a somewhat truncate base, and the branches are shorter.

7. *U. Talbotii*, Rendle in *Journ. Bot.* 1916, 369. A shrub, trailing or climbing by rootlets; stem to ¼ in. thick, glabrous but profusely armed with simple or forked protuberances which end in a very small stinging hair. Leaves broadly elliptic, apex rounded and abruptly acuminate, base emarginate, margin inconspicuously crenate or slightly undulate, nerves as in *U. Batesii*, 4-6 in. long, 2-4 in. wide, thinly membranous when dry, upper face much darker than the lower, glabrous, cystoliths linear, scattered on the upper face, minute and following the reticulation on the lower; petiole slender, ½-2½ in. long. Stipules ovate-triangular, acute, 4 lin. long, strongly nerved. Male inflorescence large, a spreading puberulous panicle 8 in. long by 11 in. broad, the flowers in clusters on dwarf shoots which are spaced along the lateral branches; pedicels slender, 1½-2 lin. long; open flower about 1½ lin. across, perianth 5-partite. Female inflorescence much smaller than the male, paniculate, pyramidal in outline, 4 in. long; flowers in few-flowered clusters on the short branchlets,

supported by simple or forked protuberances bearing short stinging hairs; perianth shallowly 4-lobed with margin ciliate, about half the length of the broadly ovoid ovary which is about $\frac{1}{2}$ lin. long. Fruit "a scarlet berry."

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 618! 1502!

8. *U. Mannii*, *Benth. et Hook. f. Gen. Pl.* iii. 383. A shrubby climber with stems 15–20 ft. long; branches unarmed, reddish or reddish-green, young parts pubescent or puberulous. Leaves elliptic or elliptic-ovate, apex abruptly and shortly acute, base cordate, often only slightly, margin crenate-dentate, base 3-nerved, with 3–4 ascending lateral nerves on each side curving to unite within the margin, 3–6 in. long, $2\frac{1}{4}$ – $3\frac{1}{4}$ in. wide, upper face with appressed short stinging hairs and sparsely pubescent or glabrous, lower face pubescent with short stinging hairs on the veins, cystoliths short, linear, more or less conspicuous on the upper face, closely following the venation, or absent from the lower; petiole 1– $1\frac{3}{4}$ in. long, pubescent and with short stinging hairs, or puberulous. Stipules ovate, long-acuminate, $\frac{1}{4}$ in. long, pubescent, caducous. Female inflorescence much branched, up to 4 in. long and about $3\frac{1}{4}$ in. broad, branches somewhat flattened, primary spreading, up to $1\frac{1}{2}$ in. long, secondary up to $\frac{3}{4}$ in. long, the short tertiary or quaternary branches few-flowered, bearing a tuft of stinging hairs below the short pedicels. Ovary shortly ovoid, about $\frac{1}{2}$ lin. long, at first completely enveloped in the sac-like perianth, above which the round ferruginous tufted stigma projects. Achene broadly subcompressed-ovoid, enveloped except at the extreme tip by the fleshy yellow perianth, which is barely 1 lin. long and is frequently split into two valves.—*U. Gravenreuthii*, *Engl. in Engl. Jahrb.* xxxiii. 120. *Scepcarpus Mannii*, *Wedd. in DC. Prodr.* xvi. i. 98.

Upper Guinea. Fernando Po, *Mann*, 176! Cameroons: Buea, 4000 ft., *Preuss*, 909!

Var. *paucinervis*, *Rendle in Journ. Bot.* 1916, 370. Leaves smaller than in the type, tending sometimes to obovate-elliptic, with 2 (rarely 3) lateral nerves on each side above the 3-nerved base; indumentum as in the species. Female inflorescences in the upper leaf-axils, ovate in outline, up to 4 in. long including the peduncle ($1\frac{1}{2}$ in.), branches spreading; ovary ovoid, bearing at its oblique apex the circular tuft of short stigmatic hairs and protruding above the shallowly lobed perianth.

Upper Guinea. Southern Nigeria: Lagos, *Dalziel*, 1021!

9. *U. cordifolia*, *Engl. in Engl. Jahrb.* xxxiii. 121. A climber with purplish branches armed with numerous compressed elongated-triangular and 2- to 3-forked spines ending in stinging hairs; flowering shoots $2\frac{1}{2}$ –5 lin. thick. Leaves ovate-cordate, acuminate to acute, margin undulate, lateral nerves 4 on each side, ascending, secondary nerves numerous, transverse, somewhat prominent

beneath, 4-6 in. long, with tip about $2\frac{1}{2}$ -4 lin. long, at first densely covered with short hairs, ultimately with a few scattered stinging hairs above, and very shortly hairy on the nerves beneath; petiole with short spines, $1\frac{1}{2}$ -2 in. long. Inflorescence a little longer than the petiole, 2-2 $\frac{1}{2}$ in. long and $1\frac{1}{2}$ -2 in. broad, horizontally expanded and cymose-corymbose, the short ultimate branches bearing numerous stinging hairs. Ovary obliquely ovoid, compressed, $\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad.

Upper Guinea. Cameroons: Johann Albrechtshöhe, in forest, *Staudt*, 892.

10. *U. cuneata*, *Rendle in Journ. Bot.* 1916, 370. Stem stout, terete, sparsely armed with simple slender columnar protuberances bearing short stinging hairs, and also hispidulous. Leaves large, shortly stalked, wedge-shaped, with a short acumen at the apex, base bluntly rounded or almost truncate, margin denticulate, shallowly undulate, base 3-nerved, with 3-4 additional ascending lateral nerves on each side, nerves conspicuous beneath, as are also the horizontal transverse connecting veins, 6-7 in. long, $3\frac{1}{2}$ -4 $\frac{1}{2}$ in. wide, upper face glabrescent, puberulous only on the nerves, lower face sparsely pubescent, cystoliths not visible; petiole stout, $\frac{1}{2}$ in. long, armed with protuberances similar to those on the stem. Inflorescence (young female) axillary, to almost 2 in. long, consisting of a stout axis densely covered with stinging hairs some of which are borne on simple or irregularly branched often flattened protuberances, also puberulous, with a few spreading main branches; flowers borne in close unilateral cymes on the short ultimate branchlets. Perianth divided almost to the base into 4 obovate-oblong segments, ciliolate on the upper margin, reaching to above the middle of the ovoid ovary which is $\frac{3}{8}$ lin. long, and is crowned by a brownish penicillate stigma.

Upper Guinea. Liberia: Sinoe Basin, *Whyte*!

11. *U. cameroonensis*, *Wedd. in DC. Prodr.* xvi. i. 97. A shrub climbing by slender adventitious roots, up to 15 ft. high, "climbing high in tree tops" (*Engler*); stems slender, terete, fleshy and brittle when young, generally unarmed, glabrous. Leaves elliptic, apex acuminate, base rounded to cuneate, margin entire, triplinerved, with a single lateral ascending nerve on each side about or sometimes above the middle of the leaf, nerves conspicuous, transverse connections numerous, horizontal and conspicuous, 3-5 in. long, $1\frac{1}{3}$ -2 $\frac{1}{2}$ in. wide, apex 4-8 lin. long, glabrous, or with a few stinging hairs on the lower part of the three main nerves on the lower face, upper face minutely punctulate, lower face with scarcely conspicuous linear cystoliths especially on the veins; petiole slender, narrowly grooved above, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, sometimes sparsely armed with a few short protuberances bearing stinging-hairs. United stipules triangular-ovate with 2-fid apex, $2\frac{1}{2}$ -4 lin. long, caducous. Inflorescence

axillary; male generally slightly exceeding the petiole, $1\frac{1}{4}$ – $1\frac{3}{8}$ in. long, with a short peduncle and a few spreading branches, bearing the shortly stalked flowers in small clusters: bud 1 lin. in diam.; perianth 4-partite, segments bearing dorsally a few short stinging hairs. Female inflorescence ultimately longer than the male, up to 2 in. long, somewhat laxly paniculate; flowers in small sessile clusters protected by tufts of short slender stinging hairs; perianth shallowly 4-lobed with ciliolate margin, enveloping the spheroidal young ovary, the large transversely ellipsoidal mass of short ferruginous stigmatic hairs alone projecting; with development the ovary becomes ovoid and somewhat compressed; when about 1 lin. long the upper third projects from the shallowly lobed perianth, bearing the stigma at the oblique tip. Fruit compressed-ovoid, enveloped except at the extreme apex by the succulent perianth forming a broadly ellipsoidal drupe-like structure a little over 1 lin. long.—Durand & Schinz. *Études Fl. Congo*, 250; Rendle in *Journ. Linn. Soc. Bot.* xxxvii. 214; Th. & Hél. Durand, *Syll. Fl. Congol.* 512; Engl. *Glied. Veg. Usambara*, 46, and in Mildbraed, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exp.* 1907–8, ii. 190. *U. obovata*, Benth., var. *Jihefo*, Hiern in *Cat. Afr. Pl. Welw.* i. 986, partly. *U. Gilletii*, De Wild. *Études Fl. Bas-et Moyen-Congo*, i. 240; Th. & Hél. Durand, *Syll. Fl. Congol.* 512.

Upper Guinea. Southern Nigeria: Oban, *Talbot*, 1501! Eket, *Talbot*! Cameroons: Cameroon Mountain, 5000 ft., *Mann*, 2173! Batanga, *Bates*, 327! Bipinde, forest district, *Zenker*, 824! 2687! Buea, *Deistel*, 180! and without precise locality, *Preuss*, 1230! Fernando Po, *Mann*, 240!

Nile Land. Uganda: Musozi, *Bagshawe*, 58! Kampala, *Scott Elliot*, 7306!

Lower Guinea. St. Thomas Island, *Henriques*! Princes Island, *Laurent*. Angola: Pungo Andongo; Cabondo, in wooded thickets, *Welwitsch*, 6294!

South Central. Belgian Congo: Lake Kiva, *Mildbraed*, 1231; Muera, *Mildbraed*, 2343, 2371; Bulika, *Mildbraed*, 3202; Kisantu, *Gillet*, 2312.

Specimens collected by Swynnerton (nos. 1518! and 1518a!) in very young male flower in the Chirinda Forest and referred by S. Moore to *U. obovata*, Benth. (in *Journ. Linn. Soc.* xl. 206), are probably referable to *U. cameroonensis*.

The South African *U. Woodii*, N.E. Br., is very closely allied; the specimen from Angola (*Welwitsch*, 6294!) has the shorter proportionately broader leaves of the South African plant.

Var. *Laurentii*, Rendle. Distinguished from the species by the cuneate base of the leaf drawn out into a blunt acumen.—*U. Laurentii*, De Wild. *Miss. É. Laurent*, i. 72. t. xx.; Th. & Hél. Durand, *Syll. Fl. Congol.* 512.

South Central. Belgian Congo: Ubangi; Imese, *Laurent*.

12. *U. arborea*, De Wild. & Durand in *Comptes-rendus Soc. Bot. Belg.* xxxviii. 52. A dioecious tree about 30 ft. high (or climbing by numerous adventitious roots); branches glabrous, armed with spines bearing stinging hairs. Leaves elliptic, long-acuminate, acute, base more or less acute, margin entire, 3-nerved, with 1–2 lateral nerves on each side, curving upwards and uniting, slightly prominent, $2\frac{3}{4}$ –6 in. long, $1\frac{3}{4}$ – $2\frac{3}{8}$ in. wide, glabrous, or with a few scattered stinging hairs on the nerves; petiole more or less armed, $\frac{1}{2}$ – $1\frac{1}{4}$ in. long.

Stipules elongated-triangular, about $3\frac{1}{2}$ lin. long, very caducous. Inflorescences in the leaf-axils, male with a short peduncle, laxly branched, armed with stinging hairs, about $2\frac{3}{4}$ in. long and $1\frac{1}{4}$ in. broad, branchlets pilosulose; flowers sessile; perianth green, 4-partite, about 1 lin. long; female shorter than the male, many-flowered, branched, about $1\frac{1}{2}$ in. long and 1 in. broad, armed with very numerous stinging hairs; flowers barely exceeding $\frac{1}{2}$ lin.; stigma capitate. Achene red, exceeding the perianth, about 1 lin. long and $\frac{1}{2}$ lin. broad.—De Wild. & Durand, Reliq. Dewevr. 218; Th. & Hcl. Durand, Syll. Fl. Congol. 512.

South Central. Belgian Congo: Coquilhatville, *Dewevre*.

Perhaps not distinct from *U. cameroonensis*, Wedd.

13. U. usambarensis, *Rendle in Journ. Bot.* 1916, 370. Stem glabrous and unarmed, in second season up to 2 lin. thick, with an ash-coloured striated cortex. Leaves elliptic to obovate, apex acuminate, base obtuse, rounded or obscurely cordate, margin entire, conspicuously 3-nerved at the base with usually one weaker ascending lateral nerve on each side in the upper part, one or both of these upper nerves may be absent, $1\frac{3}{4}$ – $2\frac{1}{2}$ in. long, 1 – $1\frac{1}{3}$ in. wide, leathery when dry, glabrous, sparsely and inconspicuously marked with short linear cystoliths on the lower face; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. Stipules ovate, acute, barely 2 lin. long. Inflorescences (male) glabrous, axillary on the young portion of the main shoot and its short young lateral branches, 2–3 in. long, lateral branches spreading; flowers in sessile clusters on these or short branches of a higher order; pedicels short, about $\frac{1}{2}$ lin. long; bud about 1 in. in diam.; perianth 4-partite, segments ovate, concave, glabrous.

Mozamb. Distr. German East Africa: Usambara; Derema, *Volkens*, 1221; *Scheffler*, 196!

The plant referred to by Engler (*Glied. Veg. Usambara*, 51) under the name *Urera obovata*, Benth., as climbing on high trees is perhaps this species; *Scheffler's* specimen no. 196 cited above was distributed under this name.

14. U. sansibarica, *Engl. Pfl. Ost-Afr. C.* 162. A climbing shrub 13 ft. long; stem stout, densely covered with numerous broad branched outgrowths bearing stinging hairs, surface of stem also densely hairy. Leaves shortly stalked, thick in texture, elliptic to ovate, weakly acuminate, base cordate, margin closely dentate, teeth blunt, with 3 lateral ascending nerves on each side above the 3-nerved base, 3–4 in. long, $1\frac{3}{4}$ – $2\frac{1}{3}$ in. wide, upper face rough with dense white appressed hairs and numerous dot-like cystoliths, lower face bearing a dense short grey-white tomentum between the conspicuous network of veins; petiole 6–10 lin. long, bearing numerous simple or 2–3-fid outgrowths smaller than but similar to those on the stem. Female inflorescence dense, much branched, exceeding

the petiole, with numerous stinging hairs. Flowers sessile or subsessile, just over $\frac{1}{2}$ lin. long; perianth sac-like, completely enveloping the ovary which is ovoid with a definite oblique apex which projects through the mouth of the perianth and bears a short densely penicillate round stigma. Achene deep brown, $1\frac{1}{2}$ lin. long, enveloped in the succulent perianth, the short beak-like oblique apex alone projecting.

Mozamb. Distr. Zanzibar: in damp shady valleys at Kidoti, *Hildebrandt*, 1039!

15. *U. repens*, *Rendle*. A low herb with a persistent thin woody glabrous creeping stem up to $1\frac{1}{2}$ lin. in diam., rooting at the nodes. Leaves long-stalked, cordate, somewhat abruptly shortly acuminate, margin very obscurely crenate, 3-nerved at the base, with 4 pairs of opposite upcurving nerves above; nerves slender and somewhat prominent beneath, as are the slender cross-unions; $2\frac{1}{2}$ –4 in. long and slightly wider, thinly membranous when dry, glabrate, both faces with visible cystoliths, which are shortly linear on the nerves and veins and dot-like between; petiole slender, 4–6 in. long, longitudinally furrowed when dry, puberulous. United stipules short, ovate, acuminate, persistent, 2 lin. long. Male inflorescences corymbiform, springing from leafless nodes; peduncles slender, as long as the petioles and similarly puberulous; flowers subumbellate at the ends of the slender branchlets; pedicels 1 – $1\frac{1}{2}$ lin. long, glabrescent, with a minute basal bract; buds depressed globose, about $\frac{3}{4}$ lin. in diam.; perianth deeply 5-partite, segments concave, ovate, with a few short stinging hairs on the back; rudimentary ovary short, inverted-turbinate. Female flowers and fruit unknown.—*Laportea repens*, Wedd. in DC. Prodr. xvi. i. 81.

Upper Guinea. Fernando Po, *Mann*, 1424!

The characters of the foliage suggest *Urera* rather than *Laportea*, especially the form and arrangement of the cystoliths.

Imperfectly known species.

16. *U. Fischeri*, *Engl. Pfl. Ost-Afr. C.* 162. A climber with stem thinly hairy. Leaves large, ovate, rather obtuse, margin with very short broad teeth, 6 in. long, $4\frac{3}{4}$ in. wide, sparsely hairy on the upper face, densely and softly hairy below; petiole half as long as the leaf, thinly hairy and bearing towards the apex long linear or forked outgrowths. Female inflorescence forming a rather dense panicle longer than the petiole.

Mozamb. Distr. German East Africa: without precise locality, *Fischer*, 117.

17. *U. engleriana*, *Dinter, Deutsch-Südw.-Afr.* 54 (*nomen abort.*). A tree 18 ft. high, "1 ft. thick," with dark cortex and ascending

branches. Leaves in clusters at the ends of the branches, with fairly long petioles, grossly toothed, up to 6 in. long, surface rough with brittle transparent stinging hairs.

Lower Guinea. Damaraland: Waterberg, *Dinter*.
Possibly not congeneric.

6. GIRARDINIA, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 384.

Flowers diœcious or monœcious, densely spicate. Male flowers: Perianth 4-5-partite, lobes ovate, concave, valvate in bud; bud depressed. Stamens 4-5. Ovary rudimentary. Female flowers: Perianth consisting of a broad very concave posterior portion denticulate at the apex which surrounds the ovary, and a small slender hair-like transitory anterior portion. Ovary straight; stigma long, subulate to filiform, partially persistent; ovule erect from the base. Achene rounded, much compressed, furnished at the base with the slightly enlarged and thickened persistent perianth; pericarp with a thin dark membranous outer coat, and a white horny inner coat. Seed-coat thin, membranous, brown; albumen very scanty; cotyledons rounded, emarginate.—Tall erect herbs, armed with strong stinging hairs. Leaves large, alternate, petioled, grossly serrate or lobed, 3-nerved. Stipules connate into a single broad entire or 2-fid structure, caducous. Inflorescences axillary, generally solitary in the leaf-axils; male flowers crowded in clusters on a simple or forked or paniculately branched axis; female flowers densely crowded in unilateral cymes on the short branchlets, becoming stout and very densely crowded in fruit and copiously armed with stinging hairs.

Species 5 or 6; in Asia, Tropical Africa and Madagascar.

Leaves bullate, with margin cut into numerous short triangular grossly serrate lobes 1. *G. bullosa*.

Leaves ovate to 3-lobed, margin serrate to grossly serrate 2. *G. condensata*.

1. *G. bullosa*, *Wedd. in Ann. Sci. Nat. 4me sér. i. 181.* A large herb, monœcious or diœcious; branches stout, hollow, hispidulous and densely beset with strong whitish spreading or recurved stinging hairs. Leaves large, rotund-ovate, apex shortly acuminate, base cordate or truncate, margin cut into numerous short triangular grossly serrate lobes, 3-nerved at the base, with 4-5 somewhat ascending conspicuous nerves above on each side, spaces between the nerves occupied by an elaborate conspicuous network of veins, $\frac{1}{2}$ -1 $\frac{1}{2}$ ft. long and about as wide; upper face dark green when dry, bullate, with scattered large stinging hairs and smaller appressed whitish stiff hairs; under face with strong stinging hairs on the nerves, and tomentose from the soft hairs on the veins; petiole 2-8 in. long, stout, hairy like the leaf-nerves. United stipules broadly elliptic,

entire or 2-fid, $\frac{3}{4}$ in. long, strongly 2-nerved, puberulous. Male inflorescence laxly paniculate, about as long as the petiole, 8 in.; flowers densely clustered on the axis and spreading branches which are similar in their hairs to the petioles; pedicels up to $1\frac{1}{2}$ lin. long, softly hairy; perianth 4-5-partite, $1\frac{1}{2}$ lin. long, the concave segments bearing a triangular horn-like projection below the incurved membranous blunt apex: in one specimen a small inflorescence containing both male and female branches occurs. Female inflorescence consisting of an axis and a few short branches densely covered with lobe-like cymes, shorter or longer than the leaf-stalk, densely beset with stinging hairs; flowers densely crowded, subsessile; perianth 2-lobed, upper lobe larger, about $\frac{2}{5}$ lin. long, enveloping the ovary, with a dorsal keel and gibbous below the minutely 3-toothed apex, lower lobe small, narrow, subulate. The inflorescence in fruit forms very dense cylindrical lobulate structures up to 6 in. long (including a stalk of 1 in.) and 1 in. thick. Achene rounded, 2 lin. in diam., blackish-brown, surface granulate.—Wedd. Monogr. Urtic. 168, and t. 2, B, figs. 5-7, and in DC. Prodr. xvi. i. 102; Engl. Hochgebirgssfl. Trop. Afr. 193 and in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8, ii. 190. *Urtica bullosa*, Hochst. ex Steud. in Flora, 1850, 259; A. Rich. Tent. Fl. Abyss. ii. 262.

Nile Land. Abyssinia: near Jenausa, *Schimper*, 1409! Gafat, 8200 ft., *Schimper*, 1261! Samen; Ghaba, *Steudner*, 1337; and without precise locality, *Schimper*, 622!

Mozamb. Distr. German East Africa: Ruanda; south of Karisimbi, *Mildbraed*, 1503.

2. *G. condensata*, *Wedd. Monogr. Urtic.* 169, and t. 2, B, figs. 1-4. A herb, monœcious or diœcious; stem erect, $1\frac{1}{2}$ -6 ft. high, simple or slightly branched, somewhat succulent, furrowed, hirtellous and beset with sharp stinging hairs, as are also the petioles, becoming glabrous below. Leaves very variable in form and size, simple and ovate or rotund-ovate, with acuminate apex and serrate or grossly serrate margin, becoming even on the same plant 3-lobed to deeply 3-lobed. Lobes acuminate, with more or less serrate margin and sometimes with a shorter secondary lobe, base rounded, or very blunt to truncate or somewhat cordate, conspicuously 3-nerved, lateral nerves and veins more or less conspicuous beneath, 2-10 in. long, $1\frac{1}{2}$ -10 in. wide, thinly membranous when dry, upper face dotted with cystoliths and with appressed white hairs, also a few stinging hairs on the nerves, lower face similarly hairy; petiole generally less than half the length of the leaf. United stipules broadly ovate, 2-fid at the apex, somewhat hispid, soon falling. Inflorescences unisexual, generally solitary in the leaf-axils, with a short peduncle, sometimes a second of alternative sex is present. Male simple, forked or with a few lax branches shorter or longer than the petiole, flowers densely arranged along the axes; bud about 1 lin. in diam.; perianth 4-5-partite,

segments with merely a small thickening of the mid-vein below the apex, hispidulous on the back. Female shorter than the petioles, the cymules densely crowded on the axis or its short branches, densely beset with spreading white stinging hairs; flowers subsessile; perianth consisting of a very concave upper segment obscurely toothed at the apex and a caducous slender transparent hair-like lower segment. In fruit the inflorescence forms capitate or generally thick oblong or cylindrical spike-like simple or branched masses $\frac{1}{2}$ lin. to 2 in. long, densely covered with the spreading stiff stinging hairs. Achene broadly ovate or somewhat cordate, $1\frac{1}{4}$ to nearly 2 lin. long. —Wedd. in DC. Prodr. xvi. i. 103, and in a more limited sense, in Ann. Sci. Nat. 4me sér. i. 181; Engl. Hochgebirgsfl. Trop. Afr. 193, Pl. Ost-Afr. C. 163, in Engl. Jahrb. xxx. 296, and in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907-8, ii. 190. *G. adoënsis*, Wedd. in Ann. Sci. Nat. 4me sér. i. 181; Hiern in Cat. Afr. Pl. Welw. i. 990. *Urtica adoënsis*, Hochst. ex Steud. in Flora, 1850, 259; A. Rich. Tent. Fl. Abyss. ii. 262. *U. condensata*, Hochst. ex Steud. l.c. 260; A. Rich. l.c. 263.

Upper Guinea. Southern Nigeria: Ewena, *Thompson*, 514!

Nile Land. Abyssinia: near Adowa, *Schimper*, 101! Mount Sholoda, *Schimper*, 1888! Mai Sigamo, 6200 ft., *Schimper*, 277! Sanka Berr, 7000 ft., *Schimper*, 1256! and without precise locality, *Schimper*, 816! British East Africa: Rabai, *Taylor*! Kibwezi River, *Kaessner*, 691! Eldama Ravine and Mau, 7000-7500 ft., *Whyte*!

Lower Guinea. Angola: Pungo Andongo; *Welwitsch*, 6295, partly (6296 in Herb. Kew.)! Huilla; Monino, *Welwitsch*, 6289!

South Central. Belgian Congo: Niragongo, north of Lake Kivu, *Mildbraed*, 1306.

Mozamb. Distr. German East Africa: Livingstone Mountains, *Goetze*, 1175. Nyasaland: Mount Chiradzulu, *Whyte*! Shire Highlands; Blantyre, *Buchanan*, 71! 166! Nyika Plateau, 6000-7000 ft., *Whyte*, 227! Manganja Hills, *Waller*! Tshinmuzo, 3000 ft., *Kirk*! and without precise locality, *Buchanan*, 557!

Very near the Himalayan *G. heterophylla*, Don.

7. PILEA, Lindl.; Benth. et Hook. f. Gen. Pl. iii. 384.

Flowers monœcious or diœcious. Male flowers: Perianth 2-5-, generally 4-partite; segments valvate, concave, somewhat fleshy, with a horn-like appendage below the membranous apex. Stamens as many as the perianth-segments; ovary rudimentary. Female flowers: Perianth 3-partite; segments unequal, generally greenish, the median larger than the two lateral, and dorsally gibbous or hooded, the lateral flat, often very small. Staminodes opposite to the perianth-segments, scale-like, inflexed, ultimately reflexed expelling the ripe fruit. Ovary straight; ovule erect from the base of the chamber. Stigma sessile, shortly penicillate. Achene ovate or roundish, compressed, smooth or scabridulous, more or less incompletely enveloped by the persistent perianth-segments. Seed-coat

thin; albumen almost none; cotyledons broad.—Annual or perennial herbs, sometimes shrubby at the base. Leaves opposite, stalked, those of a pair equal or unequal, entire or toothed, 3-nerved. Stipules connate into one, intrapetiolar. Flowers in axillary 1-sexual or 2-sexual cymes; cymes sessile or stalked, sometimes densely capituliform, sometimes paniculate.

Species about 200, widely distributed throughout the tropics.

- Leaves of a pair markedly unequal, elliptic, margin entire 1. *P. manniana*.
- Leaves of a pair generally subequal, ovate or lanceolate (elliptic in 13, *P. usambarensis*), margin serrate or crenate-serrate.
- Flowers forming false sessile whorls at the nodes ... 2. *P. ceratomeria*.
- The four uppermost leaves forming an apparent whorl subtending a cruciate dense inflorescence 3. *P. tetraphylla*.
- Flowers not in false whorls at the nodes nor specially associated with the uppermost leaves.
- Inflorescence much shorter than the petioles; flowers crowded in dorsiventral cymules which are sometimes very reduced 4. *P. angolensis*.
- Inflorescence generally laxly paniculate or dichotomous.
- Plant shrubby 5. *P. urticæfolia*.
- Plant a herb.
- Leaves ovate.
- Plant 2½ ft. high; lateral pair of nerves reaching to base of leaf-tip 6. *P. Holstii*.
- Plant ½ to 1½ ft. high; lateral pair of nerves ceasing well below the base of leaf-tip 7. *P. subluccens*.
- Leaves lanceolate 8. *P. bambuseti*.
- Flowers contracted into one or more stalked heads.
- Leaves ovate.
- Achene ovate.
- Stipules membranous, persistent 9. *P. Johnstoni*.
- Stipules deciduous 10. *P. veronicifolia*.
- Achene lenticular 11. *P. Gætzii*.
- Leaves lanceolate 12. *P. Engleri*.
- Leaves elliptic 13. *P. usambarensis*.
- Leaves trapeziform 14. *P. kiwuensis*.

1. *P. manniana*, Wedd. in DC. Prodr. xvi. i. 117. Dioecious, somewhat shrubby, apparently climbing, glabrous. Stem terete, smooth; internodes 2-4 in. long. Leaves of a pair unequal, oblong-elliptic to elliptic, acuminate, the larger petiolate, 3-6 in. long and 1½-3 in. wide, with a rounded base, the smaller sessile, 2-3 in. long, 1-1¼ in. wide, with a cordate somewhat amplexicaul base, margin subentire or inconspicuously serrulate below the apex, triplinerved, nerves prominent beneath and joined by conspicuous curving secondary veins, network of veins also prominent, the meshes bearing numerous minute linear cystoliths; petiole of larger leaf 1½-1¾ in. long. Stipules oblong-ovate, deciduous, about 5 lin. long. Cymes

generally in pairs in the leaf-axils, rather shortly stalked, spreading, up to 2 in. long including the peduncle (up to $\frac{2}{3}$ in.), the male larger than the female which do not exceed the petiole of the larger leaf. Male flowers in dense subglobular clusters on the branchlets, about $\frac{1}{8}$ in. in diam., subsessile (pedicel shorter than the flower), bud globular, $\frac{1}{2}$ lin. in diam., perianth 2-partite, segments broadly concave with a short blunt apical mucro; stamens 2. Female flowers in smaller clusters than the male, barely exceeding 1 lin. in diam.; median segment oblong, shortly and somewhat acutely hooded, half as long again as the ovate lateral segments, and not equalling the smooth broadly ovate achene which is about $\frac{1}{2}$ lin. long.—Henriques in Bolet. Soc. Brot. x. 163.

Lower Guinea. Island of St. Thomas, *Mann*, 1063! *Moller & Quintas!*

Pilea microphylla, Liebm. (*P. muscosa*, Lindl.), a common tropical American species, which has been introduced into several localities in India and China, has been sent from Zanzibar by R. H. Lync.

2. *P. ceratomera*, Wedd. in DC. *Prodr.* xvi. i. 132. Dioecious or sometimes monoecious. Stem creeping and rooting below, then erect, generally simple, or with erect branches from the lower nodes, 6 in. to 2 ft. high, 1-2 lin. thick, lower nodes becoming bare, glabrous. Leaves of a pair nearly equal, broadly ovate, acuminate, base very obtuse to almost truncate, sometimes rounded, margin crenate-serrate above the base which is 3-nerved, the two side nerves running to about the middle, 1-2 in. long, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. wide, membranous when dry, glabrous or with scattered appressed white hairs on the veins beneath, with generally numerous inconspicuous fusiform cystoliths on both faces; petiole slender, $\frac{1}{2}$ -2 $\frac{1}{2}$ in. long, generally shorter but sometimes longer than the blade. Stipules ovate-elliptic, apex rounded, $\frac{1}{4}$ - $\frac{1}{3}$ in. long, brown and scarious when dry, sometimes lasting as long as or rarely longer than the leaf. Inflorescences forming a dense sessile head at the upper nodes, the pair at each node becoming confluent, much shorter than the petioles, 1-sexual or the upper sometimes 2-sexual. Male flower about 1 lin. long, pedicel nearly as long; perianth 3-partite, segments elliptic-obovate with a horn-like process beneath the short bluntly ligulate apex about $\frac{1}{2}$ lin. long. Female flower with 3 subequal broadly ovate-elliptic segments a little shorter than the achene and bearing a subapical process as in the male $\frac{1}{2}$ lin. or less in length; staminodes bluntly ovate, varying in length. Achene compressed-ovate, with narrowly winged margin, 1 lin. long, bearing when ripe minute slender stiff transparent cuticular processes, especially on the margin.—Engl. *Pfl. Ost-Afr.* C. 163. *P. macrodonta*, Baker in *Journ. Linn. Soc. Bot.* xx. 266. *P. n. sp.*, Henriques, l.c.

Upper Guinea. Fernando Po: Clarence Peak, 4000 ft., *Mann*, 626! Cameroons: Cameroon Mountain, 7000-8000 ft., *Mann*, 2011! *Johnston*, 66! *Mildbraed*, 3437; *Buca*, *Preuss*, 957!

Nile Land. Uganda: Ruwenzori; Kivata, 7000–8000 ft., *Scott Elliot*, 7661!

Lower Guinea. Island of St. Thomas, *Möller & Quintas*!

South Central. Belgian Congo: Rugege forest, 6000 ft., *Mildbraed*, 888; Kwiji Islands in Lake Kivu, *Mildbraed*, 1250; Kissenyé; Bugoyer, 7500 ft., *Mildbraed*, 1470; Ninagongo, 8500 ft., *Mildbraed*, 1355.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 6500 ft., *Volkens*, 1275! 1493!

Also in Madagascar and Comoro Is.

Var. *Mildbraedii*, Engl. in *Mildbraed*, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907–8, ii. 191. Leaves acute at the base, more elongated at the apex.

South Central. Belgian Congo: Rugege forest, 6000 ft., *Mildbraed*, 1045; Mt. Kirungu, *Kaessner*, 3222! Kissenyé; Ninagongo, 8500 ft., *Mildbraed*, 1355.

3. *P. tetraphylla*, *Bl. Mus. Bot. Lugd.-Bat.* ii. 50. A diœcious annual herb, rarely monœcious, 1–6 in. high. Stem erect, or sometimes with a creeping base, slender, simple or branched, glabrous, brown streaked with linear white cystoliths. Leaves forming a pseudo-whorl at the apex of the stem and branches by approximation of two pairs, the leaves at the lower nodes smaller, those of a pair equal, ovate, obtuse or acute, base broadly cuneate, margin somewhat grossly crenate-serrate above the base, rarely almost entire, 3-nerved, the lateral nerves reaching to about the middle of the blade, upper leaves generally $\frac{1}{2}$ –1 in. long and nearly as wide, sometimes smaller, thinly membranous when dry, with a few appressed white hairs on the upper face and sometimes on the nerves beneath, otherwise glabrous, with numerous linear cystoliths visible under a lens; petiole almost filiform, shorter than the leaf, up to $\frac{1}{2}$ in. long. Stipules broad, rounded, persistent, scarious, about 1 lin. long. Male flowers densely crowded in the leaf-axils; perianth 3–5-partite, one or more of the segments with an appendage. Female cymes axillary, shorter than the leaves, bearing dense one-sided cymules on the short branches, and forming a densely paniculate spreading dorsiventral inflorescence to which the 4 upper leaves act as an involucre; a cyme is sometimes also present in the axils of the next lower leaf-pair; pedicel $\frac{1}{2}$ lin. or less in length; perianth 4-partite, the large median segment hooded and keeled, persisting and about $\frac{3}{4}$ as long as the achene, the other segments minute and caducous. Achene compressed-ovate, granulate, about $\frac{1}{2}$ lin. long.—Wedd. in *DC. Prodr.* xvi. i. 136; Engl. *Hochgebirgsfl. Trop. Afr.* 193, in *Glied. Veg. Usambara*, 45, and in *Pfl. Ost-Afr. C.* 163; Schweinf. in *Bull. Herb. Boiss.* iv. App. ii. 145. *Pilea quadrifolia*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 263; Wedd. *Monogr. Urtic.* 199, t. vii. figs. 4–10; Hook. in *Journ. Linn. Soc.* vii. 216. *Urtica tetraphylla*, *Steud. in Flora*, 1850, 260.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 2012!

Nile Land. Eritrea: Ginda, 2500–3000 ft., *Schweinfurth & Riva*, 192, 253, 469. Abyssinia: Adowa, *Schimper*, 74! Hamedo, 4800 ft., *Schimper*, 144! Mount Sholoda, *Schimper*, 1680! and without definite locality, *Parkyns*! *Schimper*, 436! British East Africa: probably Kilimanjaro district, *Taylor*!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 8000 ft., *Volkens*, 637! Nyasaland: Zomba Rock, *Whyte*!

Also in Madagascar.

Var. *major*, Rendle in Journ. Bot. 1917 ined. Of similar habit to the branched forms of the species but on a much larger scale. The erect stems rise from the creeping profusely rooting base to a height of 15-16 in., and are $1\frac{1}{2}$ lin. thick; the long internodes are $2\frac{1}{2}$ - $5\frac{1}{2}$ in. long, the elongated branches are suberect. Leaves on the main strong stems $1\frac{3}{4}$ - $2\frac{1}{2}$ in. long, 1-2 in. wide, smaller on the branches and weak stems; the stronger stems may bear leaves as large as those of the apical pseudo-whorl on the next two or sometimes three lower nodes. Inflorescences 1- $1\frac{1}{2}$ in. long.

Upper Guinea. Cameroons: Buca, 7000 ft., *Preuss*, 1001!

4. *P. angolensis*, Rendle. A small delicate annual herb, intensely green, glabrous. Stem erect, fleshy, 4-9 or sometimes 12 in. high, simple or branched. Leaves at the upper nodes larger than those below, those at the lowermost nodes caducous, those of a pair subequal or unequal, ovate, obtuse, base broadly wedge-shaped to truncate, 3-nerved, the lateral nerves extending beyond the middle, margin dentate above the base, those of the lowest pair sometimes entire, $\frac{2}{3}$ - $1\frac{3}{4}$ in. long, $\frac{1}{2}$ - $1\frac{1}{2}$ in. wide, of the lowest pair $\frac{1}{2}$ in. long or less; thinly membranous when dry, the surface often marked with linear slightly curved cystoliths; petioles slender, up to 2 in. long. Stipules caducous. Inflorescence 1-sexual or 2-sexual, one to several in the leaf-axils, much shorter than the petioles, rarely exceeding $\frac{1}{2}$ in., generally less; flowers in dense second cymules on the main axis or its short branches; peduncle short, slender; inflorescence sometimes reduced, becoming sessile and capituliform. Male inflorescence shorter than the female. Male perianth 4-partite, $\frac{1}{2}$ lin. in diam. before opening, lobes broad, blunt, with a short green sub-apical appendage. Female more numerous and more densely crowded than the male; perianth 3-lobed, median segment hooded, blunt, obscurely keeled, 2-3 times as long as the two lanceolate lateral segments, segments persistent in fruit, the median a little shorter than the achene; stigma lateral beneath the apex. Achene pale brown when ripe, compressed ovate-lanceolate, margin flattened, $\frac{1}{4}$ lin. long.—*Adicea tetraphylla*, var. *angolensis*, Hiern in Cat. Afr. Pl. Welw. i. 990.

Nile Land. Uganda: Ngusi River, near Lake Albert Edward, 3000 ft., *Bagshawe*, 1354!

Lower Guinea. Angola: Pungo Andongo, moist shady rocks, Barrancos de Pedra Songue, *Welwitsch*, 6258! Pedras de Guinga, *Welwitsch*, 6259! and without definite locality, *Welwitsch*, 6272!

The reference in Hiern's description to rigid long setæ sometimes present on the upper part of the stem and the lower face of the leaves, evidently relates to a specimen of *Fleurya mooreana* which has been mixed with the specimens of *Welwitsch*, 6258.

5. *P. urticæfolia*, Bl. Mus. Bot. Lugd.-Bat. ii. 47. Diœcious, shrubby below, glabrous. Stem much-branched, procumbent, terete, reaching 2 ft. in length, with 4 scarcely conspicuous longitudinal lines, somewhat reddish when dry and marked with short

linear cystoliths ; leafy only in the upper part and on the branchlets. Leaves of a pair sometimes unequal, ovate or elliptic, sometimes almost rounded, obtuse to acute or shortly acuminate, base rounded to wedge-shaped, margin serrate above the base, triplinerved, the lateral nerves reaching to about or a little beyond the middle of the leaf, $\frac{1}{2}$ –1 in. long, 4–8 lin. wide, toughly membranous, upper face when dry dark green and marked with numerous linear cystoliths, lower face dull reddish ; petioles slender, 2–5 lin. long. Stipules minute, triangular, caducous. Inflorescences in the upper leaf-axils, peduncled, generally exceeding the petiole, the male longer than the female. Male flowers clustered at the end of the peduncle or its forks ; perianth 4-partite, lobes with a subapical mucro ; bud nearly 1 lin. in diam. Female flowers more closely crowded than the male ; median lobe of perianth shortly hooded, exceeding the lateral lobes and nearly equal to the achene. Achene brown, compressed, ovate, barely exceeding $\frac{1}{2}$ lin. in length.—*P. rupipendia*, Wedd. in Ann. Sci. Nat. 4me sér. i. 186, and in DC. Prodr. xvi. i. 123. *Parietaria urticæfolia*, Linn. f. Suppl. 434. *Urtica rupipendia*, Poir. Encycl. iv. 640.

East Africa. Without precise locality, *Martin* (vide Weddell).

Also in the Mascarene Islands.

6. *P. Holstii*, *Engl. in Glied. Veg. Usambara*, 50, and *Pfl. Ost-Afr. C.* 163. A tall glabrous herb, $2\frac{1}{2}$ ft. high, monœcious or diœcious (?), sometimes branched. Leaves ovate, acuminate, base almost rectangular and entire, margin above base grossly serrate, 3-nerved, the lateral nerves running to below the apex, leaves of a pair subequal or one somewhat larger and longer-stalked than the other, generally between $1\frac{1}{4}$ –3 in. long, and $\frac{3}{4}$ to nearly 2 in. wide, thinly membranous when dry, the lower face densely covered with linear sometimes slightly curved cystoliths ; petiole slender, shorter than the leaf, $\frac{2}{3}$ – $2\frac{1}{2}$ in. long. Stipules caducous. Inflorescences axillary ; male shorter than the petiole and somewhat densely paniculate ; flowers shortly stalked ; perianth 4-partite, midveins thickened and ending in a short umbo. Female inflorescence about equal to or longer than the petiole, laxly paniculate, to about $1\frac{1}{4}$ in. long ; the flowers aggregated in small cymules on the slender branches ; perianth 3-partite, segments about equal, the median very concave, in side view oblong, apex somewhat truncate, apiculate, lateral segments ovate, subacute ; pedicel half the length of the flower. In fruit the median segment reaches just above the middle of the achene, and is about twice as long as the lateral segments. Achene ovate with a pronounced thinner margin, $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa : Usambara ; Nderema, in forest, *Holst*, 2245 ! *Buchwald*, 6381

7. *P. sublucens*, Wedd. in DC. Prodr. xvi. i. 130. A glabrous dioecious herb. Stem erect from a creeping decumbent base, 6 in. to 1½ ft. high, laxly branched; branches ascending or erect, remotely leaved below, more densely so above. Leaves of a pair more or less unequal, ovate, sometimes with a trapeziform base, apex acuminate, margin crenate-serrate, serratures apiculate, 3-nerved, the lateral nerves passing beyond the middle, ½–2½ in. long, ¼–1¼ in. wide or sometimes smaller, thinly membranous when dry, cystoliths when present linear, sometimes numerous especially on the upper face; petiole slender, shorter or sometimes longer than the leaf. Stipules small, ovate-triangular, deciduous. Inflorescence (female) opposite, axillary, sometimes apparently paired in the leaf-axils, laxly paniculate, ¾–1¾ in. long or less, peduncle about half the length, slender as are also the few branches; cymules forming the short densely flowered ultimate branchlets. Achene compressed-ovate, narrowly winged, about ½ lin. long, brown, the persistent median perianth-segment oblong, rather broadly keeled, enveloping it to about the middle; lateral perianth-segments inconspicuous. Pedicel ultimately exceeding the achene in length.—*P. Preussii*, Engl. in Engl. Jahrb. xxxiii. 123.

Upper Guinea. Cameroons: Buea, 3300 ft., *Preuss*, 573! 953! Fernando Po: Clarence Peak, 4000 ft., *Mann*, 630!

8. *P. bambuseti*, Engl. in *Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 190. An erect herb, 20–30 in. high. Stem simple or slightly branched, somewhat densely leaved above the middle, lower internodes ¾–1¼ in. long, upper 5–7 lin. long. Leaves spreading-erect, oblong-lanceolate, long-acuminate, base obtuse, margin serrate except at the base, 3-nerved, lateral nerves spreading and slightly curving, with the densely reticulate veins somewhat prominent on the lower face, 4¼ in. long, including the 1 in.-long tip, 1–1¼ in. wide, at first sparsely hairy on the nerves but soon becoming glabrous; petiole slender, shortly hairy above, one-third the length of the leaf, reaching 1 in. in the larger leaves. Stipules small, triangular. Inflorescences paniculate, equal to or up to three times the length of the petioles, ¾ to 2½ in. long, lateral branches short, 1–7 lin. long.

South Central. Belgian Congo: Rugege forest, in damp shady places, 6200 ft., *Mildbraed*, 1044; Kissenyé, on the Ninagongo, 8500 ft., *Mildbraed*, 1354; Bugoyer, bamboo forest, 8000 ft., *Mildbraed*, 1476.

Near *P. Holstii*, Engl., but distinguished by the lanceolate leaves.

9. *P. Johnstoni*, Oliv. in *Trans. Linn. Soc. ser. 2*, ii. 349. A nettle-like herb, with erect glabrous generally unbranched shoots, apparently 1½–3 ft. high, sometimes smaller. Leaves long-stalked, those of a pair equal, ovate to broadly ovate, acuminate, extreme apex blunt, base broadly rounded to obtuse, extreme base often minutely cordate,

margin grossly serrate, 3-nerved, the lateral nerves extending above the middle, $1\frac{1}{4}$ –4 in. long, 1–3 in. wide, thinly membranous when dry, with pointed white hairs scattered on the upper face, more numerous beneath especially on the nerves; cystoliths linear, generally numerous on both faces; petiole $\frac{1}{2}$ – $2\frac{1}{4}$ in. long. Stipules membranous, brown, broadly ovate or rounded, 2–3 lin. long, persistent. Cymes solitary or geminate in the leaf-axils, stalked, generally shorter than the petiole, 1– $1\frac{1}{2}$ in. long, unisexual, but male and female cymes sometimes present in the same axil. Flowers crowded in small subglobose heads 3–4 lin. in diam., at the end of the peduncle or its few short branches; male flower subglobose, about 1 lin. in diam.; perianth divided above into 4 ovate hooded lobes with a short subapical dorsal appendage; female 3-partite, the median lobe broadly oblanceolate in profile, with a short subapical dorsal appendage, about equal to the achene, lateral lobes ovate, about one-third the length of the median in the fruiting stage. Achene compressed-ovate, brown, $\frac{1}{2}$ lin. long, minutely scrobiculate. —Engl. *Pfl. Ost-Afr. C.* 163, incl. var. *runssorensis*; Cortesi in *Abruzzi, Il Ruwenzori*, i. 462; R. E. Fries in *Rhod.-Kongo-Exped.* 1911–12, i. 18.

Nile Land. British East Africa: Mau, *Baker!* Kenia, *Hutchins*, 385! Uganda: Nandi district, 6000 ft., *Whyte!* second day's march from Eldama Ravine, *Whyte!* Ruwenzori; Kivata, 7000–10,000 ft., *Scott Elliot*, 7742! *Stuhlmann*, 2730; between Kichuchu and Nakitava, *Abruzzi*.

South Central. Belgian Congo: Ninagongo, about 8800 ft., *Fries*, 1642.

Mozamb. Distr. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Marangu, 5800 ft., *Volkens*, 1136! 1848!

10. *P. veronicifolia*, *Engl. Pfl. Ost-Afr. C.* 164. A glabrous herb. Stem accumbent, rooting below, branched; branches ascending, 6–9 in. long, marked when dry with numerous white linear cystoliths, leafy in the upper part. Leaves of a pair nearly equal, ovate, acuminate, extreme apex blunt, base obtuse or truncate, above the base crenate-serrate, 3-nerved, the lateral nerves reaching the middle or a little beyond, $\frac{3}{4}$ – $2\frac{1}{4}$ in. long, $\frac{2}{3}$ – $1\frac{1}{2}$ in. wide, those at the lower nodes smaller, with numerous linear cystoliths on both faces and sometimes a few scattered hairs; petiole slender, about equal to or shorter than the blade. Stipules small, broadly ovate, deciduous. Flowers in small globular heads in the leaf-axil, heads unisexual, the female often sessile or shortly stalked, stalk rarely as long as the petiole, male long-stalked, stalk exceeding the petiole. The large median segment of the perianth nearly equal to the achene, the lateral segments small. Achene compressed, rather broadly ovate, brown, $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Usambara; Kwa Mshuza, *Holst*, 9885! Amani, *Herb. Amani*, 458!

11. *P. Götzii*, *Engl. in Engl. Jahrb.* xxviii. 379. A tall dioecious herb about 3 ft. high. Stem quadrangular, with a few scattered

hairs, otherwise glabrous, branched, internodes on the main stem $\frac{3}{4}$ – $1\frac{1}{2}$ in. long. Leaves subovate, base acute, margin rather bluntly serrate, 3-nerved, $1\frac{1}{4}$ –2 in. long, $\frac{3}{4}$ – $1\frac{1}{4}$ in. wide, with very numerous linear cystoliths; petiole slightly channelled above, sparsely hairy, 5–7 lin. long. Stipules broadly triangular, acute, about $2\frac{1}{2}$ lin. long and 1 lin. wide. Female inflorescences subglobose, 3– $4\frac{1}{2}$ lin. in diam.; peduncle exceeding the half of the leaf, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long; bracts subterete, about equal in length to the flowers, 1 lin. long; perianth-segments oblong, apiculate, dark green at the tip. Achene suborbicular, slightly compressed, lenticular, $\frac{3}{4}$ lin. broad, $\frac{1}{2}$ lin. long.

Mozamb. Distr. German East Africa: Central Uluguru; Lukwangula Plateau, 7800 ft., *Goetze*, 286.

12. *P. Engleri*, *Rendle*. Stem tall, succulent. Leaves lanceolate, acuminate, base obtuse, entire, margin otherwise serrate-dentate, glabrous, shining, very densely covered on each face, especially beneath, with minute linear cystoliths; petiole half as long as the blade. Stipules deciduous. Inflorescences glomerate, capituliform, long-stalked, the female smaller, the male nearly twice as large.—*P. longipes*, *Engl. Pfl. Ost-Afr. C.* 163; not of Liebman nor of Baker.

Mozamb. Distr. German East Africa: Kilimanjaro; girdle forest, 6000–9500 ft., *Volkens*, 1494.

13. *P. usambarensis*, *Engl. Glied. Veg. Usambara*, 55, and *Pfl. Ost-Afr. C.* 163. Stem succulent, creeping below, then erect. Leaves elliptic, acuminate, base subacute, entire, margin otherwise serrate, 3-nerved; cystoliths linear, very numerous, especially on the lower face; petiole half as long as the blade. Stipules deciduous. Inflorescences in pairs in the leaf-axils, capituliform; peduncles a little shorter than the petiole; pedicels half as long again as the subglobose flower-bud.

Mozamb. Distr. German East Africa: Usambara; Mlalo, *Holst*, 78.

14. *P. kiwuensis*, *Engl. in Mildbraed. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907–8, ii. 190. Stem decumbent, with numerous erect branches up to 8 in. long, internodes about as long as the petioles. Leaves spreading, trapeziform, acute at apex and base, margin entire below, serrate above, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, 7 lin. wide, with scattered white hairs on the upper face; petiole slender, 5–7 lin. long. Stipules triangular, acute, brownish, up to $1\frac{1}{2}$ lin. long. Inflorescences (female) in pairs, equal to or shorter than the petiole, corymbose, contracted into a head, $2\frac{1}{2}$ –3 lin. in diam., peduncle $2\frac{1}{2}$ lin. long.

South Central. Belgian Congo: Sabyino, north-east of Lake Kivu, 8800 ft., *Mildbraed*, 1692.

8. **LECANTHUS**, Wedd. ; Benth. et Hook. f. Gen. Pl. iii. 385.

Flowers monoëcious or diëcious. Male flower: Perianth 4-5-partite, segments concave, gibbous below the hooded apex. Stamens 4-5; ovary rudiment small. Female flowers: Perianth 3-4-partite, segments unequal, persistent. Staminodes opposite the perianth-segments, small, scale-like. Ovary straight, ovule erect from the base of the chamber. Stigma sessile, penicillate. Achene straight, ovate, somewhat compressed, invested with the persistent perianth-segments. Seed-coat membranous, conforming to the pericarp; albumen very scanty; cotyledons elliptic.—Annual or perennial herbs with the habit of *Pilea*. Leaves opposite, stalked, those of a pair unequal, serrate, 3-nerved. Stipules scarious, connate into one, intrapetiolar. Flowers on stalked discoid or turbinate receptacles which are solitary in the leaf-axils; male and female flowers on separate plants or more rarely mixed in the same receptacle; flowers generally stalked. Long-stalked sterile flowers may occur in the female receptacles.

Species 2; one in tropical Asia and Africa, one in the Society Islands.

1. **L. peduncularis**, Wedd. in DC. Prodr. xvi. i. 164. A delicate herb, varying in African specimens from a little over an inch to 10 in. in height. Stems one to several, erect from a creeping rooting base, simple or branched, succulent, glabrous, from $\frac{1}{3}$ - $1\frac{1}{4}$ lin. thick, leafy except at the lower nodes, leaves increasing in size in the upper part. Leaves thinly papery when dry, ovate to elliptic-ovate, apex acute to acuminate, base blunt to cuneate, sometimes unequal, margin serrate, teeth usually large, the smaller lower leaves rarely nearly or quite entire, varying very much in size, from $\frac{1}{3}$ in. to $2\frac{3}{4}$ in. long, $\frac{1}{4}$ - $1\frac{1}{4}$ in. wide, glabrous except for a few scattered sharp-pointed white hairs on the upper face, both faces with numerous linear cystoliths; nerves more conspicuous on the lower face; the lateral pair failing in the upper part of the leaf; petioles slender, glabrous, varying greatly in length, from 1 lin. to $1\frac{1}{4}$ in. long, those of a pair unequal. United stipules scarious, generally persistent, broadly elliptic, a little over 1 lin. long in the larger leaves. Receptacles on slender stalks; male generally very small, turbinate and shortly stalked. Female varying greatly in size, generally from 1-4 lin. in diam. in African specimens; margin of disc with bluntly rounded overlapping lobes, back of disc with linear cystoliths; peduncle filiform, $\frac{1}{4}$ -1 in. long; perianth deeply divided into 3 to 4 unequal segments, $\frac{2}{5}$ - $\frac{1}{2}$ lin. long, which are clavate with a more or less hooded apex; in the outer series of flowers the outermost perianth-segment is often conspicuously larger, with a more prominent hood than the remaining 2 or 3; where 4 segments are present the one opposite the larger is the smallest. Achene chestnut-brown, narrowly ovoid

to elliptic-ovoid, $\frac{2}{5}$ - $\frac{1}{2}$ lin. long.—Engl. Hochgebirgsfl. Trop. Afr. 194 (*pedunculatus*). *Lecanthus Wightii*, Wedd. in Ann. Sci. Nat. 4me sér. i. 187, and Monogr. Urtic. 280, t. ix. C; Hook. f. in Journ. Linn. Soc. vii. 216 (*Lecanthus*) and in Fl. Brit. Ind. v. 559. *L. major*, Wedd. in Ann. Sci. Nat. l.c. *L. Wallichii*, Wedd. l.c. *Procris peduncularis*, Wall. Cat. no. 4634 (name only); Royle, Illustr. t. 83. *P. obtusa*, Royle, l.c. *Elatostema oppositifolium*, Dalz. in Hook. Journ. Bot. iii. 179 (1851). *E. ovatum*, Wight, Ic. t. 1985.

Upper Guinea. Fernando Po, 7500 ft., Mann, 1461! Cameroons: Buca, 6000-7000 ft., Preuss, 1034!

Nile Land. Abyssinia: near Asega, Schimper, 637!

Also from India and Malaya to New Guinea and the Philippines.

The three specimens recorded above are widely different in appearance. The Abyssinian are small plants less than 2 in. high, with a single slender unbranched stem, and a few leaves. That from Fernando Po has several erect slender branching leafy stems, 2-3 in. high, springing from a densely rooting creeping underground stem. The Cameroons plant has tall erect rather stout stems, up to 10 in. high, and is in every way a much larger plant.

9. ELATOSTEMA, Forst.; Benth. et Hook. f. Gen. Pl. iii. 386.

Flowers monœcious or diœcious, in generally dense bracteate unisexual cymose heads; receptacle, especially in the female, generally ultimately discoid or lobed. Male: Perianth 4-5-partite; segments membranous or almost hyaline, slightly imbricated, generally with a small dorsal mucro or appendage beneath the apex. Stamens 4-5. Ovary rudiment small. Female: Perianth of 3-5 small segments, or obsolete. Staminodes small and scale-like, or absent. Ovary erect, ovoid; stigma sessile, penicillate, soon falling; ovule erect from the base. Achene ovate or ellipsoid, somewhat compressed, invested at the base with the perianth (when present); pericarp often striated or punctate, brown, thin. Seed conforming to the pericarp; testa membranous; endosperm generally absent; cotyledons elliptic.—Annual or perennial herbs, more rarely woody below, glabrous or pubescent. Leaves alternate by suppression of one in each pair, sessile or shortly stalked, in two rows, unequal-sided, the narrower side facing the top of the stem or branch, generally acuminate or acute, base very unequal, margin generally serrate, rarely entire, usually 3-nerved, generally with numerous linear cystoliths on the upper face. Stipules united, intrapetiolar, entire, generally lanceolate. Inflorescences small, axillary, subsessile or stalked, formed of congested dichotomous cymes the rhachis of which unites to form the receptacle, which is surrounded by an involucre of bracts; inner bracts and bracteoles narrower and smaller. Male flowers soon falling, sessile or stalked, each generally invested by a rather broad bract. Female flowers generally stalked

and more numerous than the male and densely crowded; subtending bracts spatulate or linear, ciliate.

Species about 50; dispersed through tropical Asia, extending to the Himalayas and Japan and to Australasia and the Pacific Islands; fewer in tropical Africa and the Mascarene Islands.

Plants more than 6 in. high. Female inflorescence many-flowered.

Leaves exceeding 2 in. in length, markedly acuminate.

Male inflorescence sessile or shortly stalked.

Outer bracts of male inflorescence ovate; leaf-tip with margin toothed.

Male perianth-segments 5, mucro unequal, half the length of the segment or less; leaf-base not auricled 1. *E. Welwitschii*.

Male perianth-segments 4, mucro nearly as long as or longer than the segment; leaf-base auricled on the broader side ... 2. *E. paivæanum*.

Outer bracts of male inflorescence broadly lanceolate; leaf-tip with margin entire ... 3. *E. thomense*.

Male inflorescence long-stalked 7. *E. Mannii*.

Leaves not exceeding 2 in. in length.

Leaves about one-third as long as broad, acuminate. Eastern species 4. *E. orientale*.

Leaves about half as long as broad, not acuminate. Western species 5. *E. monticola*.

Plant about 4 in. high. Female inflorescence few-flowered 6. *E. parvulum*.

1. *E. Welwitschii*, *Engl. in Engl. Jahrb.* xxxiii. 124. A monoecious herb with a creeping profusely rooting brown rhizome 1-1¼ lin. thick; stems generally simple, erect or ascending from a rooting base, succulent, up to 15 in. high and a little over 1 lin. in diam., hispidulous, leafy in the upper half, the leaves at the lower nodes smaller and falling early. Leaves membranous, sessile, obliquely elliptic-oblong, apex abruptly acuminate, base very unequal, shorter on the narrower side of the blade, margin generally acutely and densely serrate throughout, the larger 3-4½ in. long, 1-2 in. wide; the two main lateral nerves arising just above the base on either side and falling before or about the middle of the leaf, that on the broader side shorter; upper face with scattered, sometimes very sparse, stiff pointed hairs with a swollen base, and with numerous linear cystoliths especially along the course of the veins; lower face hispidulous on the nerves and ascending lateral veins, which are also somewhat prominent. Stipules lanceolate, acuminate, green with pale margins, 3-4 lin. long. Inflorescences sessile or shortly stalked; bracts with small linear cystoliths. Male of small few-flowered bracteate cymes which are solitary or several crowded together, arranged dichotomously and 4-6 lin. across; outer bracts broadly ovate, blunt, up to 1½ lin. long, inner bracts similar but

smaller, hairy at the tip only; flower-stalk 1-1½ lin. long; perianth green, broadly campanulate, 5-partite, a little over 1 lin. long, split two-thirds the way down, segments unequal in breadth, shortly hairy at the tip, with a dorsal subapical appendage varying in the same flower from a notch to barely half the length of the segment; stamens attached below the middle of the segment. Female many-flowered, becoming very dense in fruit and forming flattened subquadrate or somewhat irregularly 4-lobed hairy cushions, 4-6 lin. in greatest diam.; outermost bracts broadly ovate from a broad base, about ½ lin. long, the inner narrower, lanceolate to linear, hairy; perianth minute, unequally 3-toothed, glabrous. Achene pale brown, punctulate, less than ½ lin. long.—*E. sessile*, Henriq. in Bolet. Soc. Brot. x. 163; Hiern in Cat. Afr. Pl. Welw. i. 992. *E. Henriquesii*, Engl. l.c. 125. *E. n. sp.*, Henriq. l.c.

Lower Guinea. Island of St. Thomas: Lagoa Amelia, 2700 to 4400 ft., *Moller & Quintas!* *Mann!* *Henriques!* Angola: Golungo Alto; damp shady woods at the River Delamboa, *Welwitsch*, 6269! and near Cacarambola, *Welwitsch*, 6270!

Var. *cameroonense*, Rendle in Journ. Bot. 1917, 201. A coarser growing plant than the species with larger sessile or sometimes shortly stalked leaves, up to 5 or 6 in. long and 1½ to 2½ in. wide. Main lateral nerves generally reaching beyond the middle, the one on the narrower side arising some distance above the leaf-base.—*E. kamerunense*, Engl. l.c. 125.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, *Staudt*, 839! west of Buca, *Preuss*, 607! Fernando Po: Clarence Peak, 4000 ft. *Mann*, 632!

Originally distributed by Engler as a distinct species, *E. kamerunense*, but subsequently referred by him under this name to *E. Welwitschii*.

2. *E. paivæanum*, *Wedd. in DC. Prodr.* xvi. i. 178. A monœcious or diœcious herb similar in habit to *E. Welwitschii*; stem about a foot high, glabrescent, or pubescent in the upper younger portion. Leaves membranous, subsessile or shortly stalked, obliquely elliptic, apex abruptly acuminate, base unequal, on the broader side auriculate, on the narrower tapering rapidly and joining the petiole about 2 lin. above the origin of the wider half, margin serrate or dentate-serrate throughout, 3-5 in. long, 1¼-2 in. wide, lateral nerves on the broader side 6-8, the lowest short, the second from the base on the narrower side running parallel with the margin beyond the middle of the blade, upper face glabrous or with a few pointed appressed hairs, and with numerous linear cystoliths, lower face more or less pubescent on the prominent nerves, rarely glabrous; petiole up to 3 lin. long. Stipules lanceolate-acuminate to subulate, about 4 lin. long. Inflorescences sessile or subsessile, capitate, solitary at the nodes. Male many-flowered, discoid or lobed, ½-¾ in. across; outer bracts broadly ovate, often acute, ¼ in. long, glabrous or pilosulose below, with ciliolate margin and conspicuous linear cystoliths; perianth barely 1 lin. long, divided two-thirds the way down into 2 broader and 2 narrower segments, the former with a subapical appendage exceeding the length of the perianth, the latter

with a short appendage. Female heads smaller than the male and in the monœcious shoots at the lower nodes, forming dense shortly hairy rounded cushions 5 lin. or less in diam., outer bracts lanceolate to linear-oblong, blunt, ciliolate, $1\frac{1}{2}$ lin. long, inner bracts narrower and rather shorter; flowers densely crowded; perianth-segments minute. Achene bright brown, ovoid-oblong, barely $\frac{1}{2}$ lin. long; pericarp rough.—*E. Preussii*, Engl. in Engl. Jahrb. xxxiii. 126. *E. busseanum*, H. Winkler in Engl. Jahrb. xli. 277 ?

Upper Guinea. Gold Coast: Hills at Kibbi Akim, *Johnson*, 254! Fernando Po: Clarence Peak, 4000 ft., *Mann*, 290! 631! Cameroons: Efulen, on mountains at 2300 ft., *Bates*, 248! forest district west of Buca, *Preuss*, 586; Neu-Tegel, *Winkler*, 177 ?

I have doubtfully included as a synonym *E. busseanum*, H. Winkler, of which I have not seen a specimen. Judging from the description this has been drawn up from a plant bearing young male inflorescences; I do not understand the description of the flower. Winkler makes no suggestion as to the affinity of the species.

Var. *conrauanum*, Engl. l.c. Leaves obliquely oblong, acuminate, margin almost entire or slightly crenate.

Without indication of locality.

3. *E. thomense*, *Henriq. in Bolet. Soc. Brct.* x. 163. A herb with stem ascending from a rooting base, puberulous, branched, branches 20 in. long, leafy in the upper half. Leaves membranous, the lowest small, the median sessile or subsessile, obliquely elliptic, rather long-acuminate, tip $\frac{1}{2}$ – $\frac{3}{4}$ in. long, very rarely toothed, base very unequal, almost wedge-shaped, margin (except in the lower third) serrulate, $1\frac{3}{4}$ –3 in. long, 7 lin. to 1 in. wide; lateral nerves on the broader side 6–8, the lowest very short, the second reaching nearly to the middle of the blade, on the narrower side 5, the second reaching the middle, upper face glabrous with scattered slender linear cystoliths, the lower face hairy on the nerves, more or less darkly dotted. Stipules 5 lin. long, lanceolate-linear. Heads of male flowers shortly stalked, $2\frac{1}{2}$ –7 lin. broad, depressed, with an involucre of several broadly lanceolate pilosulose ciliated bracts (the upper heads small, 3-bracteate), bracteoles ovate to linear, long-haired; flowers short- or long-stalked (pedicel 2 lin. long); perianth-segments irregularly mucronate beneath the apex, mucro glabrous. Female heads smaller than the male, $2\frac{1}{2}$ lin. in diam., sessile; bracteoles linear-spathulate, with long dense hairs; pedicel $\frac{1}{2}$ lin. long; perianth-segments very small. Achenes very short-stalked.

Lower Guinea. Island of St. Thomas: Macambrara, Monte Café, at 2700–4400 ft., *Moller & Quintas*.

4. *E. orientale*, *Engl. Pfl. Ost-Afr. C.* 164. Perennial; stems numerous, succulent, ascending from a long slender and ultimately woody rooting rhizome-like base a little over 1 lin. in diam., simple

or branched, more or less densely and shortly hairy. Leaves sessile, obliquely oblanceolate, acuminate, base very unequal and entire, margin above the base serrate, excluding the lower smaller ones 1-2 in. long, 5-8 lin. wide, with 3-4 lateral nerves on each side, ascending and uniting well within the margin, the two stronger arising well above the leaf-base, upper face glabrous or with a few scattered stiff white hairs, cystoliths numerous, short, linear, lower face sparsely hispidulous on the nerves. Stipules ovate-lanceolate, apex often shortly 2-fid, a little over 1 lin. long. Female inflorescence sessile or subsessile, 2-4 lin. in width, forming when mature a dense hemispherical or rounded hairy cushion. Outer bracts membranous, ovate-oblong, green with well-marked median vein and less conspicuous laterals, margin ciliolate, $1\frac{2}{3}$ lin. long; inner bracts narrower, oblong, otherwise similar, barely $1\frac{1}{2}$ lin. long, the innermost linear-spathulate to narrow-linear, 1 lin. or less in length, all with long hairs on the upper part; cystoliths not visible in the bracts. Flowers on short or longer stalks; perianth minute, 3-partite, segments ovate, margin shortly fimbriate above, about $\frac{1}{8}$ lin. long. Achene brown, compressed elliptic-ovate, $\frac{1}{2}$ lin. long.

Nile Land. British East Africa: Kuroris, forest ground plant, handsome and abundant, *Hutchins!* Uganda: Ruwenzori; Kivata, wet dark places in forest at 8000 ft., *Scott Elliot, 7632!*

Mozamb. Distr. Kilimanjaro: Marangu, forest at 7000 ft., *Folkens, 1259!* Rhodesia: Chirinda forest, 3700-4000 ft., a small herb climbing over a stone in mid-stream of Zona River, near source, *Swynnerton, 784!*

5. E. monticola, Hook. f. in Journ. Linn. Soc. vii. 216. A small herb 1 ft. high with slender stems ascending from a long creeping rooting base, simple or branched, generally 6-8 in. high, $\frac{1}{2}$ - $\frac{3}{4}$ lin. thick, hispidulous, especially in the upper part, with short downwardly directed hairs, leafy mainly above the middle. Leaves membranous, with very short stalks, obliquely obovate, acute, base very unequal, margin somewhat grossly serrate above the base, 1-1 $\frac{1}{2}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, with 3-4 lateral nerves on either side, the longest on the broader side arising opposite the origin of the blade on the narrower side and passing about to the middle of the blade, and on the narrower side 2-3 lin. above this point and passing beyond the middle of the blade; upper face with scattered appressed pointed hairs, nerves hispidulous on lower face, and with numerous linear cystoliths visible on both faces; petiole 1 lin. or less in length. Stipules membranous, lanceolate, acute to acuminate, 1-1 $\frac{1}{2}$ lin. long, persistent. Female inflorescence sessile or subsessile, ultimately $\frac{1}{4}$ - $\frac{1}{2}$ in. in diam. and forming a somewhat flat hairy cushion surrounded by an involucre of ovate-oblong to oblong blunt green bracts about 1 lin. long with ciliated margin and surface marked with linear cystoliths, inner bracts narrower to linear-spathulate, green and ciliated above the middle. Flowers numerous, crowded, sessile or

stalked; perianth minute, deeply 3-partite, segments hyaline, orbicular, about $\frac{1}{4}$ lin. long in the fruiting stage. Achene shortly stalked, brown, ovate-ellipsoid, about $\frac{1}{2}$ lin. long; pericarp longitudinally wrinkled; stalk after fall of fruit 1 lin. or less in length.—Wedd. in DC. Prodr. xvi. i. 187.

Upper Guinea. Cameroons: Cameroon Mountain at 7000 ft., *Mann*, 2014! Buca, 6200-7000 ft., *Preuss*, 607!

6. E. parvulum, *Engl. in Engl. Jahrb.* xxxiii. 127. A small herb about 4 in. high, branched in the upper two-thirds of its length with a few erect-spreading branches; lower and middle internodes rather long, the upper short, scarcely $2\frac{1}{2}$ lin. long. Stem and midrib densely hairy. Leaves sessile, deep green above, obliquely oblong, acuminate, margin with 2-4 blunt teeth on each side, 7-12 lin. long, 5-6 lin. wide, tip $2\frac{1}{2}$ lin. long; upper face deep green, sparsely hairy and provided with linear cystoliths, grey-green beneath. Female inflorescence short, few-flowered; bracts oblong, pellucid, ciliate, $1\frac{1}{2}$ -2 lin. long, the outer longer than the inner, the outermost 1 lin. wide. Perianth-segments lanceolate. Achenes ellipsoid.

Lower Guinea. Island of St. Thomas, at about 5000 ft., *Quintas*, 152.

7. E. Mannii, *Wedd. in DC. Prodr.* xvi. i. 178. A monœcious herb; stems rising erect from a decumbent rooting base which sends out slender rooting suckers, simple or sometimes slightly branched, somewhat succulent, 6 in. to 1 ft. high, 1- $1\frac{1}{2}$ lin. thick, surface rough with crowded linear cystoliths, somewhat hispidulous in the younger portion. Leaves crowded on the upper third of the stem, a few small ones at the lower nodes, stiffly membranous when dry, sessile or very shortly stalked, obliquely obovate-lanceolate, apex abruptly acuminate, base cuneate, slightly unequal, entire, margin crenate-serrate above the base, teeth mucronate, 2- $3\frac{1}{2}$ in. long, 7-14 lin. wide, lateral nerves 4-6 on each side, the two lowest springing from the midrib above the base, that on the narrow side appreciably higher, about $\frac{1}{4}$ in. from the base, and reaching to about the middle of the leaf; upper face glabrous, densely covered with linear white cystoliths and punctulate, lower face sparsely hispidulous on the somewhat prominent veins, cystoliths sparse. Stipules persistent, lanceolate, acuminate, 2-3 lin. long, apex sometimes 2-fid. Male inflorescence on a slender stalk $\frac{1}{2}$ - $\frac{2}{3}$ in. long; cyme broadly 2-lobed, 2-4 lin. in greatest diam.; involucrel bracts broadly ovate, acute or shortly acuminate, ciliolate, marked on the back with numerous linear cystoliths, $1\frac{1}{2}$ -2 lin. long, inner bracts becoming narrower to spatulate, pilosulose; perianth deeply 4-partite, segments about $1\frac{1}{4}$ lin. long, bearing an erect dorsal mucro $\frac{1}{2}$ - $\frac{3}{4}$ lin. long; stamens attached above the base. Female cymes sessile, smaller than the male in the flowering stage; involucrel bracts bluntly and broadly

oblong, $\frac{2}{3}$ lin. long; inner bracts and bracteoles linear, green and ciliate above, hyaline below, about 1 lin. long. Flowers shortly stalked; perianth divided to the base into 3 delicate lanceolate shortly fimbriated segments, nearly as long as the ovary. Ovary less than $\frac{1}{4}$ lin. long; stigma a dense tuft of hairs which exceed the ovary in length. Achene not seen.—*E. angusticuneatum*, Engl. in Engl. Jahrb. xxxiii. 126, incl. var. *Dusenii*.

Upper Guinea. Fernando Po, *Mann*, 1431! Cameroons: Johann Albrechts-hohe, *Staudt*, 647! *Preuss*, 163; Bigundi, *Schlechter*, 12429! and without precise locality, *Dusén*, 293.

10. PROCRIS, Juss.; Benth. et Hook. f. Gen. Pl. iii. 386.

Flowers monœcious or diœcious, the male in stalked axillary cymes or clusters, the female crowded on a subglobose fleshy receptacle. Male: Perianth 5- rarely 4-partite, segments membranous, valvate or very slightly imbricate, without an appendage. Stamens 5, rarely 4. Ovary rudiment small. Female: Perianth very small, 3-4-partite, persistent in fruit. Ovary erect; stigma sessile, penicillate, soon falling; ovule erect from the base. Achene ovoid, almost covered by the enlarged fleshy perianth-segments or, in the African species, surrounded at the base by the closely imbricate unaltered segments; pericarp stiffly membranous or somewhat hard. Seed conforming to the pericarp; testa thin; albumen absent; cotyledons broadly elliptic.—Succulent herbs or shrubs, often epiphytic. Leaves alternate as in the last genus, shortly stalked, in two rows, apex generally acuminate, base unequal, margin entire or slightly serrate, penninerved. Stipules intrapetiolar, entire. Inflorescences solitary or fascicled in the leaf-axils or at the nodes of fallen leaves.

Species about 10, in tropical Asia, Africa, and Polynesia.

1. *P. wightiana*, *Wall. Cat.* 4638 (*name only*); *Wedd. Monogr. Urtic.* 336.—A succulent glabrous undershrub growing epiphytically, generally on tree-trunks. Stem ascending, 8-16 in. high, sometimes $\frac{1}{2}$ -1 in. thick in the lower part, in the leafy part 2 lin. or less, cortex brown, wrinkled when dry; upper 2-3 in. leaf-bearing, with internodes 4-5 lin. long. Leaves thinly membranous when dry and blackish green, obliquely oblanceolate, sometimes obovate-lanceolate, acuminate, more or less tapering below to the unequal base which narrows into the short stalk, distantly and shallowly crenate-serrate above the middle, 3 $\frac{1}{2}$ -6 in. long, $\frac{3}{4}$ -2 in. wide; lateral nerves 6-7 on each side, ascending, cystoliths minute, inconspicuous, fusiform, scattered; a small undeveloped leaf is sometimes present opposite or alternating with the normal leaves; petiole slender, 1-1 $\frac{1}{2}$ lin. long. Stipules obovate-triangular, obtuse, about $\frac{1}{2}$ lin. long. Flowers green, all in few-flowered stalked or subsessile clusters which are

solitary or fascicled in the lower leaf-axils or at the bare nodes ; peduncle filiform, up to $\frac{1}{2}$ in. long ; pedicel shorter than the flower. Perianth in bud depressed-globose, about 2 lin. long, divided for three-quarters of its length, 2 outer segments narrower than the inner, all elliptic, concave, rounded above, with a very short dorsal mucro below the apex. Stamens attached above the base. Rudiment of ovary minute. Female receptacles generally 3-4-fascicled at the lower leafy and naked nodes, head spherical to transversely ellipsoid, in fruit 2-4 lin. broad ; peduncles stout, 1-2 lin. long. Achenes crowded, brown, ovoid, somewhat compressed, generally subacute, about $\frac{1}{2}$ lin. long, surrounded at the base by the small imbricate rotund perianth-leaves which are indistinguishable from the bracteoles.—*P. lævigata*, Wedd. in DC. Prodr. xvi. i. 192, partly ; not of Bl. Bijdr. 508 ; Hook. Ic. Pl. t. 1295 ; Hook. f. Fl. Br. Ind. v. 575. *Elatostema lævigatum*, Hassk. Cat. Hort. Bogor. 79. *E. wightianum*, Wedd. in Ann. Sci. Nat. 4me sér. i. 188 (name only).

Upper Guinea. Fernando Po, *Mann*, 566 ! Cameroons : Buea, *Preuss*, 963 ! Lolodorf, *Zenker*, 1386 !

Nile Land. Uganda : Mabira Forest at 4000 ft., *Dawe*, 165 !

Lower Guinea. Princes Island, *Barter*, 2028 ! Angola, *Curror*, 126 !

Mozamb. Distr. German East Africa : Amani, *Herb. Amani*, 431 !

Also in India, Ceylon, Malaya, and the Mascarene Islands.

11. **BEHMERIA**, Jacq. ; Benth. et Hook. f. Gen. Pl. iii. 387.

Flowers monœcious or diœcious, in globose clusters. Male : Perianth 4-lobed or 4-partite, rarely 3- or 5-partite, lobes or segments membranous, valvate, sometimes with a short appendage beneath the apex. Stamens as many as the perianth-segments. Ovary rudiment small. Female : Perianth tubular, compressed or ventricose, generally contracted at the mouth and 2-4-toothed, persistent in fruit. Ovary enveloped by the perianth, and sometimes adhering to it, sessile or stalked ; stigma apical, continuous with the ovary, long, very slender, hairy on one side, persistent ; ovule erect from the base. Achene enclosed by the persistent perianth and sometimes adnate to it ; pericarp thinly crustaceous. Seed conforming to the pericarp ; testa thin ; albumen varying in quantity ; cotyledons elliptic.—Small trees, shrubs or undershrubs, the younger portions more or less softly hairy. Leaves opposite or alternate, stalked, equal-sided or unequal-sided, toothed, 3-nerved ; cystoliths dot-like. Stipules axillary, generally free or joined only at the base, deciduous. Flower-clusters generally unisexual, sessile at the nodes or distributed on the rachis of a spike or on the branches of a panicle-like cyme. Bracts small, scarious.

Species more than 50, natives of warmer regions ; mostly tropical.

1. **B. platyphylla**, *Don, Prodr. Fl. Nepal.* 60. A shrub 3–15 ft. high; branches soft, glabrous or more or less strigose. Leaves membranous when dry, long- or short-stalked, mostly opposite, broadly ovate to elliptic or suborbicular, sides equal or somewhat unequal, apex acuminate, base cordate, rounded or blunt, margin coarsely toothed throughout or sometimes entire at the base, 3–9 in. long, 1½–6 in. wide, 3-nerved, the two lateral nerves ascending to within one-third or one-fourth of the length from the apex, secondary nerves spreading, somewhat conspicuous beneath, upper face sparsely hispid with appressed white hairs, densely dotted with cystoliths, lower face glabrate or pubescent especially on the conspicuous nerves and veins, with generally a small glandular area on either side of the base of the midrib; petiole varying very much in length, from ½–6 in., generally slender. Stipules triangular-acuminate, 3–5 lin. long, puberulous on the back especially on the well-developed midrib. Spikes usually exceeding the leaves, generally unisexual, sometimes androgynous, simple or, the male and androgynous, sparingly branched, slender, flexuous, solitary or the males sometimes fascicled in the leaf-axils, clusters separated, rhachis generally puberulous. Male clusters fewer-flowered than the female, 1–1½ lin. in diam., flowers with very short stalks, bud depressed-globose, ⅔ lin. in diam.; perianth 4-partite, puberulous, segments acute, with a short blunt subapical mucro. Female clusters 1–1½ lin. in diam., up to 2 lin. when in fruit; bracts minute, brown, scarious, ovate or lanceolate, acuminate, ¼ lin. long or less; perianth subcompressed, ellipsoid or ovoid, about ½ lin. long, with a short neck and 2-dentate mouth, puberulous; style exceeding the perianth in length; ovary sessile. Fruit barely 1 lin. long, broadly ellipsoid, subcompressed with a short neck, puberulous.—*Wedd. Monogr. Urtic.* 364 (incl. var. *macrostachya*, 367), and in *DC. Prodr.* xvi. i. 210, 211; *Hook. f. Fl. Brit. Ind.* v. 578; *De Wild. & Th. Durand in Bull. Herb. Boiss.* 2me sér. i. 50; *Th. & Hél. Durand, Syll. Fl. Congol.* 513; *Engl. in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907–8, ii. 191. *B. caudata*, *Poir. in Bonpl. Jard. Malm.* t. 15. *B. macrostachya*, *Wedd. in Ann. Sci. Nat.* 4me sér. i. 199. *B. mauritiana*, *Wedd. l.c.* 200. *B. wightiana*, *Blume, Mus. Bot. Lugd.-Bat.* ii. 217. *Splitgerbera macrostachya*, *Wight, Icon.* t. 1977. *Urtica caudata*, *Poir. Encycl.* iv. 640. *Urtica macrostachya*, *Wall. Cat.* 4582 partly (name only).

Upper Guinea. Sierra Leone, *Smythe*, 102 Southern Nigeria: *Oban, Talbot*, 686! Fernando Po, *Mann*, 209! Cameroons, *Preuss*, 877!

Mozamb. Distr. German East Africa: Usambara; *Derema, Schaffler*, 72! *Amani, Herb. Amani*, 435! Nyasaland: Masuka Plateau, 6500–7000 ft., *Whyte*! Nyika Plateau, *Whyte*, 210! Namasi, *Cameron*! Mount Chiradzulu, *Whyte*! and without precise locality, *Buchanan*, 755!

A most variable species. It is difficult to delimit varieties, but the following represent striking groups of specimens, which however tend to grade one into the other.

Var. *ugandensis*, Rendle in Journ. Bot. 1917, 201. A straggling shrub 4-8 ft. high, hirsute; leaves stiff when dry, elliptic-lanceolate or elliptic, more rarely ovate, acuminate, base rounded, margin regularly serrate-dentate except at the base, 4-7½ in. long, 1½-2½, rarely 3½, in. wide, upper face rugulose and scabrid, lower face hirsute especially on the nerves and veins, prominently 3-nerved. Spikes simple, exceeding the leaves. Fruiting perianth compressed, shortly obovoid to rounded, with a short neck, hispidulous in the upper part.

Nile Land. Uganda, at 3900-5000 ft.: Buddu, *Scott Elliot*, 7531! Entebbe, *Bagshawe*, 799! Mawokota, *Brown*, 204! Ankole, *Dawe*, 423! Kirerema, *Dümmer*, 89! Kipayo, *Dümmer*, 979!

South Central. Belgian Congo: Monbuttu; at the River Kusumbo, *Schweinfurth*, 3204! Assika River, *Schweinfurth*, 3128!

Var. *angolensis*, Rendle, l.c. A shrub of pyramidal habit up to 8 ft. high, young shoots and leaves pubescent; leaves flaccid, elliptic with a cuneate base, apex acute or shortly acuminate, margin regularly dentate-serrate above the base, 6-9 in. long, 3-4 in. wide. Fruiting perianth compressed, rotund to obovoid, neck short, hirtellous above the base.

Lower Guinea. Angola: Cazengo; Granja de S. Luiz, *Gossweiler*, 4656! 4851!

Var. *nigeriana*, Wedd. in DC. Prodr. xvi. i. 213. Branches, petioles and rhachis of inflorescence hirsute; leaves somewhat narrowly ovate-elliptic, long-acuminate, base obtuse, emarginate at the insertion of the petiole, margin (except at the base and tip) regularly dentate-serrate throughout, 3-6 in. long, 1½-2, rarely 2½, in. wide, petiole ¼-1¼ in. long, the two leaves of a pair generally unequal and with unequal petioles, hirsute to glabrate, upper face generally more or less hispid, lower face more or less hirsute on the nerves and veins. Spikes simple, solitary in the leaf-axils, spreading. Fruit compressed, obovoid, puberulous in the upper portion.

Upper Guinea. Southern Nigeria: Aboh, *Barter*, 114! Cameroons: Efulen, *Bates*, 214! Bipinde, *Zenker*, 4034!

The species is also recorded from the following localities, but I have not seen the specimens and am therefore unable to distribute them among the various forms.

Lower Guinea. Belgian Congo: Kisantu, *Gillet*, 158.

South Central. Belgian Congo: Ituri, *Mildbraed*, 2926; Beni, *Mildbraed*, 2297.

12. POUZOLZIA, Gaud.; Benth. et Hook. f. Gen. Pl. iii. 387.

Flowers generally monœcious, in clusters at the leaf-axils. Male: Perianth 4-5-lobed or -partite, rarely 3-partite, segments valvate, often acute or shortly acuminate but without an appendage. Stamens equal in number to the perianth-segments. Ovary rudiment present. Female: Perianth forming a sac round the ovary, narrowing above and constricted at the mouth which is 2-4-toothed. Ovary completely enclosed by the perianth; stigma generally linear or filiform, hairy on one side, borne on a short style above the mouth of the perianth, generally soon falling; ovule erect from the base. Achene enclosed in the persistent perianth and conforming to it; pericarp generally smooth and shining, brittle. Seed conforming to the pericarp; testa thin; albumen very scanty or none; cotyledons

ovate.—Herbs, undershrubs or shrubs. Leaves alternate, rarely opposite, stalked, margin generally entire, more rarely toothed, 3-nerved. Stipules free, scarious or glumaceous, generally persistent and subtending the inflorescence. Inflorescences generally with male and female flowers intermingled; bracts generally small, scarious; male flowers generally jointed to the short pedicels, the female sessile.

Species about 60; throughout the tropics, but less numerous in America.

Leaf-margin entire.

Stigma linear-oblong, shorter than the perianth.

Fruiting perianth narrowly margined, sides

4-nerved 1. *P. guineensis*.

Fruiting perianth irregularly ribbed 2. *P. Dewevrei*.

Stigma narrow linear or filiform much longer than the perianth.

Leaves glabrescent except on the nerves 3. *P. Balcsii*.

Leaves more or less white-tomentose beneath.

Herbs, sometimes shrubby below; leaves rarely less than 1 in. wide, upper face very sparsely hairy.

Male flower 4-androus.

Leaves 3-nerved; petioles long, slender (up to $2\frac{1}{2}$ in.) 4. *P. andongensis*.

Leaves triplinerved; petioles short (not exceeding 1 inch) 5. *P. huillensis*.

Male flower 5-androus 6. *P. hypoleuca*.

Shrubs with woody branches and small leaves (not exceeding $1\frac{1}{4}$ by 1 in.).

Leaves densely hairy above 7. *P. mixta*.

Leaves sparsely hairy above, white-tomentose beneath 8. *P. fruticosa*.

Leaves glabrous above, sparsely pubescent beneath 9. *P. shirensis*.

Leaf-margin serrate or dentate.

A perennial, 3-6 ft. high; male flower 3-4-androus; achene polished 10. *P. parasitica*.

Annual herbs; male flower 5-androus; achene granular.

Plant 1 ft. high; leaves ovate 11. *P. Erythraea*.

A delicate plant rarely 6 in. high; leaves broadly ovate or ovate-rotund 12. *P. piscicelliana*.

1. *P. guineensis*, *Benth. in Hook. Niger Fl.* 518. An annual herb; stems erect or ascending, 2-3 ft. high, slender, terete, branched, younger portions shortly pubescent, with intervening long soft hairs. Leaves alternate, stalked, ovate-lanceolate to ovate, acuminate, base obtuse to rounded, margin entire, varying much in size on the same plant, 1- $3\frac{1}{2}$ in. long, less than $\frac{1}{2}$ - $1\frac{1}{3}$ in. wide, 3-nerved, the lateral nerves reaching to about the middle of the leaf with 1 or 2 lateral nerves above on each side, more or less

softly hairy on both faces and margin, especially on the nerves beneath, sometimes thinly white-tomentose beneath, older leaves more or less scabridulous with dotted cystoliths on the upper face; petioles slender, hairy, up to one-fifth the length of the leaf but generally less. Stipules ovate, acuminate-caudate, glumaceous, 1-1½ lin. long, with long soft hairs on the back of the mid-vein and margin. Inflorescence dense, few- to many-flowered, androgynous; bracts small, scarious, hairy; some of the female flowers are subtended each by a larger foliaceous broadly ovate or orbicular-ovate reniform blunt stipulate bract, hirsute with short hooked hairs, which envelopes the fruit. Male flowers sessile or subsessile; perianth 3-4-partite, segments broadly elliptic, hirsute on the back with short hooked hairs. Female flowers sessile; perianth ovoid, densely hairy, with a narrow tubular mouth immediately above which the style bears the oblong red-brown stigma; stigma shorter than the perianth. Fruiting perianth broadly subcompressed-ovoid, base shallowly cordate, sides 4-nerved, about 1 lin. long, edge narrowly margined except at the base, and nerves hairy. Achene dirty white, each subtended by a small scarious bract, or a large broadly-ovate leaf-like enveloping bract.—Wedd. Monogr. Urtic. 403 and in DC. Prodr. xvi. i. 223; Henriq. in Bolet. Soc. Brot. x. 164; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 50, and Reliq. Dewèvr. 221; De Wild. Miss. É. Laurent, 73; Th. & Hél. Durand, Syll. Flor. Congol. 513. *P. golumbensis*, Hiern in Cat. Afr. Pl. Welw. i. 993. *Parietaria guineensis*, Don ex Wedd. Monogr. Urtic. 403.

Upper Guinea. Senegal: Rio Nunes, *Heudelot*. Sierra Leone: *Welwitsch*, 6297! near Kambia, Scarcies Valley, *Scott Elliot*, 4354! Lagos; *Dodd*, 441! Northern Nigeria: Lokoja, *Dalziel*, 149! Confluence of the Niger and Benue Rivers, *Barter*! Southern Nigeria: Oban, *Talbot*, 689! Fernando Po, *Vogel*, 28! 251! 255! 299! Cameroons: Bipinde, *Zenker*, 1197!

Lower Guinea. Island of St. Thomas, *Don*! Belgian Congo: Kisantu, *Gillet*, 698, 859, 925. Angola: Golungo Alto; Capopa stream, *Welwitsch*, 6277!

South Central. Belgian Congo: Kutu, *Laurent*; Ubangi, *Laurent*; Lokandu, *Dewèvre*, 1006a.

Welwitsch's specimen from Sierra Leone, No. 6297, is incorrectly referred by Hiern to *Trema affinis*, Bl.

Var. abyssinica, Rendle. Stem slender, 8-20 in. high, with short branches not exceeding the leaves or diffusely branched, hairy as in the species. Leaves ovate, acuminate, 1-3 in. long, ½-1½ in. wide, with one nerve on each side above the basal nerve, with scattered appressed white hairs above and scabridulous with dotted cystoliths, white cobwebby tomentose beneath; petioles shorter than the leaf. Flowers fewer but otherwise as in the species.—*P. abyssinica*, Bl. Mus. Bot. Lugd.-Bat. ii. 236; Wedd. Monogr. Urtic. 404, and in DC. Prodr. xvi. i. 223. *P. Schimper*, Wedd. ex Solms in Schweinf. Beitr. Fl. Aethiop. 188, in note. *Parietaria abyssinica*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 258. *Margarocarpus schimperianus*, Wedd. in Ann. Sci. Nat. 4me sér. i. 205.

Nile Land. Abyssinia: Jelajeranne; Mai-Mezano valley, *Schimper*, 1433!

A small form of the species, with white tomentum more general on the under face of the leaf than in the Western specimens.

2. *P. Dewevrei*, *De Wild. & Th. Durand in Comptes-rendus Soc. Roy. Bot. Belg.* xxxviii. 53. A weak herb 1½–2 ft. high; stem suberect, diffusely branched above, pubescent; branches hirtellous, internodes ½–1½ in. long. Leaves membranous, ovate, rather long-acuminate, base more or less acute or rounded, margin entire, 1¼–4¼ in. long, ½–2 in. wide, 3-nerved, with 2 lateral nerves on each side above, curving upwards towards the margin, green above, dotted white with cystoliths, sparsely hairy and rugose, beneath with white cottony hairs, and long hairs on the prominent nerves; petiole ¼ in. to 1¾ in. long. Stipules ovate, subulate, long-acuminate, 2½–4½ lin. long, with rather long cilia. Flower-clusters axillary, few-flowered, androgynous. Male perianth 4-partite, segments hairy; anthers white. Fruiting perianth ovate, about 1 lin. long, irregularly ribbed, hairy, closely investing the dirty white or brown polished achene.—*De Wild. & Th. Durand, Reliq. Dewevr.* 221; *Th. & Hél. Durand, Syll. Fl. Congol.* 513.

South Central. Belgian Congo: Stanley Pool district, Moé, *Dewevr.* 728.

The authors place this species near *P. abyssinica*, Bl.

3. *P. Batesii*, *Rendle in Journ. Bot.* 1917, 202. Three to five feet high; stems reddish-brown and woody below with a thin separable bark, puberulous in younger portions; branches slender, ascending, leafy at the upper nodes. Leaves alternate, long-stalked, the smaller ones on weak lateral branches, often shortly stalked, ovate, markedly acuminate, base rounded or blunt, margin entire, 1–3½ in. long, ½–1½ in. wide, apex up to ¾ in. long, 3-nerved, with 2 to 3 lateral nerves above on either side, basal lateral nerves curving upwards above the middle to unite within the margin, nerves and veins slender, prominent beneath; upper face very sparsely hairy, scabridulous with dot-like cystoliths, shortly and somewhat sparsely hairy on margin and veins beneath; petiole very slender, shorter than the leaf, up to 2¾ in. long. Stipules glumaceous, ovate, acuminate-caudate, 2–3 lin. long, midvein conspicuous, margin with scattered long hairs. Inflorescences dense, many-flowered, androgynous; flowers sessile; bracts small. Male perianth deeply 4-partite, segments apiculate, glabrescent. Female perianth flask-shaped, glabrous; stigma narrow-linear, longer than the perianth. Fruiting perianth ovoid-acute, glabrous, longitudinal nerves inconspicuous, about ¾ lin. long. Achene highly polished, at first white, becoming dark metallic brown.—*P. guineensis*, Engl. in Schlechter, *West-Afr. Kautsch.-Exped.* 287; not of Benth.

Upper Guinea. Cameroons: Batanga, *Bates*, 214! Efulen, *Bates*, 221! Ngoko, *Schlechter*, 12729!

South Central. Belgian Congo: Mangala, Mombongo, *Thonner*, 153!

4. *P. andongensis*, *Hiern in Cat. Afr. Pl. Welw.* i. 992. An erect annual herb. 2–3 ft. high, growing in dense masses; stems very

tenacious, simple, naked and glabrescent below, leafy and somewhat hispidly hairy to pubescent above, with short slender branches, stem and branches densely leaved at the apex. Leaves long-stalked, membranous, alternate, ovate or elliptic-ovate, acuminate, base bluntly wedge-shaped, margin entire, 2-3½ in. long, 1-2¼ in. wide, those on the lateral branchlets much smaller, 3-nerved at the base, with 2 additional lateral nerves on each side, upper face deep green with scattered whitish appressed hairs and dotted with numerous cystoliths, lower face with long white hairs on the nerves and an often somewhat thin cottony tomentum between the nervation; petioles slender, up to 2½ in. long, with long spreading stiffish hairs. Stipules glumaceous, ovate-lanceolate, long-acuminate-caudate, about ½ in. long, with long hairs on the margin and back of nerves. The dense axillary yellowish-green flower-clusters generally androgynous; male perianth 4-partite, segments ovate with a few long hairs on the back. Fruiting perianth somewhat compressed ovoid with a short constricted apex, about 1 lin. long, glabrescent, with a few inconspicuous longitudinal nerves, closely investing the shining brownish achene.—*P. denudata*, De Wild. & Th. Durand in *Comptes-rendus Soc. Bot. Belg.* xxxviii. 53 and *Reliq. Dewevr.* 220; De Wild. *Miss. É. Laurent*, 73; Th. & Hél. Durand, *Syll. Fl. Congol.* 513.

Lower Guinea. Angola: Pungo Andongo; rocky thickets of the Presidium, *Welwitsch*, 6260! by streams in the Presidium, near Cazella, *Welwitsch*, 6271!

South Central. Belgian Congo: near Stanleyville, *Dewèvre*, 1164a; Lulanga, *Laurent*.

I have included the Congo specimens (*P. denudata*, De Wild. & Th. Durand) from the authors' original description which has apparently been based on somewhat smaller plants than those sent by *Welwitsch*.

A textile plant (*Welwitsch*).

5. *P. huillensis*, *Hiern in Cat. Afr. Pl. Welw.* i. 993. Apparently a perennial shrubby herb 3-5 ft. high; branches purplish-brown, sparsely pubescent; branchlets ascending, reddish-brown to brown, pubescent, leafy, about 9 in. long. Leaves membranous, alternate, ovate to elliptic, acuminate, base rounded or obtuse, margin entire, ½-3 in. long, ¾-2 in. wide, triplinerved near the base, with 2 additional lateral nerves above on each side, deep green with scattered whitish appressed hairs above and dotted with numerous minute cystoliths, paler beneath and more or less covered between the somewhat prominent venation with a white cottony tomentum; petioles rather slender, somewhat hispidly hairy, 1 in. or less in length. Stipules glumaceous, lanceolate, acuminate-caudate, hairy on the back, margin ciliate, up to about ½ in. long. Flowers in dense clusters in the leaf-axils, in the single specimen mostly male with a few females intermixed. Male flowers shortly stalked, depressed globose in bud; perianth 4-partite for three-quarters of the length, about 1 lin. long; lobes elliptic, apiculate. Female flower with a long narrow-linear

stigma at least 3 lin. long, densely covered on one side with short brown hairs. Unripe fruiting perianth barely 1 lin. long, ventricose-ovoid, constricted below the minutely 3-dentate mouth, with evident longitudinal nerves, puberulous in upper portion.

Lower Guinea. Angola: Huilla; in shady forests at Catumba *Welwitsch*, 6290! Ambriz, *Monteiro*!

6. *P. hypoleuca*, *Wedd. in DC. Prodr.* xvi. i. 227. A monoëcious perennial 3-4 ft. sometimes 12 ft. high, with somewhat large fleshy roots. Stems leafy, woody below, simple or branched, terete, puberulous, 2 lin. thick at about a foot below the apex and with internodes varying in length from $\frac{1}{2}$ to $1\frac{1}{4}$ in. Leaves ample, elliptic to elliptic-ovate, acuminate, base blunt to subacute, margin entire, 3-6 in. long, $1\frac{3}{4}$ - $2\frac{3}{4}$ in. wide, 3-nerved, lateral pair of nerves ascending for two-thirds the length of the blade, with two additional lateral nerves on each side, upper face sparsely hairy, minutely scabridulous with numerous dot-like cystoliths, lower face closely covered except on the nerves with a thin white tomentum; petiole rather stout, densely puberulous, $\frac{1}{2}$ - $1\frac{3}{4}$ in. long. Stipules glumaceous, lanceolate-acuminate with a well-marked pubescent midrib on the back, margin not ciliate, 4-5 lin. long. Flowers crowded in roundish axillary clusters, male and female intermixed; bracts small, scarious. Male perianth shortly campanulate, puberulous, 1 lin. long, 5-partite to about one-third from the base, segments ovate, shortly acuminate; pedicels persistent, puberulous, about as long as the perianth. Female flowers sessile; perianth puberulous, the narrow mouth 2-dentate, less than 1 lin. long; stigma very long, narrow-linear, 2- $2\frac{1}{2}$ lin. long, minutely hairy, and persisting for some time during the ripening of the fruit. Fruiting perianth broadly compressed-ovoid with acute tip, puberulous, 1 lin. long, closely investing the polished whitish to brown-black achene.—*Engl. in Engl. Jahrb.* xxx. 296.

Mozamb. Distr. German East Africa: Lower Kondealand: near Langenberg at 1600 ft., *Goetze*, 858. Nyasaland: Plains of Zomba, 2500-3000 ft., *Whyte*! *Purves*, 226! foot of Mount Moramballa, *Kirk*! Shire Highlands; Mbome, *Buchanan*, 164! and without further locality *Buchanan*, 929! Rhodesia: Victoria, *Monro*, 892! Matabele Country, *Holub*, 1352!

A fibre known to the natives as *Lichopwa* is obtained from the stems of this plant (*Purves*).

Also Transvaal and Natal.

7. *P. mixta*, *Solms in Schweinf. Beitr. Fl. Æthiop.* 188. A monoëcious shrub with woody somewhat angled branches which bear the remains of past inflorescences, young branches clothed with spreading soft white hairs. Leaves alternate, short-stalked, ovate, acuminate, margin entire, $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, 7 lin. wide, upper face densely covered with short hairs, under face especially when young more or less white-tomentose; petiole $2\frac{1}{2}$ lin. long. Stipules

lanceolate from an ovate base, very acute, up to $2\frac{1}{2}$ lin. long, glumaceous and reddish-brown. Flowers crowded, axillary; male numerous, female solitary among the male. Male perianth campanulate, segments 4 or 5, hairy on the outside with incurved hispidulous tips; stamens exserted. Female perianth ovoid, narrowed and hairy above, much shorter than the filiform geniculate stigma. Fruit unknown.—Wedd. in DC. Prodr. xvi. i. 224; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 146.

Nile Land. Upper Sennar: Fazokl, *Cienkowsky*.

Also in Arabia.

8. *P. fruticosa*, *Engl. in Engl. Jahrb.* xxxiii. 127. A shrub 6–10 ft. high, with ascending leafy branches $1\frac{1}{2}$ –2 ft. long; internodes 7–10 lin. long; young shoots somewhat densely covered with white hairs, adult shoots brown with a thin readily separable cortex. Leaves subcoriaceous, ovate, acute, base rounded or slightly emarginate, $1-1\frac{1}{4}$ in. long, $\frac{3}{4}$ –1 in. wide, lateral nerves 2 to 3 on each side, ascending, impressed above, upper face sparsely hairy and dotted with cystoliths, white-tomentose beneath; petiole white-tomentose, $2\frac{1}{2}$ – $3\frac{1}{2}$ lin. long. Stipules broadly lanceolate, acuminate, densely covered with white hairs on the back of the midrib. Flower clusters about $2\frac{1}{2}$ lin. in diam.; perianth purplish, shortly hairy, about $\frac{1}{2}$ lin. long. Male perianth divided to the middle; stamens yellow, 1 lin. long. Female perianth ovoid; ovary $\frac{1}{2}$ lin. long; stigma filiform, nearly 2 lin. long.

Nile Land. Harar: Ererthal, *Ellenbeck*.

Perhaps identical with the preceding species, but as I have not seen specimens of either and as important details are lacking from the published description of *P. fruticosa*, I hesitate to put them together.

9. *P. shirensis*, *Rendle in Journ. Bot.* 1917, 202. A monœcious shrub; branches in specimen 1–2 lin. thick with a thin reddish-brown separable bark, and bearing numerous spreading leafy slender hirtellous shoots 5 in. or less in length, with internodes $\frac{1}{3}$ – $\frac{1}{2}$ in. long; bearing both leaves and inflorescences at the nodes, except at the lower from which the leaves have fallen. Leaves shortly stalked, membranous, ovate to lanceolate, acute, base blunt, margin entire, $1\frac{1}{2}$ – $2\frac{1}{4}$ in. long, $\frac{1}{2}$ –1 in. wide, 3-nerved, the lateral nerves ascending well into the upper half of the leaf, upper lateral nerves 2–3 on each side, upper face scabridulous, lower face marked with the slender prominulous nerves and parallel cross-veins, somewhat sparsely pubescent, or when young thinly white-tomentose, margin ciliolate; petiole slender, pubescent, 2–4 lin. long. Stipules brown, glumaceous, broadly lanceolate, acuminate, $1\frac{1}{2}$ –2 lin. long, persistent, shortly hairy on the back of the midvein. Flowers in dense axillary clusters, shorter than the petiole, consisting of numerous male and a few female. Male perianth short-stalked, campanulate, about $\frac{3}{4}$ lin.

long, divided about half-way into 4 or 5 ovate acute segments, puberulous on the back. Stigma long, slender. Fruiting perianth (unripe) broadly ovoid, constricted above, about $\frac{3}{4}$ lin. long, puberulous, and with inconspicuous longitudinal nerves, closely investing the smooth white achene.

Mozamb. Distr. Nyasaland : Shire Highlands, *Scott Elliot*, 8679 !

Comparison of specimens may prove the last three species to be conspecific.

10. *P. parasitica*, *Schweinf. in Bull. Herb. Boiss.* iv. *App.* ii. 145. Perennial shrub, growing in forest or under tree-shade ; stems 3-6 ft. high, terete, reddish-brown with thin separable bark and about $\frac{1}{4}$ in. thick, erect or ascending with long slender erect branches which are herbaceous, at any rate in the upper part, and hirtellous or pubescent, lower nodes bare. Leaves long- to shorter-stalked, ovate, ovate-elliptic, sometimes roundly ovate, acuminate, base cuneate to rounded, rarely truncate, entire, the rest of the margin crenate-serrate, 2-4 $\frac{1}{2}$ in. long, 1 $\frac{1}{4}$ -2 $\frac{3}{4}$ in. wide, 3-nerved, the lateral nerves passing well above the middle generally into the upper third of the blade, with two upper lateral nerves on each side ; upper face sparsely hispidly hairy and dotted with whitish cystoliths, more or less pubescent beneath especially on the somewhat prominent slender nerves ; petiole slender, pubescent, generally between $\frac{3}{4}$ and 2 in. long. Stipules brown, glumaceous, triangular-ovate to lanceolate, acuminate, 3-5 lin. long, with long hairs on the well-marked midrib and margin, persistent and forming an involucre for the axillary inflorescence. Flower-clusters 2-3 lin. in diam., consisting of numerous short-stalked male and a few sessile female. Male perianth campanulate, about 1 lin. long, divided to about the middle into 4 (sometimes 3) ovate shortly mucronate-acuminate segments, puberulous on the back. Stigma slender, longer than the perianth, soon falling. Fruiting perianth broadly ovoid, acute, a little over 1 lin. long, puberulous especially in the upper part, longitudinally nerved, closely investing the white polished achene.—*Engl. in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 191. *P. procridioides*, *Wedd. Monogr. Urtic.* 412, and in *DC. Prodr.* xvi. i. 231 ; *Engl. Hochgebirgsfl. Trop. Afr.* 194 ; *Hiern in Cat. Afr. Pl. Welw.* i. 992. *Bæhmeria procridioides*, *Bl. Mus. Bot. Lugd.-Bat.* ii. 204. *Margrocarpus procridioides*, *Wedd. in Ann. Sci. Nat.* 4me sér. i. 204. *Urtica muralis*, *Vahl, Symb.* i. 77. *U. parasitica*, *Forsk. Fl. Ægypt.-Arab.* 160. *U. procridioides*, *E. Meyer ex Drège, Zwei Pfl. Documente*, 150, 151 (name only).

Nile Land. Abyssinia : Mount Sholoda, at 6600 ft., *Schimper*, 278 ! and without further locality, *Quartin Dillon*, 45. British East Africa : Kitui, *Hildebrandt*, 2686 ! Uganda : Ruwenzori : Kasamaga, 5300 ft., *Scott Elliot*, 7540 ! and at 7000-8000 ft., *Scott Elliot*, 7761 ! Kipayo, 4000 ft., *Dummer*, 761 ! 855 !

Lower Guinea. Angola : Benguella ; near Bumbo, *Welwitsch*, 6278 !

South Central. Belgian Congo: Kissenye, on the Ninagongo River, 8000-9500 ft., *Mildbraed*, 1342.

Mozamb. Distr. Nyasaland, *Buchanan*, 920 !

Also South Africa and Arabia; and also (according to Weddell) in tropical South America. Schweinfurth (l.c.) states that Forskal's specimen of *Urtica parasitica*, upon which also *U. muralis*, Vahl, is based, is identical with *Pouzolzia procridioides*, Wedd.

11. *P. Erythrææ*, *Schweinf.* in *Bull. Herb. Boiss.* iv. *App.* ii. 146. An annual herb, 1 ft. high, hirtellous to puberulous, with a few thin erect branches. Leaves thinly membranous, long-stalked, ovate, acutely cuspidate, base subrhomboid passing abruptly and nearly at a right angle into the petiole, margin ciliate and except in the lower third crenate-serrate, $\frac{3}{4}$ to $1\frac{1}{4}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, 3-nerved, the lateral nerves ending in the upper third of the blade, with 3-4 horizontally spreading lateral nerves on each side, bearing long scattered hairs on either face and very minutely tuberculate; petiole weak, $\frac{1}{2}$ - $1\frac{1}{3}$ in. long. Stipules subulate from a broad base, ciliate. Flower-clusters axillary, few-flowered, androgynous. Male flowers pentandrous, with 5 elliptic acuminate perianth-segments which are hairy and bear 3 apical bristles. Fruiting perianth ovoid, compressed, keeled on one side, hirtellous, with an irregular network of veins, $\frac{3}{4}$ lin. long, closely adhering to the achene. Achene crowned with the linear remnant of the deciduous stigma about half its length, dull brown, and finely granulate.

Nile Land. Eritrea: Gaaba; Lawa Valley, 1100 ft., *Schweinfurth*, 1658.

12. *P. piscicelliana*, *Buscalioni & Muschler* in *Engl. Jahrb.* xlix. 465. A small delicate annual herb, barely 6 in. high; stem simple or slightly branched; branches thin, erect, terete, inconspicuously striated, when young more or less densely covered with long white spreading hairs but soon becoming less hairy; internodes up to about $1\frac{1}{4}$ in. long. Leaves light green, long-stalked, broadly ovate or ovate-rotund, narrowed towards the acute cuspidate apex, base subrhomboid and passing abruptly and almost at a right angle into the petiole, margin toothed, teeth minute, about $\frac{1}{2}$ lin. apart and less than $\frac{1}{2}$ lin. high, somewhat mucronulate, 3-nerved, thinly membranous, at first minutely pubescent on both sides with the characteristic spreading hairs but generally soon becoming glabrous; petiole very slender, almost threadlike, up to $\frac{3}{4}$ -1 in. long, more or less densely covered with minute spreading hairs. Stipules subulate from a broad base, somewhat ciliate. Flower clusters androgynous, few-flowered. Male flowers pentandrous; perianth-segments 5, elliptic-lanceolate, acuminate, hairy and with 3 long apical bristles. Fruiting perianth and achene as in *P. Erythrææ*, but the perianth with a somewhat dense covering of rather long soft hairs.

Mozamb. Distr. Rhodesia: Between Buana Mukuba and Sekontui, 4000 ft., *Helena von Aosta*, 512.

13. **DEBREGEASIA**, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 390.

Flowers monœcious or diœcious in small dense capitata clusters. Male: Perianth 4-partite, more rarely 3- or 5-partite, segments ovate, valvate, bud depressed-globose. Stamens as many as the perianth-segments. Ovary rudiment more or less ellipsoid, glabrous or woolly at the base. Female: Perianth ventricose-tubular, ovoid or obovoid, contracted and minutely toothed at the mouth, becoming succulent in fruit. Ovary straight, enveloped by the perianth; style absent or rarely short; stigma penicillate; ovule erect from the base. Achene enclosed in and partly adnate to the succulent perianth; pericarp crustaceous. Seed conforming to the pericarp; testa membranous; albumen copious or scanty; cotyledons small, broad.—Shrubs. Leaves alternate, stalked, serrate, 3-nerved, upper face often rough, lower generally with a white or ashy tomentum; stipules joined into a single axillary structure, 2-fid. Flowers in globose axillary clusters, which are sessile or arranged in sessile or stalked cymes; bracts scarious, in the female minute; female receptacle somewhat thickened.

Species about 12, in India, Malaya, and Eastern Asia, one in Abyssinia, Arabia and Afghanistan.

1. *D. salicifolia*, Rendle. A large shrub, erect, branched; branchlets slender, erect or ascending, leafy and white tomentose above, glabrescent with warm red-brown cortex below. Leaves shortly stalked, stiffly membranous or subcoriaceous when dry, narrowly lanceolate, apex tapering acuminate, base obtuse, margin serrulate, 3 to 5 or 6 in. long, $\frac{1}{2}$ –1 in. wide, 3-nerved, the lateral basal nerves slender failing about the middle of the leaf and anastomosing with the delicate upper nerves, cross-unions regular, parallel, upper face sparsely hairy when young, soon becoming glabrous, scabrid, and often rugulose, lower face white-tomentose; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. long, slender, tomentose. Stipules glumaceous, brown, linear-lanceolate, 2-fid at the apex, 3–4 lin. long, hairy on the two prominent nerves, soon falling. Heads of flowers about the size of a pea, male, female, or sometimes androgynous, solitary or 2–4 in the leaf-axils, sessile or shortly stalked. Male heads few-flowered, larger than the female; perianth a little over 1 lin. long, campanulate below, divided about half-way down into 4 broadly ovate spreading segments, white-tomentose on the outside; stamens exceeding the perianth; ovary rudiment blunt, glabrous. Female heads many-flowered; flowers much smaller than the male, subtended by small brown scarious bracteoles, narrowly obovoid. Fruiting heads yellowish, globular, 2–3 lin. in diam., sometimes uniting in pairs; berries about $\frac{1}{2}$ lin. long, tipped with the dried remains of the stigma.—*D. bicolor*, Wedd. in DC. Prodr. xvi. i. 235²⁵; Boiss. Fl. Orient. iv. 1148; Defflers, Voy.

Yemen, 206; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 147; Engl. Hochgebirgfl. Trop. Afr. 194. *D. hypoleuca*, Wedd. Monogr. 463, t. 15 A, figs. 10, 11; Hook. f. Fl. Brit. Ind. v. 591. *Urtica bicolor*, Roxb. Hort. Beng. 67 (name only) and Fl. Ind. iii. 589. *U. salicifolia*, Roxb. Hort. Beng. 67 (name only). *Bœhmeria salicifolia*, Don, Prodr. 60. *B. hypoleuca*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 264; Ferret & Galin. Voy. Abyss. t. 17. *Missiessya hypoleuca*, Wedd. in Ann. Sci. Nat. 4me sér. i. 195. *Morocarpus salicifolius*, Bl. Mus. Bot. Lugd.-Bat. ii. 157.

Nile Land. Abyssinia: in shady rocky places on a mountain near Jenausa, *Schimper*, 862! Anadehr, 7400 ft., *Schimper*, 780! Jeleukote, *Petit*, 93! and without precise locality, *Schimper*!

Also in Arabia, Afghanistan and Western Himalaya.

14. PARIETARIA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 392.

Flowers polygamous, in small axillary cymes. Perianth of hermaphrodite and male flowers deeply 4-lobed, more rarely 3-lobed, segments valvate, of female flower less deeply lobed. Stamens as many as the perianth-segments. Ovary free, rudimentary in the male flower, glabrous; style short or absent; stigma densely penicillate, deciduous; ovule erect from the base. Achene enclosed in the persistent enlarged perianth; pericarp thinly crustaceous. Seed conforming to the pericarp; testa membranous; albumen present; cotyledons ovate or oblong.—Annual or perennial herbs, more rarely suffruticose, generally diffuse in habit, sometimes scandent, often pubescent. Leaves alternate, stalked, entire, 3-nerved or triplinerved, generally small, with numerous dot-like cystoliths; stipules absent. Cymules generally dense, in sessile pairs in the leaf-axils; bracts herbaceous, variously connate at the base or free, sometimes forming an involucre round the fruit.

Species about 10, widely dispersed in temperate and tropical regions.

Annual or perennial, scandent. Ovary with a distinct style remaining as an apiculus in the fruit.

- | | | | | |
|-----------------------------------|-----|-----|-----|-------------------------------|
| Leaves long-acuminate | ... | ... | ... | 1. <i>P. laxiflora</i> . |
| Leaves shortly acuminate, blunt | ... | ... | ... | 2. <i>P. ruwenzoriensis</i> . |
| Annual herb. Achene not apiculate | ... | ... | ... | 3. <i>P. debilis</i> . |

1. *P. laxiflora*, Engl. in *Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* ii. 191, *emend.* A scandent perennial in mountain forest, 2½–8 ft. high, with slender curved elongated herbaceous shoots which may become woody below and bear shorter spreading very slender leafy branchlets; internodes varying very much in length from less than 1 in. to 4½ in., sparsely puberulous in the young portion, soon becoming glabrous. Leaves alternate, sometimes subopposite, stalked, ovate to elliptic-ovate, passing gradually

into the long-acuminate tip, base rounded, sometimes emarginate, margin entire, varying very much in size from 1-3 in. long, $\frac{2}{3}$ - $1\frac{1}{3}$ in. wide, 3-nerved, the lateral nerves ascending and running to about the middle of the leaf and parallel with the upper lateral nerves (one on each side), thinly membranous when dry, dark green above, paler beneath, a few appressed stiff white hairs above and dotted with numerous cystoliths, sparsely hairy beneath mainly on the slender scarcely prominent nerves; petiole very slender, channelled, shorter than the blade, from less than $\frac{1}{2}$ to $1\frac{3}{4}$ in. long, minutely hairy along the channel. Cymules androgynous, in pairs in the leaf-axils, densely to laxly many-flowered; bracts linear-oblong to oblong, subacute, not exceeding the mature male flowers, hairy on back and margin. Flowers sessile or subsessile. Male perianth 4- (rarely 3-) partite for about two-thirds of its length, 1 lin. in diam. in opening bud; segments ovate, white with greenish acute recurved tip, puberulous on back; ovary-rudiment small. Female perianth ovoid, puberulous, about $\frac{1}{2}$ lin. long; style short, filiform; stigma protruding between the tips of the perianth-segments. Achene ovate-apiculate, barely 1 lin. long, polished brown, included in the ovoid brown perianth which separates into 4 lanceolate acute segments each with a conspicuous midvein.—Under *P. mauritanica*, Durieu, var. *a. erecta*, Wedd. in DC. Prodr. xvi. i. 235⁴⁶, Hook. f. in Journ. Linn. Soc. vii. 215; Engl. Hochgebirgsfl. Trop. Afr. 194.

Upper Guinea. Fernando Po: Clarence Peak, at 8000 ft., *Mann*, 613! Cameroons: Cameroon Mountain, 7000-8000 ft., *Mann*, 1230! 2013! *Johnston*, 60! *Mildbraed*, 3434; Mfonga, Mati slope, 5500-6200 ft., *Ledermann*, 5895.

Nile Land. Ruwenzori: Kivata Forest, 7000-8000 ft., *Scott Elliot*, 7780!

Differs from the Mediterranean species *P. mauritanica*, Durieu, with which it has been hitherto associated, in the climbing habit and in the persistent female perianth which retains its original ovoid form and does not become elongated and tubular as in *P. mauritanica*. I have not seen an authentic specimen of Engler's *P. laxiflora*, which is described from the Cameroons, the specimens are small but I think conspecific with those I have seen from the collectors cited.

2. *P. ruwenzoriensis*, *Cortesi* in *Ann. di Bot. Roma*, vi. 535. An annual or perennial branching herb; stems sometimes woody below, ultimately climbing to about 3 ft. high; branches slender, elongated, with ascending branchlets, younger portions pubescent, glabrous below; internodes $\frac{3}{4}$ - $1\frac{1}{4}$ in. long on the branches, 3-5 lin. long on the branchlets. Leaves ovate, shortly acuminate, extreme apex obtuse, base rounded, sometimes emarginate, margin entire, $\frac{3}{4}$ - $1\frac{1}{2}$ in. long, $\frac{1}{2}$ -1 in. wide, much smaller on the branchlets, sparsely hairy above and dotted with numerous minute cystoliths, pubescent beneath and hairy on the prominent nerves; petiole slender, varying in length, generally about half as long as the blade and never exceeding it, to $1\frac{1}{2}$ in. long, hairy. Cymules short, dense, 3-7-flowered; bracts linear or linear-lanceolate, acute, shorter than or almost equal to the male perianth. Male or ♀ flowers

suburceolate, nearly 1 lin. long; perianth 4-partite; segments ovate-triangular, white with obtuse green tips, hispidulous on the back. Female perianth 4-lobed, scarcely $\frac{1}{2}$ lin. long; lobes shortly triangular in fruit. Achene ovoid-apiculate, polished brown, about equal in length to the enclosing perianth which is barely 1 lin. long.—Cortesi in Fl. Ruwenzori Relaz. Sci. i. 463, t. xxix. *P. debilis*, Rendle in Journ. Linn. Soc. Bot. xxxviii. 278; not of Forst. *P. scandens*, Engl. in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 191.

Nile Land. Ruwenzori Region: Butagu Valley, to 11,000 ft., Mildbraed, 2576; east side, 12,000 ft., Wollaston! Bujongola, Abruzzi; third day's march from Eldama Ravine, Whyte!

3. *P. debilis*, Forst. in Fl. Ins. Austr. Prodr. 73. An annual often diffusely branched herb from a few inches to over 1 ft. high; stem and branches slender, flaccid, erect, ascending or sometimes prostrate, leafy, generally more or less pubescent, especially in the younger portions, often with small glandular hairs intermingled. Leaves thinly membranous, broadly ovate to subrotund, apex obtuse or shortly and obtusely acuminate, base rounded to obovate, sometimes contracting and passing into the petiole, margin entire, varying much in size from $\frac{1}{3}$ in. or even less to $1\frac{1}{2}$ in. long, and $\frac{1}{4}$ –1 in. wide, 3-nerved from the base, sparsely hairy on the upper face and on the veins beneath, upper face dotted with numerous cystoliths; petiole very slender, long, but shorter than the blade, hairy like the young stem. Cymules densely few (3–7)-flowered; flowers sessile; bracts generally linear, lanceolate or linear-oblong, more rarely elliptical, not increasing in size in the fruit, ciliate. Flowers a few ♂, the majority female; perianth 4-lobed, lobes ovate to ovate-triangular, obtuse; female perianth increasing in fruit, from $\frac{3}{8}$ lin. to 1 lin. long, the reddish-brown lobes bearing stiffish pointed hairs especially at and below the apex and sometimes shorter gland-tipped hairs, lobes with a conspicuous darker midrib and more or less conspicuous marginal nerves. Achene included in the perianth, ellipsoid, not apiculate, about $\frac{1}{2}$ lin. long, polished dark brown or greenish-brown.—Wedd. Monogr. Urtic. 514, t. xvii. figs. 21–25, and in DC. Prodr. xvi. i. 235⁴⁵; Bl. Mus. Bot. Lugd.-Bat. i. 254; Boiss. Fl. Orient. iv. 1150; Hook. f. Fl. Brit. Ind. v. 593 and in Journ. Linn. Soc. vii. 215 (*β diffusa*); Engl. Hochgebirgsfl. Trop. Afr. 195; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 147. *P. alsinefolia*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 258; not of Delile. *P. australis*, Bl. l.c. 256. *P. carnosula*, Bl. l.c. 255. *P. micrantha*, Ledeb. Fl. Alt. iv. 303, Icon. t. 22. *Freirea alsinefolia*, Hochst. ex A. Rich. l.c. (name cited in synonymy); not of Gaud. *Urtica debilis*, Endlich. Prodr. Fl. Norf. 37.

Upper Guinea. Cameroons: Cameroon Mountain, Mann!

Nile Land. Abyssinia: near Intjatkab, Schimper, 753! Berrethowa, 5200 ft., Schimper, 203! near Jelajeranne, Schimper, 1667! near Memsah,

Aderbati and on Mount Sellauda, *Dillon*; and without precise locality, *Schimper*, 587! Eritrea: below Gheleb, 5500 ft., *Schweinfurth*, 1622! above Ginda, 3000-5000 ft., *Schweinfurth*, 509. Nubia: below Erkowit, *Broun*, 1195!

Widely distributed in temperate regions and on high lands in the tropics.

15. **FORSKOHLEA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 393.

Flowers monœcious, embedded in wool within a more or less campanulate involucre. Male flowers forming an outer ring, indefinite; perianth club-shaped in bud, splitting in flower and somewhat irregularly 3-lobed above, the middle lobe suberect or inflexed. Stamen 1. Ovary-rudiment absent. Female flowers 1 or more in the centre of the involucre; perianth absent. Ovary straight; stigma filiform, shortly hairy on one side, persisting for some time; ovule erect from the base. Achene enclosed in the involucre and enveloped in wool, elliptic-ovate, compressed, often apiculate; pericarp tough. Seed conforming to the pericarp; testa membranous; albumen scanty or absent; cotyledons broad, flattened.—Herbs, sometimes becoming woody at the base, or shrubby, often more or less hispid. Leaves alternate, stalked, toothed, triplinerved or penninerved, often whitish-tomentose beneath, and rough on the upper face with dot-like cystoliths; stipules lateral, free. Involucres generally several sessile at the nodes, bearing long silky hairs on the outside; bracts generally 3-6, free or connate below, the upper portion often more or less expanded. Male flowers stalked, generally projecting slightly; female sessile, the stigmas only projecting.—*Caidbeja*, Forsk. Fl. Ægypt.-Arab. 82.

Species 7 or 8, throughout Africa including the Western Islands, Arabia to Western India, one in S.E. Spain.

- | | |
|---|-----------------------------------|
| Limb of involucrel bracts acute, erect in fruit. | |
| Leaves obovate or rhomboid, obtuse | 1. <i>F. tenacissima</i> . |
| Leaves ovate or elliptic-ovate. | |
| Bracts lanceolate-spathulate, very acute. Leaves blackish when dried | 2. <i>F. hereroensis</i> . |
| Bracts narrowly obovate above, shortly acute. | |
| Leaves green when dried | 3. <i>F. Eeni</i> . |
| Limb of involucrel bracts blunt, ample, spreading in fruit. | |
| Leaf-teeth acute, blade whitish-tomentose beneath | 4. <i>F. candida</i> |
| Leaf-teeth blunt, green on both sides or sometimes thinly tomentose beneath | 5. <i>F. viridis</i> . |

1. **F. tenacissima**, *Linn. Mant.* 72. A herb becoming woody below or shrubby, with a stout perennial root, from a few inches to 2 ft. high, diffusely branched from the base; branches ascending, hispid with spreading spiny and hooked hairs and shortly tomentose between, often reddish, leafy with short internodes. Leaves rounded,

obovate or rhomboid, apex obtuse, base cuneate, often very broadly so, and entire, rest of margin crenate-serrate, generally $\frac{1}{2}$ –1 in. or sometimes to 2 in. long, $\frac{1}{2}$ – $1\frac{1}{4}$ in. wide, with 1–2 lateral nerves on each side above the basal pair, upper face dark green when dry, hispid, as is the margin, and more or less tomentose, with numerous dotted cystoliths, lower face white-tomentose, nerves more or less conspicuous and with stiff hairs; petiole about half the length of the blade, slender, hispid. Stipules ovate, acute, scarious, about 2 lin. long, with stiff hairs on margin and brown midvein. Heads of flowers sessile, 2 or more at each node, sometimes crowded on undeveloped lateral branchlets; involucre 3–5 lin. long, densely clothed almost to the top with silky hairs which are often greenish when dry; bracts generally 4–5, but as few as 2 or as many as 8, lanceolate or oblanceolate, acute, hispid above. Flowers in each head varying greatly in number, males absent from the 2-leaved involucre, otherwise up to 8 or 12; female solitary (in the 2-leaved involucre) or up to 6, densely embedded in whitish wool. Male perianth unequally 3-lobed, the median lobe larger, rounded and ciliate with stiffish hairs. Fruit ovoid-elliptic, apiculate, reddish-brown.—Wedd. in DC. Prodr. xvi. i. 235⁵⁵; Boiss. Fl. Orient. iv. 1151; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 148; Hook. f. Fl. Brit. Ind. v. 593; Almagia in Ann. Istit. Bot. Roma, viii. 118; Defflers, Voy. Yemen, 207; Rendle in Journ. Bot. 1913. 272. *Caid-beja adharens*, Forsk. Fl. Ægypt.-Arab. 82.

Nile Land. Red Sea Province: about 21° N. lat., *Bent!* Hillslopes, *Sal Lom, MacDougal & Sykes*, 71! *Jebel Hyrac*, 3500 ft., *Lynes!* Somaliland: *Wagga Mountain, Lort-Phillips!* Eritrea: *Otoutumo*, near *Massowa, Schweinfurth & Rivu*, 195! *Samhar*; *Monkullo, Pirotta*, 1215; *Habab*; *Ogmat-Obel, Terracciano & Pirotta*, 1048; *Oghet-El-Ain, Terracciano & Pirotta*, 1056; *Assaorta*; *Majo-Illalia*, 2600 ft., *Pirotta*, 3566; *Illalia-Scilliki*, 1300 ft., *Pirotta*, 3600; *Zaga-Tata*, 650 ft., *Pirotta*, 2876; *Arkico, Pirotta*, 52; *Afta, Terracciano & Pirotta*, 19.

Also in North Africa, and Arabia to N.W. India; a form (*F. cossoniana*, Webb) in S.E. Spain.

Var. *erythraea*, Terracc. in Ann. Istit. Bot. Roma, v. 97. Flower-heads in groups of 4 or 5, with an abortive small one; involucre bracts 6–7, obovate-lanceolate.—Almagia in Ann. Istit. Bot. Roma, viii. 119.

Nile Land. Eritrea: *Haressan Island in Anfila Bay, Terracciano*, 3^{bis}.

2. *F. hereroensis*, *Schinz in Bull. Herb. Boiss.* iv. App. iii. 51. A low hispid undershrub about 1 ft. high; stem about $1\frac{3}{4}$ lin. in diam. at the base, becoming very slender above, branching from the base upwards; branches ascending, slender, hairs stiff, upcurved, varying very much in size. Leaves elliptic-ovate, apex generally blunt, base cuneate and narrowing into the petiole, entire, margin sinuate-dentate, inrolled, hispidulous, $\frac{2}{3}$ –1 in. long, $\frac{1}{2}$ – $\frac{2}{3}$ in. wide, pinnately nerved, with a pair of lateral nerves a short distance from the base and one or two above on either side, when dry stiff, with upper face

dark, blackish-green, sparsely hispidulous, and scabrid with the dense cystoliths, lower face grey-tomentose between the slender somewhat prominent nerves, especially when young; petiole less than half the length of the blade. Stipules rotund-ovate, cuspidately acute, white, thinly scarious, barely $1\frac{1}{2}$ lin. long, hispidulous on the margin and midvein, persistent after leaf-fall. Flower-heads sessile, generally 2 at each node, proportionately large, bell-shaped, $\frac{1}{3}$ - $\frac{1}{2}$ in. long, densely covered to about the middle with dark greenish silky hairs; bracts 6, lanceolate-spathulate, acute, ciliolate above on the back and margin, erect in fruit. Flowers many, embedded in a reddish-brown wool. Male perianth minutely hispidulous, midlobe hooded, subacute. Achene compressed, elliptic-ovoid with a long apiculus, chestnut-brown, about 2 lin. long, the filiform stigma persistent.—*F. candida*, var. β , Wedd. in DC. Prodr. xvi. i. 235⁵⁶.

Lower Guinea. Damaraland: Welwitsch, *Galpin & Pearson*, 7523! and without precise locality, *Lindner*!

Also in South Africa (Little Namaland).

3. *F. Eenii*, *Rendle in Journ. Bot.* 1917, 203. Branchlets slender, becoming woody below, 6-7 in. long, $\frac{1}{2}$ lin. in diam. Leaves small ovate, apex bluntish, base cuneate, elongated and passing into the petiole, margin entire, with 3-5 proportionately large blunt teeth on each side and hispidulous, $\frac{3}{8}$ -1 in. long, $\frac{1}{4}$ - $\frac{1}{2}$ in. wide, with a single ascending nerve on each side above the basal pair, upper face light green when dry, minutely hispidulous and scabrid with dense round cystoliths, hispidulous beneath on the somewhat prominent veins, and when young covered with a thin grey-white tomentum between; petiole 2-4 lin. long, less than half the length of the blade. Stipules scarious, ovate or broadly ovate, acuminate, $1\frac{1}{2}$ lin. long, hairy on the margin and midrib. Heads of flowers sessile, generally 2 at each node, ultimately about $\frac{1}{4}$ in. long, shortly campanulate, the tube densely clothed with silky hairs resembling those of *F. tenacissima*; bracts 4, narrowly obovate, hispidulous on back and margin, erect in fruit. Flowers resembling those of *F. tenacissima*, enveloping wool ferruginous in colour.

Lower Guinea. Damaraland, *Een*!

4. *F. candida*, *Linn. f. Suppl.* 245. A more or less hispid herb or shrub with a strong tap-root growing in dry sand or among stones, from a few inches to 3 ft. high, branched from the base; stem and branches slender, more or less hispid, especially in the younger portion. Leaves elliptic-ovate or ovate, sometimes elliptic-spathulate; apex acute or sometimes blunt, base cuneate, narrowing into the petiole, margin sinuate-dentate with 2-4 acute teeth on each side, sometimes very shallowly toothed, varying much in size from $\frac{1}{2}$ -2 in. long, $\frac{1}{4}$ -1 in. wide, pinnately nerved as in *F. hereroensis*, upper

face rough, dark-green when dry, generally grey-tomentose beneath between the nerves especially when young, nerves beneath and the slightly inrolled margin hispidulous; petiole about half the length of the blade or less. Stipules small, scarious, ovate, acuminate, about 1 lin. long, somewhat persistent. Flower-heads sessile, generally 2 at each node, 3-4 lin. long, somewhat funnel-shaped, densely hairy in the lower half; bracts generally 4 or 5, base linear, limb obovate to subrhomboid, blunt, membranous, ciliolate on the margin, upper portion ample, scarious, shining white and spreading in fruit. Flowers few, embedded in whitish or ferruginous wool. Fruit red-brown, elliptic, apiculate, 1 lin. or more long, bearing the persistent filiform stigma.—Thunb. Prodr. 77; Wedd. Monogr. Urtic. 536, and in DC. Prodr. xvi. i. 235⁵⁶; Schinz in Bull. Herb. Boiss. iv. App. iii. 51; Dinter, Deutsch. Süd.-Afr. 55. *F. scabra*, Retz. Obs. iii. 31.

Lower Guinea. Damaraland: Otjimbingue, *Marloth*, 1386; Usab, *Rautanen*, 111; Okahandya and Windhoek, *Dinter*; and without precise locality, *Schneek*; *Fleck*, 851.

Also in South Africa.

5. *F. viridis*, *Ehrenb. ex Desf. Cat. Hort. Bot. Par. ed. 3. 347* (name only); *Wedd. Monogr. Urtic. 537, t. xix. figs. 5-13*; not of *Webb in Hook. Niger Fl. 179*. An annual herb from a few inches to 3 ft. high, often becoming woody below, branching from the base; branches spreading; stem and branches slender, hirtellous, later glabrescent. Leaves ovate to lanceolate, apex acuminate, base cuneate and entire passing into the petiole, margin above the base somewhat coarsely crenate-serrate, teeth blunt, varying much in size from less than $\frac{1}{2}$ in. to 4 in. long, and $\frac{1}{4}$ -2 in. wide, triplinerved or pinnately-nerved, membranous when dry, margin ciliate, upper face sparsely hispidulous, and rough with numerous dot-like cystoliths, hairy on the nerves beneath and sometimes with a scanty whitish tomentum between the nerves; petiole shorter than and often about half the length of the blade, sometimes shorter. Stipules ovate, acuminate, scarious, hairy on the margin. Heads of flowers sessile, two or more at each node; bracts 2-6, often 4; when 2, broadly ovate to elliptic, abruptly acute, $1\frac{1}{2}$ to ultimately $2\frac{1}{2}$ lin. long, enclosing a female flower sometimes with a lateral pair of male flowers; 4-6-leaved involucre turbinate, generally many-flowered, $2\frac{1}{2}$ -4 lin. long, tube densely clothed with silky whitish hairs especially on the angles; lobes ample, obovate, blunt, ultimately spreading and membranous, sparsely puberulous, with ciliolate margin. Flowers embedded in whitish or sometimes pale ferruginous coloured wool. Male perianth-limb obsoletely 3-lobed. Achene ellipsoid, apiculate.—*Wedd. in DC. Prodr. xvi. i. 235⁵⁶*; *Solms in Schweinf. Beitr. Fl. Aethiop. 187, incl. var. ? Ehrenbergii, Solms*; *Franch. Sert. Somal.*

in Miss. Révoil. 65 ; Balfour in Trans. Roy. Soc. Edinb. xxxi. 283 ; Schweinf. in Bull. Herb. Boiss. iv. App. ii. 148 ; Hiern in Cat. Afr. Pl. Welw. i. 994 ; Ahnagia in Ann. Istit. Bot. Roma, viii. 118 ; Engl. & Gilg in Baum, Kunene-Samb. Exped. 220.

Nile Land. Soudan : Khartoum, *Massey* ! Red Sea Province, about 21° N. lat. Bent ! Tamanib, *Lord* ! Abyssinia : on rocks near Gageros, 4000 ft., *Schimpfer*, 2298 ! Eritrea : Togodele and Dahlac Islands, *Ehrenberg* ! Dahlac Islands, *Terracciano*, 254, 619, 701, 791, 840, 984, *Pirotta*, 4479 ; Samhar, *Terracciano & Pirotta*, 47, 60, 61, 2303, *Pirotta*, 36, 1255 ; Habab, *Terracciano & Pirotta*, 1055 ; Assorta, *Terracciano*, 20, 28, 63, 619 ; *Terracciano & Pirotta*, 21 ; *Pirotta*, 1, 25, 43, 44, 51, 3615 ; Amasen ; Ghinda, *Scotti* ; Howakel Island, *Ehrenberg* ; Dogali, *Schweinfurth & Riva*, 253 ! Saati, *Schweinfurth*, 42 ; Lawa Valley, *Schweinfurth*, 1658. Somaliland : Wagga Mountain, Boresti and Berbera, *Lort-Phillips* ! Sources of the Aven, *Révoil*.

Lower Guinea. Angola : Mossamedes ; in shady rocky places, *Wedwitsch*, 6291 ! abandoned fields near Cavalheiros, *Wedwitsch*, 6292 ! Open forest at kilon. 108.5 on Mossamedes railway, *Pearson*, 2910 ! sandy river bed on the Caroca, 650 ft., *Baum*, 3a.

Also in Socotra and Arabia.

16. DROQUETIA, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 394

Flowers monœcious, sometimes diœcious by suppression of the androgynous involucre ; androgynous involucre few- to many-flowered, bowl-shaped, campanulate or ventricose, with toothed margin, female involucre 1- or 2-flowered, ventricose. Male flowers few to many, shortly stalked ; perianth tubular, club-shaped in bud, becoming 3-lobed above in flower. Stamen 1. Ovary-rudiment absent. Female flowers sessile, 1 or few in the centre of the involucre ; perianth absent. Ovary straight ; stigma filiform, shortly papillose on one side, persistent during the ripening of the fruit ; ovule erect from the base. Achene included in the involucre, woolly or smooth, ovate, compressed ; pericarp somewhat thick. Seed conforming to the pericarp ; testa membranous ; albumen present ; cotyledons flattened, elliptic.—Herbaceous or somewhat shrubby perennials. Leaves alternate or opposite, stalked, crenate-serrate, 3-nerved, with dot-like cystoliths ; petioles slender ; stipules lateral, free. Involucres subsessile, generally smaller than in *Forskohlea*, shortly pubescent, the androgynous in pairs in the leaf-axil, the female borne at the base of an undeveloped axillary shoot.

Species 5, in tropical and South Africa, Arabia, Madagascar, India and Java.

Leaves opposite 1. *D. iners*.

Leaves alternate 2. *D. debilis*.

1. *D. iners*, *Schweinf. in Bull. Herb. Boiss. iv. App. ii. 146*. A perennial herb or shrub with a slender woody rhizome ; stems slender, erect or ascending from a rooting prostrate base, 2-5 ft. high, obtusely angled, pubescent or hirtellous, becoming glabrate below, internodes

generally elongated, often as long as or longer than the leaf; branches numerous, short, spreading or ascending, very slender, leafy. Leaves opposite, ovate, acuminate, base obtuse to rounded, margin above the base crenate-dentate, on the main shoots $1\frac{1}{4}$ -2 in. long, $\frac{3}{4}$ -1 in. wide, smaller on the branches, 3-nerved, membranous when dry, upper face with a few stiffish appressed hairs, and dotted with cystoliths, lower face more or less hairy on the nerves; petiole slender, often about a quarter the length of the blade, rarely nearly half as long. Stipules ovate or ovate-lanceolate, acute to subulate-acuminate, $1\frac{1}{2}$ -2 lin. long, scarious, hairy on the midrib. Inflorescence axillary, consisting in the more complete cases of an androgynous involucre above each stipule and an undeveloped axillary shoot bearing opposite dichasia of female involucre containing one or two flowers which mature later; androgynous involucre bowl-shaped to campanulate with shallowly toothed margin containing many to few male flowers surrounding one or two female, $1-2\frac{1}{2}$ lin. in diam., with scanty wool among the flowers; female involucre ventricose-tubular with shortly toothed mouth; involucre pubescent on the outside. The androgynous involucre may be much reduced or absent, in the latter case the whole plant may be female. Male flowers shortly stalked, about 1 lin. long, perianth 3-lobed above, the middle lobe acute to acuminate, 1 lin. long, puberulous above. Achene compressed ventricose-ovate, about $\frac{1}{2}$ lin. long, shiny black.—Engl. in *Mildbraed*, *Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 1907-8, ii. 192; *R. E. Fries*, *Wiss. Ergebn. Schwed. Rhodes.-Kongo Exped.* 1911-12, i. 18. *D. diffusa*, *Wedd. in Ann. Sci. Nat.* 4me sér. i. 211 and *Monogr. Urtic.* 541, t. 19, figs. A, 1-11; *Hook. f. in Fl. Brit. Ind.* v. 593. *D. pauciflora*, *Wedd. in DC. Prodr.* xvi. i. 235⁵⁸; Engl. *Hochgebirgsfl. Trop. Afr.* 194 and *Pfl. Ost-Afr.* C. 164. *Urtica iners*, *Forsk. Fl. Ægypt.-Arab.* 160. *U. verticillata*, *Vahl, Symbol.* i. 76. *U. pauciflora*, *Hochst. ex Steud. in Flora*, 1850, 258. *U. urens*, var. *iners*, *Wedd. in DC. Prodr.* xvi. i. 40. *Pouzolzia pauciflora*, *A. Rich. Tent. Fl. Abyss.* ii. 259. *Forskohlea urticoides*, *Wight, Ic. Pl.* t. 1982. *Didymogyne abyssinica*, *Wedd. in Ann. Sci. Nat.* 4me sér. i. 207. *Bæhmeria pauciflora*, *Bl. Mus. Bot. Lugd.-Bat.* ii. 201. *B. parvifolia*, *Wedd. l.c.* 203 and *Monogr. Urtic.* 359.

Nile Land. Abyssinia: Mount Silke, *Schimper*, 682! Debra Tabor, 8500 ft., *Schimper*, 1143! and without precise locality, *Schimper*, 627! Uganda: Ruwenzori, 6000-9000 ft., *Scott Elliot*, 7708! West side of Ruwenzori; Kalonge, 8500 ft., *Mildbraed*, 2490.

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volken*, 1239! Kissenye: Ninagongo, 8500-9500 ft., *Mildbraed*, 1384; *Fries*, 1638. British Central Africa: Nyasaland, *Buchanan*, 123!

Also in Arabia, India (Nilgiri Hills), and Java.

2. *D. debilis*, *Rendle in Journ. Bot.* 1917, 203. A weak plant with slender wiry stems, woody, prostrate and rooting below, then ascending, $\frac{1}{2}$ lin. or less thick, 4-6 in. long, with a few short weak ascending

branches, sparsely hispidulous above, glabrate below. Leaves alternate, ovate, acute, base blunt, entire, margin above base crenate-serrate, $\frac{3}{4}$ to barely 1 in. long, $\frac{1}{2}$ – $\frac{2}{3}$ in. wide, 3-nerved, membranous, green on both faces but paler beneath, upper face scabrid with the dotted cystoliths and sparsely hispid, lower face hispid on the slender nerves; petiole very slender, half the length of the blade or less, hispidulous. Stipules ovate-acuminate, scarious, white with a green hispidulous midvein, about 1 lin. long. Inflorescence axillary, comprising a pair of androgynous involucre above each stipule and two younger female dichasia lateral at the base of the undeveloped axillary shoot; androgynous involucre becoming ventricose, with toothed margin, about 1 lin. long in fruit, puberulous on outside, containing 3 male and 2 female flowers. Female involucre, as in *D. iners*, 1-flowered. Male flower shortly stalked, mid-lobe of perianth shortly acute. Achene black, not shining, about $\frac{1}{2}$ lin. long.

Nile Land. Uganda: Mau, shady wood at 7000–8000 ft., *Scott Elliot*, 6799!

17. AUSTRALINA, Gaud. ; Benth. et Hook. f. Gen. Pl. iii. 394.

Flowers monœcious, in clusters in the leaf-axils, without an involucre. Male flowers few to many, sessile or shortly stalked; perianth club-shaped in bud, after opening tubular below with a broad outer acuminate lobe, or ultimately splitting almost to the base. Stamen 1. Ovary-rudiment absent. Female flowers few, sessile; perianth sac-like enveloping the ovary, with contracted minutely toothed mouth, or absent. Ovary straight; stigma filiform or narrow-linear; ovule erect from the base. Achene included in the membranous or slightly fleshy perianth, or naked; pericarp thin. Seed conforming to the pericarp, testa thin; albumen very scanty; cotyledons broadly elliptic.—Diffuse annual or perennial herbs. Leaves alternate or opposite, stalked, toothed; stipules lateral, free or sometimes joined below, scarious. Male flower-clusters sessile or stalked, female sessile.

Species 6, in Australia, New Zealand and South and Tropical Africa.

Leaves opposite 1. *A. flaccida*.

Leaves alternate 2. *A. acuminata*.

1. *A. flaccida*, *Wedd. in DC. Prodr.* xvi. i. 235⁶⁰. A weak herb with slender elongated creeping stems up to 1 ft. or even 3 ft. in length, hirtellous as are the shorter (4–8 in. long) ascending branches; lower internodes $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, the few uppermost short, the leaves being aggregated at the end of the shoot. Leaves opposite, very shortly stalked, ovate to ovate-lanceolate, acuminate, extreme apex blunt, base rounded to blunt, margin above base crenate-serrate, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long, 3–7 lin. wide, or even smaller on the branchlets,

3-nerved, membranous when dry, sparsely hairy on both faces, dotted above with minute cystoliths; petiole 1 lin. or less in length. Stipules ovate, free or united in the lower part beneath the petiole, scarious, ciliate, nearly 2 lin. or less in length. Male cymules on a peduncle 2-3 times as long as the petiole; flowers few, sessile; perianth about $\frac{1}{2}$ lin. long with a funnel-shaped tube, obscurely 2-lipped, the inner lobe almost obsolete, the outer broad, abruptly acuminate and erect, ciliate on midvein and margin. Female flowers generally in a connate pair, sessile; perianth sac-like, constricted above to an obtuse bluntly 4-5-toothed mouth, puberulous; style filiform, projecting. Achene ovoid, fuscous; pericarp thin.—*A. schimperiana*, Wedd. in Ann. Sci. Nat. 4me sér. 1. 212. and in Monogr. Urtic. 546, t. 20, C. *Pouzolzia fluccida*, A. Rich. Tent. Fl. Abyss. ii. 259.

Nile Land. Abyssinia: Shoa, *Franqueville*! near Adowa and Memsah, *Dillon*; and without precise locality, 6500 ft., *Schimper*, 795!

2. *A. acuminata*, *Wedd.* in Ann. Sci. Nat. 4me sér. i. 212. An annual herb branching from the base, 8-21 in. high; stem erect, slender, puberulous, as are also the very slender ascending branches. Leaves alternate, ovate, acuminate, base triangular to cuneate and entire, margin elsewhere crenate-serrate, in tropical African specimens $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, 5-10 lin. wide, 3-nerved, membranous, sparsely pilose on the upper face and on the veins beneath, dotted with cystoliths above, lighter green beneath, margin minutely ciliolate; petiole slender, from one-third to half the length of the blade, puberulous. Stipules ovate-lanceolate, thinly long-acuminate, up to 2 lin. long, scarious with green midvein. Inflorescences axillary, androgynous, consisting of an ebracteate cluster of numerous male flowers (often about 15) in the axil of one stipule and a bracteate cyme of a few (3 or more) female flowers in the axil of the other stipule, or sometimes female only; bracts much shorter than the flower. Male flowers shortly stalked, perianth after expulsion of the anther boat-shaped with a green setose acuminate apex, including the stalk about 1 lin. long. Ovary naked, ovoid, densely hispidulous; stigma linear, recurved, barely half the length of the ovary. Achene greenish-brown, ovoid with one edge slightly narrowly flattened, acute, tipped with the remains of the style, about 1 lin. long, hispidulous.—*Didymodora acuminata*, *Wedd.* Monogr. Urtic. 549. *D. cuneata*, *Wedd.* in DC. Prodr. xvi. i. 235⁶¹. *Droguetia umbricola*, *Engl. Pfl. Ost-Afr. C.* 164. *Parietaria cuneata*, *E. Meyer* ms. ex *Wedd.* in Ann. Sci. Nat. l.c. (quoted in synonymy).

Nile Land. British East Africa: Eldama Ravine, 7000-7500 ft., *Whyte*!

Mozamb. Distr. German East Africa: Kilimanjaro; Marangu, 4800 ft., *Volken*, 1700!

Also in South Africa.

ORDER CXXIV. MYRICACEÆ.

(By J. HUTCHINSON.)

Flowers unisexual, arranged in short bracteate spikes. Perianth 0; the female with a few perianth-like whorled bracteoles. Male flower subtended by a solitary bract: stamens 2-∞, usually 4-8; filaments short, free or more or less connate; anthers erect, ovoid or oblong, with 2 parallel longitudinally dehiscent cells, rarely accompanied by a small subulate rudimentary ovary. Female flower subtended by a solitary variously shaped bract and with a whorl of small perianth-like fleshy bracteoles around the base of the ovary. Ovary sessile, 1-celled; style short, with two spreading or ascending branches. Ovule 1, erect from the base of the cell, orthotropous. Drupe small, globose or ovoid, usually strongly warted, the warts often at length covered with a white waxy substance; endocarp hard. Seed erect; testa membranous; albumen 0; embryo straight, with plano-convex fleshy cotyledons and a short radicle.— Trees or shrubs, frequently aromatic. Leaves alternate, penninerved, entire, serrate, dentate or pinnately lobed; stipules 0. Flowers monœcious or more usually diœcious. Male spikes axillary, usually dense-flowered, in the African species usually solitary, in some extra-African fasciculate or paniculate; when bisexual then the male flowers below the female. Female spikes sometimes longer or shorter than the male, often axillary.

A single genus with about 50 species, distributed throughout the Northern Hemisphere, 6 in the Mascarene Islands, 16 in South Africa.

In a monograph of *Myricaceæ*, published in 1901, A. Chevalier recognises 3 genera, *GALE*, Tournef., *COMPTONIA*, Banks, and *MYRICA*, Linn.; but for the present work it seems preferable to follow Bentham and Hooker and Engler in treating them as sections or subgenera, although it is not disputed that there are good reasons for their segregation. It should be noted, however, in reference to the use of these names, that Linnaeus in his *Systema* (1735) placed the name *Gale* of Tournefort and the older authors as a synonym of his *Myrica*, and that *Myrica Gale*, Linn., would therefore represent the type species of his genus. If this pre-Linnean name, *Gale*, were adopted, *Myrica*, Linn., would be synonymous, and, admitting *Comptonia*, an American plant, to be distinct, all the species of *Myrica* as understood by Chevalier would be referred to the genus *Morella*, Lour. (1790).

1. MYRICA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 400.

Characters of the Order.

Fruits with two pointed lateral shoulders, resinous-glandular between the angles but not warted, inserted on deciduous shoots; leaves deciduous ... 1. *M. Gale*.

Fruits without shoulders, densely warted, arranged on persistent shoots; leaves persistent.

Flowers monœcious.

Leaves truncate and unequal-sided at the base:

- male and female flowers on separate inflorescences 2. *M. arborea*.
- Leaves acute or subacute and equal-sided at the base; male and female flowers on the same inflorescence 3. *M. kaudtiana*.
- Flowers diœcious.
- Leaves 1 in. long or less, serrate in the upper half; petiole 1 lin. long or less; female flowers lax on the spike 4. *M. Meyeri* [Johannis.
- Leaves 1½ in. long or longer, if shorter then entire; petiole usually more than 1 lin. long.
- Petiole 1-2 lin. long.
- Leaves entire or simply serrate.
- Leaves entire, acute; stamens 7-8 5. *M. Mildbradii*.
- Leaves sharply serrate in the upper two-thirds, ½ in. broad or less; stamens about 8 6. *M. Gatzci*.
- Leaves entire or serrate in the upper half, rounded to a shortly mucronate apex, ½-1½ in. broad; stamens 5-6 7. *M. pilulifera*.
- Leaves doubly serrate 8. *M. usambarensis*.
- Petiole 2¼-6 lin. long.
- Branches strongly lenticellate; leaves mostly rounded to a subacute base, often with folded margins when dry 9. *M. kilimandscharica*.
- Branches not or only slightly lenticellate; leaves rounded to a subacute unequal-sided base; margins not folded 10. *M. salicifolia*.
- Branches lenticellate, softly tomentulose; leaves long-attenuated into an acute base 11. *M. conifera*.

1. *M. Gale*, *Linn. Sp. Pl. ed. 1*, 1024. A small erect shrub usually growing in swamps; stems and branches covered with dark-coloured lenticellate bark, glabrous or slightly pubescent; young branchlets leafy, pubescent. Leaves deciduous, oblanceolate, mostly subacute, attenuated to the base, ¾-2½ in. long, ⅓-¾ in. broad, entire or shortly serrate in the upper half or towards the tip, thinly chartaceous, with a few golden glands on the lower surface when young, pubescent on both surfaces; lateral nerves numerous and rather delicate, diverging from the midrib at a wide angle; petiole about 1 lin. long; perulæ scaly, persistent or subpersistent, ovate or lanceolate, subacute, up to 2 lin. long, venose, glabrous or nearly so. Flowers diœcious. Male spikes numerous, produced before the leaves, ½-¾ in. long, dense-flowered; bracts imbricate, conspicuous, very broadly ovate, subacutely mucronate, about 1¼ lin. long and broad, scaly, shining outside, very shortly ciliolate, glabrous or nearly so outside; stamens 3-6, usually 4; anthers small, nearly ⅓ lin. long. Female spikes racemously arranged on the previous season's shoots, sessile, dense-flowered, ⅓-½ in. long at the time of flowering, at length (in fruit) a little longer; bracts similar to those of the male but much smaller; ovary narrowly ovoid; style-branches spreading, slender. Fruits

3-lobed, lobes in the same plane, acute, furnished towards the base and between the lobes with numerous resinous glands, otherwise smooth, about 1 lin. long.

Mozamb. Distr. Nyasaland: Shire Highlands, "near the top of the mountain," Buchanan, 7!

Widely distributed throughout the North Temperate Zone.

This is the first and only record of *Myrica Gale*, Linn., the common European "Bog-myrtle," from the Southern Hemisphere, and in including it in the present work we rely entirely on the correctness of Buchanan's label, for there is no doubt as to the identification of the specimen to which it is attached. Buchanan collected the plant on July 6th, 1879, and his label indicates that it was gathered in the Shire Highlands "near the top of the mountain" (probably Mt. Mlanji). If it really be native there, and it is very improbable that in 1879 it could have been introduced, it affords an additional and particularly striking example of the close affinity or identity of several of the plants of the high mountains of tropical Africa with species confined to the North Temperate Zone. On this subject consult Engler in *Annals of Botany*, xviii. 523-540. For complete references and synonymy see Sargent, *Silva of North America*, ix. 84.

2. *M. arborea*, Hutchinson in *Kew Bulletin*, 1917, *inced.* A tree 20-30 ft. high; branches fairly stout, about $2\frac{1}{2}$ lin. thick, sulcate, closely puberulous and glandular; young branchlets fairly densely leafy, almost tomentulose. Leaves oblong or oblong-lanceolate, rounded to a shortly mucronate apex, mostly truncate and unequal-sided at the base, $2-3\frac{1}{2}$ in. long, $\frac{1}{2}-1\frac{1}{4}$ in. broad, rigidly chartaceous or subcoriaceous, mostly dentate or subserrate all round the margin, rarely subentire, glandular on both surfaces, more densely so below, otherwise glabrous; midrib prominent below; lateral nerves 12-16 on each side of the midrib, diverging from it almost at right angles, mostly distinctly 2-furcate towards the margin, slender, prominent on both surfaces; ultimate venation scarcely visible; petiole 2-3 lin. long, glandular and shortly pubescent. Flowers monœcious. Male spikes axillary, mostly about twice as long as the petiole or sometimes racemously arranged on long leafless shoots; rhachis velvety-tomentulose; bracts very broadly obovate, nearly 1 lin. long, submembranous, ciliate, glandular and pubescent outside; stamens about 6; anthers very sparingly pubescent. Female spikes borne at the base of the young shoots, or axillary, and then about twice the length of the petiole, sometimes with one or two flowers at the base; bracts broadly triangular, about 1 lin. long, submembranous, glandular and slightly pubescent outside, ciliate; hypogynous scales pubescent and glandular; ovary pubescent and glandular; styles flattened, broad, acute, $\frac{3}{4}$ lin. long. Fruits ellipsoid, 2 lin. long, closely warted.—*M. salicifolia*, A. Cheval. *Monogr. Myric.* 140, partly; Engl. in *Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* 178, partly; not of Hochst.

Upper Guinea. Cameroons: Cameroon Mountain, 7000-8000 ft., Mann, 1203! 2185! borders of forests on the Mannsquelle, *Mildbraed*, 3409; Buea, *Deistel*, 179!

3. *M. kandtiana*, *Engl. Jahrb.* xlv. 278, *fig. A-C*. A shrub about 6 ft. high; branchlets slender, fairly densely leafy, lenticellate, slightly pubescent when young. Leaves shortly petiolate, oblanceolate or obovate-lanceolate, subacute, attenuated to the base, $2\frac{1}{4}$ – $3\frac{1}{4}$ in. long, 1 – $1\frac{1}{4}$ in. broad, subcoriaceous, coarsely and distantly serrate in the upper half, densely covered with minute greyish glands when young, shining above when old, paler beneath; lateral nerves 10–15, slender, diverging from the prominent midrib at a wide angle, often 2-furcate towards the margin; petiole $\frac{1}{2}$ –1 lin. long. Spikes axillary, solitary, androgynous, the lower part male, the upper female, slender, a little shorter than the leaves, lax-flowered; bracts shortly ovate, glandular on the back, ciliate; stamens 4. Female flowers disposed in the upper two-thirds of the spike; bracts as in the male; hypogynous scales 3–4, ovate-lanceolate; ovary ovoid; styles spreading, acute. Fruits ellipsoid, $1\frac{1}{2}$ lin. in diam., densely warted.—*Engl. in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 177.*

Nile Land. Uganda: in swamp at Kirerema, 4000 ft., *Dümmer*, 124! Toro; Kitakwenda, 4000 ft., *Bagshawe*, 1132!

Mozamb. Distr. German East Africa: Ruanda, Nyanza Mountains, *Kandt*, 19; Karagwe, *Scott Elliot*, 7509! in a *Papyrus* swamp to the west of Lake Mohasi, *Mildbraed*, 551; Kiwu volcano, by Lake Ruhonso, and near the waterfall of Mkunga, *Mildbraed*, 1813.

4. *M. Meyeri-Johannis*, *Engl. Hochgebirgsfl. Trop. Afr.* 189. A tree 45–60 ft. high; branchlets densely leafy, very sparingly puberulous, with a few fairly conspicuous lenticels towards the base. Leaves small, oblong or elliptic, subacute, rounded or subtruncate at the base, $\frac{3}{4}$ –1 in. long, $\frac{1}{4}$ – $\frac{2}{3}$ in. broad, rigidly coriaceous, serrate or a few of the lowermost entire, glandular on both surfaces, at length minutely pitted; midrib slightly prominent; lateral nerves about 9 on each side of the midrib, spreading at a wide angle, scarcely raised below; petiole 1 lin. long or less, slightly glandular. Flowers dioecious. Male spikes axillary, solitary, $\frac{1}{3}$ – $\frac{1}{2}$ in. long, dense-flowered; rachis pubescent; bracts broadly triangular-ovate, auriculate, obtuse, glabrous outside, ciliate; stamens 4–5; filaments connate in the lower part; anthers rounded, $\frac{1}{2}$ lin. long. Female inflorescences axillary, lax-flowered, about $\frac{1}{2}$ in. long; rachis tomentulose and glandular; bracts oblong-elliptic, emarginate, submembranous, 1 lin. long, sparingly glandular up the middle, ciliate, otherwise glabrous; hypogynous scales 4, unequal, broadly elliptic, fleshy, up to $\frac{1}{2}$ lin. long, glandular on the back, ciliate; ovary glandular; styles slender, shortly connate at the base, 1 lin. long. Fruits not seen.—*Engl. Pfl. Ost-Afr. C. 160; A. Cheval. Monogr. Myric. 151.*

Mozamb. Distr. German East Africa: in forest between Marangu and Madschame, 4200–5400 ft., *Meyer*, 332; Marangu, *Volkens*, 951 ♂! 1203 ♂ & ♀! 1872 ♀!

5. **M. Mildbrædii**, *Engl. Jahrb.* xlv. 278, *fig. N. and O.* A shrub up to 6 ft. high; young branchlets puberulous, at length glabrous, densely leafy, ascending at an acute angle. Leaves spreading or erect, shortly petiolate, oblong, acute, obtuse at the base, $1\frac{1}{4}$ – $1\frac{3}{4}$ in. long, $\frac{2}{3}$ – $\frac{3}{4}$ in. broad, coriaceous, entire, glabrous above, with immersed glands below; lateral nerves about 7; petiole 1–2 lin. long. Flowers diœcious. Male spikes axillary, dense-flowered, about half as long as the leaves, about $\frac{1}{4}$ in. thick; bracts broadly ovate, shortly contracted into a stalk $1\frac{1}{4}$ lin. long, sparingly glandular outside towards the apex, ciliate; stamens 7–8. Female flowers not known.—*Engl. in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped.* ii. 178.

Mozamb. Distr. German East Africa: Rugege Forest, 5400 ft., *Mildbræd*, 975.

6. **M. Gœtzei**, *Engl. Jahrb.* xxx. 290. A shrub 3–6 ft. high; branchlets with grey shining bark, covered with numerous small black spots; internodes $\frac{1}{4}$ in. long or less. Leaves oblanceolate or linear-oblanceolate, subacute, obtuse or subacute at the base, 1 – $1\frac{3}{4}$ in. long, 4–6 lin. broad, simply serrulate in the upper two-thirds, rigidly subcoriaceous, shining and very sparingly glandular above and with a few hairs on the midrib, more densely glandular but otherwise glabrous below; midrib prominent on both surfaces; lateral nerves 10–12 on each side of the midrib, very slender and scarcely visible, diverging from the midrib at a wide angle; petiole 1–2 lin. long, sparingly glandular. Flowers diœcious. Male spikes axillary, solitary, densely flowered, about $\frac{1}{3}$ in. long; bracts broadly deltoid, ciliate and glandular, 1–2 lin. long, about $1\frac{1}{2}$ lin. broad; stamens about 8; filaments very short; anthers purple, at length yellow, $\frac{3}{4}$ lin. long. Female flowers and fruits not known.

Mozamb. Distr. German East Africa: Kinga (Livingstone) Mountains; Ussangu, *Goetze*, 1256 ♂!

7. **M. pilulifera**, *Rendle in Trans. Linn. Soc. ser. ii. iv.* 43. Main branches prominently lenticellate, rather densely pubescent, slightly ribbed when dry; younger branchlets leafy towards the tips. Leaves oblong-lanceolate or elongate-oblong, subacute or obtuse at the base, rounded to a shortly mucronate apex, $1\frac{3}{4}$ – $3\frac{1}{2}$ in. long, $\frac{1}{2}$ – $1\frac{1}{4}$ in. broad, chartaceous or subcoriaceous, entire or serrate in the upper half or towards the apex, at first slightly pubescent on both sides of and near the midrib, at length glabrous, apparently not glandular; midrib very prominent below; lateral nerves 9–15 on each side of the midrib, diverging from it at a wide angle, 2–3-furcate near the margin, slender, distinct on both surfaces; petiole 1–2 lin. long, slightly puberulous. Flowers diœcious. Male spikes axillary, solitary, $\frac{1}{2}$ –1 in. long; rhachis glandular and pubescent; bracts very broadly ovate, slightly pointed, 1 lin. long, $1\frac{1}{4}$ lin. broad,

submembranous, glabrous outside, ciliate; stamens 5-6; anthers rounded, $\frac{1}{2}$ lin. long, glabrous. Female inflorescences not seen. Infructescences solitary in each leaf-axil, numerous, up to $1\frac{1}{2}$ in. long; axis densely and shortly pubescent; fruits ovoid-ellipsoid, 2 lin. long, often tipped by two slender styles about 1 lin. long, closely and coarsely warted.—Engl. Pfl. Ost-Afr. C. 160; A. Cheval. Monogr. Myric. 142; Engl. Jahrb. xlv. 279, fig. G-I.

Mozamb. Distr. Nyasaland: Mount Mlanji, *Whyte* ♀! Blantyre, *Buchanan* in *Herb. Medley Wood*, 6829 ♂! *Buchanan*, 234 ♂! and without precise locality, *Buchanan*, 350 ♂! 939 ♀! Gazaland: Mount Pene Forest, 6500 ft., *Swynnerton*, 530 ♀! 6084 ♀! near Chirinda, *Swynnerton*, 1735 ♂! near Melsester, *Swynnerton*, 623 ♀! Nyahovi River, *Swynnerton*, 610a ♀!

8. *M. usambarensis*, *Engl. Pfl. Ost-Afr. C.* 160. Branchlets somewhat densely fulvous-pilose. Leaves very shortly petiolate, oblong, obtuse at both ends (according to *Chevalier* $1\frac{1}{2}$ - $1\frac{3}{4}$ in. long, 1 - $1\frac{1}{4}$ in. broad), coriaceous, slightly shining above, sparingly long-pilose and with numerous yellow glands below, doubly serrate, with about 7-8 pairs of spreading nerves which are impressed above and very prominent below and 3-fid near the margin. Flowers not known.—A. Cheval. Monogr. Myric. 151.

Mozamb. Distr. German East Africa: Usambara; forests near Mlalo, 4350 ft., *Holst*, 513.

9. *M. kilimandscharica*, *Engl. Hochgebirgsfl. Trop. Afr.* 188. A shrub; branches fairly stout, very markedly lenticellate, rather densely puberulous and glandular especially when young. Leaves petiolate, rather dense, oblong or oblong-elliptic, rounded at the apex, subacute or rounded and somewhat unequal-sided at the base, 1-3 in. long, $\frac{1}{2}$ - $1\frac{1}{4}$ in. broad, entire or slightly toothed in the upper part, often with conspicuously recurved margins when dry, coriaceous, glabrous and rather closely reticulate above, densely covered below with small yellowish glands; midrib very prominent below; lateral nerves about 10 on each side of the midrib, diverging from it at a very wide angle, mostly 2-furcate towards the margin, usually distinct on both surfaces; petiole $2\frac{1}{4}$ -4 lin. long, glandular. Flowers diœcious. Male spikes numerous, axillary, three or four times as long as the petiole, dense-flowered; rhachis glabrous; bracts broadly ovate-rhomboid, $\frac{3}{4}$ lin. long, about 1 lin. broad, submembranous, glandular on the back, sparingly ciliate; stamens 6-8; anthers $\frac{1}{2}$ lin. long, very sparingly pubescent or glabrous. Female inflorescences numerous, axillary, solitary, slender, usually about half as long as the leaf; rhachis densely glandular; bracts broadly rhomboid, submembranous, $\frac{2}{3}$ lin. long, $1\frac{1}{4}$ lin. broad, with an area of glands up the middle outside, ciliate; hypogynous scales 3-4, rounded, fleshy, glandular outside, ciliate; ovary pubescent and glandular; styles spreading, free to the base, slender, 1 lin. long. Fruits ellipsoid, 2 lin. long, densely warted, warts

waxy.—Engl. Pfl. Ost-Afr. C. 160; Volkens, Kilimandscharo, 296 (figure); A. Cheval. Monogr. Myric. 143; Engl. Jahrb. xlv. 279, fig. K-M. *M. salicifolia*, var. ? Oliv. in Trans. Linn. Soc. ser. ii. ii. 349. *M. kilimandscharica*, var. *macrophylla*, Engl. Jahrb. xxviii. 375.

Mozamb. Distr. German East Africa: Kilimanjaro, 4000–5000 ft., *Johnston*, ♂ & ♀! Marangu, *Volkens*, 234a ♀! 234b ♂! Usambara; Mbarama inflorescence galled, *Holst*, 2486! Kwa Mshuza, *Holst*, 9005 ♀! 9006 (galled)! Uluguru Mountains, *Goetze*, 229 ♀! Kinga (Livingstone) Mountains; *Ussang*, *Goetze*, 1247! and without precise locality, *Busse*, 196 ♂!

South Central. Belgian Congo: Kirunga Mount, *Kässner*, 3193 ♀!

10. *M. salicifolia*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 277. A tall tree or shrub; branchlets covered with dark-coloured bark, with very few lenticels, puberulous-glandular when young, at length glabrous. Leaves petiolate, oblong, lanceolate or oblong-elliptic, obtuse, mostly somewhat rounded to a subacute unequal-sided base, 2–5 in. long, $\frac{3}{4}$ – $2\frac{1}{2}$ in. broad, undulate or dentate-serrate in the upper half or two-thirds, thinly chartaceous, with small golden glands on both surfaces, more densely glandular below, otherwise glabrous; midrib flat above, prominent below; lateral nerves 9–12 on each side of the midrib, spreading from the midrib at a wide angle, slender, slightly prominent on both surfaces, many of them prominently furcate about half-way towards the margin; veins delicate and very faint; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long, puberulous-glandular. Flowers diœcious. Male spikes often crowded or conglomerate, about as long as or often rather longer than the petiole, very densely flowered; rhachis yellowish-tomentose; bract subtending each flower solitary, triangular-ovate, obtuse, $1\frac{1}{3}$ lin. long, nearly 1 lin. broad, pubescent and glandular outside and on the margin; stamens 8–12; anthers $\frac{1}{2}$ lin. broad, with short filaments, minutely papillose. Female spikes much shorter than the petiole; bracts semiorbicular, 1 lin. broad at the base, ciliate and with a few sessile glands outside, submembranous; hypogynous scales 3, transversely oblong or suborbicular, fleshy, pilose in the upper part; ovary pilose; styles fairly stout, free to the base, $\frac{1}{2}$ lin. long. Infructescence as long or up to twice as long as the petiole; fruits crowded, ellipsoid-globose, about 2 lin. in diam., warted, the warts covered with a white flaky wax-like substance.—C. DC. in DC. Prodr. xvi. ii. 150; Engl. Hochgebirgsfl. Trop. Afr. 188 and Pfl. Ost-Afr. C. 160; A. Cheval. Monogr. Myric. 140, partly.

Nile Land. Abyssinia: in valleys of the Haramat district, *Schimper*, 1093! mountains near Endschedeap, *Schimper*, 1135! near Genausa in the Semen province, *Schimper*, 1327! on the Ghaba river, *Stauder*, 1356! and without precise locality, *Schimper*, 18! *Quartin-Dillon & Petit*, 97! Anadehi, *Schimper*, 914!

Var. subalpina, Engl. in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 179. A shrub up to 6 ft. high. Leaves smaller than in the type, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long, $\frac{1}{4}$ – $\frac{3}{4}$ in. broad, entire or serrate towards the apex; petiole $1\frac{1}{3}$ –2 lin. long.—F. E. Fries, Rhod.-Kongo Exped. i. 12.

Mozamb. Distr. German East Africa: north-east of Lake Kivu, 10,000 ft., *Mildbraed*, 1699; near Kissenyc, 9000 ft., *Mildbraed*, 1362; Ninagongo, *Fries*, 1687, 1687a.

An example of this variety has not been seen. Engler (in *Mildbraed*, l.c.) quotes the following specimens under the species:—German East Africa: east of Lake Kivu, *Mildbraed*, 1088; Kissenye; Ninagongo Volcano, 4650 ft., *Mildbraed*, 1344; near Kukaye in the Rugege forest, *Mildbraed*, 1052; near Butumbi on the Njarchase Mountains, *Stuhlmann*, 2177, 2218.

11. *M. conifera*, *Burm. f. Fl. Cap. Prodr.* 31. A moderate-sized tree; branches softly tomentulose, lenticellate, leafy nearly their full length. Leaves oblanceolate or linear-oblanceolate, long-attenuated into the petiole at the acute base, subacutely triangular and mucronate at the apex, $2\frac{1}{2}$ – $4\frac{1}{2}$ (mostly about 4) in. long, $\frac{1}{2}$ –1 in. broad, rigidly chartaceous, entire or rather distantly and coarsely serrate in the upper half or two-thirds, closely reticulate and punctulate above, minutely glandular below, shortly pubescent towards the base of the midrib; midrib prominent on both surfaces, narrow; lateral nerves mostly more conspicuous above than below, 12–15 on each side of the midrib, diverging at a fairly wide angle, mostly 2-furcate; veins scarcely conspicuous; petiole 3–4 lin. long, puberulous. Flowers diœcious. Male spikes clustered or solitary, dense-flowered, more or less 1 in. long; rhachis rather densely pubescent; bracts very broadly obovate, with an auricle on each side towards the base, 1 lin. long and broad, submembranous, glandular on the back towards the middle, ciliate; stamens 4 or 5; filaments unequally connate in the lower half; anthers rounded, $\frac{1}{3}$ lin. long, minutely papillose. Female inflorescences dense-flowered, clustered or solitary, $\frac{1}{2}$ in. long or less; rhachis tomentulose; bracts very broadly triangular-ovate, subacute, $\frac{2}{3}$ lin. long, 1 lin. broad, thinly chartaceous, pubescent and glandular outside; bracteoles fleshy, broadly obovate, ciliate, pubescent outside; ovary pubescent; styles shortly connate at the base, slender, nearly 1 lin. long. Fruits ellipsoid-globose, $2\frac{1}{4}$ lin. long, strongly warted.—A. Cheval. *Monogr. Myric.* 146, incl. vars. *tomentosa*, A. Cheval., *banksifolia*, A. Cheval., *glabra*, A. Cheval., and *integra*, A. Cheval. l.c. 147–8. *M. athiopica*, Linn. *Mant.* ii. 278; Engl. *Jahrb.* xxx. 291; Baum, *Kunene-Samb. Exped.* 219; R. E. Fries, *Rhod.-Kongo Exped.* 12. *M. serrata*, Lam. *Encycl.* ii. 593. *M. capensis*, Hort. ex Steud. *Nomencl.* ed. 2, 173. *M. natalensis*, C. DC. in DC. *Prodr.* xvi. ii. 148; A. Cheval. l.c. 149.

Lower Guinea. Angola: between Kutue and Onschingue, on the Kuito River, 3600 ft., *Baum*, 748!

Mozamb. Distr. German East Africa: banks of Luangwa River, *Goetze*, 1303. Nyasaland: Shire Highlands, *Buchanan*, 139 ♀! 235 ♂! 351 ♂ & ♀! Blantyre, *Buchanan in Herb. Medley Wood*, 6925 ♂ & ♀! Rhodesia: Island at Victoria Falls, *Kirk* ♀! *Fries*, 53, 53a; Livingstone, north bank of the Zambesi, *Rogers*, 7454!

Widely spread in South Africa.

ORDER CXXV. CASUARINEÆ.

(By C. H. WRIGHT.)

Flowers unisexual, bracteate and 2-bracteolate. Male flower: Perianth-segments 1-2, concave or cucullate, circumscissile at the base. Stamen 1; filament inflexed in bud; anther rather large, cells distinct, dehiscing longitudinally. Female flower: Perianth 0. Ovary minute, 1-celled; style with long linear branches stigmatose throughout their length; ovules 2, collateral, semi-anatropous, micropyle superior. Fruit formed of nutlets arranged in ovoid or cylindric strobiles; bracts and bracteoles enlarged, united and often woody; nuts laterally compressed, smooth, winged at the apex, dehiscing by 2 valves. Seed solitary by abortion, laterally affixed; testa membranous; albumen 0; embryo straight, cotyledons complanate, radicle short, superior.—Trees or shrubs; branches and branchlets leafless, rigid, erect or pendulous, many deciduous, cylindric and verticillate or tetragonal and scattered, articulated at the nodes. Scales 4 to many at each node, small, appressed, sometimes connate into a short sheath, midribs decurrent and forming angles on the stem. Male spikes simple or compound, usually terminal on deciduous branches, cylindric or tetragonal; female spikes globose or ovoid, terminal or lateral on persistent branches.

Genus 1; species about 50, chiefly in Australia and New Caledonia, a few in the Malay Archipelago, Pacific Islands and Mascarene Islands.

1. **CASUARINA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 402.

Characters as for the Order.

1. **C. equisetifolia**, Linn. *Amæn. Acad.* iv. 143. A tall tree with brown smooth much cracked bark. Branches horizontal, drooping at their apices; branchlets filiform, resembling a slender *Equisetum*, 6-8-ribbed, the ribs of one internode alternate with those of the next, ashy-grey; scales verticillate, $\frac{1}{2}$ lin. long, narrowly lanceolate, brown in the upper part. Male spikes numerous, slender, 1-1 $\frac{1}{2}$ in. long; bracteoles oblong, obtuse, scarious, $\frac{1}{2}$ lin. long. Perianth-segments about as long as the bracteoles, concave, obtuse, scarious. Filament nearly 1 lin. long; anther-lobes shortly elliptic, pointed at the base. Female spikes on short lateral branches, subglobose, about 6 lin. in diam. in fruit, valves pubescent on the back, strongly ribbed round the edge.—Forst. Char. Gen. 103, fig. 52; Miq. in DC. Prodr. xvi. ii. 338, and Rev. Crit. Casuar. 43, t. 5; Seem. Fl. Vit. 263;

Benth. Fl. Austral. vi. 197 ; Hook. f. Fl. Brit. Ind. v. 598 ; Engl. Pfl. Ost-Afr. A. 4, B. 289, C. 159 ; Knuth, Blütenbiol. iii. 219, fig. 39 ; Engl. Pflanzenfam. iii. i. 17, fig. 15. *C. africana*, Lour. Fl. Cochinch. ed. 1, ii. 670, ed. 2, 549.

Mozamb. Distr. German East Africa : Dar-es-Salaam, *Hildebrandt*, 1234 ! Usambara ; Derema, *Scheffler*, 182 ! Rovuma Bay, *Kirk* ! Portuguese East Africa : Namiqua Island, *Speke* ! *Hutton* ! Mafinale, *Forbes* ; Gazaland, *Swynerton* !

Also on the east side of the Bay of Bengal, the Malay Islands, north of Australia and the Pacific Islands. Cultivated specimens have been seen from " St. Ludovici " Island, Sengal, *Brunner*, 167, and Aburi, Gold Coast, *Johnson*, 792.

ORDER CXXVI. SALICINÆ.

(By S. A. SKAN.)

Flowers diœcious, one under each bract, in cylindric catkins or more rarely in racemes, ebracteolate. Perianth 0. Disc of 2 gland-like scales, one posterior, the other anterior, or one only and then posterior, sometimes cup-shaped, obliquely truncate, crenate or variously lobed. Male flowers : Stamens 2 to many ; filaments free or connate ; anthers ovate or oblong, affixed at the base or at the back near the base ; cells 2, distinct, parallel, dehiscing longitudinally ; rudiment of the ovary 0. Female flowers : Ovary sessile or shortly stalked, 1-celled ; placentas 2-4, parietal ; style short or 0 ; stigmas 2-4, rather thick, emarginate or 2-fid and lobed ; ovules 2 to many, in 2 to many series, ascending, anatropous. Capsule ovoid or lanceolate, 2-4-valved. Seeds few or many, small or minute, each with numerous long silky hairs arising from the funicle ; testa very thin ; albumen 0 ; cotyledons plano-convex ; radicle short, inferior.—Trees or shrubs. Leaves alternate, entire, toothed or sometimes lobed, nearly always deciduous ; stipules free, small, scale-like and deciduous or larger, leafy, and persistent. Flowers in catkins. Catkins axillary and sessile or terminating short branches, appearing before or with the leaves, pendulous or erect, often silky-villous. Bracts membranous, caducous or sometimes in the female catkins persisting till the ripening of the fruits.

Genera 2 ; species about 210, widely dispersed in the Arctic, Temperate and Tropical Regions of both hemispheres, most frequent in Europe, Temperate Asia and North America, usually on the banks of streams or in moist places.

Leaves usually narrow. Disc of 1 or 2 small distinct

glands 1. SALIX.

Leaves usually broad. Disc cupshaped or annular 2. POPULUS.

1. SALIX, Linn.; Benth. et Hook. f. Gen. Pl. iii. 411.

Flowers dicecious. Disc of very small fleshy gland-like scales. Male flowers: Stamens 2-8 or sometimes up to 12; filaments filiform, free or rarely more or less connate; anthers ovate, usually small. Female flowers: Ovary sessile or shortly stalked, 1-celled; placentas 2; style often short or 0; stigmas 2, retuse or 2-fid. Ovules usually 4-8 on each placenta, 2-seriate. Capsule 2-valved. Seeds of the order.—Trees or shrubs. Leaves alternate, entire or toothed, pinnately veined, often narrow; stipules free, small and deciduous or larger leafy and persistent. Flower in catkins. Catkins usually dense and erect, axillary and sessile or terminating short branches, appearing before or with the leaves. Bracts small, entire or rarely toothed.

Species 180-190, with the distribution of the order.

Leaves lanceolate to ovate- or oblong-lanceolate, acute or acuminate, usually much more than 1 in. long; male catkins usually more than 1 in. long.

Branchlets and young leaves glabrous or only slightly pubescent, soon glabrescent.

Capsule rather broad, abruptly terminating in a very short style or with a sessile stigma; disc-glands usually much shorter than the pedicel.

Leaves usually 2-3 in. long, $\frac{1}{3}$ -1 in. broad; capsule $2\frac{1}{2}$ - $3\frac{1}{2}$ lin. long 1. *S. Safsaf.*

Leaves usually $\frac{3}{4}$ - $1\frac{1}{4}$ in. long and $1\frac{1}{2}$ -3 lin. broad; capsule $1\frac{1}{2}$ - $2\frac{1}{2}$ lin. long 2. *S. capensis.*

Capsule (immature) narrow, gradually attenuated into a style about $\frac{3}{8}$ lin. long; disc-glands about as long as the pedicel... .. 3. *S. Hutchinsii.*

Branchlets and young leaves and often the adult leaves more or less conspicuously pubescent.

Leaves ovate-lanceolate to lanceolate, acute to shortly acuminate, 2-3 in. (rarely up to 4 in.) long; fruiting catkins less than 2 in. long; capsule scarcely beaked.

Capsule narrowly ovoid, nearly 4 lin. long; leaves prominently reticulated 4. *S. Chevalieri.*

Capsule broadly ovoid, 2-3 lin. long; leaves not or only faintly reticulated.

Leaves lanceolate, 4-9 lin. broad, soon glabrescent or nearly so; style nearly $\frac{1}{4}$ lin. long 5. *S. nigrica.*

Leaves ovate-lanceolate to broadly lanceolate, 7-12 lin. broad, more or less densely grey-pubescent even when mature; style 0 6. *S. Muricii.*

Leaves oblong-lanceolate, long-acuminate, up to 5 in. long, $1-1\frac{3}{4}$ in. broad; fruiting catkins

up to $2\frac{1}{2}$ in. long; capsule distinctly
beaked 7. *S. Schweinfurthii*.

Leaves elliptic or elliptic-ovate, broadly rounded at
the apex, not more than 1 in. long; male catkins
 $\frac{1}{2}$ – $\frac{3}{4}$ in. long 8. *S. coluteoides*.

1. **S. Safsaf**, *Forsk. Fl. Ægypt.-Arab.* lxxvi. Tree up to 30 ft. high or more, with the habit of *S. alba*; branchlets glabrous, or villous when young, brown or reddish-brown. Leaves lanceolate, acute to long-acuminate at the apex, cuneate at the base, more or less serrulate, especially towards the apex, or almost entire, often furnished with glands at the base, 1–4 in. (usually 2–3 in.) long, $\frac{1}{3}$ –1 in. broad, quite glabrous or sometimes villous when young, light green above, paler beneath and sometimes glaucescent; petiole 1–6 lin. long, often reddish, glabrous or sometimes more or less pubescent; stipules semi-cordate, up to 2 lin. long, often minute or wanting, glandular denticulate and sometimes with prominent glands on the sides. Catkins appearing with the leaves, pedunculate. Peduncle $\frac{1}{2}$ – $2\frac{1}{2}$ in. long, bearing a few usually oblanceolate apiculate leaves smaller than the ordinary leaves. Male catkins cylindric, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long; rhachis sparingly pubescent. Bracts ovate to ovate-orbicular, and 1– $1\frac{1}{3}$ lin. long, $\frac{3}{4}$ –1 lin. broad, obtuse to acuminate, concave, villous inside, sparingly villous to nearly glabrous outside. Disc-glands forming a somewhat irregular cup around the base of the stamens, about $\frac{1}{4}$ lin. long, or the anterior suborbicular about $\frac{1}{3}$ lin. across and the posterior rather smaller and 2-lobed. Stamens 6–7 or more; filaments shortly villous on the lower part. Female catkins (in fruit) $1\frac{1}{4}$ –2 in. long; rhachis sparingly and shortly pubescent or nearly glabrous. Bracts ovate or broadly ovate, about 1 lin. long and broad, rounded or subacute, scurfy. Disc-glands forming a thick more or less irregular cup surrounding the base of the pedicel, $\frac{1}{4}$ – $\frac{1}{3}$ lin. long. Pedicels $\frac{1}{3}$ – $1\frac{3}{4}$ lin. long, glabrous or sometimes villous at the base. Capsule ovoid, $2\frac{1}{2}$ – $3\frac{1}{2}$ lin. long, $1\frac{1}{4}$ –2 lin. broad, rounded or sometimes narrowed at the base, glabrous.—Trautv. *Salicetum*, 6, t. 2; Anderss. in *Vet.-Akad. Handl. Stockh.* vi. (1867), no. 1, 10, and in *DC. Prodr.* xvi. ii. 196 (incl. var. *nilotica*, Anderss.); Solms in *Schweinf. Beitr. Fl. Aethiop.* 187; Oliv. in *Trans. Linn. Soc.* xxix. 151; Boiss. *Fl. Or.* iv. 1183; Engl. *Hochgebirgsfl. Trop. Afr.* 189; Muschler, *Man. Fl. Egypt.* i. 242. *S. subserrata*, Willd. *Sp. Pl.* iv. 671; Poir. *Encycl.*, Suppl. v. 58; Hiern in *Cat. Afr. Pl. Welw.* i. 1030. *S. octandra*, Sieb. ex A. Rich. *Tent. Fl. Abyss.* ii. 276. *S. aegyptiaca*, T. Thoms. in *Speke. Nile, Append.* 647; not of Linn. *S. huillensis*, Seemen in *Engl. Jahrb. xxiii. Beibl.* 57, 45, and xxx. 291; Warb. in *Baum, Kunene-Samb. Exped.* 219.

Nile Land. Upper Egypt: banks of the Nile at Abou-Farouh, *Kralik*! Nubia: banks of the Nile near Amada, *Kralik*! Gherrî Pass, N. Lat. 16°, *Grant*! El Korehr and near Ibrim and Tingur, *Ehrenberg*; Abyssinia:

banks of the Tacazze River, *Schimper*, 700; Gageros, *Schimper*, 106; Bege-meder; near Gafat, *Steudner*, 1344! 1345; Semmar, *Duke of Württemberg*.

Lower Guinea. Angola: Bumbo; at the base of the Chella Mountains, *Welwitsch*, 6334! at a stream in Chão da Xella, *Welwitsch*, 6332b! Loanda; district of Malange, *Gossweiler*, 1102! Mossamedes; banks of the Kakulovar River, near N'jambi, *Pearson*, 2011! between Matukua and Ediva, at about 3800 ft., *Baum*, 969! Huilla, *Antunes*, 99; at the banks of rivers and streams about Lopollo, Monino and the Iwantala lake, *Welwitsch*, 6332! 6333!

Mozamb. Distr. German East Africa: Northern Kinga (Livingstone) Mountains; Ussangu, *Goetze*, 999!

Also in Lower Egypt, Syria and Palestine.

Var. *cyathipoda*, *Anderss.* in *Vet.-Akad. Handl. Stockh.* vi. (1867) no. 1, 10, and in *DC. Prodr.* xvi. ii. 196. Capsule usually smaller, ellipsoid or ovoid-ellipsoid, narrower or sometimes acute at the base.—*Engl. Hochgebirgsh. Trop. Afr.* 189; *Seemen* in *Engl. Jahrb.* xxviii. 375; *Pirota* in *Ann. Istit. Bot. Roma*, viii. 255. *S. blumhardtiana*, *Schimp.* ex *Hochst.* in *Flora*, xxiv. (1841) i. *Intell.* 21. *S. cyathipoda*, *Anderss.* in *A. Rich. Tent. Fl. Abyss.* ii. 275. *S. arillaris*, *Anderss.* l.c. *S. Salsaf*, forma *abyssinica*, *Anderss.* in *Vet.-Akad. Handl. Stockh.* vi. (1867) no. 1, 11.

Nile Land. Eritrea: Amasen and Az Tackesan, *Terracciano & Pappi*, 433, 2115. Abyssinia: Gondar, *Schimper*! on rivulets near Assai, *Quartin-Dillon*; Wojerat, *Petit*; Tigre; near Adowa, *Schimper*, 625; Mount Sholoda; *Schimper*, 250! Urahut; on Mount Errareta, *Schimper*, 623; and without precise locality, *Schimper*, 13!

Mozamb. Distr. German East Africa: Uchehe; Iringa, *Goetze*, 648. Rhodesia: River Kafulafuta, at 4000 ft., *Rogers*, 8312! Batoka Highlands, at 3000 ft., *Kirk*! Victoria, *Munro*, 334!

S. nigritina, *Seemen* in *Engl. Jahrb.* xxiii. *Beibl.* 57. 46, from Huilla (*Newton*, 178), and *S. ramiflora*, *Seemen*, l.c. 45, also from Huilla (*Antunes*, 93), of which I have not seen specimens, are probably referable to *S. Salsaf*, *Forsk.* There is nothing in the descriptions by which they may be distinguished from that species.

2. S. capensis, *Thunb. Fl. Cap.* i. 139, and *ed. Schult.* 31. Shrub or tree up to 50 ft. high or more, very much branched: branchlets very slender, sometimes more or less pubescent when young, quite glabrous often shining and reddish to dark brown when older. Leaves narrowly lanceolate or lanceolate, rarely broadly lanceolate, acute to acuminate at the apex, more or less cuneate at the base, entire or closely or remotely serrulate, usually $\frac{3}{4}$ –1 $\frac{1}{4}$ in. rarely up to 2 in. long, $1\frac{1}{2}$ –3 lin. rarely up to 6 lin. broad, often thin, becoming more or less coriaceous, glabrous or sometimes slightly pubescent when young, green on both sides or green above and glaucous beneath; petiole $\frac{1}{2}$ –2 lin. long; stipules minute or wanting. Catkins appearing with the leaves, terminating very short peduncles which bear 1–5 shortly stalked or sessile leaves similar to the others but usually smaller. Male catkins narrowly cylindrical, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long. Bracts ovate to elliptic or suborbicular, $\frac{3}{4}$ –1 lin. long, $\frac{2}{3}$ – $\frac{3}{4}$ lin. broad, more or less villous inside, villous or glabrous except at the base or sometimes nearly quite glabrous outside. Disc-glands fleshy, scarcely $\frac{1}{4}$ lin. long. Stamens 4–8 (usually 5 or 6); filaments villous below the middle. Female catkins cylindrical or ovoid, $\frac{1}{3}$ –1 in. long; rhachis

glabrous to densely villous. Bracts as in the male, soon deciduous. Disc-gland cup-shaped, nearly or quite surrounding the pedicel, about $\frac{1}{4}$ lin. long. Pedicel $\frac{1}{2}$ – $1\frac{1}{4}$ lin. long. Ovary narrowly ovoid, 1 – $1\frac{3}{4}$ lin. long, glabrous; style very short or 0. Capsule ovoid, $1\frac{1}{2}$ – $2\frac{1}{2}$ lin. long.—Fries in Öfvers. Vet. Akad. Förhandl. Stockh. xxiii. (1856) 121; Anderss. in Vet. Akad. Handl. Stockh. vi. (1867) no. 1, 13. t. 1, fig. 11, and in DC. Prodr. xvi. ii. 197; Gibbs in Journ. Linn. Soc. xxxvii. 471.

Mozamb. Distr. Rhodesia: Matopo Hills, on the banks of the Malami River, *Gibbs*, 21! Victoria, *Monro*, 2053!

Also in South Africa.

3. **S. Hutchinsii**, *Skan*. Young branches at first very sparingly pubescent, soon glabrescent, purplish-brown. Leaves petiolate, narrowly lanceolate or oblanceolate, acute or acuminate at the apex, attenuate at the base, entire or sometimes minutely serrulate, 1 – $2\frac{1}{2}$ in. long, 3–5 lin. broad, thin, glabrous, green above, markedly glaucous beneath; petiole 1 – $2\frac{1}{2}$ lin. long, glabrous or very sparingly pubescent; stipules minute. Male catkins wanting. Female catkins $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, lax, terminating short leafy peduncles: rhachis grey-villous. Bracts broadly ovate, obtuse or subacute, 1 lin. long, nearly 1 lin. broad at the base, membranous, densely villous especially on the margin, glabrescent at the apex outside, quickly deciduous. Disc-glands 1 and posterior, half-surrounding the pedicel, or 2 and lateral, large and fleshy, quite or nearly quite as long as the pedicel. Pedicel about $\frac{1}{2}$ lin. long, thick, glabrous. Ovary narrowly ovoid, $1\frac{1}{2}$ – $1\frac{3}{4}$ lin. long, glabrous, tapering to a distinct style about $\frac{1}{3}$ lin. long; stigma of 2 short thick rounded spreading lobes. Capsule (immature) narrowly ovoid-ellipsoid, $2\frac{1}{4}$ – $2\frac{1}{2}$ lin. long, $1\frac{1}{3}$ – $1\frac{2}{3}$ lin. broad.

Nile Land. British East Africa: banks of the River Nyiro, *Hutchins!* at 6000–6500 fr., *Battiscombe*, 29!

4. **S. Chevalieri**, *Seemen in Fedde. Repert. Nov. Sp.* v. 133. Branchlets slender, dirty brown, the younger pale grey, almost villous. Leaves shortly petiolate, lanceolate, sharply acuminate, acute or obtuse at the base, minutely serrulate, up to $2\frac{1}{4}$ in. long, and $\frac{1}{2}$ in. broad, dark green somewhat shining and silky-hairy when young above, grey-green and shortly and densely hairy beneath, later glabrescent on both sides, rather rigid; veins closely reticulated, prominent on both sides; petiole up to $2\frac{1}{2}$ lin. long. Catkins appearing with the leaves, terminating short peduncles bearing several oblong or lanceolate leaves 5–12 lin. long. Male catkins cylindric, 8–11 lin. long, 3–4 lin. thick, densely flowered; rhachis densely villous. Bracts elliptic, scarcely 1 lin. long, obtuse, densely whitish-villous. Disc-glands flattened, entire or lobed, about $\frac{1}{4}$ lin. long. Stamens 8–10; filaments villous at the base. Female catkins

erect, cylindric or ellipsoid, up to $1\frac{1}{2}$ in. long and 7 lin. broad, densely flowered; rhachis densely villous. Bracts oblong, rather acute, narrowed at the base, membranous, thinly grey-pubescent, one-third as long as the capsule. Pedicel glabrous, half as long as the ovary. Disc-glands 2, posterior and anterior, broadly ovate, acute or split, one-third as long as the pedicel. Ovary conical-attenuated from an ovoid base, glabrous; style almost 0; stigmas short, divaricate, capitate. Capsule narrowly ovoid, nearly 4 lin. long, $1\frac{1}{2}$ lin. broad at the base.

Upper Guinea. French Soudan: between Dialiba and Sangana, *Chevalier*, 262! Kéniégué, *Chevalier*, 271! Mande Country; between Nyamina and Segou, *Chevalier*, 2666!

5. *S. nigerica*, *Skan*. Branchlets terete, the younger silky-hairy, the older reddish-brown and glabrous. Leaves lanceolate, acute or acuminate at the apex, rounded to cuneate at the base, remotely and minutely serrulate or entire, $1\frac{1}{2}$ –3 in. long, $\frac{1}{3}$ – $\frac{3}{4}$ in. broad, more or less silky-hairy when young, finally glabrous and leathery; petiole 1– $2\frac{1}{2}$ lin. long, puberulous or glabrous; stipules wanting. Catkins appearing with the leaves; rhachis densely villous. Peduncle $\frac{1}{2}$ – $\frac{3}{4}$ in. long, villous, bearing a few elliptic-lanceolate shortly petiolate leaves rounded or apiculate at the apex, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, $1\frac{1}{2}$ –4 lin. broad, more or less silky-hairy. Male catkins cylindric, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, $2\frac{1}{2}$ –3 lin. broad, densely flowered. Bracts suborbicular or obovate, nearly 1 lin. long, $\frac{3}{4}$ lin. broad, rounded at the apex, villous. Disc-glands anterior, subcylindric, up to $\frac{1}{3}$ lin. long. Stamens up to 11 or more; filaments densely villous on the lower part. Female catkins up to 14 lin. long when in fruit. Bracts as in the male, quickly deciduous. Pedicel scarcely $\frac{1}{2}$ lin. long, villous. Disc-glands forming a lobed cup surrounding and nearly as long as the pedicel. Capsule broadly ovoid, $2\frac{3}{4}$ –3 lin. long, $1\frac{1}{2}$ – $1\frac{3}{4}$ lin. broad, minutely lepidote, sometimes sparingly silky-hairy; style nearly $\frac{1}{4}$ lin. long; stigmas 2-lobed.

Upper Guinea. Northern Nigeria: Katagum District; on banks of streams, *Dalziel*, 220! Lake Chad to Bornu, *Talbot*, 1493!

Dalziel's no. 199, from the banks of the Benue River at Yola, has male catkins only and these are more slender than those in his no. 220 and have narrower sparingly woolly or nearly glabrous bracts, while the flowers have only 5 to 8 stamens. The leaves present on the short catkin-bearing branchlets are narrower and longer. It is possibly a distinct species, but the material is inadequate for a complete description. Its Hausa name is "*ba ruana*."

6. *S. Murielii*, *Skan*. Branchlets terete, the younger densely grey-villous, the older glabrous and brown. Leaves ovate-lanceolate to broadly lanceolate, acute to acuminate at the apex, rounded to somewhat cuneate or sometimes slightly cordate at the base, entire, $1\frac{1}{2}$ –3 in. long, 7–12 lin. broad, densely grey-silky hairy on both sides when young, less densely hairy when mature; petiole 1– $3\frac{1}{2}$ lin. long,

densely and shortly grey-villous; stipules obliquely ovate, 2-4½ lin. long, more or less glandular-denticulate, sometimes with glandular papillæ on the upper surface, sometimes very small or wanting. Catkins appearing with the leaves. Male catkins cylindric, 1-3 in. long, 3½-4 lin. thick, very densely flowered; rhachis villous. Peduncle up to ¾ in. long, villous, bearing several obovate or elliptic shortly petiolate leaves 4-8 lin. long and 2-3 lin. broad, rounded and apiculate or acute at the apex. Bracts elliptic, obovate or ovate, 1-1½ lin. long, ⅔-1 lin. broad, obtuse or rounded at the apex, densely covered with white woolly hairs. Disc-glands up to ⅓ lin. long, broad and flattened, entire, toothed or deeply lobed. Stamens 6-12; filaments densely covered on the lower part with white woolly hairs. Female catkins 1½-2 in. long when in fruit; rhachis villous. Peduncle ¾-1¼ in. long, bearing several elliptic-lanceolate apiculate leaves up to 1½ in. long and 7 lin. broad. Bracts elliptic, 1½ lin. long, ⅔ lin. broad, obtuse, densely villous, quickly deciduous. Pedicel ½-¾ lin. long, villous. Disc-glands forming an irregular toothed or lobed cup one-quarter to one-half as long as the pedicel which it surrounds. Capsule broadly ovoid, 2-2¾ lin. long, 1¼-1⅔ lin. broad, glabrous or sometimes rather densely villous; style 0; stigmas small, slightly lobed.—*S. Safsaf*, Forsk., var. *hirta*, Anderss. in Vet.-Akad. Handl. Stockh. vi. (1867) no. 1, 12, and in DC. Prodr. xvi. ii. 197.

Nile Land. Without precise locality, *Subbutier*. Nubia; near Khartoum, *Schweinfurth*, 866! between Berber and Khartoum, *Schweinfurth*, 511! Sennar; common on the Blue Nile, *Muriel*, S18! S19! north of the mouth of the River Dinder, *Brown*!

7. **S. Schweinfurthii**, *Skan*. Young branches at first densely grey-tomentose, finally brown and glabrous. Leaves petiolate, oblong-lanceolate, long-acuminate, rounded at the base, serrulate, up to 5 in. long, 1-1¾ in. broad, at first densely villous on both sides, later glabrescent, rather thin; midrib conspicuous, flat above, prominent beneath; lateral veins numerous, conspicuous but fine; petiole 4-7 lin. long, more or less villous or glabrescent; stipules semi-cordate, rounded or acute, 2-8 lin. long, sometimes minute or wanting, glandular-denticulate and sometimes with prominent glands on the sides. Male catkins wanting. Female catkins (in fruit) pedunculate, 1-2½ in. long; rhachis villous. Peduncle villous, ½-1 in. long, bearing a few lanceolate leaves ¾-1½ in. long and 2-6 lin. broad. Bracts wanting. Disc-glands ¼-½ lin. long, forming an irregular lobed cup. Pedicel nearly 1 lin. long, glabrous. Capsule ovoid, contracted above the middle into a beak, 2-2½ lin. long, 1¼-1½ lin. broad about the middle, glabrous; stigmas almost sessile, very shortly 2-lobed.

Nile Land. Nubia: Khartoum, *Schweinfurth*, 870! Kordofan, *Kotschy*, 439!

Kotschy's no. 436, also from Kordofan, probably belongs to this species, but differs in having much smaller leaves. Like his no. 439 it bears no catkins.

Solms (in Schweinf. Beitr. Fl. Aethiop. 187) mentioned under the name of *S. nilicola* a willow with long acute toothed leaves and very long catkins of which specimens were collected by Ehrenberg in Dongola. It is possible that it is the same as *S. Schweinfurthii*.

8. *S. coluteoides*, Mirb. in Mém. Mus. Par. xiv. 462, t. 20. Tree or shrub; branches slender, reddish-brown, glabrous. Leaves petiolate, elliptic, entire, mucronate, obtuse or rounded at the apex, cuneate at the base, the larger $\frac{3}{4}$ –1 in. long and 4–5 lin. broad, thin, glabrous, somewhat glaucous beneath, faintly veined; petiole $\frac{3}{4}$ –2 lin. long; stipules minute. Male catkins appearing with the leaves, terminating slender leafy peduncles or branches $\frac{1}{2}$ to nearly 2 in. long, cylindrical, $\frac{1}{3}$ –1 in. long, rather few-flowered, somewhat interrupted at the base; rachis pubescent. Bracts deeply concave, suborbicular, $\frac{3}{4}$ –1 lin. long and broad, obtuse or rounded at the apex, purplish or rose-coloured, sparingly pubescent. Disc-glands fleshy, $\frac{1}{4}$ – $\frac{1}{3}$ lin. long, both posterior and anterior divided into 2 or 3 cylindrical or flattened bodies. Stamens 5–11; anthers large; filaments very densely clothed in the lower part with long woolly whitish hairs. Female catkins? Ovary pedicellate, glabrous, ovoid; pedicel scarcely longer than the disc-gland; style short; stigmas thick, undivided. Capsule less than 1 lin. long.—Trautv. Salicetum, 16. *S. senegalensis*, Mert. ex Anderss. in Vet.-Akad. Handl. Stockh. vi. (1867) no. 1, 12, t. 1, fig. 10, and in DC. Prodr. xvii. ii. 197; Seemen in Fedde, Repert. Nov. Sp. v. 133.

Upper Guinea. Senegal, *Perrotet*; on the banks of the Senegal River at Dagana, *Roger*! Lower Senegal and Cayor; Mbohou, *Chevalier*, 2667!

Imperfectly known species.

9. *S. adamauensis*, Seemen in Engl. Jahrb. xlv. 205. Shrub 6–13 ft. high; branches erect; bark of the older branchlets red-brown; younger branchlets grey-brown, shortly grey silky-hairy. Leaves shortly petiolate, lanceolate and long-acuminate or the lower oblong or oblong-lanceolate and shortly acuminate, all acute at the base, entire, up to 4 in. long, 10 lin. broad, pale green above, glaucous beneath, the younger shortly grey silky-hairy, the older glabrous; petiole up to $\frac{1}{3}$ in. long. Male catkins appearing with the leaves, pedunculate, erect, cylindrical, $1\frac{1}{4}$ in. long, $2\frac{1}{2}$ lin. thick, rather loosely flowered; rachis at first shortly grey-hairy, afterwards glabrous. Peduncle up to 5 lin. long, bearing a few small lanceolate leaves. Flowers recurved. Bracts ovate, straw-coloured, whitish-woolly on the margin. Disc-glands 2, narrowly ellipsoid, obliquely acute or emarginate at the apex, about one-third as long as the bracts.

Stamens 4-6, mostly 5; filaments densely whitish-woolly at the base. Female catkins not known.

Upper Guinea. Cameroons: Adamaua District, 4100 ft., *Ledermann*, 2613.

10. *S. kamerunensis*, *Seemen in Engl. Jahrb.* xlv. 205. Shrub 10-13 ft. high; bark of the older branchlets grey-brown; young branchlets red, somewhat shortly silky-hairy. Leaves shortly petiolate, lanceolate or narrowly lanceolate, acute or long-acuminate, acute at the base, up to 3 in. long and $\frac{1}{2}$ in. broad, sharply serrulate, grass-green above, paler beneath, slightly silky-hairy when young, afterwards glabrous. Male catkins appearing with the leaves, pedunculate, erect, cylindric, up to 2 in. long, $\frac{3}{4}$ in. thick, loosely flowered at the base; rhachis densely tomentose. Peduncle up to $2\frac{3}{4}$ in. long, erect, densely and shortly tomentose, bearing small lanceolate leaves. Bracts ovate, rather obtuse, straw-coloured, veined, densely tomentose on the margin. Disc-glands 2, broadly elliptic, the anterior faintly and unequally toothed at the apex, the posterior more deeply incised, both one-third as long as the bracts. Stamens 6-7, twice as long as the bracts; filaments densely and long whitish-woolly at the base. Female catkins not known.

Upper Guinea. Cameroons: Bambutto Mountains at about 6000 ft., *Ledermann*, 1751.

11. *S. Ledermannii*, *Seemen in Engl. Jahrb.* xlv. 204. Tree 12-40 ft. high; branchlets dark brown, the younger shortly grey-tomentose, the older glabrous. Leaves petiolate, lanceolate, oblong-lanceolate or oblong, acute at the apex and base or shortly acuminate at the apex, entire, up to $2\frac{3}{4}$ in. long and $\frac{2}{3}$ in. broad, pale green above, greenish-white beneath, shortly hairy when young, afterwards glabrous; petiole up to $2\frac{1}{2}$ lin. long; stipules small, obliquely ovate, serrate. Catkins appearing with the leaves. Male catkins pedunculate, erect, cylindric, up to $1\frac{1}{4}$ in. long, $2\frac{1}{2}$ lin. thick, densely flowered; rhachis densely grey-tomentose. Peduncle up to 5 lin. long, densely and shortly grey-hairy, bearing some small leaves. Bracts broadly elliptic, rounded at the apex, yellow-brown, densely grey-tomentose. Disc-glands 2, posterior and anterior, broadly elliptic, toothed at the apex, about half as long as the bracts. Stamens 8-9; filaments densely woolly at the base. Female catkins pedunculate, erect, cylindric, up to $1\frac{1}{4}$ in. long, $3\frac{1}{2}$ lin. thick, somewhat loosely flowered, rhachis densely and shortly grey-tomentose. Peduncle up to $1\frac{1}{4}$ in. long, leafy. Bracts as in the male catkins. Pedicel one-third as long as the ovary. Disc-glands 2, posterior and anterior, almost as long as the pedicel. Ovary conical, obtuse, glabrous; style short, thick, a quarter as long as the ovary; stigmas elliptic, thick, laterally curved, emarginate.

Upper Guinea. Cameroons: Bambutto Mountains, at about 6500 ft., *Ledermann*, 1610, 1646.

2. **POPULUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 412.

Flowers diœcious. Disc more or less cupshaped, often oblique, entire, toothed or irregularly lobed, fleshy or membranous. Male flowers: Stamens 4-30; filaments filiform, free; anthers often rather large. Female flowers: Ovary sessile inside the disc; placentas 2-3, more rarely 4; style short, with as many branches as the placentas, entire or 2-fid; ovules many or often very many on each placenta, 2-∞-seriate. Capsule 2-3-valved, more rarely 4-valved. Seeds of the order.—Trees with terete or angular branchlets; buds scaly, often resinous. Leaves alternate, usually broad, pinnately veined and 3-nerved at the base, entire, toothed or lobed; stipules narrow, membranous, deciduous. Flowers in loose catkins, usually shortly pedicellate in both sexes. Catkins usually more or less pendulous, appearing before or rarely with the leaves. Bracts often contracted into a stalk, dilated, toothed or ciliate-fimbriate at the apex, not rarely very fugacious.

Species 30 to 40, or according to some authorities over 120, in Europe, Northern and Temperate Asia, North and East Tropical Africa, and North America southwards to Northern Mexico and Lower California.

1. **P. Denhardtiorum**, Dode in Bull. Soc. Dendr. France, 1909, 152. A deciduous tree, 60-80 ft. high; branchlets at first shortly grey-pubescent, soon glabrous; buds ovoid, glabrous, resinous. Leaves ovate or elliptic, sometimes ovate-lanceolate or suborbicular, acute or broadly rounded at the apex, cuneate to truncate at the base, coarsely and acutely few-toothed, $1\frac{1}{4}$ -2 in. or rarely up to $3\frac{1}{2}$ in. long, usually $1-1\frac{1}{4}$ in. broad, pubescent when young, soon glabrous, coriaceous, somewhat glaucous, furnished with 2 glands at the base; petiole slender, $\frac{3}{4}-1\frac{1}{2}$ in. long, soon glabrescent; stipules linear-filiform, $1\frac{1}{2}$ lin. long, quickly deciduous. Male catkins arising from the previous year's branches, leafless at the base, $7\frac{1}{2}-10$ lin. long, 8-10-flowered; rhachis slender, somewhat pilose; bracts spatulate-cuneate, unequally toothed above, $1\frac{1}{2}-2$ lin. long, membranous, quickly deciduous; pedicels 1 lin. long. Disc membranous, deeply laciniate. Stamens about 30. Female catkins terminating short 1-3-leaved shoots arising from the previous year's branches, $\frac{3}{4}-1$ in. long, 4-14-flowered, lax, at first pubescent on rhachis and pedicels, finally glabrous; bracts obovate or spatulate, toothed, up to 3 lin. long, membranous, deciduous; pedicels $1\frac{1}{2}-2$ lin. long. Disc 2-3-partite or divided into filiform segments. Ovary sessile on the disc, ovoid, $1\frac{1}{2}-1\frac{3}{4}$ lin. long, densely grey-tomentose. Style $\frac{1}{2}-\frac{3}{4}$ lin. long. Stigmas up to $3\frac{1}{2}$ lin. long, deeply 2-fid; lobes 2-3-toothed or -lobed. Capsule ovoid, rounded at the base, subacute, 3-6 lin. long, verruculose, shortly pubescent, 2-4-valved.—Stapf in Hook. Ic. Pl. t. 3050. *P. euphratica*, subsp. *Denhardtiorum*, Engl.

in Notizbl. Kön. Bot. Gart. Berlin, ii. 217, in Sitzungsber. Preuss. Akad. Wiss. 1904, 369, and in Engl. Jahrb. xxxvi. 252; Aschers. in Ber. Deutsch. Bot. Gesellsch. xxvii. 360.

Nile Land. British East Africa: along the Tana River, from 1500 ft. to sea-level, *Battiscombe*, 207! Korokoro, *Thomas*; Witu, *Thomas*, 49! on the banks of the Athi and Tsavo Rivers, *Hildebrandt*, 2608!

ORDER CXXVII. CERATOPHYLLÆ.

(By S. A. SKÅN.)

Flowers monœcious. Perianth thinly herbaceous or submembranous, equal; segments 6-12, subvalvate, often toothed or lacerated at the apex. Male: Stamens 10-20, crowded on a flat or convex torus; filaments very short; anthers linear-oblong, equalling the perianth; cells 2, linear, parallel, adnate, dehiscing longitudinally; connective produced beyond the cells into a thick coloured usually 2- or 3-toothed appendage. Female: Ovary 1, sessile, ovoid, 1-celled; style terminal, linear-subulate, persistent; stigma unilateral; ovule 1, pendulous, anatropous. Fruit 1-seeded, leathery, indehiscent, ovoid or ellipsoid, somewhat compressed, tipped with the hardened style, sometimes with 2-4 spreading or reflexed spines at the base, wingless or surrounded by a narrow or broad leathery toothed wing, smooth or tuberculate. Seed pendulous; testa membranous; albumen 0; embryo straight, with oblong rather thick equal cotyledons; radicle very short; plumule large, many-leaved.—Aquatic herbs with elongated leafy floating branches. Leaves verticillate, 2-fid or dichotomously divided; segments linear or filiform, somewhat rigid, usually toothed. Flowers axillary, solitary, very small, sessile, the male and female alternating at the nodes, or male at the lower and female at the upper.

Ceratophyllum, the only genus, includes 1 or 2, or, according to some authorities, about a dozen species, growing in fresh water in nearly all parts of the world.

1. **CERATOPHYLLUM**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 415.

Characters and distribution of the Order.

1. **C. demersum**, Linn. *Sp. Pl. ed. i.* 992. A glabrous perennial herb. Stems much-branched, floating and submerged, 2-3 ft. or

sometimes up to 8 ft. long. Leaves in whorls of 5-12, 1-3 times usually twice dichotomously divided, often about 1 in. long; segments linear to filiform, entire or more or less remotely spinulose-serrulate. Perianth-segments oblong, about $\frac{1}{2}$ lin. long. Fruit ovoid or ellipsoid, slightly compressed, about 3 lin. long, smooth or sparingly covered with minute tubercles, narrowly or broadly winged or wingless, crowned with the long slender often curved persistent style and usually bearing 2 recurved subulate or terete spines at the base.—Smith & Sowerby, Engl. Bot. xiv. t. 947; DC. Prodr. iii. 73; Guill. & Perr. Fl. Seneg. Tent. 296; Boiss. Fl. Orient. iv. 1202; Hook. f. Fl. Brit. Ind. v. 639; K. Schum. in Mart. Fl. Bras. iii. iii. 746, t. 125; Hiern in Cat. Afr. Pl. Welw. i. 1031; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 58; De Wild. Étud. Fl. Bas-et Moy. Congo, i. 122, and Miss. É. Laurent, 82; Th. & Hël. Durand, Syll. Fl. Congol. 513; Muschler, Man. Fl. Egypt, i. 363. *C. demersum*, var. *oxyacanthum*, K. Schum. in Engl. Pfl. Ost-Afr. C. 178. *C. oxyacanthum*, Cham. in Linnæa, iv. 504, t. 5, fig. 6b. *C. cristatum*, Guill. & Perr. Fl. Seneg. Tent. 296. *C. vulgare*, Schleid. in Linnæa, xi. 540, t. 11; Hook. Niger Fl. 525. *Ceratophyllum sp.*, Oliv. in Trans. Linn. Soc. xxix. 150.

Upper Guinea. Senegal, (fruiting) *Perrottet*! Lagos: Cradu Lake, *Barter*, 3242!

Nile Land. Eritrea: Asmara, at 7500 ft., *Schweinfurth & Riva*, 2108! Abyssinia: Begemeder; Lake Tana, *Schimper*, 1362! Sudan: Sennar, *Kotschy*, 285! White Nile, *Petherick*! Kana, *Schweinfurth*, 968! near Gebel Memati, (fruiting) *Schweinfurth*, 1007! Bahr-el-Gebel, *Brown*, 47! mouth of the Bahr-el-Gebel, *Schweinfurth*, 1128! Sobat River, *Murid*, 53! Bahr-el-Ghazal, (fruiting) *Schweinfurth*, 1140! above the mouth of the Jur River, (fruiting) *Schweinfurth*, 1229! Uganda: Unyoro, *Speke & Grant*!

Lower Guinea. Angola: Barra do Dande; in pools at the River Dande, *Welwitsch*, 524! Barra do Bengo; Lagoa de Quifandongo, at the mouth of the River Bengo, *Welwitsch*, 525. Icolo e Bengo; Lagoa de Quilunda, *Welwitsch*, 524b! Pungo Andongo; in the River Cuije and near Sansamanda on the Cuanza, (fruiting) *Welwitsch*, 526! Mossamedes; in the fazenda "Boa Vista," (fruiting) *Gossweiler*, 55! Lower Congo: Kimuenza, *Gillet*: Stanley Pool, *Luja*. Damaraland: Kilevi near Kunene, *Schinz*, 11!

South Central. Belgian Congo: Sankuru River; Bolombo and Isaka, *Laurent*.

Mozamb. Distr. German East Africa: Usambara; Masheua, *Holst*, 3492! Portuguese East Africa: Luabo River, *Kirk*! Nyasaland: Lower Shire River, *Kirk*! *Scott*! Lake Nyasa, *Laws*! Shire Highlands, near Blantyre, (fruiting) *Last*!

Almost cosmopolitan.

Only a few of the specimens cited above have fruits and such are indicated. The specific identity of the others cannot be determined with certainty. For full synonymy see K. Schum. in Mart. Fl. Bras. iii. iii. 746.

In the work cited K. Schumann (p. 748) refers to *C. demersum*, var. *apiculatum*, Gareke, as being found in East Tropical Africa, but he neither gives any information as to localities nor cites specimens. According to his description the fruits in this variety are sometimes quite unarmed at the base, or they may be furnished with two tubercles, or with short curved or straight appendages.

ORDER CXXVIII. GNETACEÆ.

(By H. H. W. PEARSON.)

Dicæcious or monocæcious. Florets (flowers) declinous or pseudo-bisexual, few or many in axillary, rarely terminal, unisexual or bisexual spikes. Male floret (pseudo-bisexual in *Welwitschia*): Envelope formed of one pair or two decussating pairs of scales, free or united. Stamens 1-8 with the anthers sessile or subsessile on the summit of a stout central axis or (in *Welwitschia*) 6 with the filaments connate at the base around a central superior barren ovule. Female floret: Envelope an ovary-like utricule. Ovule naked, erect, orthotropous with a single integument produced into an elongated tubular micropyle and protruding through the orifice of the utricule, with or without an aril. Seed albuminous, enclosed at maturity in the hardened utricule which is either differentiated into a fleshy outer and a hard inner layer, or entirely coriaceous and sometimes (*Welwitschia*) produced laterally into 2 wings. Embryo straight with 2, rarely 3, cotyledons.—Erect or scandent virgate or leafy shrubs, trees or woody climbers or (in *Welwitschia*) a woody plant of unique form consisting of a stout tuberous hypocotyl and an early arrested depressed stem apex, with true vessels in the secondary wood, without resin canals. Foliage leaves 2 or more, rarely in whorls of 3, opposite, simple. Spikes at the time of pollination greenish or yellowish, rarely vividly coloured (*Welwitschia*). Seeds with their envelopes more or less enclosed in dry or fleshy cones or exposed and drupe-like (*Gnetum*).

Genera 3; species 50-60, mainly in the tropics and subtropics of both hemispheres.

The group as defined above covers an extremely wide range of generic characters; when these are more completely known it will perhaps be necessary to subdivide it into at least two Natural Orders.

TRIBE I. EPHEDROIDEÆ.—*Leaves usually all, or all but those of the seedling, reduced to scales. Stems longitudinally grooved or striated. Embryo not developing a "feeder" during germination.*

Only Tropical African genus 1. EPHEDRA.

TRIBE II. GNETOIDEÆ.—*Leaves large. Stems not longitudinally grooved. Embryo developing a "feeder" during germination.*

Trees, shrubs or lianes with more than one pair of foliage leaves. Pollen spherical 2. GNETUM.

Plant body mainly a much thickened woody hypocotyl with a single pair of foliage leaves. Pollen ellipsoid 3. WELWITSCHIA.

1. **EPHEDRA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 418.

Usually dicæcious. Florets unisexual. Male florets in 2-12 pairs, crowded in short rounded (rarely angular) spikes, in the axils of

opposite, sometimes whorled, free or connate bracts. Envelope of 2 median scales connate below. Anthers 8 or less, sessile or subsessile on the summit of a central column, 2- (rarely 3-) celled. Female florets in much reduced spikes with 2-4 or more pairs (or 3-nate whorls) of crowded bracts, solitary in the axils of the uppermost 2 (or 3) bracts, more rarely only one and terminal. Utricle ovoid to oblong, rarely subulate, usually plano-convex in cross-section. Ovule with 1 integument; micropylar tube (*tubillus*) produced through the mouth of the utricle, straight or spirally coiled, truncate, lobed or toothed at the apex. Seed closely invested by the leathery utricle, in the section *Pseudobaccata* enclosed in the fleshy inner bracts of the spike; endosperm fleshy; perisperm scanty; radicle erect; cotyledons 2, very narrow.—Erect or climbing, usually much branched, virgate shrubs with scale-like or rarely filiform or subulate connate leaves in alternating whorls of 2, rarely 3 or 4, sometimes reduced to sheaths. Stems slender, longitudinally grooved, green when young. Fertile shoots usually much branched in the male, less so in the female. Spikes unisexual, rarely bisexual, axillary, solitary, subsolitary or, in the male, usually aggregated in dense glomerules, near the tips of the branches.

Species 30 or more, widely distributed in Central and Western Asia, the Mediterranean Region, Atlantic Islands, Southern States of North America, the Andes from Ecuador southwards to Patagonia and the Eastern Argentine. One species only in Tropical Africa.

1. **E. Alte**, *C. A. Mey. Monogr. Gatt. Ephedra* (1846), 75, i. iii. fig. iv. A shrub, climbing high among trees, or erect, much branched. Branchlets flexuous or rigid, terete or the younger more or less 4-angled or bilateral, in the male plant usually $1\frac{1}{2}$ –2 lin. thick, in the female rarely exceeding $1\frac{1}{5}$ lin. with internodes up to $2\frac{3}{4}$ in. long or much shorter, more or less crowded in false whorls in the upper nodes. Bark glaucous or yellowish-green, scabridulous, very faintly striate. Buds terminal or lateral, minute, shortly ovate. Leaves in whorls of 2 or 3, linear-setaceous, acute, $\frac{1}{4}$ – $\frac{1}{2}$ lin. broad, $1\frac{1}{2}$ lin. long, connate at the base. Male spikes subsolitary or 2-4, crowded in glomerules, obovate or oblong, $2\frac{1}{2}$ –3 lin. long, with 4-8 pairs (rarely 3-nate whorls) of florets; peduncles very unequal in length; bracts broadly ovate or rotund, obtuse, connate from one-third to half their length, 1 lin. long. Envelope obovate, exceeding the bract; column far exserted, often black at the apex; anthers usually 4, rarely 3 or 5, sessile, closely crowded. Female spikes solitary or fasciated, clustered or racemously arranged, with 3 or 4 pairs of bracts. Florets 2 or, by abortion, 1; utricle oblong, 3-angled; micropylar tube straight. Mature spike globose, up to 3 lin. long, red, with fleshy bracts. Seeds black, ovate, obtusely 3-angled, 4 lin. long.—

Stapf, Die Arten der Gattung *Ephedra* (1889) 51, t. ii. xi. figs. 1-7.

Nile Land. Nubia: hills on the coast about 21° North Latitude, *Bent!*
Somaliland: Ahl Mountains, 5000 ft., *Hildebrandt*, 887!

Also in dry and desert regions of Syria, Palestine, Sinai, Egypt and the Mediterranean coast westwards to the Cyrenaica.

2. GNETUM, Linn.; Benth. et Hook. f. Gen. Pl. iii. 419.

Usually dioecious. Florets unisexual. Male florets: Envelope of 2 median connate scales, tubular or the posterior lobe overlapping in bud; anthers 2 or 1, sessile on the summit of a central column; pollen spherical. Female florets (perfect): utricle a close-fitting envelope contracted at the mouth, at length differentiated into a hard stony inner layer and a more or less fleshy and variously coloured outer layer, closely investing the seed; ovule with an integument and an aril; integument produced into a straight micropylar tube exerted through the orifices of the aril and utricle, truncate, toothed or fimbriate at the summit. Female florets (imperfect): like the perfect florets but without an aril, usually barren. Seed radially symmetrical; embryo developing in the fallen seed (? always); endosperm copious.—Large-leaved evergreen loosely twining lianes, or erect trees or shrubs with long smooth internodes and, in the African species, swollen nodes. Leaves opposite, petioled, net-veined. Spike with crowded or more distant nodes, terminating in a barren segment or a perfect or an imperfect female floret; bisexual, bearing at each node an upper whorl of about 8 perfect female florets and a lower whorl of about 15 male florets; or pseudobisexual, bearing at each node an upper whorl of about 8 imperfect (rarely 1 or more perfect) female florets and 4 or more basipetally developing and alternating whorls of male florets; or male, resembling the last but without female florets; or female, with a single whorl of 8 or 9 perfect female florets at each node; florets in each case more or less surrounded by jointed hairs orramenta, the whole subtended by an entire or 2-toothed cupule.

Species 15-30, in the tropical forest regions of both hemispheres. Two species in West Africa.

Internode of male spike of the same diameter throughout its length, slender in dried (or old) specimens; staminal column exerted from the mouth of the envelope. Leaves commonly less than 2 in. broad 1. *G. africanum*.

Internode of the male spike in the fresh condition much thicker at the base than higher up: staminal column hardly exerted from the mouth of the envelope. Leaves commonly more than 2 in. broad 2. *G. bucholzianum*.

1. *G. africanum*, *Welw. in Trans. Linn. Soc. xxvii. 73*. A dioecious (*Welwitsch*) liane with twining stem, remotely branched, somewhat

thickened and tumid at the nodes; branches spreading, reflexed or pendulous, opposite, sometimes in whorls of 3, glabrous; penultimate internodes 6–8 in. long; lower branches as thick as a crow's quill. Leaves opposite, sometimes in whorls of 3, shortly petioled, ovate- or elliptic-oblong, more rarely lanceolate, attenuate at the base, abruptly acuminate, obtuse or minutely apiculate, entire or obscurely subcrenate, somewhat rigid, thin, glabrous, pale green above, paler beneath, with 3–6 strongly curved lateral veins on each side, looped under the margin, prominent beneath; petiole canaliculate above, 3–5 lin. long; blade 4–5 in. long, $1\frac{1}{2}$ –2 in. broad, with an acumen $\frac{1}{4}$ – $\frac{1}{2}$ in. long. Male spike lateral or terminal on a short lateral branch, solitary, peduncled, usually (? always) unbranched, with a pair of triangular scale-like bracts on the peduncle, internodes 8–12, cylindric, very slender in dried (? or old) specimens; peduncle about $\frac{1}{2}$ in. long; rhachis 2–2 $\frac{1}{2}$ in. long; cupule very prominent in dried (? or old) specimens, with an entire, rarely 2-toothed margin; anthers 2, exserted from the 2-leaved envelope during flowering. Female spike straight or variously twisted, terminal on a short or long lateral branch, unbranched or sometimes branched, pedunculate, with a pair of triangular scale-like bracts on the peduncle, with 5–9 slightly turbinate internodes, bearing at each node a whorl of 3 or 2 perfect or aborted seeds; peduncle about $\frac{1}{2}$ in. long; rhachis $1\frac{1}{2}$ –2 in. long; internode $\frac{1}{6}$ – $\frac{1}{5}$ in. long; cupule very slightly swollen, with an entire or somewhat irregular margin. Ovule sessile in a cup-shaped depression. Mature seed $\frac{1}{2}$ – $\frac{5}{8}$ in. long, enclosed in the somewhat drupaceous orange-tinted envelope.—Rendle in Cat. Afr. Pl. Welw. ii. 257; Pearson in Ann. Bot. xxvi. 603–620, t. lx. fig. 1b. (♂ spike).

Upper Guinea. Cameroons: Abonando, *Rudatis*, 42! Bipinde, *Zenker*, 1180! 4129! 4134! 4380!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 205! Angola: Cazengo District; Golungo Alto, in dense thickets, *Welwitsch*, 1224! Serra de Alto Queta, *Welwitsch*, 1225; on the Queta range near the Montobello homestead, in dense forest, *Gossweiler*, 756! *Pearson*, 2307!

2. *G. bucholzianum*, *Engl. in Engl. Jahrb.* xl. 519. A dioecious liane. Adult branches flexuous; internodes of the penultimate branches 6 in. long, $\frac{1}{8}$ in. thick; of the younger 2–2 $\frac{1}{2}$ in. long, green, tumid at the nodes, glabrous. Petiole slender, canaliculate above, frequently twining, $\frac{1}{2}$ –3 in. long; blade oval or oblong-elliptic, obtuse or acute at the base, at the apex long-acuminate and mucronulate, entire, somewhat rigid, glabrous, pale green, paler beneath, with 4–5 ascending curved lateral veins on each side looped under the margin and prominent beneath, 3–6 in. long, $1\frac{1}{2}$ –3 $\frac{1}{4}$ in. broad with an acumen $\frac{1}{4}$ – $\frac{3}{4}$ in. long. Male spikes lateral or terminal, solitary, shortly pedunculate with a whorl of 2 or 3 triangular scale-like bracts on the peduncle, with 8–12 turbinate internodes thicker at the base than higher up; cupule cyathiform, with an entire or 2-toothed edge, much shorter than the internode; peduncle $\frac{1}{2}$ in. long; rhachis

1¼–2 in. long; internode 2½ lin. long; cupule ¾ lin. long; envelope 2-leaved, ½ lin. long; anthers 2, hardly exserted from the envelope during flowering. Female spikes lateral or terminal, shortly pedunculate, usually ¾–1 in. long, with 6 nodes, each bearing a whorl of 3 perfect female florets. Ripe seed not seen.—Pearson in Ann. Bot. xxvi. 603–620, t. lx. fig. 1, *c* & *d* (♂ spike).

Upper Guinea. Cameroons: near Abo, Yaunde, *Zenker*, 522; Johann-Albrechtshöhe, *Staudt*, 543! and without precise locality, *Zenker in Herb. Bolus*!

3. WELWITSCHIA, Hook. f.; Benth. et Hook. f. Gen. Pl. iii. 418.

Diœcious. Male (pseudohermaphrodite) floret: Envelope of 2 imbricating whorls; outer whorl of two laterally placed free boat-shaped keeled scales; inner of 2 median broadly ovate or subrotund keel-less scales, connate at the base; stamens 6, exserted; filaments connate in a very short tube at the base; anthers somewhat 3-lobed when mature, 3-celled, dehiscing by 3 slits from the summit; pollen ellipsoid, slightly coherent in irregular masses; ovule solitary, terminal, erect, orthotropous, imperfect, with the single integument produced into a tubular micropyle, sharply bent near the middle, expanding at the tip in an exserted glandular-papillose stigmatiform disc. Female flower: Utricle of 2 laterally placed connate leaves, bottle-shaped, contracted at the throat, compressed from back to front, with 2 lateral membranous wing-like expansions from the midribs; ovule solitary, terminal, erect, orthotropous, perfect, with the single integument produced into a straight micropylar tube through the mouth of the utricule; micropylar tube irregularly labiate or fimbriate, but not expanded at the apex. Seed flattened, closely invested by the winged utricule; endosperm starchy, wedge-shaped below, retuse above, supporting the withered nucellar cap (*perisperm*); radicle erect; cotyledons 2, rarely 3, narrow-linear; suspensor long, coiled, persistent.—Plant body (*hypocotyl*) woody, covered by thick corrugated cork, sometimes intricately fused with other individuals, when injured exuding a copious gummy secretion which congeals in alcohol, broadly obconic or turbinate, concave on the top, more or less circular or elliptic in horizontal section, rising ¼–1 ft. above the ground, 1–3 ft. in diam. at the top. Epicotyl reduced to 2 leaf-bearing grooves and floriferous cushions forming a raised rim round the top of the hypocotyl interrupted at the ends of the longer diameter and a depressed and early arrested stem apex, at length buried beneath 2 coalescent corky expansions (“*lateral cones*”) overlying the concave summit of the hypocotyl, developed from buds in the axils of the cotyledons. Tap-root greatly elongated, unbranched above, at length very slender, branched and brittle. Leaves 2, rarely 3, each inserted in an epicotylar groove

extending round half the raised rim of the hypocotyl, oblong, entire, usually in old plants torn into few or many strap-like segments from apex to base, thick, leathery with the main nerves parallel and distinct, growing at the base as long as the plant lives, dying at the apex, up to 4 yards long. Spikes arranged in compound dichasial cymes (rarely solitary) arising annually from pits in the floriferous cushions situated immediately above, not seldom immediately beneath each leaf. Male spike bearing 40-70 axillary flowers in 4 rows; bracts connate, lowest pair or 2 pairs barren; florets concealed by the bracts until the exertion of the anthers. Female spike bearing 40-60 florets in 4 rows; lowest 6-10 pairs of bracts increasing in size from below upwards, barren, the lowest 2 or 3 pairs connate; except the micropylar tube, the seed completely concealed by the bract at maturity.—*Tumboa*, Welw. ex Hook. in Gard. Chron. 1861, 75.

Species 1, in the South West African Coast belt.

1. *W. mirabilis*, Hook. f. in *Trans. Linn. Soc.* xxiv. 1, tt. 1-14. Characters as for the genus. —Bot. Mag. tt. 5368-9; Monteiro, Angola and Riv. Congo, ii. 228-231, t. 15; Naudin in Gard. Chron. 1882, xvii. 14, fig. 3; Eichl. in Engl. & Prantl, *Pflanzenfam.* ii. i. 123, figs. 79-82; Gürich in *Mitteil. Geogr. Gesellsch.*, Hamburg, 1891-2, 166; Baum, *Kunene-Samb. Exped.* 450, frontispiece and figs. 2-3; Kew Bulletin, 1907, 360, 412, t. 2, figs. 2-3; Pearson in *Nature*, 1907, lxxv. 536, figs. 1-3, in *Geogr. Journ.* 1910, xxxv. 494, with figs. and in Gard. Chron. 1910, xlvii. 49, suppl. illustration, Jan. 22; Henriques in Gard. Chron. 1910, xlvii. 210, fig. 90; Marloth, *The Flora of South Africa*, Pl. 21; Church in *Phil. Trans.* (B), ccv. (1914), 115 (with figures). *Tumboa Bainesii*, Hook. f. in Gard. Chron. 1861, 1008; Engl. in Engl. & Prantl, *Pflanzenfam.* Nachtr. i. zu ii.-iv. 27, and in *Pflanzenwelt Afr.* ii. 90-93, fig. 85.

Lower Guinea. Angola: Mossamedes District; Cabro Negro, *Welwitsch*, and without precise locality, *Mrs. Monteiro*. Damaraland: *Welwitsch*, *Galpin & Pearson*, 7470! 7476! and without precise locality, *Baines!* Swakop River, near Walfish Bay, *Cleverly* in *MacOwan Herb. Austr.-Afr.* 17251 *Haimchab*, *Galpin & Pearson*, 7440! 7441!

Mrs. Monteiro's specimens are labelled "Loanda." The river San Nicolau which Monteiro regarded as the northern limit of *Welwitschia* is about 300 miles south of Loanda. The species certainly does not occur in the Loanda district.

ORDER CXXIX. PINACEÆ.

(By O. STAFF.)

Dicæcious or monæcious. Male cones mostly catkin-like, terminal or axillary, simple and usually solitary, rarely spicate or lanceolate-bracteate or ebracteate at the base; scales bearing basi-dors.

2-15 pollen-sacs, squamiform or more or less differentiated into a claw or stalk (*filament*) and a variously modified and often much reduced blade (*connective*); pollen-grains with or without vesicular appendages. Female cones terminal or axillary; scales very numerous or few, sometimes only a part of them fertile, simple or with a scale- or ligule-like suprabasal appendage (*ovuliferous scale*) on the upper adaxial side, the fertile bearing 1-8 ovules direct or on the ovuliferous scale; ovules erect or more often inverted, always shorter than their scales and covered by them; integument 1. Mature cones mostly developed as typical "cones" with enlarged indurated scales or the scales proper arrested and their appendages enlarged, more rarely the mature scales fleshy and the cone owing to their fusion at length berry-like (*galbule*). Seeds always enclosed, winged by the adhesion of a portion of the ovuliferous scale, or by wing-like expansions of the testa; testa crustaceous to woody without an aril or arilloid covering.—Shrubs or trees; leaves spirally arranged or in whorls, needle-like or linear or lanceolate to ovate or squamiform, mostly evergreen.

Genera 25-30, with 250-300 species, mostly in the temperate zone of the northern hemisphere.

Mature cones woody, dehiscing with 4 very thick valves 1. WIDDRINGTONIA.

Mature cones fleshy, berry-like (*galbules*) 2. JUNIPERUS.

1. WIDDRINGTONIA, Endl. Cat. Hort. Vindob. i. 209.

Dicæious. Male cones small, terminal, solitary, sessile; scales decussately opposite, rhomboid-deltoid, produced into an upwards rapidly decreasing beak, with 2-6 dorsal pollen-sacs at the base. Pollen-grains globose, without appendages. Female cones small, axillary, sessile, lax or in dense, sometimes much reduced and short spikes, scattered along elongated shoots; scales opposite in 2 alternating pairs, divaricate at the time of pollination, then closing up, corky-coriaceous, apiculate; ovules 5 or more at the base of each scale, erect, with a single integument. Mature cones woody, ovoid or globose, opening with 4 very thick erect valves corresponding to the 4 scales. Seeds few, erect; ovoid or 3-gonous; testa crustaceous, winged. Embryo axile; cotyledons 2.—Evergreen trees. Leaves passing from a spiral arrangement in the juvenile state and long-shoots to a strictly decussate-opposite arrangement in the adult state (except the long-shoots), acicular in the juvenile form, squamiform and tightly appressed in the adult. Cones the size of a small plum, usually in lateral clusters.

Species 4, in South Africa and the mountains of southern tropical Africa.

1. *W. Whytei*, Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 60, t. 9, figs. 6-11. A tall tree up to 140 ft. high; trunk up to over 5 ft.

across, top wide, loose; ultimate ramifications of the adult plant slender, almost cylindric, about $\frac{1}{2}$ lin. in diam. Leaves of juvenile state acicular, up to 1 in. by $\frac{1}{2}$ -1 lin., of adult state squamiform, those of the older branches with a lanceolate acuminate or oblong to ovate and acute somewhat spreading or appressed free blade, 2-1 lin. long, and a broad adnate base, usually narrowed downwards; those of the ultimate divisions squamiform, tightly appressed, so that the contour of the branchlets is an approximately straight line, rhombic, about $\frac{1}{2}$ lin. long or slightly longer, subacute at both ends, the free and the adnate portions about equally long, slightly keeled or rounded on the back, with 1-3 slender resin ducts, which are usually not visible externally. Male cones cylindric-oblong, $1\frac{1}{2}$ -2 lin. long, ebracteate and sessile in the cup formed by the subtending foliage leaves; scales in about 6 decussate pairs, coriaceous, sub-peltate, the lower deltoid, with distinct hard beaks, the upper more rounded and minutely apiculate; pollen-sacs 4. Female cones in short sessile, often much reduced spikes, terminating with a vegetative bud and $2\frac{1}{2}$ -5 lin. long; cones at time of pollination $1\frac{1}{2}$ lin. across, equalling or exceeding the subtending squamiform broad-ovate acuminate bract; scales ovate, apiculate, face bluish-pruinose, back and margins greenish-brown; ovules up to 5 with each scale. Mature cones ellipsoid-ovoid, 9-10 lin. long, 7-8 lin. across (when closed), somewhat pruinous and resinous; valves very slightly spreading with an often pungent mucro (the morphological apex) from below the top. Seeds ovate-lanceolate in outline, 3 lin., or including the lateral wings, up to 5 lin. by $2\frac{1}{2}$ lin., dark-brown, the wings transparent towards the margins.—Masters in Gard. Chron. 1894, xv. 746; 1894, xvi. 190, and 1905, xxxvii. 18; in Nature, 1894, 85; in Journ. Linn. Soc. Bot. xxxvii. 270; Whyte in Kew Bulletin, 1895, 189; McClounie in Kew Bulletin, 1896, 216; Rendle in Journ. Linn. Soc. Bot. xl. 235; Dallimore in Kew Bulletin, 1913, 224; Burkill in Johnston, Brit. Centr. Afr. 279. *W. Mahoni*, Mast. in Journ. Linn. Soc. Bot. xxxvii. 271. *Callitris Mahoni*, Engl. Pflanzenwelt Afr. ii. 88. *Callitris Whytei*, Engl. l.c. 89; Eyles in Trans. R. Soc. South Afr. v. 292.

Mozamb. Distr. Nyasaland: Mlanji Mountains, 7000-10,000 ft., *Whyte!* *McClounie!* *Adamson*, 443! *Ritchie!* Zomba, *Whyte!* Gazaland: *McClounie!* at 6000 ft., *Slater!* *Mahon!* *Swynnerton*, 1963! Chimanimani, 5000-8000 ft., *Swynnerton*, 1964!

2. JUNIPERUS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 427.

Diœcious or more rarely monœcious. Male cones terminal or axillary, solitary, rarely in small clusters, sessile or borne on short imbricately bracteate peduncles; scales spirally arranged or opposite or in whorls of 3, at length more or less loose, roundish-ovate to

peltate with 2-6 dorsal pollen-sacs near the base; pollen-grains globose, without appendages. Female cones very small at the time of pollination; scales in 2-4 series, opposite or in whorls of 3, imbricate, free or more or less connate below, with or without a fleshy cushion-like thickening on the inner surface, the lower and often also the uppermost barren; ovules 2-1 in front of each fertile scale or alternating with the nearest scales, erect, with a single integument. Mature cones (*galbules*) berry-like, formed by the fusion of the scales which become more or less fleshy during maturation. Seeds few to 1, usually entirely enclosed in the galbules, free, rarely united into a several-celled false putamen; testa coriaceous to bony. Embryo axile; cotyledons 2-3, very rarely more.—Evergreen shrubs or trees. Leaves opposite or in whorls of 3, acicular or squamiform, frequently heteromorphous—acicular in the juvenile and squamiform in the adult state. Cones axillary or terminal on usually short branchlets. Galbules dark blue or reddish-brown, from the size of a pea to that of a walnut.

Species about 30, in the northern hemisphere, some extending to the mountains of the tropical regions.

1. *J. procera*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 278. A tall tree up to over 100 ft. high, often with a straight trunk up to over 3 ft. in diam. and a loose top; ultimate ramifications of the adult plant slender, under $\frac{1}{2}$ lin. in diam. Leaves of juvenile state acicular, 3-4 $\frac{1}{2}$ lin. long, of adult state squamiform, in whorls of 3 or, more usually, decussately opposite; those of the older branches with triangular to ovate acutely acuminate and pungent free blades, up to over 1 lin. long, and more or less square decurrent bases, those of the penultimate and ultimate branchlets squamiform, loosely appressed so that the contour of the branchlets is broken (zigzag), with ovate-lanceolate to lanceolate acute dorsally strongly convex free blades and somewhat shorter triangular decurrent bases, the whole leaf $\frac{3}{4}$ -1 lin. long, green, with a linear to linear-oblong resin-gland on the back. Male cones solitary and terminal on branchlets of the ultimate and penultimate order, usually very copious, ellipsoid-globose, 1-1 $\frac{1}{2}$ lin. long, ebracteate and sessile in the cup formed by the uppermost foliage-leaves; scales in about 6 decussate pairs, ovate-rotundate or rotundate, obtuse or subapiculate; pollen-sacs 2-3. Female cones solitary and terminal on branchlets of the ultimate and penultimate order, much less copious than the male, subglobose, about $\frac{3}{4}$ lin. in diam. at the time of pollination, sessile in the cup formed by the uppermost foliage leaves; scales in 3-4 decussate imbricate pairs, broad-ovate, obtuse or obtusely apiculate, with a thick fleshy cushion on the inner (upper) face (or the lower pair without it), extending to or beyond the middle, or in the uppermost pair the whole scale fleshy ending in an obtuse boss, the scale-

bases fusing early, the fused and fleshy portions bluish-pruinose, the free tips subcoriaceous to membranous, spreading or suberect, soon turning brown; only the intermediate scales fertile, with 2 or 1 ovule in front of them. Ovules ovoid with their wide micropyles exerted from the scale-bases. Galbules globose, mostly $2\frac{1}{2}$ -3, more rarely $3\frac{1}{2}$ lin. in diam., often irregular when immature owing to the unequally growing and thickening scale-tips which project as bosses, finally almost smooth, dark reddish- or purplish-brown with an often copious bluish bloom. Seeds usually 2-3, rarely 4 or 1, free, more or less separated by false septa, ovoid-oblong, acute, obtusely and often obscurely angular, about 2 lin. long, smooth.—Endl. Conif. 26; Carr. Trait. Conif. ed. i. 42; Parl. in DC. Prodr. xvi. ii. 485; C. Koch, Dendrol. ii. ii. 131; Hook. f. in Nature, xxx. (1884), 635; Hook. f. & Oliver in Journ. Linn. Soc. xxi. (1885), 394, 395, 404; Martelli, Florul. Bogos. 79; Schweinf. Piante utili Eritr. 42; in Bull. Herb. Boiss. ii. App. ii. 6; in Höhnel Discov. Lake Rudolf & Stefanie, ii. 354; Engl. Hochgebirgsl. Trop. Afr. 110; Glied. Veg. Usambara, 68, 69; Pfl. Ost-Afr. A. 117, 118, 128, 129, and C. 93; Notizbl. Königl. Bot. Gart. Berlin, i. 5, 239; Bot. Jahrb. xxx. (1901), 266; Veget. Nyassa Gebirgsl. 16, 18; Veget. Somaliland, 55; Veget. Harar und Gallahochl. 6, 9, 11, 16; Pflanzenwelt Afr. ii. 89, with plate; Gilg in Engl. Pfl. Ost-Afr. B. 288, 411; Volkens in Notizbl. Königl. Bot. Gart. Berlin, i. 131, ii. 14; Kilimandscharo, 199, 211, 298, fig. on p. 200; Durand & Schinz. Consp. Fl. Afr. v. 954; Sclater & Whyte in Kew Bulletin, 1899, 197; Engl. & Goetze, Veget. Ansicht. Deutsch. Ostaf. 45, t. 55, 56; C. H. Wright in Johnston, Uganda, i. 344; Pirotta, Fl. Col. Eritr. in Ann. Istit. Bot. Roma, viii. 21; Hutchins, Rep. Forests on Kenia in Col. Rep. Misc. no. 41 (1907), 15; Drake-Brockman, Brit. Somaliland, 294, plate (cedars) facing p. 230. *J. excelsa*, Roth in Harris, Highl. Aeth. ii. (407); not of M.B. *J. excelsa procera*, Carr. Trait. Conif. ed. ii. 37. *J. abyssinica* and *J. Lasdeliana* (or *Lasdeniana*), Hort. ex C. Koch, Dendrol. ii. ii. 132.

Nile Land. Eritrea: Habab; Bagla, *Hildebrandt*. Mensa; Geleb, 6500-6600 ft., *Schweinfurth*, 1481, 1525, 1593. Rova Calicauc, 6500 ft., *Terracciano & Pappi*, 651. Maldi, *Beccari*. Amasen; Asmara, 7600 ft., *Schweinfurth*, 620; 7300-8000 ft., *Terracciano & Pappi*, 130, 135, 2537. Bogos, *Terracciano & Pappi*, 2479. Oeule Cusai; Saganeiti, forming almost forests, 6600-7200 ft., *Schweinfurth*, 782! 832, 1210! 1211! 1278; *Pappi*, 3751, 3847; *Bartolomei-Gioli*, 66; and other localities between 6300 and 8000 ft., *Pappi*, 132, 3925; *Bartolomei-Gioli*, 60. Accrou, 6000 ft., *Schweinfurth*, 776! Shoho country, *Quartin Dillon & Petit*! Kohaito, *Schweinfurth*. Abyssinia: Agame, *Schimper*, 919. Tigre; Urahut, *Schimper*, 501! Sana; Jelajerame, *Quartin-Dillon & Petit*. Semen; Mount Bachit above Intjatkab, *Schimper*, 537! Lotho, *Schimper*, 532! Ghaba Valley, *Stuedner*, 1335! Wojerat, *Petit*! Shea; Ankober, forming forests, *Roth*! Mount Seguela, south of Addis Ababa, up to 9700 ft., *Ellenbeck*. Harar; mountains towards Belaua, from 6300 ft. upwards, *Ellenbeck*; Gallas Country; Abumas and Abu-el-Kassim mountains, from 6000 to 10,000 ft., *Ellenbeck*. British Somaliland: Golis Range, from 5000 ft. upwards, *Phillips*! *Drake-Brockman*, 573! 574! Ahl Mountains above Maud, *Hilde-*

brandt. Uganda: Mau Escarpment, 6000–8000 ft., *Scott Elliot*, 6789! Mau Plateau, *Whyte*! Nandi, 7000–8000 ft., *Scott Elliot*, 6976! Eldama Ravine, 7600 ft., *Whyte*! Nairwasha, 7000 ft., *Scott Elliot*, 7043! Kedong Escarpment, *Sclater*. British East Africa: Leikipia, 6000–8000 ft., forming forests at 8000 ft., *Thomson*! foot of Aberdare Range, *Höhnel*, 56, 115; Kikuyu, *Whyte*! Mount Kenia, *Höhnel*, 46, 50, 51; *Hutchins*! and without precise locality, *Scott Elliot*, 307! *Powell*!

Mozamb. Distr. German East Africa: Usambara; Mbalu, up to 6000 ft., forming extensive forests, Mlalo, *Holst*, 3779! Heboma, *Holst*, 2597! without precise locality, *Buchwald*, 449! Kilimanjaro above Uesri, 6600 ft., *Volkens*! Mawenzi summit, 8600 ft., *Volkens*. Schira, 10,000 ft., *Volkens*. Kinga Mountains; Kipengere ridge, 8200 ft., *Goetze*. Nyasaland: Nyika plateau, 11° 15' S. lat., 33° 40' E. long., *Major Pearce*!

Also indicated from Yemen, Jebel Sabor above Taiz (*Botta*).

A very valuable timber tree (see *Hutchins*, l.c.). Vernacular names: *Ssahadi* (Tigre); *Mutarakwe* (Kikuyu); *Ol-Daraqwe* (Masai); *Deiyib* (Somali).

The Somaliland specimens have been included here with some reluctance. The only adult samples seen by me are some branches of a female tree collected by Drake-Brockman with a few strobiles in the pollination stage and a few galbules. The branchlets are stouter than in the remainder of the material examined which is remarkably uniform although it is derived from localities spread over an enormous area, and when the scale-leaves are more appressed and less convex they approach frequently the more or less cylindrical shape (with straight contours) of the branchlets of *J. polycarpus*, *C. Koch* (*J. macropoda*, *Boiss.*; see *Medwedeff*, *Trees and Shrubs Caucas.* 41, with plate); finally the galbules are rather larger than in typical *J. procera*. The trees are described as tall (*Phillips*) and certainly appear so in Drake-Brockman's photograph, but the habit is different from that described as characteristic of *J. procera*, the branching beginning low down, as is usual in *J. polycarpus*, and forming a wide crown. The nearest locality where *J. polycarpus* occurs is Jebel Akbar above Maskat whence it ranges to Asia Minor, the Eastern Caucasus, Turkestan and the Himalayas.

ORDER CXXIXA. TAXACEÆ.

(By O. STAPF.)

Dioecious, very rarely monœcious. Male cones mostly catkin-like, sometimes externally only slightly differentiated from the vegetative branches, simple or compound, terminal or axillary, solitary or fascicled, bracteate or ebracteate at the base; fertile scales bearing basi-dorsally 2–8 pollen-sacs, squamiform or more or less differentiated into a claw or stalk and blade, the latter large and projecting beyond the pollen-sacs or transverse to the stalk (peltate) or very much reduced, when the scales with their pollen-sacs assume the appearance of typical angiospermous stamens; pollen-grains with or without vesicular appendages. Female cones usually much reduced, terminal or axillary; lower scales barren, the upper or only the uppermost fertile, always simple, each bearing 1 (very rarely 2) ovule,

or all barren, and supporting a solitary terminal ovule; ovule usually more or less exceeding its scale, sometimes long-exserted, rarely quite enclosed in the cone. Mature cones usually little altered or the axis or also the scales becoming more or less fleshy. Seeds usually exserted; testa coriaceous to woody, with or without an outer covering (*epimatium*), which is either free or more or less fused with the testa and varies from membranous to leathery or fleshy.—Shrubs or trees; leaves usually spirally arranged, quaquaversal or dorsiventrally disposed in one plane, scale-like or linear to lanceolate, rarely ovate, always evergreen.

Genera 10, with over 100 species, mostly in the tropics and the southern temperate zone; few in the northern temperate zone.

1. **PODOCARPUS**, L'Hérit.; Benth. et Hook. f. Gen. Pl. iii. 434.

Diœcious, very rarely monœcious. Male cones usually axillary, variously arranged, bracteate at the base, sessile or peduncled; scales numerous, spirally arranged, imbricate, with usually broad, triangular to ovate-rotundate, rarely lanceolate blades and 2 relatively large dorsal pollen-sacs near the base. Pollen with 2 vesicular appendages. Female cones terminal or axillary, usually reduced to a few sterile lower scales, which are more or less fused with each other and the axis—the whole plexus becoming ultimately fleshy (*receptacle*)—and 1 or 2 terminal fertile scales, rarely spike-like with few to numerous usually distant fertile scales; scales spirally arranged or opposite in decussate pairs, the lower often with a foliaceous blade, the upper squamiform; ovules solitary, adnate to the face of the fertile scale and usually much exceeding it, inverted, and enclosed in a false aril (*epimatium*) arising from the face of the scale and adnate to the single integument. Seeds deciduous together with the modified (*receptacle*) or unmodified remainder of the cone or falling from the scales of its persistent axis; testa and false aril (rarely also the fertile scale) forming a coriaceous or externally fleshy and internally woody shell. Embryo axile; cotyledons 2. Shrubs or trees, often of great height. Leaves squamiform or linear or lanceolate to ovate, usually spirally arranged, but placed dorsiventrally, rarely opposite. Male cones solitary or clustered or disposed in compound inflorescences, rarely apical. Seeds and receptacles where present greenish or brown or sometimes vividly coloured the former always conspicuously exposed.

About 60 species, mostly in the mountain forests of the tropics, a few in the temperate regions of the southern hemisphere and in Japan.

Receptacle well developed, fleshy, obconical to sub-globose, finally bright red 1. *P. milanjanus*.

Receptacle 0; the axis of the mature cone forming a slightly thickened stalk bearing the seed.

Seed up to over 1 in. long; woody inner layer of seed-shell 2-3½ lin. thick.

Seed globose or ellipsoid-globose 2. *P. usambarensis*.

Seed attenuated at the base, subpyriform.

Leaves, including those of the fruiting branchlets, up to 6 in. by 5 lin. 3. *P. Mannii*.

Leaves up to 1-1½ in. by 1½-2½ lin. 4. *P. Dawei*.

Seed up to ¾ in. long; woody inner layer of seed-shell ½-1 lin. thick.

Leaves of the fruiting branches 1-2½ in. by 1¼-1¾ lin. 5. *P. gracilior*.

Leaves of the fruiting branches ¾-1 in. by ½-¾ lin. 6. *P. gracillimus*.

1. *P. milanjanus*, *Rendle in Trans. Linn. Soc. ser. 2. iv. (1894) 61*. A shrub or tree up to 100 ft. high; branchlets terete, slightly grooved; terminal buds ovoid-globose, up to 2 lin. long. Leaves spirally arranged, crowded, particularly upwards, linear, acute, attenuated at the base into a short petiole, straight or slightly falcate, spreading, 2-4 in. by 4-5 lin. or in the juvenile state up to 6 in. by 7 lin., coriaceous, midrib slightly raised on both sides, very fine on the upper. Male cones solitary or in pairs, cylindric, up to 1 in. by 2-2½ lin., with a few rotundate-ovate subcoriaceous bracts up to 1½ lin. long, at the base; scales loosely imbricate, up to 1¼ lin. long, blade rotundate-ovate, denticulate, about ½ lin. long; pollensacs almost 1 lin. long. Female cones borne on peduncles 3-6 lin. long and formed of 2 decussate pairs of scales fused into a fleshy receptacle, one barren, slightly shorter, with or without small ovate or triangular tips, the other fertile with short free rims or small roundish blades embracing the base of the ovule, the whole receptacle obconic and more or less 2-lobed or when quite mature obovoid-globose to globose and bright red, covered with a bluish bloom, 4-5 lin. long; sometimes only 1 scale fertile and then the receptacle more or less oblique. Seed subglobose, about 5-6 lin. long; inner layer of seed-shell thin crustaceous, outer coriaceous or hard-fleshy, resinous, slightly pruinose.—*Rendle in Journ. Linn. Soc. Bot. xxxvii. 226 and xl. 235*; *Dawe in Kew Bulletin, 1907, 22*; *Journ. Linn. Soc. Bot. xxxvii. 534, 538*; *Pilger, Taxac. in Engl. Pflanzenreich, iv. v. 92 (f. *arborescens* and f. *typica*)*; *Mildbraed, Wiss. Ergebn. Zentr.-Afr. Exped. 1907-8, ii. 40*; *Eyles in Trans. Roy. Soc. S. Afr. v. 292. P. Mannii*, *Engl. Pf. Ost-Afr. C. 92, t. i. fig. A*; not of Hook. f. *P. sp. aff. Mannii*, *Schweinf. in Höhnel, Discov. Lakes Rudolf & Stefanie, ii. 354*; *Rendle in Journ. Linn. Soc. Bot. xxx. 379, 434*; *Engl. in Sitzungb. Preuss. Akad. Wiss. Berlin, 1899, 208*; not of Hook. f. *P. latifolia*, *Engl. l.c. 1902, 230, 232*; not of Wall. nor of R. Br. *P. Thunbergii*, *Engl. Jahrb. xxx. (1901), 266*; not of Hook.

Nile Land. Uganda: Ruwenzori, 8500 ft., *Stuhlmann*, 2360 (arborescent); 10,500 ft., *Stuhlmann*, 2393, 2432 (frutescent); 8-11,000 ft., *Dawe*, 547! (arborescent); 9000 ft., *Scott Elliot*, 8003! (arborescent); 7500-10,000 ft., *Doggott*! (arborescent). Butagu Valley, 9850-10,800 ft., *Mildbraed*, 2456. Ninagongo, 9500 ft., rare, *Mildbraed*, 1335. Buddu; littoral belt, 3750-4000 ft., *Dawe*, 273! 969! Musozi; mouth of Kagere river, lake shore, *Bagshawe*, 125. British East Africa: Kikuyu, 7500 ft., *Whyte*! up to 11,000 ft., *Hutchins*! Muzhen-gira, *Elliot*, 251! 255! Leikipia plateau and western base of Kenia, 6550 ft., *Höhnel*. Kenia, 8000-9000 ft., *Gregory*! (arborescent).

Mozamb. Distr. German East Africa: Kirunga Volcano, *Küssner*, 3202! Kilimanjaro, southern slopes, 4250-6550 ft., *Höhnel*, 174. Marangu, 7200-8200 ft., *Volkens*, 814 (arborescent); above Kiboscho, 9500 ft., *Volkens*, 1524; by the Kifinika, 7900-9500 ft., *Volkens*, 1894 (arborescent). Usambara; between Kwai and Gare, 5250 ft., *Engler*, 2232 (arborescent); Magamba above Kwai, 8850 ft., *Engler*; *Holst*, 3863. Unguru; Lukwangulu, 7200-8200 ft., *Stuhlmann*, 9179, 9212. Uhehe; Utschungwe Mountains, 6550 ft., *Gölze*, 584 (frutescent). Rungwe Mountains, *Stolz*, 373! (arborescent). Kinga Mountains; Kipengere ridge, 8200 ft., *Gölze*, 986.

Mozamb. Distr. Nyasaland: Mlanji, *Whyte*! 6400 ft., *Brown*! Mwanemba, 7800 ft., *McCloune*, 171! Nyika plateau, 6000-7000 ft., *Whyte*! Mount Malosa, 4000-6000 ft., *Whyte*! between lakes Shirwa and Chinta, 2500 ft., *Cunningham*! without precise locality, *Buchanan*, 949! Gazaland: Chimanimani Mountains, 7000 ft., *Swynnerton*, 1962! Mount Pene, 7000 ft., *Swynnerton*, 6038! (arborescent).

A valuable timber tree (*Dawe*). Although usually of moderate size, it attains in places to a height of 100 ft., as in Usambara and on Mt. Kenia (*Gregory*). *Dawe* saw trees 70 ft. high on Ruwenzori.

2. *P. usambarensis*, *Pilger*, *Taxac. in Engl. Pflanzenreich*, iv, v, 70. A tall tree, up to over 250 ft. high; branchlets slender, scattered or subopposite or subverticillate, spreading, loosely disposed in young, more crowded in old specimens. Vegetative buds very small, obtuse. Leaves linear, long-tapering to a sharp point, shortly attenuated at the base into a very short petiole, straight or sub-falcate, about 3 in. by $2\frac{1}{2}$ lin., rarely broader (up to $3\frac{1}{2}$ lin.) and thinly coriaceous in young trees, much shorter and much more coriaceous in adult specimens; midrib very obscure above, slightly raised beneath. Male cones unknown. Female cones only known in the mature state. Seed solitary on slender peduncles, 7-10 lin. long and marked with the scars of the fallen scales, globose to subglobose, about 1 in. long; inner layer of seed-shell very hard, woody, up to $3\frac{1}{2}$ lin. thick, outer coriaceous, resinous inwards. *Pilger* in *Mildbraed*, *Wiss. Ergebn. Zentr.-Afr. Exped. 1907-8*, ii, 41. *P. falcata*, *Engl. Pfl. Ost-Afr. C. 92*, t. ii, figs. A, F. and G.; not of R. Br.

Mozamb. Distr. German East Africa: Usambara; Mbalu, Heboma, in mountain meadows, *Holst*, 2548; Malo, 5250 ft., *Engler*, 1444; Para Mountains, Mtai, in forests, *Holst*, 2467! Kwai, in virgin forest from 5000 ft. upwards, *Eich*, 17; between Kwai and Gare, 5250-5900 ft., *Engler*, 2229; Mogamba forest, the prevailing tree, *Holst*, 3816; Mkussu forest, *Busse*, 363. Ruanda: Rugege forest, 6200 ft., *Mildbraed*, 1035; Bugoier forest 8200 ft., *Mildbraed*, 1473. Karagwe; Bukoba, *Mildbraed*, 124.

3. *P. Mannii*, *Hook. f. in Journ. Linn. Soc. Bot.* vii, 218. A tree 30-50 ft. high; branchlets loosely disposed or in adult trees crowded

upwards and short. Leaves sessile, linear, gently tapering to an acute point, shortly attenuated at the base, straight or more or less falcate, up to 6 in. by 5 lin., or in the flowering region sometimes only 3 in. by $2\frac{1}{2}$ lin., coriaceous (particularly when short), midrib very slender, faint above, more conspicuous beneath. Male cones axillary, solitary or in pairs, sessile, with a few rounded bracts, $\frac{1}{2}$ lin. long at the base, cylindrical, up to 1 in. long; scale-blades broad-triangular, shorter than the pollen-sacs. Female cones only known in the mature state, sessile at the ends of short few-leaved branchlets. Seed solitary, borne on the slightly thickened axis of the cone; axis about 2 lin. long, with 2 or 1 persistent ovate-lanceolate recurved scales; seed pyriform, up to almost $1\frac{1}{2}$ in. long, chestnut-brown, shining; inner layer of seed-shell hard, woody, up to 2 lin. thick, outer hard coriaceous, slightly thinner.—Hook. f. in Journ. Linn. Soc. Bot. xxi. 395; Henriques in Bolet. Soc. Brot. v. 216; Nobre, l.c. vii. 115, t. 1-3.

Lower Guinea. Island of St. Thomas, from 4750 to the summit of the Peak, 7025 ft., *Mann*, 1065! *Moller*!

4. *P. Dawei*, *Stapf*. A tree up to 100 ft. high with a long clear bole, branched from near the top; branchlets of the flowering region crowded, short. Vegetative buds $1-1\frac{1}{2}$ lin. long. Leaves crowded upwards, sessile, linear, acute or subacute, shortly attenuated at the base, $1-1\frac{1}{2}$ in. by $1\frac{1}{2}-2$ lin., coriaceous, firm, midrib very obscure above, slightly raised beneath. Male cones unknown. Female cones only known in the mature state, terminal on short bracteate branchlets; bracts small, ovate, recurved, resembling the scales of the cone; axis of cone slightly thickened, $2-2\frac{1}{2}$ lin. long; scales about 2, broad ovate, spreading or recurved, 1 lin. long. Seed subglobose, very shortly attenuated at the base, dark brown, slightly pruinose, $10-11$ lin. long, about 8 lin. in diam.; inner layer of seed-shell hard-woody, light coloured, $1\frac{1}{2}$ lin. thick, outer also woody, but chestnut-brown.

Nile Land. Uganda: South Buddu, near the Kagera River, 4000 ft., *Dawe*, 961!

5. *P. gracilior*, *Pilger*, *Taxac. in Engl. Pflanzenreich*, iv. v. 71. A tree 30 to over 60 ft. high; branchlets crowded upwards in the old trees, scattered or subverticillate, angular from the decurrent leaf-bases. Vegetative buds obtuse, $\frac{1}{2}$ lin. long. Leaves scattered, crowded on the short branchlets, linear, long and gently tapering to a sharp point, shortly contracted at the base, up to 4 in. by 3 lin. in young plants and on long shoots, mostly much shorter, $1-2$ in. by $1\frac{1}{4}-2$ lin., coriaceous, midrib obscure above, very slender and slightly raised beneath. Male cones subsessile, subtended by a few small broad roundish bracts, axillary, solitary or in pairs or threes, straight or flexuous, mostly up to 9 lin., occasionally over 1 in.

long; scales about 1 lin. long, their blades broadly ovate-triangular, acute, $\frac{1}{2}$ lin. long. Female cones sessile at the ends of short leafy branchlets; their axis 1-2 lin. long, with or without 1 or rarely 2 small broad ovate spreading or recurved barren scales, ultimately slightly thickened; fertile scales like the preceding. Ovule obovoid-oblong, $1\frac{1}{2}$ -2 lin. long, bluish-pruinose. Seed ellipsoid-globose, rounded or slightly attenuated at the base, 8-9 lin. long, 7-8 lin. across, purplish-brown and slightly bluish-pruinose; inner layer of seed-shell very hard, woody, up to 1 lin. thick, outer coriaceous about as thick as the inner or slightly thicker, resinous inwards.—Engl. Pflanzenwelt Afr. iv. v. 86, fig. 81, and Veget. Harar und Gallahochl. 11 (sphalm. *P. gracilis*). *P. elongata*, A. Rich. Tent. Fl. Abyss. ii. 278; Engl. Hochgebirgssfl. Trop. Afr. 109; Pfl. Ost-Afr. C. 92. t. i. fig. B (not C-G); Oliv. in Journ. Linn. Soc. Bot. xxi. 404 (as forma ?); Hutchins, Forests of Kenia in Col. Rep. Miscell. no. 41, 17; not of L'Hérit. *P. falcata*, Engl. in Hochgebirgssfl. Trop. Afr. l.c., and Veget. Usambara, 68; not of R. Br. *Tarus elongata*, Roth in Harris, Highl. Aeth. ii. 408; not of Ait.

Nile Land. Abyssinia: Shire, *Quartin Dillon & Petit*, 105! Gerra Abuna Tekla Zlaimanot, *Schimper*, 1160! Shoa; Ankober, *Roth*! Arussi Galla: Djafa, 6200-8500 ft., *Ellenbeck*, 1344, 1350, 1428; Gernu Abas, *Drake-Brockman*, 244! W. Sidamo, *Drake-Brockman*, 205! between Surro and Rogono, *Riva*, 194. Southern Abyssinia, without precise locality, *Stordy*! Uganda: Nandi, *Johnston*! Eldama Ravine, 7600 ft., *Johnston*! Whyte! Mau, 6000-8000 ft., *Scott Elliot*, 6959! British East Africa: Leikipia, 6000-8000 ft., *Thomson*, 399! at the foot of the Aberdare range, 5300-6900 ft., *Höhncl*. Kenia, *Hutchins*, 400!

6. *P. gracillimus*, *Stapf*. A tree of great height (a mammoth tree, *Nelson*) with slender branchlets. Vegetative buds up to 1 lin. long. Leaves densely crowded at the end of the branches and branchlets, sessile, linear, about equally and slightly attenuated at both ends, acute, straight or slightly falcate, up to 10 lin. by $\frac{1}{2}$ - $\frac{3}{4}$ lin., coriaceous, midrib obscure on both sides, particularly above. Male and female cones unknown. Seeds (immature) globose, about 5 lin. in diam., supported by the moderately stout axis of the cone which is about $1\frac{1}{2}$ lin. long and bears scars of 1 or 2 (?) barren scales and the fertile scale which is ovate-triangular, $\frac{1}{2}$ lin. long, and closely appressed to the seed.

Mozamb. Distr. North Transvaal: Houtboschberg, *Nelson*, 423!

Imperfectly known species.

P. veros. latifolius, R. Br.: *Mildbraed Wiss. Ergebn. Zentr.-Afr. Exped.* ii. 40.

Mildbraed states that he saw in the Schampf Valley of the Rugege Forest, Ruanda, a tree of considerable height and broad-pyramidal habit with almost

vertically erect branches, the barren specimens of which match completely with examples of "*P. latifolius*" from South Africa, and he adds that it differs from *P. milanjanus* in the very shortly tapering leaves. The description of the habit does not suggest *P. latifolius*, R. Br., by which is here evidently meant *P. Thunbergii*, Hook. (see Kew Bulletin, 1916, 236).

ORDER CXXX. CYCADACEÆ.

(By D. PRAIN.)

Cones dicecious. Males one or more, terminal or subterminal, composed of numerous thickly coriaceous or fleshy flat or variously peltate scales, bearing on the under surface crowded 1-celled pollen-sacs. Females terminal or subterminal, composed of flat or thickened variously peltate scales or, less often (*Cycas*), of flat blades crowded round the apex of the stem; ovules large, sessile, orthotropous, solitary and inverted on either side of the peltate scales of the female cone, or (*Cycas*) several and erect in notches along the margins of the blades. Seeds large, drupaceous, with a more or less fleshy outer coat and a crustaceous or bony inner coat; albumen copious, at first fleshy, at length horny, with one or more embryonic cavities; embryo usually solitary by abortion, slender; cotyledons 2; radicle superior, attached to the crumpled suspensory cord.—Shrubs or small trees with a thick simple, rarely forking stem crowned with a terminal tuft of leaves, or stemless with the leaves arising from a tuberous simple or branched rootstock. Leaves in alternate series of short coriaceous scales and of palm-like pinnate, rarely 2–3-pinnate fronds with membranous or coriaceous often marginally toothed leaflets (*pinnules*) which are usually many-nerved with the nerves parallel, rarely (*Stangeria*) anastomosing, sometimes (*Cycas*) 1-nerved.

Species about 80, natives of the tropics and of southern subtropical and temperate regions.

Leaflets (*pinnules*) 1-nerved, their margins entire, in bud circinate; male cones approximately terminal; female cone apical; ovules erect, 2 or more along either margin of the stalk of an at length reflexed elongated blade 1. CYCAS

Leaflets (*pinnules*) many-nerved, the nerves close-set and longitudinal, their margins (in the tropical species) usually toothed, in bud straight; both male and female cones approximately terminal or only subterminal; ovules inverted, solitary on either side of a peltate scale 2. ENCEPHALARTOS.

1. **CYCAS**, Linn. ; Benth. et Hook. f. Gen. Pl. iii. 444.

Cones 1-sexual, diœcious. Male apparently terminal, peduncled ; scales cuneate, closely imbricate ; apex often long-acuminate ; pollensacs ellipsoid, in groups of 3-5 on the lower face. Female blades numerous, crowded round the apex of the ultimately produced stem, densely woolly, at first appressed into a terminal cone, soon spreading, elongate, flattened, dilated upwards, entire, crenate or pectinate. Ovules 1-5, in notches on either side of the stalk, rather remote, alternate or opposite, nearly erect. Seeds ellipsoid or globose. — Shrubs or small trees with a simple or casually branched cylindric trunk clothed with the woody bases of the petioles. Leaves in terminal crowns, linear-oblong, pinnate ; pinnules linear, 1-nerved, quite entire, circinate in bud ; lower often reduced to spines.

Species about 12, extending from tropical East Africa to Polynesia.

1. **C. Thouarsii**, R. Br. Prodr. 347 (*Thouarsii*). Stem well-developed, cylindric, casually branched when old, 12-20 ft. high, 1½ ft. thick. Leaves 5-9 ft. long, 1-2 ft. wide above the middle, bright green, shining above, rather paler beneath ; petiole and rhachis slightly angular, quite glabrous ; pinnules very coriaceous, 60-70 pairs, linear, gently curved, 8-15 in. long, ½-½ in. wide, slightly unequally attenuated at the base the lower edge there shortly decurrent and somewhat concave, apex acutely acuminate slightly indurated, margin entire on either edge, midrib grooved above. Male cone shortly peduncled, brown, oblong-cylindric, 1-1½ ft. long, 5-6 in. wide ; peduncle under 2 in. long, sparingly brown-pubescent ; scales horizontally spreading, obovate-deltoid, 1½-2 in. long, ½-¾ in. wide, with a barren glabrous basal portion ½ in. long, fertile portion glabrous, 1-1¼ in. long, considerably longer than broad, apex barren, triangular, curved sharply upwards, acute or shortly acutely acuminate, ¾ in. long, clothed externally with close brown tomentum, glabrous above. Female blades 9-12 in. long ; stalk long, rusty-pubescent, with 4-5 pairs of ovules above the middle, passing insensibly into the ovate-lanceolate lamina, which is 3-4 in. long, ¾-1¼ in. wide, apex acute, margin crenulate or subentire, glabrous on both sides towards apex and margins, elsewhere closely rusty-pubescent. Seeds ovoid-globose, 2-2¼ in. long, 1¾ in. wide ; outer coat red (*Engler*).—Miq. in Tijdschr. Wis. en Nat. Wetens. ii. 287. Arch. Néerl. iii. 236. Nieuwe Bijdr. Cycad. 40, and Adansonia, ix. 56, 366 ; Lem. Ill. Hort. 1864, [4] sub t. 405 ; DC. Prodr. xvi. ii. 528 ; A. Br. in Verh. Bot. Ver. Brand. xviii. 1875, Sitzungs. 15, and in Sitzungs. Gesellsch. Naturf. Freunde, Berl. 1876, 113 ; Duchartre in Bull. Soc. Bot. Fr. xxxv. 247 ; Baron in Journ. Linn. Soc. Bot. xxv. 268 ; Eichler in Engl. & Prantl, Pflanzenfam. ii. i. 21 ; Warburg, Monsunia, i. 180, 181 ; Drake del Castillo in Madagascar

au debut du xx^e Siècle, 117; Heckel in Ann. Mus. Col. Marseille, sér. 2, viii. 48, 256, 276, 328; Kirk ex Stapf in Kew Bulletin, 1916, 2; Stapf, l.c. 8. *C. circinalis*, Pet. Thouars, Hist. Veg. 2, tt. 1, 2; Richard, Conif. et Cycad. 187 in part, tt. 25, 26 but excl. t. 24; Bojer, Hort. Maurit. 301; Pollen, Recherches s.l. Faune de Madagascar, Rel. Voy. t. 19; Regel in Gartenfl. xxv. 1876, 49, as to syn. *C. madagascariensis* only; Dyer in Challenger Rep. Bot. i. iii. 207 and in Hook. f. Fl. Brit. Ind. v. 656, as to African material; Engl. in Pfl. Ost-Afr. A. 5, C. 422; Warburg in Engl. l.c. B. 167, 172; Werth, Veg. Insel. Sansibar, 94; not of Linn. *C. circinalis*, subsp. *Thouarsii*, Engl. Pflanzenw. Afr. ii. 82. *C. madagascariensis*, Miq. Comment. Phytogr. 127, Monogr. Cycad. 32, and in Linnæa, xvii. 1843, 699, excl. cit. t. 24 Richard; Duchartre, l.c. 246, as syn.; Heckel, l.c. 329. *C. comorensis*, Bruant, Cat. printemps 1888, n. 195, 5; Duchartre, l.c. 246, as syn. *C. sp.*, Duchartre in Journ. Soc. Nat. Hort. Fr. sér. 3, ix. 48.

Mozamb. Dist. Zanzibar: cultivated specimens, Kirk! *Miss Thackeray!* Werth. German East Africa: Mrogoro; thickets at Ussungula, on the Ruvu, about 50 miles inland from Bagamoyo and Dar-es-Salaam, Bley. Portuguese East Africa: Zambesi Delta; on the banks of the Luabo distributary, Kirk! sea-coast between the Kongoni and the Melambe mouths, Kirk!

Also in the Comoro Islands, in Madagascar and, as an introduced species, in Mauritius.

Possibly, though this is doubtful, the *Mpapindi* of the Kisuah (*Stuhlmann*). This species is said to be a source of Sago in Madagascar and perhaps Mauritius (*Baron, Bojer, Heckel*); there is so far no evidence of its economic use on the African continent (*Warburg*). A littoral species in Mozambique, it appears to be absent from the coast of German East Africa (*Engler*) though it is said to occur there some distance inland (*Bley, Warburg*). The only African member of the genus *Cycas*, this species is most nearly allied to *C. Rumphii*, Miq., from south-eastern Asia (*Braun*), and rather less closely to *C. circinalis*, Linn., from southern India and south-eastern Asia (*Stapf*), of which it has been considered by some authors to be a geographical form. Undoubtedly indigenous in the Comoro group (*Kirk, Hildebrandt*) and in certain parts of northern and eastern Madagascar (*Drake del Castillo, Pollen, Baron*), this species may perhaps owe its presence in the Zambesi delta to other than human agency. Its introduction to Mauritius, apparently from Madagascar, is known to have been deliberate; in Zanzibar its occurrence is attributed to Arabs trading with the Comoro Islands (*Werth*) and there is at least the possibility that at Ussungula in Mrogoro it may mark the site of some bygone Arab trading station.

2. ENCEPHALARTOS, Lehm.; Benth. et Hook. f. Gen. Pl. iii. 445.

Cones 1-sexual, diœcious. Males subterminal, peduncled, solitary or several; scales closely imbricate, apex subpeltate, somewhat decurved, barren; pollen-sacs ovoid, closely set on the lower face of the claw. Females subterminal, nearly sessile, ellipsoid or oblong; scales imbricate, distinctly stipitate, peltate, thick, more or less reniform, with an expanded somewhat triangular flattened, convex or prismatic apex and an ovule-bearing basal sinus on either side behind;

stipe slender, usually angular. Ovules sessile, ovoid, inverted. Seeds ellipsoid or oblong, usually slightly angular by compression, at length protruding between the mature scales. Shrubs or small, rarely medium trees with a simple or casually branched globose, fusiform or cylindrical trunk clothed with coriaceous scales and the woody bases of the petioles. Leaves in terminal plumes or crowns, linear-oblong, erect or the outer ascending, pinnate, pinnules diminishing from the middle downwards, linear-lanceolate or lanceolate or ovate or oblong-lanceolate, longitudinally many-nerved, the nerves close-set, tip pungent, margin (in the tropical species) spinulose-toothed, very rarely casually entire, usually slightly revolute, straight in bud; lower often reduced to spines.

Species about 17; seven within the tropics, the others in South Africa.

A species of *Encephalartos*, *E. horridus*, Lehm. (Pugill. vi. 14) [*Zamia horrida*, Jacq. (Fragm. 27, tt. 27, 28)] is said by A. de Candolle (Prodr. xvi. ii. 532), to be a native of Tropical Africa. This does not appear to be the case; Jacquin received his original plant from an unspecified locality 100 miles inland from the south coast; the only localities for which we have records of the collection of uncultivated specimens are in Cape Colony. According to Sim (For. Fl. Port. E. Africa, 109) one or more species of *Encephalartos* occur in M'Chopes and elsewhere in Portuguese East Africa; one, wild in the vicinity, is planted for ornament in the square at Quissiqui. These species are known in the language of Zuvalla as *Impanga* or *Mwanga*. No specimens have been seen; the species in question are stated to occur only to the south of Inhambane and therefore beyond the area here dealt with.

Leaves thinly coriaceous, bright green; pinnules linear-lanceolate, slightly falcate, acutely acuminate, base subequally long-cuneate, margin about 4-toothed throughout on either edge; stem very short 1. *E. Barteri*.

Leaves firmly coriaceous.
Leaves glaucescent; pinnules linear-lanceolate, slightly falcate, acute, base subequally short-cuneate, lower edge entire or casually 2-3-toothed, upper edge 1-4-toothed near the base or sometimes entire; stem short or very short ... 2. *E. Poqoqo*.

Leaves dark green above, rather paler beneath.
Pinnules subequally rounded or cuneate at the base.
Pinnules ovate-lanceolate, distinctly falcate, abruptly acute, base shortly rounded or wide-cuneate, insertion broad, margin 3-8-toothed mainly in the basal half on either edge; stem short or very short ... 3. *E. septentrionalis*.

Pinnules linear-lanceolate, slightly falcate, acute, base long-cuneate, insertion narrow, margin 1-5-toothed throughout on either edge, tip often 3-spinescent; stem tall, cylindrical 4. *E. Hildebrandtii*.

Pinnules very oblique at the base, much narrowed on the lower edge.
Pinnules ovate-oblong, nearly straight, tip broad, 2-4-spinescent, margin 2-4-toothed

throughout on either edge; stem rather short, fusiform 5. *E. ferox*.

Pinnules ovate-lanceolate, distinctly falcate, acutely acuminate.

Pinnules at base wide-cuneate or rounded on upper, narrow-cuneate on lower edge, margin 1-4-toothed throughout on lower, 2-4-toothed mainly in basal half on upper edge; stem usually short or very short, cylindrical or globose 6. *E. gratus*.

Pinnules at base rounded or less often wide-cuneate on upper, straight or at times concave on lower edge, margin 6-10-toothed throughout on either edge; stem tall or very tall, cylindrical or sometimes irregular 7. *E. laurentianus*.

1. *E. Barteri*, *Carruth. ex Miq. in Arch. Néerl.* iii. 243, as to *Barter's plant only*. Stem very short, ellipsoid, rarely over 1 ft. high, 9 in. thick, hardly rising above the soil, closely covered with alternating scales and persistent imbricating leaf-bases clothed with grey cottony tomentum. Leaves $3\frac{1}{2}$ - $5\frac{1}{2}$ ft. long, 8-10 in. wide above the middle, bright green; petiole and rhachis subcylindric, clothed at first with deciduous grey tomentum; pinnules rather thinly coriaceous, about 80 pairs, linear-lanceolate, very slightly falcate, 5-6 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, somewhat unequally attenuated to the base, apex acutely acuminate, pungent, margin with about 4 ascending small teeth along either edge. Male cone peduncled, pale green, narrow cylindrical, 5-9 in. long, 2 in. wide; peduncles 4-7 in. long, at first sparsely tomentose, soon glabrous; scales spreading, deltoid, fertile portion $\frac{1}{2}$ in. long, not much longer than broad, apex triangular, $\frac{3}{4}$ in. across, the lateral angles acute, the lower very obtuse, umbonate. Female cone sessile, dark olive-green, oblong-ellipsoid, 8-10 in. long, 5 in. wide; apex of scales wide rhomboid, $2\frac{1}{4}$ in. across, $1\frac{1}{4}$ in. deep, lateral angles explanate, upper very obtuse, lower obtuse, umbonate. Seeds ovoid-oblong, faintly angled, $1\frac{1}{4}$ in. long; outer coat crimson.—*Miq. Nieuwe Bijdr. Cycad.* 46, and *Adansonia*, ix. 61; *Aschers. in Verh. Bot. Ver. Brand.* xx. (1878), xxxv.; *Moloney, For. W. Afr.* 214; *De Wild. Ic. Hort. Then.* iv. 180; *Engl. Pflanzenw. Afr.* ii. 84; *Prain in Bot. Mag.* t. 8232; *Chipp, Herb. Pl. Gold Coast*, 39.

Upper Guinea. Gold Coast: Odumasi; Krobo, *Rumsey*! Kwahu; west of Abene, *Chipp*, 624! Volta River; Anum, *Schönfeld*! *Moloney*! Drome, *Schönfeld*! Labo-labo, *Anderson*! Aburi, *Johnson*! Dahomey: Borgou, about 300 miles from the coast, *Poisson*! Northern Nigeria: near Jeba, 800 ft., *Barter*, 1692!

The *Pardi Attar*, "Ghost Palm," of the Adangme Krobo (*Rumsey*), so named because it has no economic value (*Schönfeld*). It is common on dry rocky hill-sides or river-banks (*Barter*, *Schönfeld*) and on rocky savannah where the soil is scanty (*Chipp*). *Chipp's* specimens suggest that, at least in savannah tracts, the leaves are deciduous; the young foliage appears in December and January.

2. **E. Poggei**, *Aschers. in Verh. Bot. Ver. Brand.* xx. (1878), xxxv. Stem short or very short, ellipsoid or subcylindric, casually forked, 1-2 ft. high, 8 in. thick, closely covered with alternating scales and persistent imbricating leaf-bases clothed with shaggy grey tomentum. Leaves $2\frac{3}{4}$ -4 ft. long, 8-10 in. wide above the middle, glaucescent, petiole and rhachis subcylindric, clothed at first with shaggy tomentum which partially persists near the base; pinnules rigidly coriaceous, 20-60 pairs, linear-lanceolate, very slightly falcate, 4-6 in. long, $\frac{1}{3}$ - $\frac{1}{2}$ in. wide, abruptly slightly unequally narrowed at the base, apex acute, pungent, margin usually entire occasionally with 2-3 diverging teeth along the lower edge, and with 1-4 diverging teeth mainly near the base rarely entire along the upper edge. Male cones peduncled, greenish or orange-yellow, narrow cylindric, 6-8 in. long, $2\frac{1}{2}$ in. wide; peduncles 4 in. long, nearly glabrous; scales spreading, deltoid, fertile portion $\frac{3}{4}$ in. long, not much longer than broad, apex rhomboid, 1 in. across, the lateral angles acute, the others very obtuse, ridged and faintly faceted, not umbonate. Female cone sessile, green, at length becoming pale salmon-coloured, oblong-ellipsoid, 8-9 in. long, $4\frac{1}{2}$ in. wide; apex of scales wide-rhomboid, $1\frac{3}{4}$ -2 in. across, $\frac{2}{3}$ - $\frac{3}{4}$ in. deep, lateral angles explanate, upper and lower very obtuse, surface divided into 3-4 facets, centre raised but not umbonate. Seeds ovoid, faintly angled, about 1 in. long; outer coat brownish-red.—De Wild. *Ic. Hort. Then.* iv. 176, 184, and *Not. Pl. Util. Congo*, i. 388, 396; *Engl. Pflanzenw. Afr.* ii. 84. *E. lemarinellianus*, De Wild. & Durand in *Comptes-rendus Soc. Bot. Belg.* xxxix. 80-82; De Wild. *Études Fl. Bas-et Moyen-Congo*, i. 9. tt. 23, 24, *Not. Pl. Util. Congo*, i. 390, tt. 25, 26, 28, figs. 1, 11, *Pl. Laurent 12 (lemarinellianus)*, Miss. *É. Laurent*, 364, figs. 56, 57, 59 (*lemarinellianus*), and *Ic. Hort. Then.* iv. 176, 183; *Gentil, Rev. Hort. Belg.* 1904, 7, and *Gard. Chron.* 1904, xxxv. 370, figs. 164, 165; *André, Rev. Hort.* 1904, 58, fig. 23; *Bois, Rev. Hort.* 1907, 177, figs. 60, 61; *Thonner, Blütenpfl. Afr.* t. 1; *Engl. Pflanzenw. Afr.* ii. 84; *Th. & Hél. Durand, Syll. Fl. Congol.* 650.

South Central. Belgian Congo: Lualaba-Kasai district; plateau between the Luisa and the Casserigi Rivers, *Pogge*; Bena-ganza, near the Inabo River, *Pogge*; right bank of the Lubi River, *Lemarinell*; left bank of the Lulua River, near Luluabourg, *Gentil*; Kanda-Kanda, *Gentil*; between Kanda Kanda and Lusambo, *Gentil*; without precise locality, *Pynaert*.

The *Tchiondo* of the Kanioka, *Biondo* of the Baluba, *Lulondo* or *Kalaba Kaba* of the Lulua, this species has no economic value; it occurs in dry savannahs and survives the annual grass-fires (*Gentil*). The leaves are deciduous, disappearing during the hot season; the fresh foliage springs up when the rains commence (*Laurent*). The plant has been introduced to cultivation through the efforts of Lemarinel, Laurent, Gentil and Pynaert. Lemarinel's plant has been treated by De Wildeman as distinct from that of Pogge, perhaps owing to De Wildeman's belief that Pogge's plant is an Angolan species which only occurs outside the limits of the Belgian Congo. The locality in which Pogge originally found this Cycad is, however, within the Lualaba-Kasai district, between the Kasai and the Sankuru, not far south of Mussumba; Pogge met with it again, prior to its re-discovery by Lemarinel, in a locality within the

same district but 150 miles further north (*Lamarinel*); so far, it has not been found in Angola (*Pogge*). Ascherson describes the apex of the scales of the female cone as distinctly umbonate; they are, as De Wildeman remarks, raised in the centre, but there is no umbo such as that which characterises the scales of the female cone in *E. Barteri* and in *E. Hildebrandtii*.

3. *E. septentrionalis*, *Schweinf. in Bot. Zeit.* xxix. (1871), 334. Stem usually very short, globose, 1 ft. in diam., hardly rising above the soil, but sometimes developing a stout cylindrical trunk 2 ft. high, closely covered with alternating scales and persistent imbricating leaf-bases clothed with dense grey tomentum. Leaves 5 ft. long, 7-9 in. wide above the middle, dark green; petiole and rachis subcylindric, clothed with a more or less persistent grey tomentum; pinnules firmly coriaceous, about 50 pairs, at first densely tomentose, ultimately sparingly pubescent or nearly glabrous, ovate-lanceolate, rather distinctly falcate, 4-5 in. long, $\frac{2}{3}$ -1 in. wide, abruptly slightly unequally rounded or wide-cuneate at the base, apex abruptly acute, pungent, margin with 3-8 diverging teeth, mainly in the basal half, on either side. Male cone not described; sometimes, in examples with elongated stems, the cones 8-10 on a single plant (*Schweinfurth*). Female cone or scales not seen (*Schweinfurth*). Seeds ovoid, not angled, about 1 in. long; outer coat not seen (*Schweinfurth*).—*Schweinf. ex A. Br. in Ind. Sem. Hort. Berol.* 1874, 18; *Regel in Gartenfl.* xxv. 1876, 203, 205; *Aschers. in Verh. Bot. Ver. Brand.* xx. (1878), xxxv.; *Eichler in Engl. & Prantl, Pflanzenfam.* ii. i. 22; *Warburg in Engl. Pfl. Ost-Afr. B.* 173; *De Wild. Ic. Hort. Then.* iv. 176, 184; *Engl. Pflanzenw. Afr.* ii. 84; *A. Cheval. Études Fl. Cent. Afr.* i. 379. *E. sp.*, *Schweinf. Heart of Africa*, i. 448; *Stuhlmann, Mit Emin Pascha*, 397, possibly. *Cycadea*, *Schweinf. Heart of Africa*, ii. 374.

North Central. Oubangui-Shari Territory: Mandjia; near the confluence of the Nana and the Gribingui Rivers, 1300 ft., *Chevalier*, 6303. Dar Banda: near Ndelle, 1900 ft., *Chevalier*, 7906; Boro Valley, 1700-2000 ft., *Chevalier* 7071.

Nile Land. Golo: Kredy Nduggo country; between the Uyeeli and the Uyissoba, east of the Beery (specimens with distinct cylindrical stems), *Schweinfurth*; Dem Zubeir, 2200 ft., *Boardman*! Niam-niam: Mambeli; Gumango Hill near the Ryc, *Schweinfurth*, 2952! on the Ibba (Tonj) River near Nganye, *Schweinfurth*, 3992! east of the upper Huüh, *Schweinfurth*. Bongo: on the Lohssy River, at Abu Ssamat, *Schweinfurth*; near Ngoli's village (seeds), *Schweinfurth*! Uganda: Nile Province; on a rocky hill near Agu, 60 miles east of Dufila (photograph), *Seth-Smith*!

The *Mwue Piah* of the Niam-niam, the *Kugga Kondo* of the Bongo and the *Kotto* of the Kredy Nduggo. Among the Niam-niam it is put to no economic use; the Kredy Nduggo prepare a kind of beer from the mealy central part of the stem (*Schweinfurth*). According to *Schweinfurth* it is confined to savannah forest and survives the annual grass-fires, sending up its fresh foliage in February when these are over; it does not extend northwards into the districts of Jur or Mittu. It is possible that the *Encephalartos* recorded by *Stuhlmann* as met with by *Emin Pasha* and himself in savannah forest on the Upper Duki, a tributary of the Ituri immediately to the west of Lake Albert Nyanza, may be this species. The outer coat of the seed has not been seen, the firm inner coat is pale pink.

4. **E. Hildebrandtii**, *A. Br. & Bouché, Ind. Sem. Hort. Berol.* 1874, 8. Stem usually well developed, cylindrical, casually branched, up to 20 ft. high, 1 ft. in diam., occasionally short or very short, closely covered with alternating scales and persistent imbricating leaf-bases sparingly clothed with grey cottony tomentum. Leaves 8-9 ft. long, 12 in. wide above the middle, dark green; petiole and rhachis subcylindric, clothed at first with deciduous grey tomentum, soon quite glabrous; pinnules firmly coriaceous, 50-70 pairs, linear-lanceolate, very slightly falcate, 9 in. long, $\frac{2}{3}$ -1 in. wide, somewhat unequally attenuated to the narrow base, apex acute, pungent, margin with 1-4, usually 2-3, diverging teeth on either side, the uppermost teeth generally some distance from the tip but not infrequently high up and the tip then 3-spinescent—in young plants casually 4-5-spinescent. Male cone peduncled, sometimes up to 7 in one crown, greenish or dull-red, ovate to narrow-cylindric, 8-18 in. long, $2\frac{1}{4}$ -4 in. wide; peduncles $3\frac{1}{2}$ in. long, tomentose: scales spreading, obovate-deltoid, fertile portion $\frac{3}{4}$ in. long, rather longer than broad, apex rhomboid, $\frac{2}{3}$ - $\frac{3}{4}$ in. across, the lateral angles acute, the upper very obtuse, ridged and faintly faceted, not umbonate. Female cone sessile, green, at length becoming dull yellow, subcylindric, up to 2 ft. long, 7 in. wide; apex of scales wide-rhomboid, 2 in. across, 1 in. deep, lateral angles explanate, upper and lower very obtuse, umbonate near the lower angle. Seeds ellipsoid or ovoid, faintly angled, $1\frac{1}{4}$ in. long; outer coat vermilion.—*A. Br.* in Sitzungsber. Gesellsch. Naturf. Freunde, Berl. 1876, 117, and in Monatsber. Akad. Berl. 1876, 859; Regel in Gartenfl. xxv. 1876, 203, 204, and xxvi. 1877, 215 with fig.; Aschers. in Verh. Bot. Ver. Brand. xx. (1878), xxxv.; Mast. in Gard. Chron. 1878, ix. 430; Hildebrandt in Zeitschr. Gesellsch. für Erdkunde, xiv. (1879), 264; Carrière in Rev. Hort. 1880, 456, fig. 93 (*Hildebrandii*); Eichler in Monatsber. Berl. Ver. Beförd. Gartenb. 1880, 50, t. 1, and in Engl. & Prantl, Pflanzenfam. ii. i. 22, fig. 14 A, B; Hennings in Gartenfl. 1890, 231, fig. 55, 1 and 4, 4a-δ; Stuhlmann, Mit Emin Pascha, 824; Engl. Pfl. Ost-Afr. A. 35, 78, C. 92; Warburg in Engl. l.c. B. 173; Mast. in Gard. Chron. 1900, xxvii. 120, with suppl. fig.; Werth, Veg. Insel Sansibar, 49; De Wilde, Rev. Hort. Belg. 1903, 196, fig. 29; De Wild. Ic. Hort. Thén. iv. 181; Stapf in Kew Bulletin, 1914, 386, and in Bot. Mag. tt. 8592, 8593. *E. villosus*, var. *Hildebrandtii*, Engl. Pflanzenw. Afr. ii. 84. *E. villosus*, forma *Hildebrandtii*, Hennings, l.c. 238. *Zamia Hildebrandii*, Hort. ex Carrière, l.c. figs. 94, 95.

Nile Land. British East Africa: Seyidieh; hills near Mombasa, *Kirk!* *Hildebrandt!* hills near Shangamui, *Hildebrandt!* Rabai Hills, at Mlima, *Taylor!* old lake-bed below Kaya-Bomu, *Taylor!* Samburu, *Powell!*

Mozamb. Distr. German East Africa: Usambara; Tanga, in the coast belt, *Kirk!* Simbili, at the base of the Usambara Hills, *Holst,* 2371! upper Bombo Valley, 2700 ft., in savannah forest, *Engler.* Useguha; Bagamoyo, in the coast belt, *Kirk!* Rosako, 17 miles west of Bagamoyo, in savannah-forest, *Stuhlmann.* Usaramo; Dar-es-Salaam, in the coast belt, *Kirk!* Island of

Zanzibar: among bushes on recent coral formation, *Kirk* (and photograph)! *Sacleur*, 6264! *Werth*.

The *Mtsapu* of the Rabai range (*Taylor*), the *Mkarabáka* of Useguha (*Stuhlmann*), this species is sometimes termed the East African Sago-palm (*Engler*). The stem, like that of various South African species, yields Kaffir Bread (*Engler*), whence the generic name *Encephalartos*, ἐν κεφαλῇ ἄρτος; near Mombasa, the farinaceous seeds serve as food in time of famine (*Hildebrandt*). Allied, among the tropical species, most closely to *E. laurentianus*, De Wild., of Uganda and the Belgian Congo and to *E. gratus*, Prain, of Nyasaland, *E. Hildebrandtii* differs from the former in the shape of the female cone-scales, from the latter in that of the male cone-scales, from both by its narrower, less distinctly falcate pinnules; less nearly allied to *E. villosus*, Lem., of Natal, whereof *E. Hildebrandtii* has by some authors been thought a geographical form. It is difficult in certain stages to discriminate *E. Hildebrandtii* from *E. villosus* by their foliage; the female cone-scales, umbonate in *E. Hildebrandtii*, flattened in *E. villosus*, differ however so essentially as to invalidate the suggestion that the two are conspecific.

5. *E. ferox*, *Bertol. f. in Mem. Accad. Sci. Bologn.* iii. (1851), 264. Stem fusiform, about 2½ ft. high, 1 ft. in diam. Leaves 10 in. wide above the middle; petiole and rhachis subcylindric; pinnules firmly coriaceous, ovate-oblong, not at all falcate, 4–6 in. long, 1¾–2 in. wide, very oblique at the base and then rounded on the upper, narrow-cuneate on the lower edge, apex broad, pungently 2–4-spinescent, margin with 2–4 strong triangular diverging pungent teeth on either edge. Female cone sessile, sometimes 3 in one crown, red (*Fornasini*). Seeds with outer coat black (*Fornasini*).—*Engl. Pfl. Ost-Afr. C.* 92; *De Wild. Ic. Hort. Then.* iv. 181; Prain in *Kew Bulletin*, 1916, 180.

Mozamb. Distr. Portuguese East Africa: Mozambique, *Fornasini*.

The trunk of *E. ferox* yields a kind of flour used as food; the black seeds are not edible (*Fornasini*). As regards the bases and the marginal tooting of the leaf-pinnules this species resembles *E. laurentianus*, De Wild., of Uganda and the Belgian Congo, and *E. gratus*, Prain, of Nyasaland. In this Mozambique plant, however, the pinnules are much shorter relatively to their width and are nearly straight. From *E. Hildebrandtii*, A. Br. & Bouché, which is met with from Dar-es-Salaam northwards to Mombasa, *E. ferox* differs in having much shorter and broader more coarsely toothed leaf-pinnules, and in having seeds with a black instead of vermilion outer coat. No specimen of *E. ferox* has been seen; we are, however, indebted to Professor Antonio Bertoloni for a water-colour drawing of a portion of one of the leaves on which his grandfather's original account of *E. ferox* was mainly based.

6. *E. gratus*, *Prain in Kew Bulletin*, 1916, 181. Stem usually very short, globose or ellipsoid, often entirely underground, 1–1¼ ft. high, 1 ft. in diam., occasionally and especially in male plants subcylindric, up to 3–4 ft. high and at times over 2 ft. in diam., closely covered with alternating scales and persistent imbricating leaf-bases clothed with grey cottony tomentum. Leaves usually 4–5 ft., occasionally up to 7 ft. long, 12 in. wide above the middle, dark-green; petiole and rhachis subcylindric, clothed with persistent grey tomentum; pinnules firmly coriaceous, 30–70 pairs, ovate-

lanceolate, very distinctly falcate, 7-9 in. long, $1\frac{1}{4}$ in. wide, very oblique at the base and wide-cuneate or rounded on the upper, narrow-cuneate on the lower edge, apex acutely acuminate, pungent, margin with 1-4 diverging teeth throughout the lower edge, and 2-4 strong diverging teeth, mainly in the basal half, on the upper edge, occasionally a tooth on the lower edge high up and the tip then 2-spinescent; in young plants casually 4-5-spinescent. Male cone peduncled, sometimes 5 or more in one crown, dull yellowish-green finely dotted with deep red, becoming dark brown after pollen is shed, ovate to fusiform, 12-16 in. long, 3-4 in. wide; peduncles 6-7 in. long, tomentose; scales spreading, wide obovate-deltoid, fertile portion $\frac{3}{4}$ in. long, as much wide, apex rhomboid, $\frac{3}{4}$ in. across, the lateral angles acute, the upper very obtuse and sometimes nearly obsolete, ridged and distinctly 3-faceted, faintly umbonate. Female cone peduncled, sometimes up to 10 in one crown, dull yellowish-green, becoming at length dark brown, subcylindric or narrow-conical, up to 2 ft. long, 6-8 in. wide; peduncles $4\frac{1}{2}$ - $5\frac{1}{2}$ in. long; apex of scales wide-rhomboid, $2\frac{1}{4}$ in. across, $1\frac{1}{4}$ in. deep, lateral angles explanate, upper and lower very obtuse, umbonate near the lower angle. Seeds ellipsoid or ovoid, rather distinctly angled and 3-7-faceted by compression, $1\frac{1}{3}$ - $1\frac{1}{2}$ in. long; outer coat dull vermilion.

Mozamb. Distr. Nyasaland: south-western Mlanji, between the Tuchila and the Ruo Rivers, 2500 ft., Mahon! lower slopes of Mount Mlanji, 2200-3000 ft., Davy! Zomba, cultivated, McClounie, 197! Davy, 417!

This species is not put to any economic use, and has no definite vernacular name (Davy). Originally discovered in 1899 by Mahon, *E. gratus* has been in cultivation since 1903 when it was introduced by McClounie; a second introduction was effected by Davy in 1914. It is most common in rocky ravines and on rocky river-banks, frequently in rock-crevices with no apparent soil. Usually subject to intense insolation, it nevertheless survives occasional brief submersion in heavy floods. Specimens are sometimes met with in savannah forest and less often in dense forest with rich soil. In savannah the plants are usually defoliated by the annual grass-fires, but survive. Female plants may remain leafless for twelve to eighteen months after ripening seeds, their stems continuing short and globose, about 1 ft. across, hypogæal or only rising 6 inches above the surface. Male plants of approximately the same age may develop stems 4 ft. high, over 2 ft. thick at the base (Davy). In shape of leaf-pinnules *E. gratus* most resembles, among the tropical species of the genus, *E. laurentianus*, De Wild., from Uganda and the Belgian Congo. In shape of cones it most resembles *E. Hildebrandtii*, A. Br. & Bouché, from Usaramo, Usambara and Seyidieh. The male cone-scales of *E. gratus*, however, differ greatly from those of the two species mentioned, and most resemble those of *E. Barteri*, Carruth., from Upper Guinea and of *E. Poggei*, Aschers., from the Belgian Congo, two species with widely different foliage. As regards the shape, size, and marginal toothing of the leaf pinnules, *E. gratus* agrees closely with *E. Woodii*, Sand., from Zululand, a species whose cones have not yet been described. When seen growing side by side, however, the Zulu and the Nyasa plants are readily distinguishable; the leaves of *E. Woodii* are shining above, those of *E. gratus* are dark dull green.

7. *E. laurentianus*, De Wild. *Études Fl. Bas- et Moyen-Congo*, i. 10, t. 25. Stem well-developed, cylindric, sometimes irregularly shaped (*Gentil*), erect or sometimes prostrate (*Johnston*), casually

branched especially when prostrate, 12–30 ft. high, $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. thick, closely covered under the crown with 2–3 in. wide alternating scales and persistent imbricating leaf-bases, lower down pale, shaggy, and marked by the scars of the fallen scales and leaves (*Gentil*). Leaves 10–20 ft. long, $1\frac{1}{2}$ – $2\frac{1}{4}$ ft. wide above the middle, dark green; petiole and rachis slightly angular, quite glabrous; pinnules firmly coriaceous, 60–80 pairs, ovate-lanceolate, distinctly falcate, 10–15 in. long, $1\frac{1}{4}$ –2 in. wide, very oblique at the base and there rounded on the upper, straight or at times concave on the lower edge, apex acutely acuminate, pungent, margin with 6–10 strong diverging teeth along either edge, the tip in young plants casually 3–4-spinescent. Male cone peduncled, pale green to bright red, ovate to narrow-cylindric, 6–12 in. long, $2\frac{1}{2}$ in. wide; peduncle 5–10 in. long, tomentose; scales spreading, obovate-deltoid, fertile portion $\frac{3}{4}$ in. long, rather longer than broad, apex rhomboid, $\frac{2}{3}$ – $\frac{3}{4}$ in. across, the lateral angles acute, the upper very obtuse, ridged and faintly faceted, not umbonate. Female cone sessile, greyish-green (*Johnston*), oblong-ellipsoid, $1\frac{1}{2}$ ft. long, 9 in. wide, usually 3 to each separate crown (*Doggett*); apex of scales wide-rhomboid, $2\frac{1}{2}$ in. across, $\frac{3}{4}$ in. deep, lateral angles explanate, upper and lower very obtuse, vertically 2-ridged with an obscure central channel between the ridges, not umbonate. Seeds ovoid-oblong, faintly angled, $1\frac{1}{2}$ in. long; outer coat orange (*Johnston*).—De Wild. Ic. Hort. Then. iv. 176, 183, Not. Pl. Util. Congo, i. 392, tt. 27, 28, figs. 1–6 (*Laurentii*), and Miss. É. Laurent, 370, figs. 58, 60; *Gentil*, Rev. Hort. Belg. 1904, 8, and Gard. Chron. 1904, xxxv. 370, fig. 163; André, Rev. Hort. 1904, 59, footnote; Bois, Rev. Hort. 1907, 178, fig. 62; Pynaert, Rev. Hort. Belg. 1908, 181, 182 with fig.; Engl. Pflanzenw. Afr. ii. 84; Th. & Hél. Durand, Syll. Fl. Congol. 649. *E. sp.*, Johnston, Uganda Protect. i. 134, 321, 322, figs. 216, 217; André, l.c., possibly, as to Büttner's plant.

Nile Land. Uganda: Toro; valley of the Mpanga, 3500–4200 ft., *Doggett*! *Johnston* (photographs)! *Bagshawe*, 1054!

Lower Guinea. Belgian Congo: Kwango district; on steep banks of the Kwango at Kasongo Lunda, *Gentil*! without precise locality, *Pynaert*. Angola: Portuguese Congo; Mayaka, on steep banks of the Kwango opposite Kasongo Lunda, *Gentil*!

The *Mulele* of the inhabitants of the Kwango valley, this species has no economic value (*Gentil*). In its southern locality it is said to be confined to the sloping banks of the Kwango and the level tract immediately behind; *Gentil*, to whom its first introduction to cultivation in 1903 is due, thinks that here it may be a survival from old forests destroyed by constantly recurring fires. According to Johnston it is, in its northern locality, similarly restricted to open park-like forest among boulders in the Mpanga valley near the south-eastern base of Ruwenzori. André states that a species of *Encephalartos* was met with by Büttner during his journey in 1884–5 across Angola and the south-west Congo. If so, the species in question was probably that here described; Büttner's route followed the left bank of the Kwango. There is, however, no allusion to the species in the list of plants collected by Büttner (Mitteil. Afr. Gesellsch. Deutschl. v. 253–266) nor is it included among the new plants described by him in 1889 (Verh. Bot. Ver. Brand. xxxi. 64). A second introduction of *E. laurentianus*, from the Kwango district, was effected by Pynaert prior to 1906.

ADDENDA.

4a. *Celtis fragifera*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8c, 299.

A tree 90-120 ft. high, with a quite cylindrical trunk 45-75 ft. high below the branches, and $2\frac{1}{2}$ -3 ft. in diam.; branches forming a rounded head. Bark whitish. Young branchlets green, angled, puberulous and very scabrid; branches ash-coloured, with prominent white lenticels. Leaves stalked, oval or oval-oblong, abruptly long-acuminate, acute, somewhat wedge-shaped below from a rounded base, sometimes oblique, margin entire or at the top slightly coarsely dentate, $3\frac{1}{3}$ -8 in. long, $1\frac{3}{4}$ - $3\frac{1}{2}$ in. wide, 3-nerved at the base of the blade, with 2 additional lateral nerves above; firm but membranous in texture, upper face beautifully green, and very shining, the lower paler, very scabrid; main nerves depressed above, prominent beneath, lateral nerves nearly horizontal; petiole terete, channelled above, $3\frac{1}{2}$ -5 lin. long, finely puberulous-scabrid. Stipules lanceolate, subulate, spurred at the base, $2\frac{1}{2}$ -3 lin. long. Fruiting peduncles axillary, $\frac{1}{2}$ - $1\frac{1}{2}$ in. long, 1 lin. thick, somewhat woody, glabrous, ascending, bearing a single fruit. Drupe subrotund or obovoid, crowned at the top with the remains of the styles, 10 lin. long, about 9 lin. in diam., green when ripe, surface very slightly rough, with strawberry taste and smell; pulp dark green, somewhat gelatinous, 2- $2\frac{1}{2}$ lin. thick; stone obovoid, 5 lin. across, the wall about $\frac{1}{2}$ lin. thick, white, hard, very rough, enclosing a roundish seed 4 lin. in diam., the thick fleshy cotyledons oily.

Upper Guinea. Ivory Coast: Vallée du Moyen Comocé, between Tingouéla and Assipasso, Chevalier, 22575.

Native name "Hézan."

4b. *Celtis compressa*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8c, 298.

A fine tree, 80 to 100 ft. high, with a cylindrical trunk, winged at the base and 30 to 60 ft. high below the branches, and $1-2\frac{1}{2}$ ft. in diam. Branches grey, with white lenticels, when young very slender and ferruginously pubescent. Leaves close together, obovate or oblong, acuminate with the tip obtuse, often apiculate, rarely long and acute, base acutely wedge-shaped, margin entire or sometimes somewhat dentate above and on the fertile branches, on fertile shoots broader and regularly toothed, 3-nerved, with 3 to 4 ascending lateral nerves on each side above the base, in the adult state quite glabrous except on the nerves, bright green and shining on both sides; nerves depressed above, puberulous, prominent beneath and somewhat pubescent, nervation conspicuous below; petiole 1-3 lin. long, with ferruginous pubescence. Stipules lanceolate-subulate, $1\frac{1}{2}$ - $2\frac{1}{2}$ lin. long, pubescent, soon falling. Fruits solitary, axillary; pedicels slender, puberulous, $2\frac{1}{2}$ -6 lin. long; sepals often persisting at the base of the fruit,

lanceolate, acute, pubescent, $\frac{3}{4}$ lin. long. Drupe ovoid, compressed, even when young glabrescent, except for a few hairs at the base and apex, 5-6 lin. long, 3 lin. broad, marked with more or less prominent lines and two longitudinal keels. Styles 2-fid, persisting, ferruginously pubescent.

Upper Guinea. Ivory Coast: Bouroukrou, *Chevalier*, 16144! 16152! Morénoù, near Bangouanou, *Chevalier*, 22451! 22460!

8. *Celtis Prantlii*, Priemer. Add.: *C. scotellioides*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém 8^e, 299.

Upper Guinea. Ivory Coast: High Sassandra; Dyola country, between Droupleu and Zoanlé, at 2000 ft., *Chevalier*, 21459.

77b. *Dorstenia piscicelliana*, Buscal. & Muschler in Engl. Jahrb. xlix. 464. A fine plant $1\frac{1}{2}$ -2 ft. high. Stem succulent, erect, cylindrical, with a few branches, about $1\frac{1}{2}$ lin. thick above the base, somewhat densely or more often sparsely covered with minute simple 1-celled whitish hairs, generally glabrous below; internodes up to $1\frac{1}{4}$ - $1\frac{3}{4}$ in. long, very rarely longer. Leaves sessile, thick, lanceolate or generally linear-lanceolate, gradually narrowing towards the base, margin entire or very rarely subrepand-denticulate (teeth very small, less than $\frac{1}{2}$ lin. long, mucronulate), $2\frac{1}{3}$ -3 in. long, $2\frac{1}{2}$ - $3\frac{1}{2}$ lin. wide, generally bright green, hairy like the stem and peduncle, penninerved, lateral nerves thicker, sunk above, slightly conspicuous beneath, with slender reticulations between the lateral nerves. Stipules caducous, leaving visible scars. Inflorescences solitary, axillary; stalk long, more or less densely covered with the minute hairs; disc orbicular, 8-9 lin. in diam., apparently dingy-purple; bracts generally 10-12, linear or very rarely linear-lanceolate, acute or very acute, 2- $2\frac{1}{2}$ in. long, sometimes alternating with shorter bracts $1\frac{1}{2}$ - $1\frac{3}{4}$ in. long. Endocarp subglobose, keeled on the back, warted except on the ventral face, 1 - $1\frac{1}{2}$ lin. long.

Mozamb. Distr. Rhodesia: Mountain plains at 3300 ft. between Broken Hill and Buana Mukuba, *Princess Helena of Aosta*, 389.

Nearly allied to *D. Hildebrandtii*, Engl., but distinguished by its narrower leaves, much larger receptacle with much longer stalk and much longer bracts.

90. *Dorstenia barnimiana*, var. *tropæolifolia*, Rendle. Add:

Nile Land. British East Africa: near Mount Elgon, *Mrs. M. L. Milford-Barrington*!

124a. *Ficus djalonensis*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8e 301. A large tree, with very viscous white latex. Leaves at the apex of the branches, glabrous, ovate or elongate-ovate, sometimes subrhomboid, rounded or shortly and obtusely acuminate at the apex, truncate or subcordate at the base, 5-8 in. long, 3 - $4\frac{1}{2}$ in. broad, very leathery, shining above, yellowish-green below, more or less undulate on the margin, 3-5-nerved at the base, the middle nerve with 3-5 secondary nerves, nerves whitish and slightly prominent; petiole thick, cylindric, swollen at the apex, 2-5 in. long, sulcate above; stipules $\frac{3}{4}$ - $\frac{3}{4}$ in. long, lanceolate, long-acuminate, finely puberulous outside, whitish-tomentose on the lower part inside. Receptacles solitary or paired, sessile in the axils of the leaves, surrounded by the remains of 4-5 (?) small scarious ovate-lanceolate 1 - $2\frac{1}{2}$ lin.-long bracts, globose, very pubescent, crowned with a glabrous

ostiole, $\frac{2}{3}$ – $\frac{3}{4}$ in. in diam., yellowish-green outside, marked with a few shining spots. Ostiole with 2 lanceolate obtuse 4 lin.-long bracts pendulous within the receptacle. Flowers sessile or pedunculate, surrounded by scarious acicular bracts; ovary sessile, spherical. Male flowers few, inserted at the base and apex of the receptacle; stamens with a short filament, surrounded by 3 acute scarious sepals. Achenes rugose.

Upper Guinea. French Guinea: Futa Jallon; around Mamou, Soya, Jan. 1909, *Chevalier*, 20372.

Specimen not seen; the author marks its relation to *F. Nekkudu*, Warb., to which species, from the description, it runs down in our key and to which it is evidently very closely allied.

142a. *Ficus bangouanensis*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8e, 300. A tree 75–95 ft. high, with a cylindric trunk 45–60 ft. high, 1½–4 ft. in circumference; bark of the trunk reddish, smooth; branches spreading, forming a head; young branchlets slender, glabrous or very slightly puberulous. Leaves alternate, petiolate, ovate, subcordate at the base, slightly narrowed and obtuse at the apex, 4–6 in. long, 2½–3 in. broad, leathery, slightly undulate on the margin, dark green on the upper surface, glaucous-green below, glabrous; midrib prominent above, much so below; lateral nerves 7–10 on each side of the midrib, the lower two pairs from the base, prominent below, slightly conspicuous above; petiole 1–1½ in. long, subcylindric, finely channelled above, probably puberulous in a young state; stipules ovate-subulate, imbricate, 3–4 lin. long, slightly pubescent outside, falling off before the opening of the leaves. Receptacles pedunculate, solitary or paired in the leaf-axils or from where the leaves have fallen, spherical, $\frac{1}{2}$ – $\frac{7}{8}$ in. in diam., yellowish-green, white-spotted, papillose all over but not pubescent; peduncle slender, $\frac{1}{8}$ – $\frac{1}{5}$ in. long; involueral bracts 3, ovate-orbicular, about $\frac{1}{10}$ in. diam., puberulous outside. Ostiole $\frac{1}{6}$ in. in diam., with numerous ovate-orbicular bracts produced into an umbo; walls of receptacle firm and somewhat sclerotic. Flowers very crowded, the males not seen, the female pedicellate or sessile, small, with a very oblique style. Achenes small.

Upper Guinea. Ivory Coast: Morénon, Nov. 1909, *Chevalier*, 22444.

Specimen not seen; stated by the author to be allied to *F. umbellata*, Miq. According to our arrangement of the species it should be placed next to *F. Kerstingii*, Warb., from which by the description alone it does not appear to be easily separated.

14a. DECORSELLA, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8e, 297 (1916). [MORACEÆ.]

Flowers diœcious or monœcious? Male flowers not known. Female flowers numerous, inserted on the upper side of a dilated and three-branched pedunculate receptacle borne in the axil of a leaf, fasciculate or solitary, sessile, very minute, arising from 3 irregular swellings on both the upper and lower surfaces of the receptacle; bracteoles scarious, very minute. Calyx of 4–5 small imbricate sepals appressed to the ovary. Ovary concave above, without a distinct style or stigma. Ovule at first campylotropous, then anatropous. Fruit drupaceous, pedunculate, "nucleus" woody.

Seed one, with the hilum on the upper side; integument thin, membranous, with rather fleshy endosperm; radicle inferior. Leaves alternate, stipulate; stipules caducous; latex evidently absent.

Species 1, endemic.

1. **D. paradoxa**, *A. Chev. in Bull. Soc. Bot. France*, lxi, *Mém.* 8e, 298. A small shrub 3-4½ ft. high, everywhere glabrous. Stems slender, tough, branched at the apex, evidently without whitish latex in cortex. Leaves alternate, petiolate, oblong-acuminate, subacute, rounded or wedge-shaped at the base, 4¾-7 in. long, 1¾-2¾ in. broad, papery, very slightly crenulate; midrib conspicuous on both surfaces, with 7-8 pairs of lateral nerves; venation not at all prominent; petiole 2-3 lin. long, deeply channelled above; stipules lanceolate, very acute, about 1 lin. long, caducous. Receptacle woody, solitary in the axils of the upper leaves, ½-¾ in. long, ½-¾ in. broad and subtriangular at the apex, divided into 3 thick short rounded lobes, clothed with flowers on the whole surface and also below. Involucre absent. Female flowers not more than ½ lin. in diam., sessile, clustered on small swellings of the receptacle, inserted in the axils of scarious ovate-acute ½ lin.-long bracts. Sepals 4-5, suborbicular, concave, ½ lin. long, much imbricate, supported on the outside by 2-3 scarious bracts. Ovary ½ lin. in diam., flattened and disc-like. Fruit with peduncles ½-¾ in. long, articulate above the receptacle, at first of a dull green, when mature red, glabrous, spherical or somewhat turbinate at the base, 5-6 lin. in diam., with a fleshy exocarp, and a woody whitish-yellow endocarp about 1 lin. thick. "Nucellus" fleshy; cotyledons 2, leafy, whitish, heart-shaped.

Upper Guinea. Ivory Coast: valley of the Agniéby at Accrédiou, 3 Feb. 1907, *Chevalier*, 17113; Erymakougné station, in the forest, 27 Jan. 1907, *Chevalier*, 17192; Dyola country, on the bank of the Boan river, near Danané, 16 Apr. 1909, *Chevalier*, 21277.

Known to us only from Chevalier's description. No suggestion is offered by the author as to the precise affinity of the plant.

3a. **Urera sarmentosa**, *A. Chev. in Bull. Soc. Bot. France*, lxi, *Mém.* 8e, 302. A diocious woody plant, sarmentose, climbing, 10-16 ft. long. Stems ash-colour, subtriquetrous, 2-3½ lin. thick, bearing a pair of gibbous vesicles 1½-2½ lin. in diam. (? galls) at the points of division. Young branches glabrous or slightly puberulous at the top. Leaves long-stalked, thinly membranous, oval, apex obtusely acuminate, base subcordate, margin entire, lateral nerves in 4 to 5 pairs, the lowest pair basal, glabrous, or with a few stinging hairs on the nerves when young, upper face shining; petioles slender, glabrous, ¾-2½ in. long. Stipules linear-subulate, 2 lin. long, soon falling. Male flowers in reddish-green corymbiform axillary cymes, 1½-3 in. long, generally in the axil of the leaf-scars on old branches; peduncle ½-1½ in. long, very finely puberulous, pedicels and rhachis very fleshy, yellow-green. Flowers in umbels of 5 to 7 at the end of branches of the second and third order; pedicels very slender, ¾-1 lin. long; bracts oval, less than ¼ lin. long; perianth-segments 5, oval, subobtusely, ½ lin. long, puberulous on the outside. Female flowers in corymbiform cymes, ¾-1½ in. broad; peduncle glabrous, 5-7 lin. long; branches of inflorescence glabrous, slender, passing into persistent small branched brown-purple lacinate outgrowths beset with

stiff stinging hairs; flowers subsessile; calyx absent; ovary $\frac{1}{2}$ lin. long, glabrous, bearing a finely papillose stigma. Ripe fruit yellow-orange, fleshy, subtriquetrous-ovoid, $1-1\frac{1}{4}$ lin. in diam.; seed $\frac{3}{4}$ lin. long.

Upper Guinea. Ivory Coast: High Sassandra; Dyola country, Zoanlé, at 2000 ft., *Chevalier*, 21456, between Niangouépleu and Man, *Chevalier*, 21530.

I have little doubt that this is synonymous with *U. Thonneri*, De Wild. & Durand.

4a. *Urera robusta*, A. Chev. in Bull. Soc. Bot. France, lxi. Mém. 8e. 301. A robust woody liane, climbing on trees up to 45 to 60 ft., sometimes an epiphyte, clothed throughout with stinging hairs; younger stems pubescent. Leaves membranous, obovate or obovate-elliptic, abruptly acuminate, very acute, base wedge-shaped, margin denticulate-runcinate. $4-5\frac{1}{4}$ in. long, $2\frac{1}{2}-3$ in. wide, 3-nerved at the base, with 3 to 4 pairs of lateral nerves above, which are united by parallel veins, pubescent on both faces; petiole terete, $\frac{3}{4}-1\frac{1}{2}$ in. long. Stipules oval-lanceolate, 5 lin. long, passing into a long bristle-like point and with two lateral nerves. Female flowers in dense lateral cymes, $1\frac{1}{2}-2\frac{1}{2}$ in. wide; peduncle ascending, $\frac{3}{4}-1$ in. long, pubescent; branches of inflorescence markedly dichotomous, bearing in addition to the flowers small lacinate purple terminal outgrowths bristling with stinging hairs; flower-pedicels very slender, $\frac{1}{4}-\frac{1}{2}$ lin. long. Perianth-segments 5, linear-oblong, glabrous, $\frac{3}{4}$ lin. long, some becoming red, others orange-yellow during ripening of the fruit. Ripe fruit yellow, discoid, 1 lin. in diam., enveloped in the perianth.

Upper Guinea. Ivory Coast: High Sassandra; Dyola country, *Chevalier*, 21539; Toura country; Gouréni, at 3000 ft., *Chevalier*, 21641.

The leaves are sometimes reddish beneath.

2. *Myrica arborea*, Hutchinson in Kew Bulletin, 1917. Add: 234 and delete *ined.*

3. *Salix Hutchinsii*, Skan. Add: in *Kew Bulletin*, 1917, 235.

5. *Salix nigerica*, Skan. Add: in *Kew Bulletin*, 1917, 236.

6. *Salix Murielii*, Skan. Add: in *Kew Bulletin*, 1917, 235.

7. *Salix Schweinfurthii*, Skan. Add: in *Kew Bulletin*, 1917, 237.

INDEX OF GENERA AND SPECIES.

The Synonyms and Species incidentally mentioned are printed in Italics.

	Page		Page
<i>Acanthotreculia</i>		<i>Bosqueia</i>	217
<i>Winkleri</i> , Engl.	228	<i>angolensis</i> ,	
<i>Adicea</i>		<i>Ficalho</i>	218
<i>mooreana</i> , Hiern	250	<i>cerasiflora</i> , Volk.	219
<i>tetraphylla</i> , O. Kze,		<i>Phoberos</i> , Baill.	219
var. <i>angolensis</i> ,		<i>spinosa</i> , Engl.	14
Hiern	271	<i>Welwitschii</i> , Engl.	218
<i>Anona</i>		<i>Bosqueiopsis</i>	215
<i>senegalensis</i> , Pers.	79	<i>carvalhoana</i> , Engl.	216
<i>Antiaris</i>	223	<i>Gilletii</i> , De Wild.	
<i>africana</i> , Engl.	223	& Dur.	217
<i>usambarensis</i> ,		Lujæ, De Wild.	217
Engl.	224	<i>parvifolia</i> , Engl.	216
<i>Welwitschii</i> , Engl.	224	<i>Bosqueica</i>	217
<i>Artocarpæ</i>	19	<i>Brosimeæ</i>	19
<i>Australina</i>	305	<i>Broussonetia</i>	18
<i>acuminata</i> , Wedd.	306	<i>Caidbeja</i>	
<i>flaccida</i> , Wedd.	305	<i>adhærens</i> , Forsk.	300
<i>schimperiana</i> ,		<i>Callitris</i>	
Wedd.	306	<i>Mahoni</i> , Engl.	335
<i>Barbeya</i>	15	<i>Whytei</i> , Engl.	335
<i>oleoides</i> , Schweinf.	15	CANNABINACEÆ	16
BARBEYACEÆ	14	<i>Cannabis</i>	16
<i>Bœhmeria</i>	284	<i>sativa</i> , Linn.	16
<i>caudata</i> , Poir.	285	<i>Cardiogyne</i>	24
<i>hypoleuca</i> , Hochst.	296	<i>africana</i> , Bur.	24
<i>macrostachya</i> ,		<i>Carica</i>	80
Wedd.	285	<i>Casuarina</i>	315
<i>mauritiana</i> ,		<i>africana</i> , Lour.	316
Wedd.	285	<i>quisquetifolia</i> , L.	315
<i>parvifolia</i> , Wedd.	304	CASUARINÆ	315
<i>pauciflora</i> , Bl.	304	<i>Celtis</i>	2
<i>platyphylla</i> , Don	285	<i>Adolphi-Friderici</i> ,	
var. <i>angolensis</i> ,		Engl.	9
Rendle	286	<i>australis</i> , A. Rich.	4
var. <i>macrosta-</i>		<i>Brownii</i> , Rendle	10
<i>chya</i> , Wedd.	286	<i>Burmanni</i> , Planch.	4
var. <i>nigeriana</i> ,		<i>compressa</i> , A. Chev.	355
Wedd.	286	<i>dioica</i> , S. Moore	5
var. <i>ugandensis</i> ,		<i>Durandii</i> , Engl.	4
Rendle	286	var. <i>ugandensis</i> ,	
<i>procridioides</i> , Bl.	293	Rendle	5
<i>rigida</i> , Benth.	258	<i>foliis subrotundis</i> ,	
<i>salicifolia</i> , Don	296	Burm.	4
<i>wightiana</i> , Bl.	285	<i>Celtis</i> (<i>continued</i>)	
		<i>fragifera</i> , A. Chev.	355
		<i>guineensis</i> ,	
		Schumach.	11
		var. <i>parvifolia</i> ,	
		Schumach.	11
		<i>Henriquesii</i> , Engl.	4
		<i>ilicifolia</i> , Engl.	8
		<i>insularis</i> , Rendle	9
		<i>integrifolia</i> , Lam.	7
		<i>kraussiana</i> , Bernh.	3
		var. <i>flavescens</i> ,	
		Engl.	4
		<i>lactea</i> , Sim	4
		<i>mauritiana</i> ,	
		Planch.	9
		<i>Mildbraedii</i> , Engl.	6
		<i>Prantlii</i> , Priemer 8,	356
		<i>Prantlii</i> , Priemer	9
		<i>rhamnifolia</i> , Presl	4
		<i>scotellioides</i> , A.	
		Chev.	356
		<i>Soyauxii</i> , Engl.	5
		<i>Soyauxii</i> , Engl.	6
		<i>sp.</i> , Ficalho	4
		<i>sp.</i> , Planch.	9
		<i>Stuhlmannii</i> , Engl.	6
		<i>Tessmannii</i> , Rendle	7
		<i>ugandensis</i> , Rendle	5
		<i>usambarensis</i> , Engl.	6
		<i>vesiculosa</i> , Hochst.	4
		<i>Zenkeri</i> , Engl.	6
		<i>Centogyne</i>	
		<i>angolensis</i> , Welw.	218
		CERATOPHYLLÆ	326
		<i>Ceratophyllum</i>	326
		<i>cristatum</i> , Guill.	
		& Perr.	327
		<i>demersum</i> , L.	326
		var. <i>apiculatum</i> ,	
		Garcke	327
		var. <i>oxyacanthum</i> ,	
		K. Schum.	327
		<i>oxyacanthum</i> ,	
		Cham.	327
		<i>sp.</i> , Oliv.	327
		<i>culpari</i> , Schleid.	327

	Page		Page		Page
<i>Chaetacme</i>	13	<i>Dorstenia</i> (<i>continued</i>)		<i>Dorstenia</i> (<i>continued</i>)	
<i>aristata</i> , Engl.	13	var. <i>angustior</i> ,		<i>Hockii</i> , De Wild.	64
var. <i>kamerun-</i>		Engl.	71	<i>Holstii</i> , Engl.	36
<i>ensis</i> , Engl.	13	var. <i>ophiogloss-</i>		var. <i>grandifolia</i> ,	
<i>aristata</i> , Planch.	14	<i>oides</i> , Engl.	71	Engl.	36
<i>microcarpa</i> , Rendle	13	var. <i>Telekii</i> ,		<i>holtziana</i> , Engl.	69
var. <i>longifolia</i> ,		Engl.	71	<i>Hornblei</i> , De Wild.	65
Engl.	14	var. <i>tropæoli-</i>		<i>intermedia</i> , Engl.	32
<i>serrata</i> , Engl.	14	<i>folia</i> , Rendle 71, 356		<i>jabassensis</i> , Engl.	42
<i>Chlorophora</i>	21	<i>Barteri</i> , Bur.	53	var. <i>subcuneata</i> ,	
<i>alba</i> , A. Chev.	23	<i>Batesii</i> , Rendle	56	Engl.	42
<i>excelsa</i> , Benth. &		<i>benguellensis</i> ,		<i>kameruniana</i> , Engl.	76
<i>Hook. f.</i>	22	<i>Welw.</i>	63	<i>katangensis</i> , De	
<i>regia</i> , A. Chev.	23	<i>bicornis</i> , Schweinf.	49	<i>Wild.</i>	62
<i>tenuifolia</i> , Engl.	23	<i>Braunii</i> , Engl.	66	<i>Klainii</i> , Pierre	53
<i>Comptonia</i>	307	<i>Brieyi</i> , De Wild.	44	<i>kribensis</i> , Engl.	33
<i>Conoccephala</i>	19	<i>Brownii</i> , Rendle	36	<i>laikipiensis</i> , Rendle	34
<i>Cordia</i>		<i>Buchanani</i> , Engl.	48	<i>latibracteata</i> , Engl.	62
<i>abyssinica</i>	79	var. <i>longipedun-</i>		<i>Laurentii</i> , De	
<i>Cudrania</i>		<i>culata</i> , Rendle	48	<i>Wild.</i>	41
<i>sp.</i> , Kirk	24	<i>Buesgenii</i> , Engl.	59	var. <i>brevipedi-</i>	
<i>Cyathanthus</i>		<i>caudata</i> , Engl.	67	<i>cellata</i> , De	
<i>Zenkeri</i> , Engl.	221	<i>caulescens</i> ,		<i>Wild.</i>	41
CYCADACEÆ	344	<i>Schweinf.</i>	68	<i>Ledermannii</i> , Engl.	57
<i>Cycas</i>	345	<i>eiliata</i> , Engl.	31	<i>liebuschiana</i> , Engl.	73
<i>circinalis</i> , Thouars	346	<i>convexa</i> , De Wild.	47	<i>longicauda</i> , Engl.	44
subsp. <i>Thou-</i>		<i>crispa</i> , Engl.	73	<i>lotziana</i> , Engl.	39
<i>arsii</i> , Engl.	346	var. <i>lancifolia</i> ,		<i>Lujæ</i> , De Wild.	54
<i>comoroensis</i> , Bruant	346	Rendle	73	<i>lukafuensis</i> , De	
<i>madagascariensis</i> ,		<i>cuspidata</i> , Hochst.	68	<i>Wild.</i>	51
<i>Miq.</i>	346	<i>Debeerstii</i> , De		<i>Mannii</i> , Hk. f.	31
<i>Thouarsii</i> , R. Br.	345	<i>Wild. & Dur.</i>	62	<i>mirabilis</i> , R. E.	
<i>Thuarsii</i> , R. Br.	345	var. <i>multi-</i>		<i>Fr.</i>	65
<i>Debregeasia</i>	295	<i>bracteata</i> ,		<i>mogandjensis</i> ,	
<i>hypoleuca</i> , Wedd.	296	Rendle	63	<i>De Wild.</i>	55
<i>salicifolia</i> , Rendle	295	<i>Dinklagei</i> , Engl.	45	<i>multiradiata</i> , Engl.	54
<i>Decorsella</i>	357	<i>Dinklagei</i> , Engl.	59	<i>mundamensis</i> , Engl.	35
var. <i>paradoxa</i> , A. Chev.	358	<i>dionga</i> , Engl.	46	<i>mungensis</i> , Engl.	34
<i>Dicranostachys</i>	231	<i>edeensis</i> , Engl.	58	var. <i>bipinden-</i>	
<i>serrata</i> , Trécul	236	<i>ellenbeckiana</i> ,		<i>sis</i> , Engl.	35
<i>Didymodora</i>		Engl.	72	<i>obovata</i> , Hochst.	73
<i>acuminata</i> , Wedd.	306	<i>elliptica</i> , Bur.	31	<i>obtusibracteata</i> ,	
<i>cuneata</i> , Wedd.	306	<i>equatorialis</i> , Rendle	43	Engl.	41
<i>Didymogyne</i>		<i>foetida</i> , Schweinf.		<i>ophiocomma</i> , K.	
<i>abyssinica</i> , Wedd.	304	var. <i>obovata</i> ,		<i>Schum.</i>	32
<i>Dorstenia</i>	25	Engl.	72	var. <i>longipes</i> ,	
<i>alta</i> , Engl.	59	<i>frutescens</i> , Engl.	30	Engl.	32
<i>alternans</i> , Engl.	33	<i>gabunensis</i> , Engl.	39	var. <i>minor</i> ,	
<i>amœna</i> , A. Chev.	59	<i>Gilletii</i> , De Wild.	53	Rendle	32
<i>angusta</i> , Engl.	48	<i>Gœtzei</i> , Engl.	47	<i>ophiocomoides</i> ,	
<i>angusticornis</i> , Engl.	60	var. <i>angusti-</i>		Engl.	34
<i>aspera</i> , A. Chev.	58	<i>bracteata</i> ,		<i>ophioglossoides</i> , Bur.	71
var. <i>delloidea</i> ,		Engl.	47	<i>palmata</i> , Engl.	72
A. Chev.	59	<i>gourmanensis</i> ,		<i>paucidentata</i> ,	
<i>asteriscus</i> , Engl.	36	A. Chev.	68	Rendle	46
<i>barnimiana</i> ,		var. <i>floribunda</i> ,		<i>pellata</i> , Engl.	71
<i>Schweinf.</i>	70	A. Chev.	68	<i>Phillipsia</i> ,	
		<i>harmsiana</i> , Engl.	31	<i>Hook. f.</i>	73
		<i>Hildebrandtii</i> , Engl. 65	65	<i>pieta</i> , Bur.	38

Page		Page		Page
	<i>Dorstenia (continued)</i>		<i>Dorstenia (continued)</i>	
	<i>piscicelliana</i> , Bosc. & Muschler . . . 356		<i>tayloriana</i> , Rendle . . . 43	
	<i>Poggei</i> , Engl. . . 64		<i>Telekii</i> , Schweinf. . . 71	
	var. <i>Meyeri-Johannis</i> , Engl. 64		<i>tenera</i> , Bur. . . 35	
	<i>poinsettiifolia</i> , Engl. . . 45		<i>tenuifolia</i> , Engl. . . 52	
	var. <i>grossedentata</i> , Engl. . . 45		<i>Tessmannii</i> , Engl. 39	
	var. <i>subdentata</i> , Engl. . . 45		<i>tropaeolifolia</i> , Bur. 71	
	var. <i>undulata</i> , Engl. . . 45		<i>turbinata</i> , Engl. . . 57	
	<i>Preussii</i> , Schweinf. . . 70		<i>ulugurensis</i> , Engl. 43	
	var. <i>latendata</i> , Engl. . . 70		<i>unicaudata</i> , Engl. 48	
	<i>prorepens</i> , Engl. . . 45		<i>Uuyikæ</i> , Engl. & Warb. . . 68	
	var. <i>robustior</i> , Rendle . . . 46		<i>usambarensis</i> , Engl. 40	
	<i>psilurus</i> , Welw. . . 50		<i>variigata</i> , Engl. . . 38	
	var. <i>brevicaudata</i> , Rendle. . . 51		<i>variifolia</i> , Engl. . . 35	
	var. <i>compacta</i> , De Wild. . . 51		<i>Verdickii</i> , De Wild. & Dur. . . 64	
	var. <i>subintegri-folia</i> , De Wild. 52		<i>vivipara</i> , Welw. . . 37	
	<i>psiluroides</i> , Engl. 50		<i>Volkensii</i> , Engl. . . 69	
	<i>quercifolia</i> , R. E. Fr. . . 37		<i>Walleri</i> , Hemsl. . . 68	
	<i>rhodesiana</i> , R. E. Fr. . . 64		var. <i>minor</i> , Rendle . . . 68	
	<i>Rosenii</i> , R. E. Fr. 63		<i>Warneckeii</i> , Engl. 61	
	var. <i>multibracteata</i> , R. E. Fr. 63		<i>Wellmannii</i> , Engl. 66	
	<i>ruahensis</i> , Engl. . . 67		<i>yambuyænsis</i> , De Wild. . . 56	
	<i>scabra</i> , Engl. . . 51		<i>zanzibarica</i> , Oliv. 69	
	var. <i>subintegri-folia</i> , Rendle. . . 52		<i>Zenkeri</i> , Engl. . . 40	
	var. <i>longicaudata</i> , Engl. . . 52		<i>Dorsteniæ</i> . . . 18	
	<i>scaphigera</i> , Bur. 61		<i>Droguetia</i> . . . 303	
	<i>Schlechteri</i> , Engl. 67		<i>debilis</i> , Rendle . . . 304	
	<i>sessilis</i> , R. E. Fr. 67		<i>diffusa</i> , Wedd. . . 304	
	<i>Smythei</i> , Sprague 60		<i>inerts</i> , Schweinf. . . 303	
	<i>Solheidi</i> , De Wild. 40		<i>pauciflora</i> , Wedd. 304	
	<i>spathulibracteata</i> , Engl. . . 59		<i>umbicola</i> , Engl. . . 306	
	<i>Staudtii</i> , Engl. . . 42		<i>Elatostema</i> . . . 277	
	<i>stenophylla</i> , R. E. Fr. . . 64		<i>angusticucatum</i> , Engl. . . 283	
	<i>stipulata</i> , Rendle 33		var. <i>Dusenii</i> , Engl. . . 283	
	<i>Stolzii</i> , Engl. . . 52		<i>busseanum</i> , H. Winkl. . . 280	
	<i>subrhombiformis</i> , Engl. . . 42		<i>Henriquesii</i> , Engl. 279	
	<i>subtriangularis</i> , Engl. . . 55		<i>kamerunense</i> , Engl. 279	
	<i>Talbotii</i> , Rendle . . 56		<i>levigatum</i> , Hassk. 284	
			<i>Mannii</i> , Wedd. . . 282	
			<i>monticola</i> , Hook. f. 281	
			<i>oppositifolium</i> , Dalz. . . 277	
			<i>orientale</i> , Engl. . . 280	
			<i>ovatum</i> , Wight . . 277	
			<i>paivaanum</i> , Wedd. 279	
			var. <i>conrauanum</i> , Engl. 280	
			<i>parvulum</i> , Engl. . . 282	
			<i>Preussii</i> , Engl. . . 280	
			<i>sessile</i> , Henriq. . . 279	
			<i>Elatostema (continued)</i>	
			<i>sp.</i> , Henriq. . . 279	
			<i>thomense</i> , Henriq. 280	
			<i>Welwitschii</i> , Engl. 278	
			var. <i>cameroonense</i> , Rendle 279	
			<i>wightianum</i> , Wedd. 284	
			<i>Encephalartos</i> . . . 346	
			<i>Barteri</i> , Carruth. 348	
			<i>ferox</i> , Bertol. f. . . 352	
			<i>gratus</i> , Prain . . . 352	
			<i>Hildebrandii</i> , Carr. 351	
			<i>Hildebrandtii</i> , A. Br. & Bouché . . 351	
			<i>horridus</i> , Lehmann . 347	
			<i>laurentianus</i> , De Wild. . . 353	
			<i>Laurentii</i> , De Wild. 354	
			<i>lemarinianus</i> , De Wild. & Dur. 349	
			<i>lemarinellianus</i> , De Wild. . . 349	
			<i>Poggei</i> , Aschers . . 349	
			<i>septentrionalis</i> , Schweinf. . . 350	
			<i>sp.</i> , Johnston . . . 354	
			<i>sp.</i> , Schweinf. . . 350	
			<i>villosus</i> , Lam. . . 352	
			var. <i>Hildebrandtii</i> , Engl. 351	
			forma <i>Hildebrandtii</i> , Hennings . . 351	
			<i>Woodii</i> , Sand. . . 353	
			<i>Ephedra</i> . . . 328	
			Alte, C. A. Meyer 329	
			<i>Euartocarpæ</i> . . . 19	
			<i>Eudorstenia</i> . . . 26	
			<i>Eumoreæ</i> . . . 18	
			<i>Ficæ</i> . . . 19	
			<i>Ficus</i> . . . 78	
			<i>abutilifolia</i> , Mildbr. & Burr. . . 190	
			<i>abutilifolia</i> , Mig. 191	
			<i>abutilifolia</i> , Mildbr. & Burr. 191, 193, 194	
			<i>acrocarpa</i> , Steud. 212	
			<i>acutifolia</i> , Hutchinson . . . 108	
			<i>Adolli-Friderici</i> , Mildbr. . . 182	
			<i>africana</i> , Hort. Berol. . . . 164	
			<i>Afzelii</i> , Don . . . 214	
			<i>Afzelii</i> , Hort. Berol. . . . 161	

	Page		Page		Page
<i>Ficus</i> (<i>continued</i>)		<i>Ficus</i> (<i>continued</i>)		<i>Ficus</i> (<i>continued</i>)	
aganophila, <i>Hutchinson</i>	186	buddensis, <i>Hutchinson</i>	194	citharexifolia,	
<i>Akaie</i> , De Wild.	177	Buntingii, <i>Hutchinson</i>	128	<i>Kotschy</i>	215
<i>Albersii</i> , Warb.	121	Burkei, <i>Miq.</i>	202	clarencensis,	
<i>albivenia</i> , Warb.	179	barretiana,		<i>Mildbr. & Hutchinson</i>	162
<i>Alvaresii</i> , Warb.	181	<i>Mildbr. & Hutchinson</i>	213	<i>clethrophylla</i> , <i>Hiern</i>	97
<i>Wild.</i>	188	<i>Buttneri</i> , Warb.	134	<i>colophylla</i> , Warb.	110
<i>andongensis</i> , <i>Welw.</i>	172	<i>var. globi-</i>		<i>Columbarum</i> ,	
<i>angolensis</i> , Warb.	115	<i>carpa</i> , Warb.	134	<i>Hochst.</i>	208
annobonensis,		buxifolia, <i>De Wild.</i>	157	congensis, <i>Engl.</i>	195
<i>Mildbr. & Hutchinson</i>	184	<i>Cabrae</i> , Warb.	214	<i>var. mollis, Hutchinson</i>	196
Anomani, <i>Hutchinson</i>	157	<i>caffra</i> , <i>Miq.</i>	121	Conraui, Warb.	150
<i>antithetophylla</i> ,		<i>callabatensis</i> , Warb.	195	<i>cordata</i> , <i>Thunb.</i>	119
<i>Steud.</i>	107	<i>callescens</i> , <i>Hiern</i>	154	<i>var. Marlothii</i> ,	
arcuatonevata,		<i>calyptata</i> , <i>Vahl</i>	164	<i>Warb.</i>	119
<i>De Wild.</i>	186	camptoneura,		<i>cordata</i> , <i>Sim</i>	121
ardisioides, Warb.	207	<i>Mildbr.</i>	147	<i>coronata</i> , <i>Spin.</i>	111
argentea, <i>Miq.</i>	214	<i>camptoneura</i> ,		<i>corylifolia</i> , Warb.	99
artocarpoides,		<i>Mildbr.</i>	148	<i>var. glabrescens</i> ,	
<i>Warb.</i>	132	<i>var. angustifolia</i> , <i>Mildbr.</i>	187	<i>Warb.</i>	99
<i>aspera</i> , Hort.	111	camptoneuroides,		crassicosta, Warb.	144
<i>asperifolia</i> , <i>Miq.</i>	111	<i>Hutchinson</i>	148	craterostoma,	
<i>asperifolia</i> , <i>Chipp</i>	111	<i>capensis</i> , <i>Mildbr.</i>		<i>Warb.</i>	160
asymmetrica,		& <i>Burret</i>	97, 101	craterostoma,	
<i>Hutchinson</i>	166	<i>var. mulloto-</i>		<i>Mildbr. & Burr.</i>	159
<i>atrovirens</i> , Hort.		<i>carpa</i> , <i>Mildbr.</i>		<i>cyaneostipula</i> ,	
<i>Berol.</i>	119	& <i>Burret</i>	97	<i>Warb.</i>	153
bangouanensis, <i>A.</i>		<i>forma pubifolia</i> ,		<i>cyathistipula</i> ,	
<i>Chev.</i>	357	<i>Mildbr. &</i>		<i>Mildbr. & Burr.</i>	155
<i>barbata</i> , Warb.	172	<i>Burret</i>	97	<i>cyathistipuloides</i> ,	
<i>barombiensis</i> ,		<i>capensis</i> , <i>Thunb.</i>	101	<i>De Wild.</i>	206
<i>Warb.</i>	125	<i>var. guineensis</i> ,		<i>cyclocarpa</i> , Warb.	135
<i>Barteri</i> , <i>Sprague</i>	205	<i>Hiern</i>	97	cyphocarpa,	
<i>Barteri</i> , <i>Mildbr.</i>		<i>var. guineensis</i> ,		<i>Mildbr.</i>	200
& <i>Burr.</i>	205	<i>Miq.</i>	102	<i>Dahero</i> , <i>Ferr. & Gai.</i>	175
basarensis, Warb.	181	<i>var. trichoneura</i> ,		<i>Dahro</i> , <i>Del.</i>	175
<i>bembicarpa</i> ,		<i>Warb.</i>	102	<i>damarensis</i> , <i>Engl.</i>	104
<i>Warb.</i>	120	<i>var. pubescens</i> ,		<i>darbandensis</i> ,	
<i>benghalensis</i> , <i>A.</i>		<i>Warb.</i>	102	<i>Warb.</i>	211
<i>Rich.</i>	176	<i>capreaefolia</i> , <i>Del.</i>	107	Dar-es-salaamii,	
<i>Bequaertii</i> , <i>De Wild.</i>	212	<i>var. ovatifolia</i> ,		<i>Warb.</i>	171
<i>blepharophora</i> ,		<i>Hutchinson</i>	108	Dawei, <i>Hutchinson</i>	161
<i>Warb.</i>	96	<i>Carica</i> , <i>Linn.</i>	79	Dekdekena, <i>A.</i>	
<i>bongoensis</i> , Warb.	203	<i>caricoides</i> , <i>Roxb.</i>	94	<i>Rich.</i>	211
<i>brachylepioides</i> ,		<i>caulocarpa</i> , Warb.	102	<i>Dekdekena</i> , <i>Mildbr.</i>	
<i>Warb.</i>	172	<i>cerasicarpa</i> , Warb.	135	& <i>Burr.</i>	208
<i>brachylepis</i> , <i>Welw.</i>	126	<i>Chanas</i> , <i>Forsk.</i>	96	<i>delagoensis</i> , <i>Sim</i>	131
<i>brachypoda</i> , <i>Hutchinson</i>	189	<i>chariensis</i> , Warb.	115	<i>Demeusei</i> , Warb.	131
<i>brachypus</i> , Warb.	102	<i>Chevalieri</i> , Warb.	208	<i>densetipulata</i> ,	
<i>Brassii</i> , <i>R. Br.</i>	102	chlamydocarpa,		<i>De Wild.</i>	151
<i>brevicula</i> , <i>Hiern</i>	106	<i>Mildbr. & Burr.</i>	163	<i>depauperata</i> , <i>Sim</i>	204
<i>Bubu</i> , Warb.	166	<i>chlamydocarpa</i> ,		<i>Dewevrei</i> , Warb.	140
<i>Buchanani</i> , Warb.	115	<i>Warb.</i>	188	<i>Dewevrei</i> , <i>Mildbr.</i>	
<i>Buchneri</i> , Warb.	164	<i>chrysocerasus</i> ,		& <i>Burr.</i>	134
		<i>Welw.</i>	208	<i>dicranostyla</i> ,	
				<i>Mildbr.</i>	119

	Page		Page		Page
<i>Ficus</i> (continued)		<i>Ficus</i> (continued)		<i>Ficus</i> (continued)	
var. <i>nitida</i> , <i>Hutchinson</i> . . .	120	var. <i>lanuginosa</i> , <i>Martelli</i> . . .	172	<i>Kerstingii</i> , <i>Warb.</i> . . .	192
<i>dicnsis</i> , <i>Warb.</i> . . .	172	var. <i>intermedia</i> , <i>Martelli</i> . . .	172	<i>kiboschensis</i> , <i>Warb.</i> . . .	97, 102
<i>Dinteri</i> , <i>Warb.</i> . . .	182	<i>glumosa</i> , <i>Mildbr.</i> & <i>Burr.</i> . . .	170	<i>kilimandscharica</i> , <i>Warb.</i> . . .	188
<i>discifera</i> , <i>Warb.</i> . . .	196	<i>glumosoides</i> , <i>Hutchinson</i> . . .	169	<i>kimunczensis</i> , <i>Warb.</i> . . .	138
<i>djalonsensis</i> , <i>A. Chev.</i> . . .	356	<i>gnaphalocarpa</i> , <i>A. Rich.</i> . . .	104	<i>Kirkii</i> , <i>Hutchinson</i> . . .	209
<i>Dob</i> , <i>Warb.</i> . . .	179	<i>Goetzei</i> , <i>Warb.</i> . . .	188	<i>kisantuensis</i> , <i>Warb.</i> . . .	132
<i>dorbandensis</i> , <i>Warb.</i> . . .	211	<i>Goliath</i> , <i>A. Chev.</i> . . .	167	<i>Kitaba</i> , <i>De Wild.</i> . . .	170
<i>dryepontdiana</i> , <i>Gentil</i> . . .	127	<i>golungensis</i> , <i>Hutchinson</i> . . .	105	<i>Kitubalu</i> , <i>Hutchinson</i> . . .	163
<i>durandiana</i> , <i>Warb.</i> . . .	172	<i>gombariensis</i> , <i>De Wild.</i> . . .	172	<i>kondeensis</i> , <i>Warb.</i> . . .	97
<i>Durbanii</i> , <i>Warb.</i> . . .	208	<i>gongoensis</i> , <i>De Wild.</i> . . .	98	<i>kotschyana</i> , <i>Miq.</i> . . .	198
<i>Dusenii</i> , <i>Warb.</i> . . .	188	<i>Gossweilerii</i> , <i>Hutchinson</i> . . .	129	<i>kwaiensis</i> , <i>Warb.</i> . . .	97, 102
<i>duscnioides</i> , <i>Warb.</i> . . .	188	<i>grandicarpa</i> , <i>Warb.</i> . . .	102, 103	<i>Langenburgii</i> , <i>Warb.</i> . . .	131
<i>calansis</i> , <i>De Wild.</i> . . .	135	<i>Grueudleri</i> , <i>Warb.</i> . . .	164	<i>lanigera</i> , <i>Warb.</i> . . .	161
<i>ebolowensis</i> , <i>Mildbr. & Hutchinson</i> . . .	150	<i>guineensis</i> , <i>Stapf</i> . . .	102	<i>lateralis</i> , <i>Warb.</i> . . .	198
<i>clastica</i> , <i>Linn.</i> . . .	79	<i>gurichiana</i> , <i>Engl.</i> . . .	211	<i>Laurentii</i> , <i>Warb.</i> . . .	206
<i>elasticooides</i> , <i>De Wild.</i> . . .	214	<i>hararensis</i> , <i>Warb.</i> . . .	195	<i>laurifolioides</i> , <i>Warb.</i> . . .	164
<i>elegans</i> , <i>Miq.</i> . . .	128	<i>Hemprichii</i> , <i>Ehrenb.</i> . . .	190	<i>Leardii</i> , <i>Warb.</i> . . .	117
<i>Engleri</i> , <i>Warb.</i> . . .	170	<i>herococsis</i> , <i>Engl.</i> . . .	105	<i>Ledermannii</i> , <i>Hutchinson</i> . . .	193
<i>epiphytica</i> , <i>De Wild.</i> . . .	144	<i>Hochstetteri</i> , <i>A. Rich.</i> . . .	174	<i>leconensis</i> , <i>Hutchinson</i> . . .	185
<i>Erici-Roscarii</i> , <i>R. E. Fr.</i> . . .	202	var. <i>glabrior</i> , <i>Miq.</i> . . .	188	<i>Leprieuri</i> , <i>Miq.</i> . . .	158
<i>erioblasta</i> , <i>Warb.</i> . . .	172	<i>Holstii</i> , <i>Warb.</i> . . .	179	var. <i>intermedia</i> , <i>Hutchinson</i> . . .	159
<i>criobotryoides</i> , <i>Kunth & Bouche</i> . . .	160	<i>Hombleri</i> , <i>De Wild.</i> . . .	171	var. <i>sessilis</i> , <i>Hutchinson</i> . . .	159
var. <i>Caillei</i> , <i>A. Chev.</i> . . .	161	<i>howardiana</i> , <i>Sim</i> . . .	171	<i>Leprieuri</i> , <i>Mildbr. & Burr.</i> . . .	159, 210
var. <i>latifolia</i> , <i>Hutchinson</i> . . .	161	<i>humilis</i> , <i>Warb.</i> . . .	172	<i>libertiana</i> , <i>Warb.</i> . . .	131
<i>eriocarpa</i> , <i>Warb.</i> . . .	173	<i>incognita</i> , <i>De Wild.</i> . . .	180	<i>Lichtensteinii</i> , <i>Link</i> . . .	102
<i>erubescens</i> , <i>Warb.</i> . . .	102	<i>indiana</i> , <i>A. Rich.</i> . . .	176	<i>Lingua</i> , <i>Warb.</i> . . .	156
<i>exasperata</i> , <i>Vahl</i> . . .	116	<i>indica</i> , <i>Forsk.</i> . . .	116	<i>longipendunculata</i> , <i>De Wild.</i> . . .	134
<i>excentrica</i> , <i>Warb.</i> . . .	209	<i>ingens</i> , <i>Miq.</i> . . .	121	<i>Lujæ</i> , <i>De Wild.</i> . . .	184
<i>fasciculiflora</i> , <i>Hutchinson</i> . . .	141	<i>ingentoides</i> , <i>Hutchinson</i> . . .	123	<i>lukanda</i> , <i>Wclw.</i> . . .	133
<i>Fischeri</i> , <i>Warb.</i> . . .	126	<i>inkasuensis</i> , <i>Warb.</i> . . .	132	<i>lutea</i> , <i>Vahl</i> . . .	215
<i>flavidobarbata</i> , <i>Warb.</i> . . .	96	<i>integrifolia</i> , <i>Sim</i> . . .	96	<i>lutca</i> , <i>Mildbr. & Burr.</i> . . .	121, 124
<i>flavovenia</i> , <i>Warb.</i> . . .	196	<i>intermedia</i> , <i>Del.</i> . . .	190	<i>luteola</i> , <i>De Wild.</i> . . .	159
<i>fulcrispula</i> , <i>Warb.</i> . . .	157	<i>iteoides</i> , <i>Miq.</i> . . .	116	<i>lyrata</i> , <i>Warb.</i> . . .	142
<i>furcata</i> , <i>Warb.</i> . . .	159	<i>itophylla</i> , <i>Miq.</i> . . .	203	<i>mabifolia</i> , <i>Warb.</i> . . .	188
<i>Galpinii</i> , <i>Warb.</i> . . .	182	<i>Johnstonii</i> , <i>Stapf</i> . . .	164	<i>macrocarpa</i> , <i>Warb.</i> . . .	130
<i>Gilletii</i> , <i>Mildbr. & Burr.</i> . . .	142	<i>jollyana</i> , <i>A. Chev.</i> . . .	143	<i>maculosa</i> , <i>Hutchinson</i> . . .	138
<i>Gilletii</i> , <i>Warb.</i> . . .	134	<i>Kaba</i> , <i>De Wild.</i> . . .	180	<i>magenjensis</i> , <i>Sim</i> . . .	121
<i>glandulifera</i> , <i>Warb.</i> . . .	188	<i>kamerunensis</i> , <i>Warb.</i> . . .	156	<i>malungensis</i> , <i>Warb.</i> . . .	118
<i>glandulosa</i> , <i>Hort.</i> . . .	111	<i>Kannenbergii</i> , <i>Warb.</i> . . .	103	<i>mallotocarpa</i> , <i>Warb.</i> . . .	97
<i>glaucophylla</i> , <i>Desf.</i> . . .	119	<i>katagumica</i> , <i>Hutchinson</i> . . .	122		
<i>glumosa</i> , <i>Del.</i> . . .	171	<i>Kawuri</i> , <i>Hutchinson</i> . . .	122		
var. <i>glaberrima</i> , <i>Martelli</i> . . .	172				

	Page		Page		Page
<i>Ficus</i> (<i>continued</i>)		<i>Ficus</i> (<i>continued</i>)		<i>Ficus</i> (<i>continued</i>)	
<i>mallotoides</i> ,		var. <i>oetomeli-</i>		<i>pseudomangifera</i> ,	
<i>Mildbr. & Hut-</i>		<i>folia, Mildbr.</i>		<i>Hutchinson</i> . . .	204
<i>chinson</i> . . .	165	<i>& Burr.</i> . . .	165	<i>Pseudo-Sycamor</i> ,	
<i>mangiferoides</i> ,		<i>pachypleura, Warb.</i>	166	<i>Decne</i>	94
<i>Hutchinson</i> . . .	205	<i>pachysarca, Warb.</i>	125	<i>pseudo-Vogelii</i> ,	
<i>Marquesii, Warb.</i>	127	<i>pallidobarba, Warb.</i>	96	<i>A. Chev.</i>	178
<i>Matabelæ, Warb.</i>	102	<i>palmata, Forsk.</i> . .	93	<i>psilopoga, Welw.</i>	188
<i>medullaris, Warb.</i>	188	<i>paludicola, Warb.</i>	113	<i>pubicosta, Warb.</i>	175
<i>megalodisca, Warb.</i>	124	<i>pulustris, Sim</i> 107, 115		<i>pubigera, Warb.</i> . .	173
<i>megaphylla, Warb.</i>	164	<i>pandurata, Sander</i>	143	<i>pulvinata, Warb.</i>	137
var. <i>glabra</i> ,		<i>panifica, Del.</i> . . .	100	<i>punctifera, Warb.</i>	111
<i>Warb.</i>	164	<i>pendula, Welw.</i> . .	108	<i>pynophysa, Warb.</i>	111
<i>microcarpa, Vahl</i>	188	<i>persicifolia, Welw.</i>	210	<i>pygmæa, Welw.</i> . .	106
<i>Mildbrædii, Hut-</i>		var. <i>angusti-</i>		<i>Pynarti, De Wild.</i>	137
<i>chinson</i>	212	<i>folii, Warb.</i> . . .	210	<i>Quibeba, Welw.</i> . .	177
<i>mittuensis, Warb.</i>	190	var. <i>depressa</i> ,		<i>ralumensis, Warb.</i>	79
<i>mittuensis, Warb.</i>	190	<i>Warb.</i>	203	<i>rectangula, Warb.</i>	132
<i>mollifolia, Warb.</i>	196	var. <i>glabripes</i> ,		<i>recurvata, De Wild.</i>	199
<i>monbuttensis</i> ,		<i>Warb.</i>	210	<i>Roderi, Hutchinson</i>	154
<i>Warb.</i>	161	var. <i>longipes</i> ,		<i>Rehmanni, Warb.</i>	170
<i>montana, Sim</i> . . .	170	<i>Warb.</i>	203	var. <i>ovatifolia</i> ,	
<i>Mucoso, Welw.</i> . .	98	var. <i>pubicarpa</i> ,		<i>Warb.</i>	170
<i>Munsa, Warb.</i> . . .	102	<i>Warb.</i>	203	var. <i>villosa, Warb.</i>	170
<i>mutantifolia</i> ,		<i>Petersii, Warb.</i> . .	182	<i>religiosa, Forsk.</i> . .	190
<i>Hutchinson</i> . . .	155	<i>petitiana, A. Rich.</i>	94	<i>rhodesiaca, Warb.</i>	201
<i>Mvumo, Warb.</i> . . .	188	<i>picta, Sim</i>	176	<i>rhynchocarpa</i> ,	
<i>namalalensis</i> ,		<i>pilosula, De Wild.</i>	159	<i>Warb.</i>	144
<i>Hutchinson</i> . . .	149	<i>Pireiri, Welw.</i> . . .	118	<i>riparia, Hochst.</i> . .	100
<i>natalensis, Hochst.</i>	208	<i>plateiocarpa</i> ,		<i>Rivæ, Warb.</i>	195
var. <i>peduncu-</i>		<i>Warb.</i>	102	<i>Robecchii, Warb.</i>	94
<i>lata, Sim</i>	208	<i>platyphylla, Del.</i>	197	<i>Rokko, Warb. &</i>	
<i>ndellensis, Warb.</i>	115	<i>polita, Vahl</i>	124	<i>Schweinf.</i>	188
<i>Nekbudu, Warb.</i>	180	var. <i>persicarpa</i> ,		<i>rokkoides, Warb.</i>	188
<i>neriifolia, A. Rich.</i>	213	<i>Hutchinson</i> . . .	125	<i>rubicunda, Miq.</i> . .	172
<i>niamniamensis</i> ,		<i>polybractea, Warb.</i>	139	<i>rubropunctata</i> ,	
<i>Warb.</i>	125	<i>polybractea</i> ,		<i>De Wild.</i>	160
<i>nigerica, Warb.</i> . .	172	<i>Mildbr. & Burr.</i>	138	<i>rubroroceptacula</i> ,	
<i>nigropunctata</i> ,		<i>pondoensis, Warb.</i>	121	<i>De Wild.</i>	167
<i>Warb.</i>	173	<i>populifolia, Vahl</i>	189	<i>rudens, Hutchinson</i>	136
<i>nigropunctata</i> ,		var. <i>major, Warb.</i>	190	<i>ruficeps, Warb.</i> . .	182
<i>Warb.</i>	171	var. <i>somalensis</i> ,		<i>rugosa, C. Don</i> . . .	215
<i>nyanzensis, Hut-</i>		<i>Warb.</i>	190	<i>rukwanensis, Warb.</i>	170
<i>chinson</i>	149	var. <i>taitensis</i> ,		<i>rupium, Dinter</i> . . .	215
<i>oblongicarpa</i> ,		<i>Warb.</i>	190	<i>Ruspolii, Warb.</i> . .	200
<i>Warb.</i>	102	<i>præruptorum</i> ,		<i>sagittifolia, Warb.</i>	143
<i>obovata, Sim</i> . . .	79	<i>Hiern</i>	115	<i>salicifolia, Vahl</i> . .	115
<i>oetomeliifolia, Warb.</i>	165	<i>praticola, Mildbr.</i>		var. <i>latifolia</i> ,	
<i>oreodryadum</i> ,		<i>& Hutchinson</i> . . .	145	<i>Hutchinson</i> . . .	116
<i>Mildbr.</i>	187	<i>Pretoriæ, Burtt-</i>		<i>salicifolia, Balf. f.</i>	117
<i>ostiolata, De Wild.</i>	102	<i>Davy</i>	116	var. <i>australis</i> ,	
var. <i>brevipedun-</i>		<i>Preussii, Warb.</i> . .	152	<i>Warb.</i>	117
<i>culata, De</i>		<i>pringsheimiana</i> ,		<i>saligna, Hochst.</i> . .	212
<i>Wild.</i>	102	<i>J. Br. & K. Sch.</i>	153	<i>sansibarica, Warb.</i>	130
<i>ottoniæfolia, Miq.</i>	134	<i>Pseudo-Carica, Miq.</i>	94	<i>Sapini, De Wild.</i>	164
<i>ottoniæfolia, Hiern</i>	133	var. <i>tomentosa</i> ,		<i>sarcpes, Warb.</i> . . .	102
<i>ottoniæfolia</i> ,		<i>A. Rich.</i>	94	<i>scabra, Sim</i>	111
<i>Mildbr. & Burr.</i>	204	<i>pseudo-elastic</i> ,		<i>scabra, Willd.</i> . . .	111
<i>ovata, Vahl</i>	164	<i>Welw.</i>	125	<i>Scheffleri, Warb.</i> . .	141

	Page		Page		Page
<i>Ficus</i> (continued)		<i>Ficus</i> (continued)		<i>Ficus</i> (continued)	
<i>Schimpertii</i> , Hochst.	188	<i>springifolia</i> , Warb.	125	<i>viridimaculata</i> ,	
<i>var. Hochstetterii</i> ,		<i>syriogoides</i> , Warb.	125	<i>De Wild.</i>	110
Mildbr. & Burr.	175	<i>Telonkat</i> , Batt. &		<i>vogeliana</i> , Miq.	94
<i>schimperiana</i> ,		Trab.	116	<i>var. latifolia</i> ,	
Hochst.	121	<i>tesselata</i> , Warb.	146	Hutchinson	95
<i>schinziana</i> , Warb.	182	<i>tettonica</i> , Hutchin-		Vogelii, Miq.	179
<i>Schweinfurthii</i> , Miq.	103	son	199	<i>Mildbr. & Burr.</i>	180
<i>sciaphylla</i> , Warb.	114	<i>thonningiana</i> , Miq.	102	<i>Vohsenii</i> , Warb.	161, 166
<i>scolophora</i> , Warb.	110	<i>Thonningii</i> , Blume	187	<i>Volkenii</i> , Warb.	208
<i>Scott-Elliottii</i> ,		<i>toensis</i> , Warb.	143	<i>Wakefieldii</i> , Hut-	
Mildbr. & Burr.	207	<i>trachyphylla</i> , Fenzl	104	chinson	168
<i>senegalensis</i> , Miq.	105	<i>tremula</i> , Warb.	137	<i>Wachnagii</i> , Winkl.	109
<i>sericogemma</i> ,		<i>triangularis</i> , Warb.	158	<i>Welwitschii</i> , Miq.	227
Warb.	102	<i>tridentata</i> , Fenzl	107	<i>Welwitschii</i> , Warb.	118
<i>serrata</i> , Forsk.	111	<i>tristis</i> , Kunth &		<i>var. breoensis</i> ,	
<i>sessilis</i> , De Wild.	185	Bouché	119	Hiern	118
<i>sidifolia</i> , Welw.	99	<i>Tsjela</i> , Hochst.	212	<i>Whyti</i> , Stapf	227
<i>sidifolia</i> , Welw.	104	<i>tuberculosa</i> , Welw.	124	<i>wildemaniana</i> ,	
<i>silicea</i> , Sim	111	ugandensis, Hut-		Warb.	178
<i>simbilensis</i> , Warb.	102	chinson	129	<i>Winkleri</i> , Mildbr.	
<i>socotrana</i> , Balf. f.	195	<i>ukambensis</i> , Warb.	96	& Burr.	152
<i>sokodensis</i> , Warb.	172	<i>ulugurensis</i> , Warb.	139	<i>Winkleri</i> , Mildbr.	
<i>soldanella</i> , Warb.	176	<i>umangiensis</i> , De		& Burr.	147
<i>Sonderi</i> , Miq.	169	Wild.	140	<i>Woermanni</i> , Warb.	124
<i>sp.</i> , Hiern	105, 132	<i>var. Laurentii</i> ,		<i>xanthophylla</i> , Steud.	121
<i>spectabilis</i> , Kunth		De Wild.	141	<i>xiphophora</i> , Warb.	110
& Bouché	164	<i>umbellata</i> , Fahl.	124	<i>zambesiaca</i> , Hut-	
<i>spragueana</i> ,		<i>umbellata</i> , Miq.	190	chinson	198
Mildbr. & Burr.	202	<i>umbonigera</i> , Warb.	102	<i>Zenkeri</i> , Warb.	120
<i>Standtii</i> , Warb.	153	<i>umbrosa</i> , Sim	125	<i>zobiansis</i> , De	
<i>stellulata</i> , Warb.	95	<i>umbrosa</i> , Warb.	198	Wild.	176
<i>var. glabrescens</i> ,		<i>urceolaris</i> , Welw.	109	zuvalensis, Sim	168
Warb.	102	<i>var. bambana</i> ,		<i>Fleurya</i>	245
<i>stenosiphon</i> , Warb.	125	Hiern	109	<i>aestuans</i> , Gaud.	246
<i>sterculioides</i> , Warb.	134	<i>ureolaris</i> ,		<i>var. glandulosa</i> ,	
<i>stipulifera</i> , Hut-		Mildbr. & Burr.	113	Wedd.	247
chinson	146	<i>ucrophylla</i> , Welw.	118	<i>var. tinuata</i> ,	
<i>storthophylla</i> , Warb.	112	usambarensis,		Wedd.	247
<i>Stuhlmannii</i> , Warb.	170	Warb.	135	capensis, Wadd.	249
<i>var. glabrifolia</i> ,		<i>utilis</i> , Sim	180	<i>cordata</i> , Gaud.	247
Warb.	124	<i>Vallis-Choudæ</i> , Del.	103	<i>glandulosa</i> , Wedd.	247
<i>subcalcarata</i> ,		<i>variifolia</i> , Warb.	113	<i>grossa</i> , Hiern	250
Warb. & Schweinf.	178	<i>variifolia</i> , Mildbr.		<i>interrupta</i> , Gaud.	248
<i>var. vestitobracteata</i> ,		& Burr.	114	<i>lanceolata</i> , Engl.	248
Mildbr.		<i>vasta</i> , Forsk.	194	<i>mitis</i> , Wedd.	249
& Burr.	181	<i>var. glabrescens</i> ,		<i>mooreana</i> , Reudb.	250
<i>subcostata</i> , De		Hutchinson	195	<i>pedunculata</i> ,	
Wild.	183	<i>vasta</i> , Mildbr. &		Wedd.	250
<i>subpuduraformis</i> ,		Burr.	169, 176	<i>podocarpa</i> , Wadd.	251
Hort.	143	<i>virrucocarpa</i> , Warb.	177	<i>var. fulmineans</i> ,	
<i>Sur</i> , Forsk.	100	<i>verruculosa</i> , Warb.	114	Hiern	251
<i>Sycomorus</i> , Linn.	95	<i>var. stipitata</i> ,		<i>var. Mannii</i> ,	
<i>var. aluca</i> , Hiern	102	Mildbr. &		Wadd.	252
<i>var. polybotrya</i> ,		Burr.	115	<i>sp. no. 1</i> , Benth.	251
Hiern	102	<i>vestitobracteata</i> ,		<i>sp. no. 2</i> , Benth.	247
<i>var. prodigiosa</i> ,		Warb.	180	<i>sp. no. 3</i> , Benth.	247
Welw.	102	<i>villosipes</i> , Warb.	102	<i>urticoides</i> , Engl.	247
<i>var. veru</i> , Forsk.	96	<i>virgata</i> , Roxb.	94		

	Page		Page		Page
Parietaria . . .	296	Podocarpus (continued)		Salix (continued)	
<i>abyssinica</i> , Hochst.	288	<i>forma arbores-</i>		<i>egyptiaca</i> , T.	
<i>alsinifolia</i> , Hochst.	298	<i>ceus</i> , Pilger . . .	340	Thoms.	318
<i>australis</i> , Bl. . .	298	<i>forma typica</i> ,		<i>axillaris</i> , Anderss.	319
<i>carunculata</i> , Bl.	298	Pilger	340	<i>blumhardtiana</i> ,	
<i>cuneata</i> , E. Meyer	306	<i>forma latifolia</i> ,		Schimp.	319
<i>debilis</i> , Forst. . .	298	Engl.	340	<i>capensis</i> , Thunb.	319
<i>debilis</i> , Rendle . .	298	<i>sp.</i> , Schweinf. &		Chevalieri, <i>Seemen</i>	320
<i>guineensis</i> , Don . .	288	Hönel	340	<i>coluteoides</i> , Mirb.	323
<i>laxiflora</i> , Engl. . .	296	<i>Thunbergii</i> , Engl.	340	<i>cyathipoda</i> ,	
<i>manritanica</i> , Dur-		usambarensis,		Anderss.	319
<i>ricu</i> ,		<i>Pilger</i>	341	<i>huillensis</i> , <i>Seemen</i>	318
<i>var. erecta</i> ,		<i>Pontyu</i>		Hutchinsii, <i>Skau</i>	320,
<i>Wedd.</i>	297	<i>excelsa</i> , Chev. . .	219	359
<i>micrantha</i> , Ledeb.	298	<i>Populus</i>	325	<i>kamerunensis</i> ,	
<i>ruwenzoriensis</i> ,		<i>Denhardtiorum</i> ,		<i>Seemen</i>	324
<i>Cortesi</i>	297	<i>Dode</i>	325	<i>Ledermannii</i> ,	
<i>scandens</i> , Engl. . .	298	<i>euphratica</i> , <i>Olivier</i> ,		<i>Seemen</i>	324
<i>urticaefolia</i> , Linn.	272	<i>subsp.</i> , <i>Den-</i>		<i>Murielii</i> , <i>Skau</i>	321, 359
Pilea	267	<i>hardtiorum</i> ,		<i>nigerica</i> , <i>Skau</i>	321, 359
<i>angolensis</i> , <i>Rendle</i>	271	Engl.	325	<i>nigritana</i> , <i>Seemen</i>	319
<i>bambuseti</i> , <i>Engl.</i>	273	<i>Pouzolzia</i>	286	<i>nilicola</i> , <i>Solms-</i>	
<i>ceratocera</i> , <i>Wedd.</i>	269	<i>abyssinica</i> , Bl. . .	288	<i>Laub.</i>	323
<i>var. Mildbrædii</i> ,		<i>andongensis</i> , <i>Hiern</i>	289	<i>octandra</i> , <i>Sieb.</i> . .	318
<i>Engl.</i>	270	<i>Batesii</i> , <i>Rendle</i> . .	289	<i>ramiflora</i> , <i>Seemen</i>	319
<i>Dawei</i> , <i>Stapf</i> . . .	342	<i>denudata</i> , <i>De Wild.</i>		<i>Sasaf</i> , <i>Forsk.</i> . . .	318
<i>clonguta</i> , A. Rich.	343	& <i>Dur.</i>	290	<i>forma abyssinica</i> ,	
<i>Engleri</i> , <i>Rendle</i> . .	275	<i>Deweyi</i> , <i>De Wild.</i>		Anderss.	319
<i>falcata</i> , <i>Engl.</i> . .	341, 343	& <i>Dur.</i>	289	<i>var. cyathipoda</i> ,	
<i>Gætzii</i> , <i>Engl.</i> . . .	274	<i>Erythraea</i> ,		Anderss.	319
<i>gracilior</i> , <i>Pilger</i> . .	342	<i>Schweinf.</i>	294	<i>var. hirta</i> ,	
<i>Holstii</i> , <i>Engl.</i> . . .	272	<i>flaccida</i> , A. Rich.	306	Anderss.	322
<i>Johnstoni</i> , <i>Oliv.</i> . .	273	<i>fruticosa</i> , <i>Engl.</i> . .	292	<i>var. nilotica</i> ,	
<i>var. rumsorensis</i> ,		<i>gobungensis</i> , <i>Hiern</i>	288	Anderss.	318
<i>Engl.</i>	274	<i>guineensis</i> , <i>Benth.</i>	287	<i>Schweinfurthii</i> ,	
<i>kiwuensis</i> , <i>Engl.</i> . .	275	<i>var. abyssinica</i> ,		<i>Skau</i>	322, 359
<i>longipes</i> , <i>Engl.</i> . .	275	<i>Rendle</i>	288	<i>senegalensis</i> ,	
<i>macrodonta</i> , <i>Baker</i>	269	<i>guineensis</i> , <i>Engl.</i>	289	<i>Mert.</i>	323
<i>manniana</i> , <i>Wedd.</i>	268	<i>huillensis</i> , <i>Hiern</i> . .	290	<i>subseriata</i> , <i>Willd.</i>	318
<i>Mannii</i> , <i>Hook. f.</i> . .	341	<i>hypoleuca</i> , <i>Wedd.</i>	291	<i>Scopocarpus</i>	
<i>microphylla</i> , <i>Liebm.</i>	269	<i>mixta</i> , <i>Solms-Laub.</i>	291	<i>Mannii</i> , <i>Wedd.</i> . .	260
<i>muscosa</i> , <i>Lindl.</i> . .	269	<i>parasitica</i> ,		<i>Scyphosyce</i>	220
<i>Prussii</i> , <i>Engl.</i> . . .	273	<i>Schweinf.</i>	293	<i>manniana</i> , <i>Baill.</i>	220
<i>quadrifolia</i> , <i>Hochst.</i>	270	<i>piscicelliana</i> ,		<i>pandurata</i> , <i>Hut-</i>	
<i>rapipendia</i> , <i>Wedd.</i>	272	<i>Busc. & Musch.</i>	294	<i>chinson</i>	221
<i>sp.</i> , <i>Henriq.</i>	269	<i>procridioides</i> ,		<i>Zonkeri</i> , <i>Engl.</i> . . .	221
<i>sublucens</i> , <i>Wedd.</i> . .	273	<i>Wedd.</i>	293	<i>Slectiopsis</i>	77
<i>tetraphylla</i> , <i>Bl.</i> . .	270	<i>Schimperi</i> , <i>Wedd.</i>	288	<i>usambarensis</i> , <i>Engl.</i>	77
<i>var. major</i> ,		<i>shirensis</i> , <i>Rendle</i> . .	292	<i>Solenostigma</i>	3
<i>Rendle</i>	271	<i>Procris</i>		<i>Splityrha</i>	
<i>urticaefolia</i> , <i>Bl.</i> . .	271	<i>laevigata</i> , <i>Wedd.</i> . .	284	<i>macrostachya</i> ,	
<i>usambarensis</i> , <i>Engl.</i>	275	<i>obtusata</i> , <i>Royle</i> . .	277	<i>Wight</i>	285
<i>veronicifolia</i> , <i>Engl.</i>	274	<i>peduncularis</i> , <i>Wall.</i>	277	<i>Sponia</i>	11
PINACEÆ	333	<i>wightiana</i> , <i>Wall.</i>	283	<i>affinis</i> , <i>Planch.</i> . .	11
Podocarpus	339	SALICINÆ	316	<i>afriana</i> , <i>Planch.</i>	12
<i>gracillimus</i> , <i>Stapf</i>	343	<i>Salix</i>	317	<i>bracteolata</i> , <i>Hochst.</i>	12
<i>latifolius</i> , <i>R. Br.?</i>	343	<i>adamauensis</i> ,		<i>glomerata</i> , <i>Hochst.</i>	12
<i>Mannii</i> , <i>Engl.</i> . . .	340	<i>Seemen</i>	323	<i>Hochstertii</i> ,	
<i>milanjianus</i> , <i>Rendle</i>	349			<i>Buching.</i>	12

	Page		Page		Page
<i>Sponia</i> (continued)		<i>Trymatococcus</i> (con-		<i>Urera</i> (continued)	
<i>orientalis</i> , Planch.		<i>tinued</i>)		Thonneri, De Wild.	
var. <i>asperata</i> ,		<i>kamerunianus</i> ,		& Durand	256, 359
Solms-Laub.	12	<i>Engl.</i>	76	Thonneri, De Wild.	257
<i>strigosa</i> , Planch.	12	<i>sp.</i> , Welw.	76	<i>usambarensis</i> ,	
<i>Sycidium</i>	81	<i>usambarensis</i> , Engl.	76	<i>Rendle</i>	263
<i>Sycomoros</i>	80	<i>Tumboa</i>		Woodii, N. E. Br.	262
<i>Antiquorum</i> , Gasp.	96	<i>Bainesii</i> , Hook. f.	333	<i>Urostigma</i>	82
<i>capensis</i> , Miq.	102			<i>abutilifolium</i> , Miq.	192
<i>gnaphalocarpa</i> , Miq.	102			<i>acrocarpum</i> , Miq.	212
<i>guineensis</i> , Miq.	104	ULMACEÆ	1	<i>binderianum</i> ,	
<i>hirsuta</i> , Sond.	170	<i>Ulmus</i>		<i>Kotschy</i>	79
<i>panifica</i> , Del.	100	<i>integrifolia</i> , Roxb.	2	<i>Burkei</i> , Miq.	202
<i>rigida</i> , Miq.	96	<i>Urera</i>	253	<i>caffrum</i> , Miq.	121
<i>riparia</i> , Miq.	101	<i>arborea</i> , De Wild.		<i>calypratum</i> , Miq.	164
<i>schimperiana</i> , Miq.	103	& Dur.	262	<i>catalpæfolium</i> ,	
<i>Sur</i> , Miq.	100	<i>Batesii</i> , Rendle	259	Miq.	190, 192
<i>thoningiana</i> , Miq.	102	<i>cameroonensis</i> ,		<i>Dekdekena</i> , Miq.	212
<i>trachyphylla</i> , Miq.	104	<i>Wedd.</i>	261	<i>elegans</i> , Miq.	128
<i>vogeliana</i> , Miq.	95	var. <i>Laurentii</i> ,		<i>eriobotryoides</i> ,	
		<i>Rendle</i>	262	Miq.	161
TAXACEÆ	338	<i>congolensis</i> , De		<i>fazokelense</i> , Miq.	172
<i>Taxus</i>		Wild. & Dur.	257	<i>glumosum</i> , Miq.	172
<i>elongata</i> , Roth	343	<i>cordifolia</i> , Engl.	260	<i>Hochstetteri</i> , Miq.	175
<i>Treculia</i>	225	<i>cuneata</i> , Rendle	261	<i>ingens</i> , Miq.	121
<i>acuminata</i> , Baill.	228	<i>Dewevrei</i> , De		<i>kotschyanum</i> , Miq.	198
<i>affona</i> , N. E. Br.	227	Wild. & Dur.	257	<i>ottoniæfolium</i> ,	
<i>africana</i> , Decne	226	<i>Dinklagei</i> , Engl.	257	Miq.	184
var. <i>nitida</i> , Engl.	227	<i>Elliotii</i> , Rendle	258	<i>ovatum</i> , Miq.	164
<i>Dewevrei</i> , De Wild.		<i>engleriana</i> , Dinter	264	<i>politum</i> , Miq.	125
& Dur.	227	<i>Fischeri</i> , Engl.	264	<i>populifolium</i> ,	
<i>mollis</i> , Engl.	229	<i>Gilletii</i> , De Wild.	262	Miq.	190
<i>obovoidea</i> , N. E.		<i>Gravenreuthii</i> , Engl.	260	<i>rubicundum</i> , Miq.	173
<i>Br.</i>	228	<i>Henriquesii</i> , Engl.	257	<i>sulicifolium</i> , Miq.	116
<i>parva</i> , Engl.	229	<i>hypselodendron</i> ,		<i>Schimperi</i> , Miq.	188
<i>Staudtii</i> , Engl.	228	<i>Wedd.</i>	255	<i>Thoningii</i> , Miq.	188
var. <i>angusti-</i>		<i>Laurentii</i> , De Wild.	262	<i>Thunbergii</i> , Miq.	119
<i>folia</i> , Engl.	228	<i>Mannii</i> , Benth. &		<i>Vogelii</i> , Miq.	180
<i>Zenkeri</i> , Engl.	229	<i>Hook. f.</i>	260	<i>xanthophyllum</i> ,	
<i>Trema</i>	10	var. <i>paucinervis</i> ,		Miq.	121
<i>affinis</i> , Bl.	11	<i>Rendle</i>	260	var. <i>ovator-</i>	
<i>africana</i> , Bl.	11	<i>oblongifolia</i> ,		<i>datum</i> , Sond.	121
<i>bracteolata</i> , Bl.	11	<i>Benth.</i>	255	<i>Urtica</i>	242
<i>glomerata</i> , Bl.	11	<i>obovata</i> , Benth.	257	<i>adoënsis</i> , Hochst.	267
<i>guineensis</i> , Ficalho	11	var. <i>Jihefo</i> ,		<i>æstuans</i> , L.	247
var. <i>Hochstet-</i>		Hiern	257, 262	<i>bicolor</i> , Roxb.	296
<i>teri</i> , Engl.	12	var. <i>longifolia</i> ,		<i>bullosa</i> , Hochst.	266
<i>forma strigosa</i> ,		<i>Wedd.</i>	256	<i>condensata</i> , Hochst.	267
<i>Büttneri</i>	11	var. <i>Quintasii</i> ,		<i>deblis</i> , Endl.	298
<i>Hochstetteri</i> , Engl.	12	<i>Engl.</i>	258	<i>hypselodendron</i> ,	
<i>nitens</i> , Bl.	11	<i>obovata</i> , Engl.	263	Hochst.	255
<i>sp.</i> , Ficalho	6	<i>obovata</i> , S. Moore	262	<i>iners</i> , Forsk.	304
<i>strigosa</i> , Bl.	11	<i>repens</i> , Rendle	264	<i>interrupta</i> , L.	249
<i>Trymatococcus</i>	74	<i>robusta</i> , A. Chev.	359	<i>lonatocarpa</i> ,	
<i>africanus</i> , Baill.	75	<i>sansibarica</i> , Engl.	263	Hochst.	249
<i>conrauanus</i> , Engl.	77	<i>sarmentosa</i> , A.		<i>macrostachya</i> , Wall.	285
<i>dorstenioides</i> , Engl.	75	<i>Chev.</i>	358	<i>muralis</i> , Vahl	293
<i>Gilletii</i> , De Wild.	76	<i>Schimperi</i> , Wedd.	255	<i>parasitica</i> , Forsk.	293
		<i>Talbotii</i> , Rendle	259	<i>pauciflora</i> , Hochst.	304

	Page		Page		Page
<i>Urtica</i> (continued)		<i>Urtica</i> (continued)		<i>Welwitschia</i>	
<i>peduncularis</i> , E.		<i>simensis</i> , Hochst.	243	<i>mirabilis</i> , Hook. f.	332
Meyer . . .	250	<i>tetraphylla</i> , Steud.	270	<i>Widdringtonia</i> . .	334
<i>procridioides</i> , E.		<i>urens</i> , L. . . .	242	<i>Mahoni</i> , Mast. . .	335
Meyer . . .	293	var. <i>iners</i> , Wedd.	304	<i>Whytei</i> , Rendle . .	334
<i>rigida</i> , Don . . .	258	<i>verticillata</i> , Vahl .	304		
<i>rupipendia</i> , Poir.	272	URTICACEÆ	240		
<i>sabiceifolia</i> , Don .	296	<i>Urticastrum</i>		<i>Zamia</i>	
<i>schimperiana</i> ,		<i>carruthersianum</i> ,		<i>Hildebrandi</i> , Hort.	351
Hochst. . . .	247	Hiern	245	<i>horrida</i> , Jacq. . .	347

ERRATUM.

Page 89, line 12 from bottom, for *wildemanniana* read *wildemaniana*





