HOOKER'S

ICONES PLANTARUM

OR

FIGURES, WITH DESCRIPTIVE CHARACTERS AND REMARKS OF NEW AND RARE PLANTS

SELECTED FROM THE

KEW HERBARIUM

FIFTH SERIES

EDITED FOB THE BENTHAM-MOXON TRUSTEES BY

SIR EDWARD J. SALISBURY, C.B.E., D.Sc, SEC.R.S.

DIRECTOR, ROYAL BOTANIC GARDENS, KEW.

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The names given in **clarendon** type are those of plants figured in the work; an * is prefixed to new names and combinations. Names in roman characters are those of plants discussed in the text. All synonyms are printed in italics.

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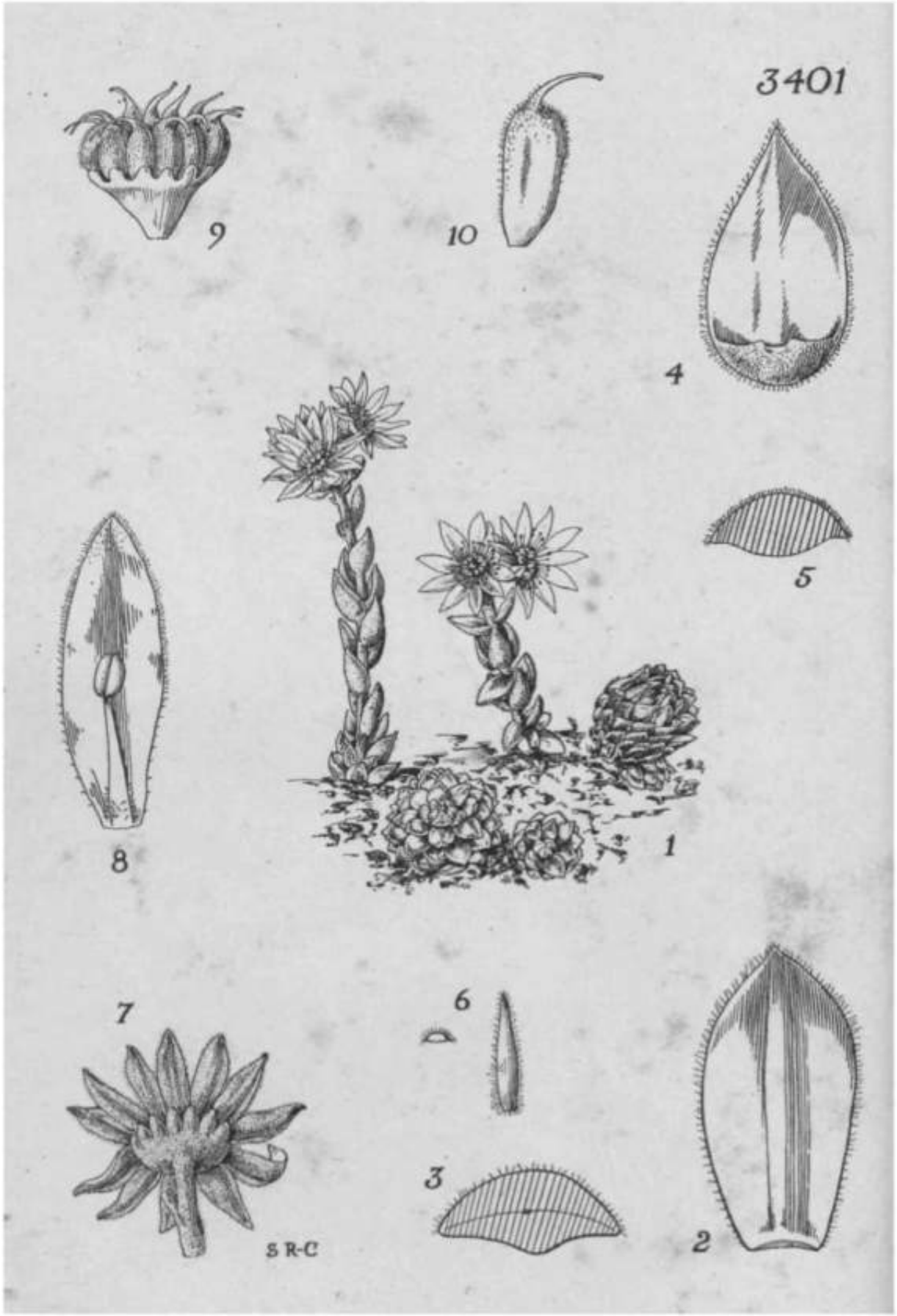
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TABULA 3401.

SBMPERVIVUM MINUS TiimH.

CBASSULACEAE.

S. minus *Tvrrill*; species nova, a #. *armeno* Boiss. rosulis foliisque multo minoribus, caulibus floriferis brevioribus facile distinguenda.

Rosula juvenilis 0-9-1-8 cm. diametro. *Folia rosuhria* oblanceolata vel oblongo- vel oblanceolato-elliptica, apice abrupte mucronata vel subabrupte mucronato-acuminata, circiter 8 mm. longa et 3*5 mm. lata et 1-5 mm. crassa, utrinque breviter glanduloso-pubescentia, viridia, molliter carnosa, margine glanduloso-ciliata, ciliis usque ad 0-5 mm. longis. *Caulis fiorifer* 2-5-6-5 cm. altus, erectus, tenuis, teres, dense glanduloso-pubescens, multifoliatus. *Folia caulina* anguste elliptica vel elliptico-lanceolata vel ovato-oblonga, apice acuta vel brevissime acuminata, basi rotundata haud amplexicaulia, circiter 8 mm. longa 4: mm. lata 1 • 5 mm. crassa, dorso rotundata, utrinque breviter glanduloso-pubescentia, margine glanduloso-ciliata, viridia, saepe apice leviter purpurea. *Inflorescentia* 3-4-flora, saepissime densa vel subdensa, glanduloso-pubescens; alabastra ovoideo-globosa; pedicelli 2-8 mm. longi; bracteae variables, plus minusve lineares vel lanceolato-lineares vel fere subulatae, glanduloso-pubescentes. *Fkres* 1-6 cm. diametro, 11-12-meri. *Calyx* cum receptaculo 5 mm. longus, dense glanduloso-puberulus; segmenta lanceolata, acuta, 2-5 mm. longa, 1-25 mm. lata, viridia, apice purpurea. *Petala* oblongo- vel lanceolato-linearia, acuta, 8 mm. longa, 2-25 mm. lata, in pagina inferiore dense glanduloso-puberula, in superiore glabra vel apicem versus leviter glanduloso-puberula, pallide flava. *Stamina* 4-5 mm. longa ; filamenta tenuia, inferne applanata et ieviter glanduloso-puberula, pallide flava; antherae ante dehiscentiam fere globosa, flava. *Squamae* plus minusve quadratae vel interdum apice subrotundatae, haud contiguae, brevissimae. *Carjpella* 5 mm. longa; ovaria 3 mm. longa, **1-75** mm. lata, viridia, utrinque glanduloso-puberula, inferne glabrescentia; styli glabri vel fere glabri, abaxialiter patentes.

ASIA MINOR. The species has been figured and described from living material grown in the Herbarium Ground, Kew, from rosettes communicated by Messrs. J. E. H. Roberts and H. R. Miller with the information that it was originally collected by E. K. Balls on the Haldizan Dagh, Asia Minor. This name has not been found on any of the maps consulted, but, judging from Balls' manuscript notes, it must be near to Baiburt, approximately 40° N. and 40° E., and Balls collected there on 17 Sept. 1934.

The colours of the living flower parts of *S. minus* have been matched with the reproductions in Ridgway's Color Standards as follows: sepal tips, Pompeian Red (PI. XIII.); petals and filaments, Martius Yellow (PI. IV.); anthers, Picric Yellow (PI. IV.).

The *Semperviva* of Asia Minor and the Caucasus are still very imperfectly known. Material from these areas is meagre, at least in collections in Britain. Lloyd Praeger comments on this (An Account of the Sempervivum Group, 76: 1932), and asks what are the " *tectorum,"* " *globuliferum* " *(globiferum)* and " *montanum "* of Radde, and one might add the " *Braunii "* of Grossheim. Even *S. caucasicum* Ruprecht was not seen, living or dried, by Praeger.

S. armenum Boiss. (Diagn. PL Or. Ser. 2, ii. 60 : 1856), with which *S. minus* is contrasted above, is reduced by Praeger (I.e. 80) to a synonym of *S. ruthenicum* Koch. The exact relationship of true *S. armenum* Boiss. to European material named *S. globiferum* L., *S. ruthenicum* Koch, *S. Zelebori* Schott, etc., requires further investigation with the aid of living material. The name *S. ruthenicum* W. D. J. Koch (Syn. Fl. Germ. ed. 2, 289 : 1843) was not validly published, having been merely cited as a synonym (Internat. Rules, Art. 40,1935). The name *S. ruthenicmn* was first validly published by Schnittspahn and Lehmann in Flora, xxxviii. 5 (1855), with a description in German, for plants received from various gardens and grown also from seed received from Halle Botanical Garden. Exactly to what the name *S. ruthenicum* Schnittsp. et Lehm. applies remains doubtful. It may be *S. grandiflorum* Haworth, to which Praeger reduces the quoted synonym *S. globiferum* Curt. Bot. Mag. t. 507 (1801) non Linn. The description does not agree in important respects with that *ofS. armenum* Boiss. (I.e.), and since the latter is based upon wild material it seems preferable to retain the name, at least for the present.

W. B. TUKRILL.

FIG. 1, plants, *natural size*; 2, old rosette leaf, x 6 ; 3, diagrammatic transverse section of same, x 6; 4, caulinc leaf, upper surface, x G; 5, diagrammatic transverse section of same, x 6; 6, bract, and transverse section of it, x 6; 7, flower, from outside, x 2 ; 8, petal and stamen, x 6 ; 9, scales and gynoecium, x 4; 10, carpel, side view, x 6.


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TABULA 3402.

LIMONIUM MOURETI *(Pitard) Maire.*

PLUMBAGINACEAE. Tribus STATICEAE.

L. Moureti *(Pitard) Maire* in Jahandiez et Maire, Cat. PL Maroc, iii. 569 (1934); Steam in Gard. Chron. ser. 3, cvi. 158, fig. 68 (1939); R. Jackson, Gardening on Chalk, 54 (1940). *Statice Moureti* Pitard, Contrib. Etude Fl. Maroc, 33 (1918).—Species maroccana ab aliis speciebus Africae septentrionalis pariter foliis margine sinuatis et caulibus angulatis vel alatis gaudentibus propter folia caulesque glabra, pedunculos spicarum angulatos (nee alatos apicibus alarum in appendices triangulares abeuntibus), bracteam superiorem apice haud spinosam, calycem anguste infundibuliformem bene distincta.

Herba perennis, rosulata, rosulis confertis. *Rkizoma* multiceps, caespitosum, lignosum, 4-8 (-15) mm. crassum. *Folia* omnia basalia, numerosa, primaria anguste oblanceolata integra, ea serius evoluta anguste oblanceolato-lyrata, 2-7 (-20) cm. longa, 8-20 (-40) mm. lata, basi in petiolum latum attenuata, .apice acuta vel acuminata seta 1-2 mm. longa apiculata, margine foliorum primariorum integro piano foliorum serius evolutorum sinuato undulato dentibus minutis cartilagineis ciliato, subcoriacea, glabra, costa prominula. *Caulis Jlorifer* erectus vel inclinatus, 9-45 (-75) cm. altus, aphyllus, rigidus, glaber, biangulatus (vel interdum bialatus, praecipue in parte superiore, alis planis vel undulatis), ramis lateralibus 2-6 (-8) omnibus floriferis erectis vel ascendentibus plerumque incurvatis 1-5 (-20) cm. longis, inflorescentia 3-5 cm. longa unilaterali terminali; bracteae deltoideae, acutae, 3-10 mm. longae; pedunculi spicarum (rami spiciferi) breyissimi, tantum angulati, haud late alati. *Spiculae* (1-) 2 (-3)-florae, in spicis brevibus suberectis dense imbricatae; bractea inferior late ovato-deltoidea, 3 mm. longa, 5 mm. lata, aristata, dorso subcarinata, brunnea, glabra, coriacea, margine anguste hyalina ; bractea intermedia late ovato-deltoidea, 3 mm. longa, 4 mm. lata, brunnea, dorso subcarinata, glabra vel dorso minute hirsuta ; bractea superior oblonga, 6 (-8) mm. longa, 4 (-5) mm. lata, apice subtruncata erosa, parte superiore brunnea inferiore viridi, glabra vel minute hirsuta. *Calyx* anguste infundibuliformis, 7 (-8) mm. longus, ore 2-3 mm. diametro, glaber (f. *genuinum* [Maire pro var.]) vel minute hirsutus (f. *pubicalyx* Steam); pars inferior viridis ; pars superior rosea, 3 mm. longa, costis 5 in apiculas abeuntibus, membrana dentata. *Petala* alba, basi coalita, unguiculata, limbo e calyce exserto 3-5 (-7) mm. longo 2 (-3-5) mm. lato. *Antherae* pallide flavae, 1 mm. longae; filamenta alba, 5 mm. longa. *Styli* 5, filiformes, 5 mm. longi, albi. *Semen* (? maturum) oblongum, 5 mm. longum, 1 • 5 mm. crassum, brunneum.

MOROCCO. Moyen Atlas, Immouzer, bords des ruisseaux, juli 1913, *Mouret* 2405 (Herb. Mus. Paris.); Bekrit, vallée du Senoual, terrains salés, 1800 m., 18 juin 1924, *Jahandiez* 643 ; in Atlante medio prope oppidum Bekrit, in pascuis humo*is, 1800-19QP m., 5 VIII 1924, *Maire* (Herb. Mus. Paris.); in pascuis humosis oropedii calcarei inter

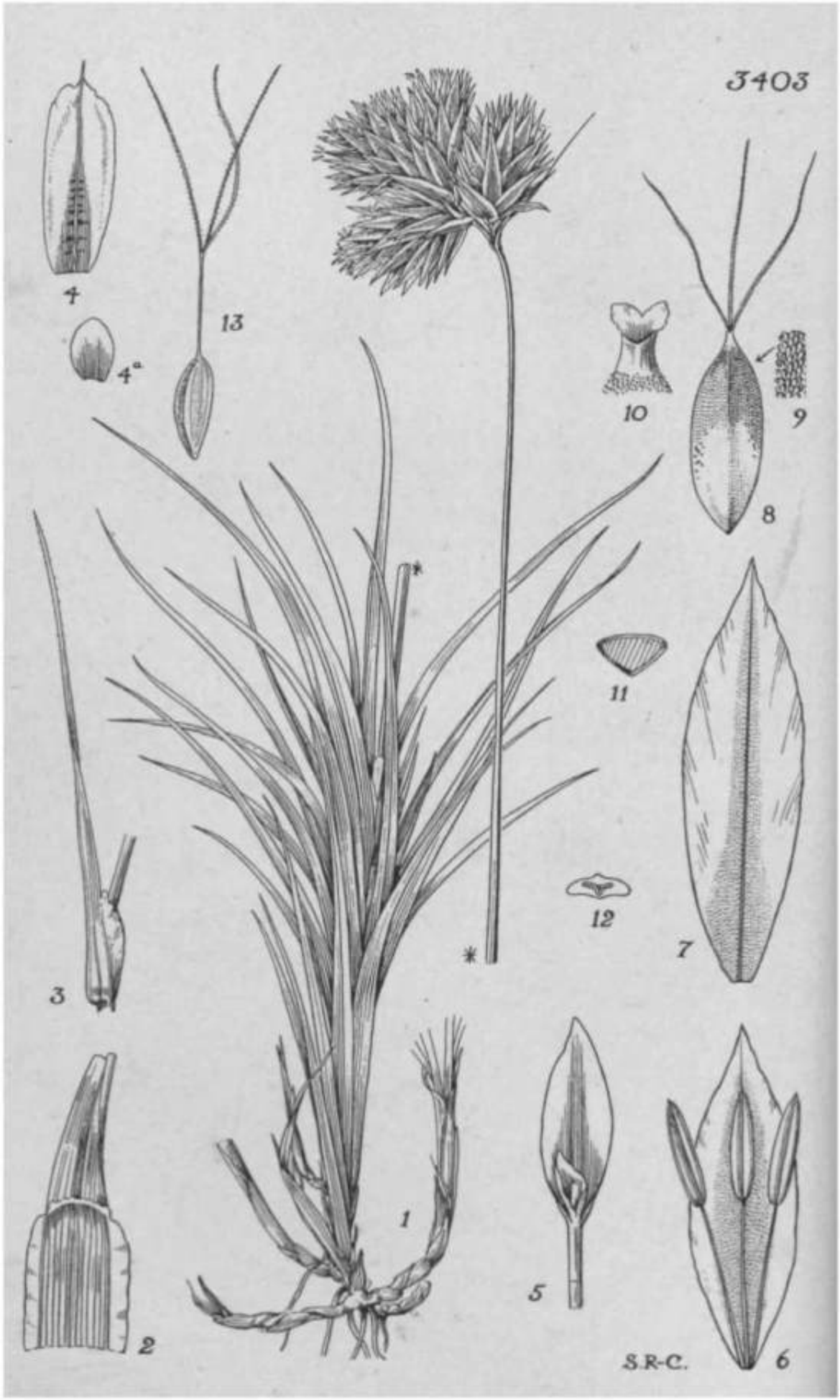
Ain Leuh et lacum Ouiouane, 1790 m., 31 VII 1924, *Maire.* Grand Atlas, montagnes des Ftouaka, entre Demnat et Ai't Tamellil, *Litardière et Maire* (fide Jahandiez et Maire, I.e.).

Limonium Moureti agrees in its sinuate-margined leaves and angled stems with *L. sinuatum* (L.) Mill., *L. Bonduelli* (Lestiboud.) Kuntze, *L. Beaumieranum* (Maire) Maire and *L. Thouini* (Viv.) Kuntze, but seems to have no close affinity with these species. It is almost glabrous throughout instead of having its leaves or stems bristly with rather long basally swollen hairs ; the peduncles of the spikes are very short and merely angled, instead of conspicuously three-winged with the wing continued upwards alongside the spike as a sharp triangular projection; the tip of the inner (upper) bract has merely a minute prominence instead of spines ; and the calyx is almost tubular instead of broadly funnel-shaped with a large outspread well-differentiated and conspicuously coloured limb. Moreover it exhibits remarkable variation in foliage : the first leaves produced by the rosette are narrowly oblanceolate, entire-margined and flat, the later leaves slightly undulate at the margin, the leaves of the rosette in its flowering state narrowly oblanceolate-lyrate with sinuate undulate margins and hiding the withered entire leaves produced earlier in the season.

It was discovered by Lieut. Marcellin Mouret (1881-1915), at Immouzer, about 35 kilometres south of Fès. Material since collected by Jahandiez and Maire near Bekrit, about 65 kilometres south-south-west of Immouzer, differs from Mouret's in having the calyx, together with the inner (upper) bract, distinctly hairy and may be distinguished as f. *pubicalyx* Steam. According to Prof. Rene' Maire (in litt.), this hairy form has also been collected at Timhadit and, together with the glabrous form (f. *genuinum* [Maire, pro var., in Bull. Soc. Hist. Nat. Afr. Nord, xxx. 354 (1939), reimpr. in Maire, Contrib. PL Afr. Nord, xxviii. no. 3014 (1939)] Steam), at Ifrane; material from Ouiouane, Ain Kahla and Tizi-n-Oulfigh (Grand Atlas) is glabrous. Maire remarks that "la pilosite est tres nette et abondante dans certains specimens, plus faible dans d'autres."

The plant here figured is one cultivated by the writer at Kew : hairs are present on the calyx and inner (upper) bract, but are not so evident as in Jahandiez and Maire's wild specimens. This cultivated plant is believed to have been introduced from Morocco by the late Sir William Lawrence about ten years ago. Its response to well-manured soil is amazing, the leaves becoming more than twice the size of those of wild specimens and the flower-stems more than twice as tall (see measurements in brackets in description) with the upper part distinctly winged rather than angled and the side-branches longer. Of two plants cultivated at Kew, one died during the severe winter of 1939-40 ; the other barely survived, most of the rosettes being killed.—W. T. STEARN.

Fig. 1, flowering plant, x J; 2, margin of leaf, x 2; 3, section of stem, x 4: 4, spike, *x 2;* a. bnct of flowering stem; 6, bract of spike; 7, lower bract of spikelet; 8, middle bract of spikelet; 9, upper bract of spikelet from side; 10, calyx opened out; 11, corolla opened out; 12, gynoeeium. *Figs.* 5-12, x 4 :— I, bract of flowering stem; II, bract of spike; III, lower bract of spikelet; 1\', middle bract of spikelet; V, upper bract of spikelet.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TABULA 3403.

CAREX PRAECLARA *Nelmes.*

CYPERACEAE. Tribus CARICEAE.

C. piaeclara *Nelmes*; species nova, ab omnibus congeneribus praesertim squamis maximis, spicis subglobosis sessilibus capitulum densum in apice curvato culmi plerumque aphylli efformantibus distincta.

Herba stolonifera, stolonibus crassiusculis curvatis adscendentibus. *Culmi* 12-30 cm. alti, rigidi, superne curvati, angulis laevibus, superne aphylli, basi vaginis aphyllis purpureo-brunneis obtecti et in solo glareoso longiuscule sepulti. *Folia* omnia e culmi triente infimo orta, infra solum cauli adpressa, itaque ad soli superficiem haud procul a basi culmi velut aggregata visa, ibique curvata, culmo multo breviora, 3-4 mm. lata, planiuscula interdum conduplicata, rigida, cinereo-viridia ; vaginae superiores albidae, inferiores purpureae vel purpureo-brunneae, marginibus demum reticulatim fissae. *Sjricae* 3-5, in capitulum dense confertae, sessiles, ellipsoideae vel subglobosae, densi-florae, 1-5-2-5 cm. longae, usque 1-75 cm. diametro, superiores 1-4 androgynaeceae, inferiores omnino femineae, parte mascula spicarum androgynaecearum quam pars feminea multo breviore. *Bracteae* vel omnes squamiformes vel infima subfoliacea, inflorescentiam sub-aequans vel ea brevior, marginibus scabriuscula, leviter vaginans, basi gibbosa, vagina lactea. *Squamae* magnae, plerumque anguste ellip-ticae vel oblongo-ellipticae, acuminatae, tenuiter acutae, atro-castaneo-purpureae, marginibus plerumque latissime albido-hyalinae, tenuiter carinatae sed raro mucronatae, patentes, femineae 9-10 mm. longae, utriculos obtegentes, masculae circiter 6 mm. longae, omnes circiter 2-3 mm. latae. *Vtriculi* anguste elliptico-oblongi usque late elliptici, 4-5 mm. longi, usque 2-25 mm. lati, membranacei, inferne albidi, superne purpurei vel atro-purpurei, compresso-trigoni, enervii vel indistincte nervosi, superne plerumque dense papillosi, in rostrum breve ore albido-hyalinum oblique bilobum abrupte vel subabrupte contracti. *Nux* parvula, in utriculi parte inferiore sita. *Stylus* longus, tenuis. *Stigmata* 3, loriga, tenuissima, basi in utriculo breviter inclusa.

TIBET. Salween-Tsangpo divide, on alpine gravel slopes, 4800-5100 m., 30 Sept. 1933, *F. Kingdon Ward* 10878 (typus in Herb. Mus. Brit.; duplum in Herb. Kew.).

SIKKIM. Jonsong La Valley, Llonakh, 4950 m., 10 Aug. 1909, *Smith & Cave* 2318 (Herb. Calcutt. et Kew.); Lhonak, 4800-5700 m., 1936, *Chapman* 155 (Herb. Kew.).

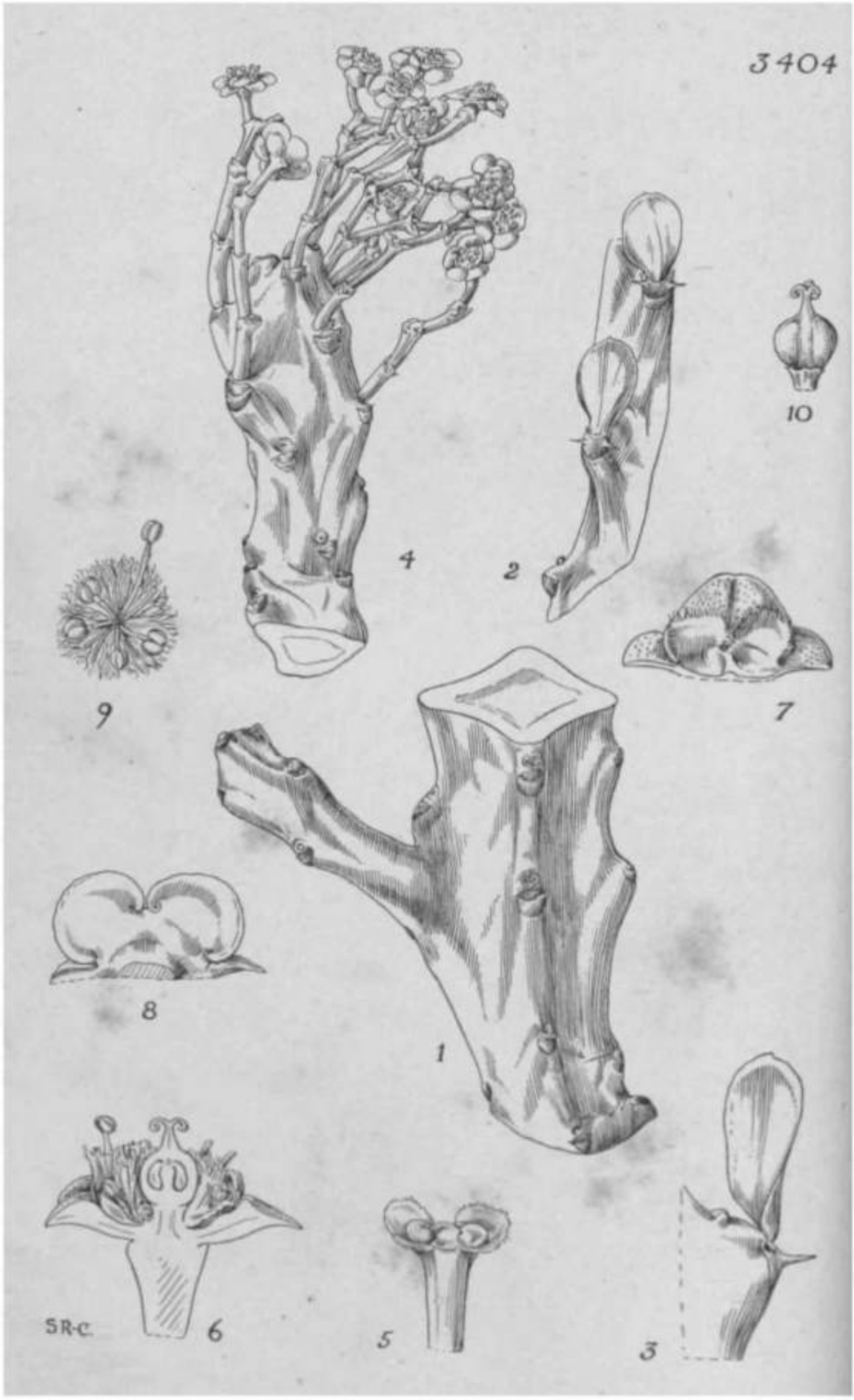
Carex praeclara is a well-marked and striking sedge : the subglobose sessile spikes, crowded into a head at the curved apex of a leafless stem, and the large and spreading glumes, combine to distinguish it from all hitherto described species of *Carex*.

The plant in its vegetative parts most resembles *C. melanantha* C. A. Mey., *C. Moorcroftii* Falc. apud Boott, and *C. sahilosa* Turcz., all members of the section *Atratae* Kunth, and like them it appears to be a sand and gravel binder on the high plateaux of central Asia, forming those extensive areas of " sand grass " described by Moorcroft in the account of his travels in the Himalayas (edited by H. H. Wilson), vol. i. pp. 293-295 (1841). In flower and fruit characters, however, *C. praeclara* appears to have an affinity with certain species of the section *Frigidae* Fries, including C. *atro-fusca* Schkuhr and C. *cruenta* Nees, from all of which it is strongly differentiated by its relatively very large pale-margined glumes, by the very short and obliquely bilobed beak of its utricle, and by its capitate inflorescence.

With its upper, glume-like bracts are associated smaller squamiform structures, which appear to be of the nature of " cladoprophylla " *(sensu* Kiikenthal), present in most *Carices*.

The specimens collected by Smith and Cave and by Chapman differ in several points from the type. They are included provisionally in the species until sufficient material is available to determine their precise position and status. The former plant was identified by Smith and Cave in their account of the vegetation of the Zemu and Llonakh valleys of Sikkim (Rec. Bot. Surv. Ind. iv. 252: 1911) as C. *Moorcroftii* Falc. var.—E. NELMES.

FIO. 1, plant, *natural size;* 2, basal portion of a leaf, with sheath, x 3; 3, lowest bract, x 3; 4, higher bract, x 3; 4a, cladoprophyllum, x 3; 5, still higher bract with cladoprophyllum, x 3; 6, male glume, with stamens, x 8; 7, female glume, x 6 ; 8, utricle, with stigmas, x 6 ; 9, part of utricle showing papillae, x 56; 10, beak of utricle, x 40; 11, transverse section of utricle, x 6; 12, transverse section of flatter utricle, x 6 ; 13, nut, style, and stigmas, x 6.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TABULA 3404.

EUPHORBIA MAYUBANATHANII *Croizat.*

EUPHORBIACEAE. Tribus EuPHORBIEAE.

E. Mayuranathanii *Croizat*; species nova, affinis *E. antiquorum* L., a qua habitu toto, ramis pro more affinium gracillimis, cymis in gemma quaque singulis, foliis majoribus, podariis mammillatis nequc alatis bene discedit.

Arbor mediocris, glaberrima. *Caules* articulati, 3-4-angulati, 1*5-3 cm. crassi; podaria obscura vel more *E. neriifoliae* illiusque affinium mamraillata, nequaquam in alam confluentia ; aculei tenues, pungentes, in innovatipnibus usque 4 mm. longi, apice 4-5 mm. inter se distantes, ceterum minimi vel subnulli, scutello rotundato-quadrangulo badio basi obtuso a gemma 4-5 mm. remoto 4-5 mm. magno fulti. *Folia* elliptica, carnosa, evenia, concava, margine integra, in petiolulum 1 mm. longum abrupte coarctata, 10 mm. longa, usque 8 mm. lata ; stipulae minimae. *Cymae* pluries dichotomae, in gemma quaque singulae, pro more, affinium bene effusae, usque 5 cm. longae totidem latae, pedunculo pedicellisque ob bracteas decurrentes terefibus per medium sublaeviter impresso-angulatis; bracteac scariosae, saccatae, margine erosulae, 4 mm. longae, 5 mm. latae. *Cyathium* usque 9 mm. latum, usque 2*5 mm. profundum, bracteis amplectentibus iis cymae similibus fultum ; nectaria 5, contigua, elliptica vel subreniformia, oculo armato porulosa, sordide lutea, margine integra, facie interna levissime labiata, 5 mm. lata, 2 mm. longa ; lobi 5, rotundati vel subspathulati, margine lacerato-fimbriati, 4 mm. lati, usque 2 mm. longi; flores <£ plurimi, in fasciculos 5 aggregati, maturi breviter exserti, staminodiis numerosis hyalinis lineari-spathulatis lacerato-fimbriatis admixtis ; flos $ pedunculo ecalyculato brevissimo fultus, maturus in cyathio subinclusus, trigono-rotundatus, usque 2 mm. magnus; stylus 2 mm. longus, stigmatibus 3 capitato-partitis usque 2 mm. longis. *Fructus* desiderantur.

INDIA. Madras Presidency : Pallasana, Palghat gap, on the summit of a hillock which forms the spur of the Vahumala hills, summer 1938, *P. V. Mayuranathan* (typus in herb. Kew.; syntypus in herb. Am. Arb.). " Shrub 12 feet in height; branches form a round canopy. Trunk rather short and bark gray."

There is no type-specimen of *Euphorbia antiquorum* L. in the Linnaean Herbarium, the binomial resting solely on the original diagnosis, synonymy and illustrations cited. Commelin's *Euphorbium verum antiquorum* (Plant. Rar. Hort. Amstel. 23, t. 12 : 1697) is certainly *E. tortilis,* and the early note of Linnaeus (Hort. Cliff. 196 : 1737), " alis saepius duabus horizontalibus, margine repandis," refers to that species. The only other illustration cited by Linnaeus under typical

E. antiquorum, **namely, Rheede's** *Schadida-caUi* **(Hort. Malab. ii. 81, t. 42 : 1679), is one of the least satisfactory of the whole Hortus Malabaricus, and it may be suspected that it was drawn from sections of stems possibly belonging to two or more plants. It is important that the Linnaean concept of** *E. antiquorum* **be finally limited and defined, because it is impossible to classify the complex of species concerned without the acceptance of a definite type. The limitation of** *E. antiquorum* **to the first Spurge of the Hortus Cliffortianus definitely identifies the plant of Linnaeus with** *E. tortilis* **Wight, a well-known species at least twice adequately illustrated.**

In the writer's opinion, *Euphorbia trigona* **Haw. (Syn. PL Succ. 127 : 1812), stated by Haworth to be a native of India, and long regarded as a subspecies of** *E. antiquorum,* **is conspecific with** *E. Hermentiana* **Lem. (111. Hortic. v. Misc. 63 : 1858), a ubiquitous ornamental plant in hothouses throughout the world and manifestly a West African endemic.** *E. trigona* **Roxb. has been renamed** *E. Barnhartii* **Croizat (De Euph. Antiq. 25,54: 1934).**

Wight's illustration of *E. antiquorum* **var.** *polygona* **(Ic. PL Ind. Orient, iii. t. 897 : 1843;** *E. antiquorum* **in textu, pt. n. p. 9) suggests the possibility that** *E. Mayuranathanii* **is closely related to that variety, agreeing with it, so far as the illustration shows, in the main characters of the inflorescence. The new species differs, however, in the much more slender build, and in the habit which in leafless condition makes it resemble** *E. neriifolia* **more closely than the forms of the complex near** *E. antiquorum.*

The species is named for Mr. P. V. Mayuranathan of the Government Museum, Madras, who collected abundant live and preserved material from the few living specimens known and suggested that it be studied.

L. OROIZAT.

FIG. 1, lower part of stem, *wit.* *,zt; -\ **part** of stem showing leaves and spines, *fiat, size;* 3, leaf and spine in side view, x 2; 4, apical portion of stem, bearing inflorescences, *not. size;* 5, apex of peduncle, cyathium removed, showing bracts. x 2; 6, cyathium in longitudinal section; 7, part of nectaries and lolws from above, flowers removed; 8, part of nectaries from U'low : i>. male flowers and staminodes; **10, female flower.** ***Figs.*** **6-10, x 4.**


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TABULA 3405.

ARISAEMA PSITTACUS *E. Barnes.*

AKACEAE. Tribus ABEAE.

A. **psittacus** *E. Barnes* ; species nova, *A. Leschenaultii* Bl. affinis, sed spathae limbo cucullato sensim curvato-caudato, spadicis appendice apice in lobum ovoideum dilatata supra medium constricta apice verruculosa distinguenda.

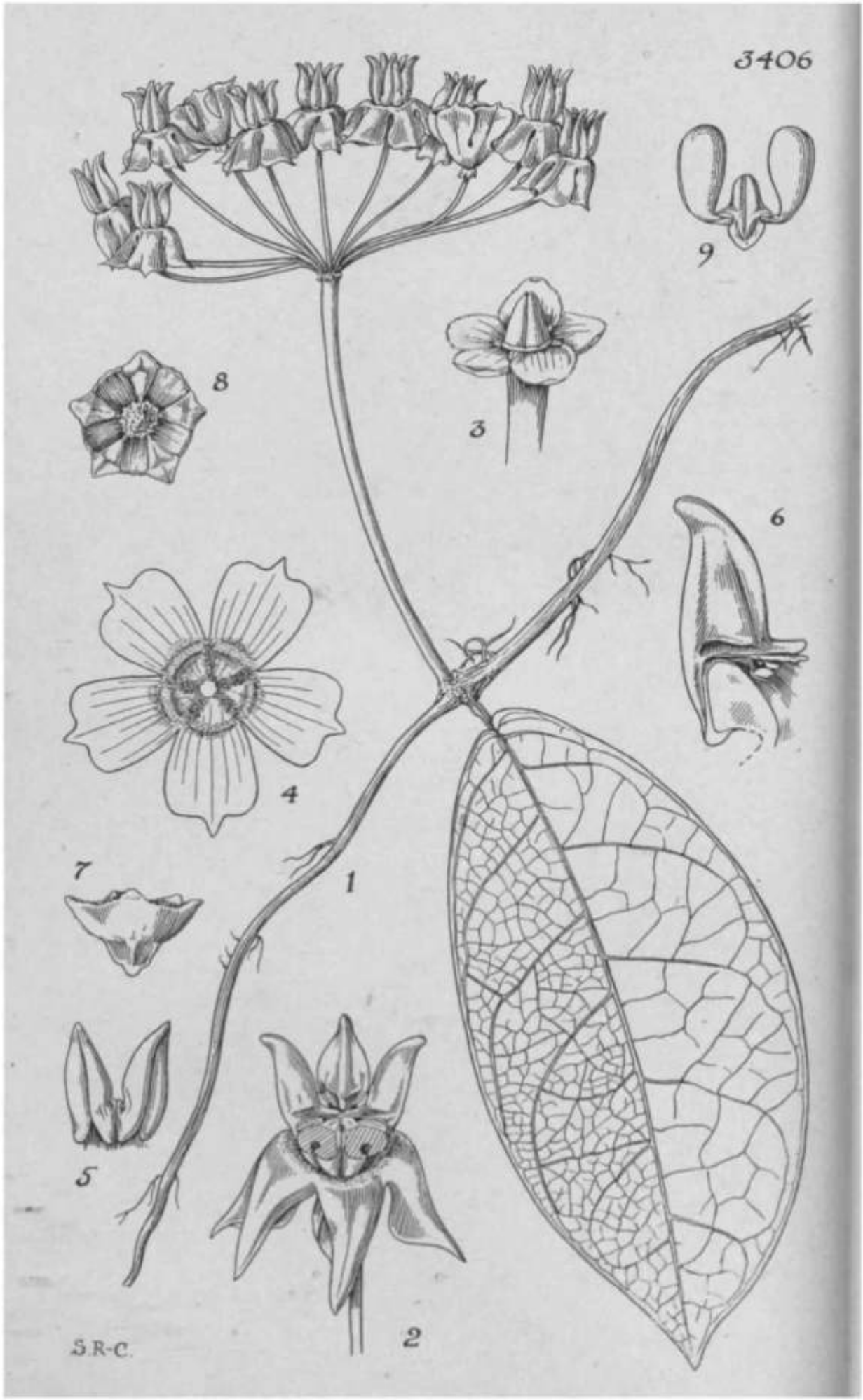
Herba dioica, sucQulenta, glabra. *Tuber* oblatum, inferne vestigiis emarcidis tuberis annotini vestitum, came albo. *Cataphylla* compluria, membranacea, pallide viridia et emarmorata, vel brunneo-purpurea et marmorata. *Folium* solitarium ; petiolus 50 cm. longus, cylindricus, basi pedunculum per 25 cm. vaginans; foliola radiata, in plantis (J 7-10, in plantis $ 10-11, sessilia, obovato-lanceolata usque oblanceolata, usque circiter 20x5 cm., apice caudato-acuminata, nervis numerosissimis, nervo intramarginali perdistincto, pagina superiore saturate viridi obscura vel subnitida, inferiore pallida nitida vel subnitida. *Pedunculus* gracilis, cylindricus, 43 cm. longus. *Spathae tubiis* 7*6 cm. longus, anguste infundibularis, ore circiter 3-8 cm. diametro, sectione transversa plus minus rotundato-triangularis (dorso lateribusque duobus planis), viridi- et albo-striatus ; limbus plus minus hemisphaericus, deinde in caudam curvatam sensim angustatus, circiter 15 cm. longus, viridis, vittis 5 latis albis translucentibus vel semi-translucentibus notatus. *Spadix* 8 cm. longa ; pars inferior fertilis, angusta, acuminata, circiter 3-8 cm. longa; appendix in cylindrum robustum 1 cm. latum subito ampliata, cylindro supra medium vel apicem versus distincte constricto, supra constrictionem in lobum ovoideum lutescentem subverruculosum 2 cm. longum 1-2 cm. latum intus valde grosse cellularem dilatato. *Flores $* : antherae 3, curvatae, purpureae, in pedicello brevi columnari albo, pedicellis superne gradatim brevioribus; flores neutri in inflorescentiis <J nulli. *Flwres* ?: ovarium plus minus sphaericum, nitidum, viride, stylo brevissimo fusco-purpureo, stigmatibus albis fasciculatis ; flores neutri in parte spadicis angusta supra femineos siti, breves, acuminati, virides, sursum porrecti. *Ovitla* circiter 6. *Infructescentia* e baccis circiter 150 sistens, 13*5 cm. longa, basi 5 cm. lata, apice 3-5 cm. lata. *Baccae* usque 1-3 cm. diametro, nitidae, aurantiaco-scarlatinae, usque 6-sporae. *Semina* 0 • 5-0 • 6 cm. longa, in pulpa immersa, testa caeruleo-nigra externe translucente, albumine albo.

TRAVANCORE. High Range, in shola on side of Chunduvurrai, and in Mannavan Shola, 2100-2250 m., fl. May, fr. Sept., *Barnes* 1538, 1574,1576 (typus), 1581,1582,1586,1587.

As with other Arisaemas there is considerable variation in size according to conditions of growth. The above dimensions are of a male plant; female plants grow to larger sizes than males : one measured had a corm 7 cm. in diameter and a peduncle 58 cm. long. There is a definite aperture at the base of the male spathe where the sides overlap, but not in the case of female inflorescences ; the scheme for cross-fertilisation therefore appears to be identical with that of *A. Leschenaultii* and other dioecious species.

The fruiting plants were collected at Chunduvurrai in September. I am not able to distinguish with certainty between the leaves of *A. psittacus* and *A. Leschenaultii.* The leaves of the former usually have more numerous nerves and a slightly more cylindrical tip at the apex. These characters and the fact that *A. psittacus* is the common *Arisaema* in this area are my grounds for taking the fruiting plants for *A. psittacus.*—E. BARNES.

FIG. 1, leaf from a $ plant, x £; 2, $ spathe, *natural size* ; 3, 6* inflorescence, *natural size;* 4, *$* flowers, x 4 ; 5, $ inflorescence, *natural size;* 6, $ flowers, x 8.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TABULA 3406.

HOYA **MITRATA** *Kerr.*

ASCLEPIADACEAE. TribuS MARSDENIEAE.

H. mitratfe *Kerr*; species nova, *H. oreostemmati* Schlechter (ex descriptione) affinis, foliis minoribus, floribus multo majoribus distincta.

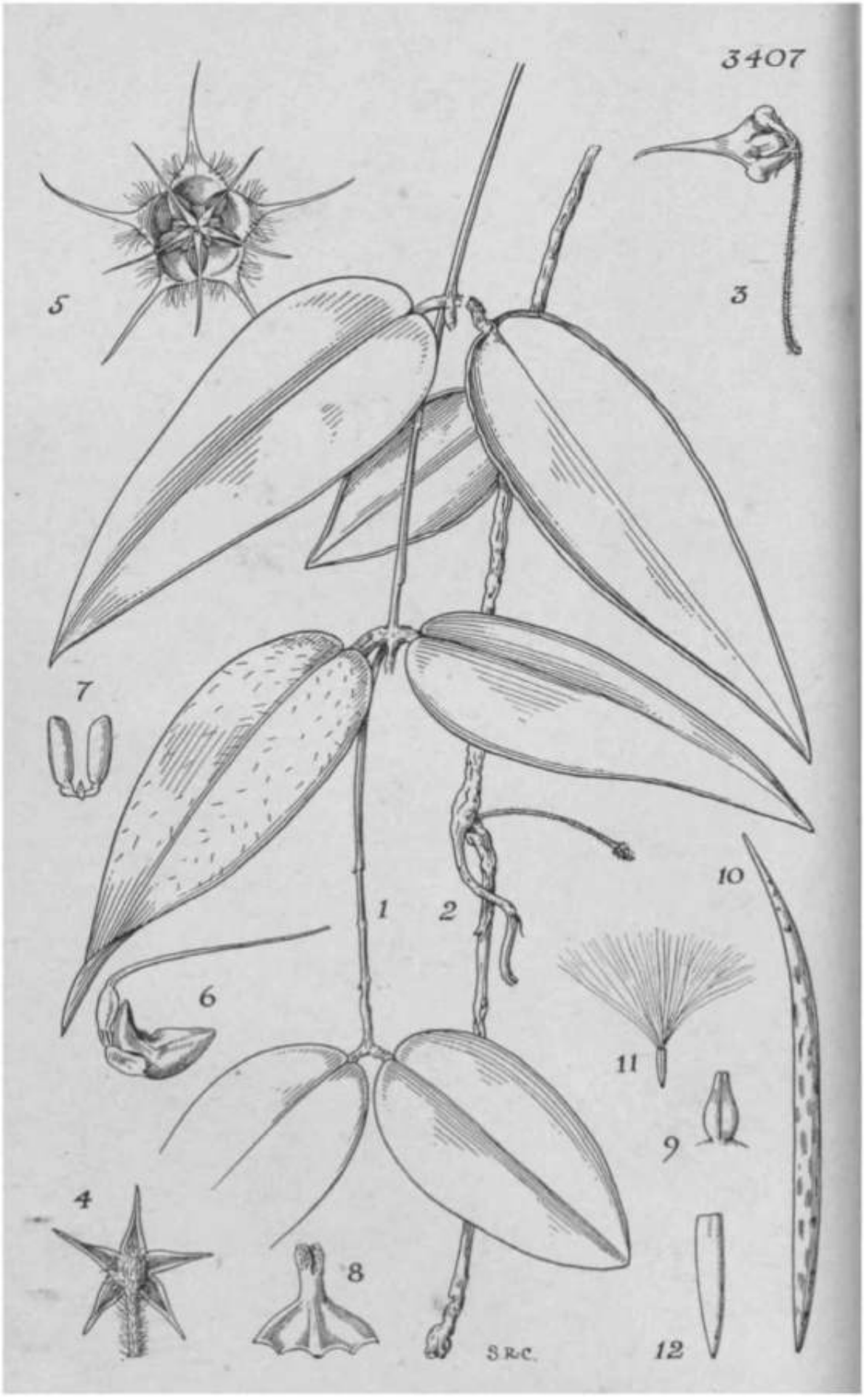
Svffrutex volubilis ; rami teretes, siccitate striati, glabri, radicantes. *Folia* oblanceolata vel elliptica, basi rotundata et leviter auriculata, apice breviter acuminata, margine plana, 6-5-12 cm. longa, 4-7-6 cm. lata, coriacea, siccitate cinerea, glabra, supra nitida, subtus opaca, costa supra concava subtus prominente, nervis lateralibus 5-6 paribus marginem versus valde arcuatis et 5-6 mm. a margine anastomosantibus cum rete venularum utrinque prominentibus ; petiolus 6-8 mm. longus, supra concavus, glaber. *Inflorescentia* axillaris, umbelliformis, peduncu* lata, circiter 15-flora ; pedunculus robustus, glaber, 6-5 cm. longus ; pedicelli graciles, glabri, 2* 5-3* 8 cm. longi. *Sepala* late ovata, obtusa, circiter 2 • 5 mm. longa et lata, breviter ciliata, extus minute puberula. *Corolla* sub anthesi reflexa, 5-lobata, extus glabra, intus basin versus velutina, explanata circiter 24 mm. diametro ; tubus 4 • 5 mm. longus ; lobi sub anthesi margine valde reflexi, explanati obovati vel fere obcordati, breviter. acuminati, circiter 9 mm. longi, apicem versus 8*5 mm. lati. *Coronae segmenta* erecta, cymbiformia, adaxialiter obtuse carinata, abaxialiter alte sulcata, basi bilobata, circiter 9 mm. alta, angulo interno in linguam circiter 1 -25 mm. longam horizontaliter producto. *Antherae* appendix coronam breviter excedens; pollinia oblonga, circiter 1 mm. longa, corpusculo duplo longiora, margine translucido angusto. *Carpella* glabra, circiter 2 mm. alta ; stigmatis caput obconicum. *Folliculi* ignoti.

THAILAND (SIAM). Surat, Ban Tong Tao, circiter 10 m., in evergreen forest, *Kerr* 13152.

In its corona with erect segments and in its reflexed corolla this plant fits the section *Oreostemma,* which Schlechter created for his species *H. oreostemma,* hitherto the only representative of that section.

H. mitrata appears to be rare. Besides the collection recorded above, only one other has been seen: Takuapa, *Haniff* 3841. Takuapa is almost in the same latitude as Ban Tong Tao, but on the opposite (west) side of peninsular Thailand (Siam). The writer is indebted to Mr. E. E. Holttum, Director of the Singapore Gardens, for the loan of a sheet of HanifFs collection. The specific name refers to the turban-like appearance of the gynostemium.—A. F. G. KERR.

FIG. 1, portion of plant, *natural size*; 2, flower, two corona segments partially cut away, x 2; 3, calyx and carpels, x 4; 4, corolla, flattened out, x 1-5; 5, two corona segments, x 2; 6, median section through anther and corona segment, x 4 ; 7, stigmatic head, lateral view, x 6 ; 8, stigmatic head, from above, x 6; 0, pair of pollinia, x 12.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TABULA 3407.

HOTA FLAGELLATA *Kerr.*

ASCLEPIADACEAE. TribuS MARSDENIEAE.

H. **flagellata** *Kerr*; species nova, *H. caudatae* Hook. f. affinis, foliis floribusque minoribus, corollae lobis pro rata longius caudatis distinguenda. "

Suffrutex epiphyticus ; rami graciles, glabri. *Folia* ovata vel lanceolata, basi rotundata et minute auriculata, apice acuta, margine plus minusve revoluta, 4-7-8-5 cm. longa, 2-2-5 cm. lata, coriacea, siccitate pallide brunnea, glabra nisi supra interdum pilis minutis sparsissime instructa, costa supra subtusque aegre visibili, nervis lateralibus utrinque obscuris; petiolus crassus, rugosus, glaber, 3-5 mm. longus. *Inflorescentia* lateralis, pedunculata; pedunculus gracilis, 20-25 mm. longus, pilis deflexo-patentibus copiose indutus; pedicelli graciles, circiter 9 mm. longi, indumento ut illud pedunculi. *Alabastrum* apice in cornu circiter 4 mm. longum productum. *Calyx* alte 5-fidus, extus parce pilosus; lobi ovati, longe acute acuminati, apice acuti, 2 mm. longi, basi 0 • 75 mm. lati. *Corolla* rotata, subtus glabra, supra marginem versus pilis mollibus longiusculis praedita, explanata circiter 15 mm. diametro ; tubus circiter 2- mm. longus ; lobi late triangulares, apice in caudam 5 mm. longam producti, cauda exclusa circiter 1 -5 mm. longi. *Coronae segmenta* radiato-patentia, elliptica, circiter 2-25 mm. longa, supra plana, subtus convexa, angulo interno in linguam brevem acutam erectam producto, angulo externo subacuto. *Antherae* appendix niembranacea, apice in processum anguste linearem circiter 5 mm. longum producta ; corpusculum parvum, ellipticum. *Carpella* circiter 1 • 5 mm. alta ; stigmatis caput umbonatum, leviter bifrdum. *Folliculus* teres, glaber, leviter striatus, siccitate pallide cinereus maculis fusco-purpureis variatus, apice sensim attenuatus, circiter 7-5 cm. longus, medio 3*5 mm. diametro; semina compressa, circiter 5 mm. longa, 0*75 mm. lata, apice comosa.

THAILAND (SIAM). Terutao, edge of mangrove forest, *Kerr* 14164.

This species is known only from the one, rather scanty collection, ft is closely allied to *H. caudata* Hook, f., found further to the south, in Malacca and Penang. Terutao, the provenance of //. *flagellata,* is an island off the coast of Satul.—A. F. G. KERR.

FIG. 1, young shoot with leaves, *natural size* ; 2, older shoot, showing a peduncle from which flowers have dropped ; 3, a flowering bud with pedicel, × 3 ; 4, calyx and upper portion of pedicel, × 6 ; 5, flower, × 3 ; 6, corona segment with anther, × 8 ; 7, pair of pollinia, × 24 ; 8, stigmatic head, × 16 ; 9, carpels, × 8 ; 10, follicle, *natural size* ; 11, seed with coma, *natural size* ; 12, seed, × 4.


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TABULA 3408.

TERNSTROEMIA MAGNIFICA *Stapf ex Ridley.*

THEACEAE. Tribus TERNSTROEMIEAE.

T. **(Erythrochiton)** magnifica *Stapf ex Ridley* in Kew Bull. 1938,175; in genere foliis magnis subtus glaucescentibus, floribus maximis 3-4 cm. diametro valde egregia.

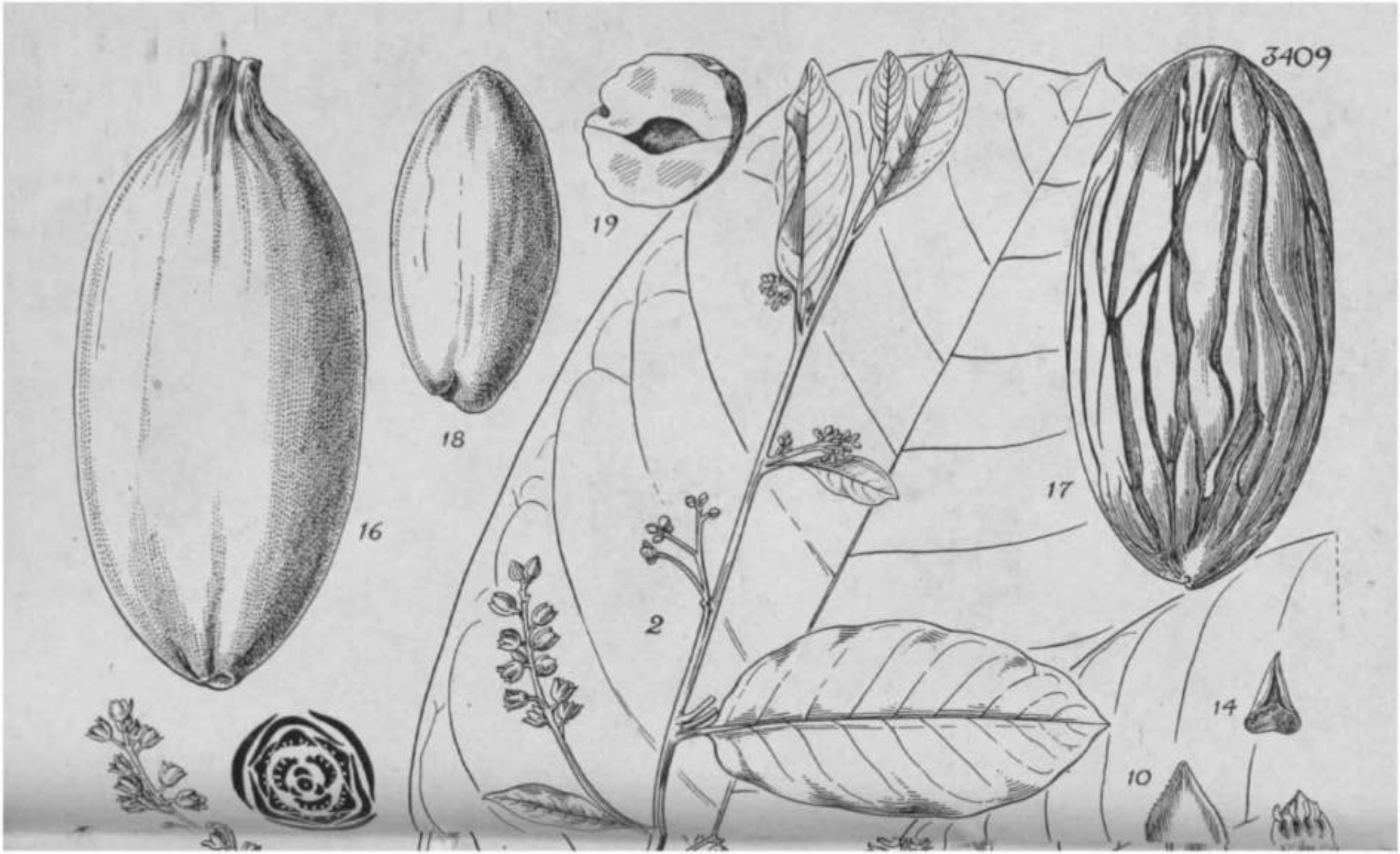
Arbor parva. *Ramuli* 4-5 mm. crassi, teretes, cortice sublaevi pallido. *Folia* per 3-5 pseudo-verticillata, elliptico- usque oblanceolato-oblonga, (10-)13-21 cm. longa, 4-5-8-5 cm. lata, basi cuneata vel rotundato-cuneata, apice subrotundata abruptiuscule brevissime (7-11 mm.) acute caudata, margine integerrimo piano, crasse coriacea, glaberrima, siccitate supra brunnescentia haud nitentia, subtus glaucescentia ; costa valida, supra argute impressa, subtus prominens, teres; nervi laterales gracillimi, 10-15-jugi, patuli, prope marginem arcuato-anastomosantes, supra valde obscuri subtilissime insculpti, subtus levissime prominuli pallidi, venulis minoribus inconspicuis laxe clathratis; petioli 2-2*5 cm. longi, 2-3 mm. crassi, teretes, supra canaliculati. *Flvres* (<J tantum cogniti) insignes, subglobosi, 3-4 cm. diametro, ut videtur 1-2 infra foliorum pseudo-verticillos editi, fragrantes. *PediceM* patentes, robusti, 2-2-3 cm. longi, 2-3 mm. crassi, apicem versus incrassati, 4-5 mm. infra apicem bibracteolati, bracteolis caducis (non visis). *Sepala* suborbicularia, inaequalia, duo exteriora tribus interioribus minora: exteriora 8-12 mm., interiora 10-15 mm. diametro; omnia siccitate dura, sublignosa, margine tenui submembranaceo rubido-translucente minute erosulo. *Petala* obovata, 2 • 5-2 • 8 cm. longa, circiter 2 cm. lata, basi haud unguiculata, apice rotundata, cucullata, crasse carnosa, margine tenui pulchre eroso-denticulato, lutea. *Stamina* valde numerosa, 7-10 mm. longa ; filamenta linearia, plana, 2-3 mm. longa, in connectivum aequilatum apice breviter productum desinentia ; antherae laterales, 6-7 mm. longae. *Ovarii rudimentum* breviter conicum, lignosum. *Fructus* ignotus.

SARAWAK. Near Kuching, 2 Dec. 1892, *Garai* for *HaviUnd* 1984: Small tree; leaves glaucous on the back; flower yellow, sweet scented."

The 4-pecious flowers, distant bracteoles and produced connective of this striking species undoubtedly place it in Sect. *Erythrochiton* (Griff.) Turb. The petals are not " clawed " as in some species of this section. The glaucescent under-surface of the leaves is very untypical of the genus. *T. magnifica* has the appearance of a " primitive " and relict species.

No material of this rare tree appears to have been obtained since Haviland's collector found it in 1892, and the female flowers and fruit are therefore still unknown.—H. K. AIRY-SHAW.

FIG. 1, flowering branch, showing foliage; 2, flower, detached, showing calyx, from below; 3, a petal, upper surface; 4, two stamens, from within. Figs. 1-3, *natural size;* fig. 4, x 6.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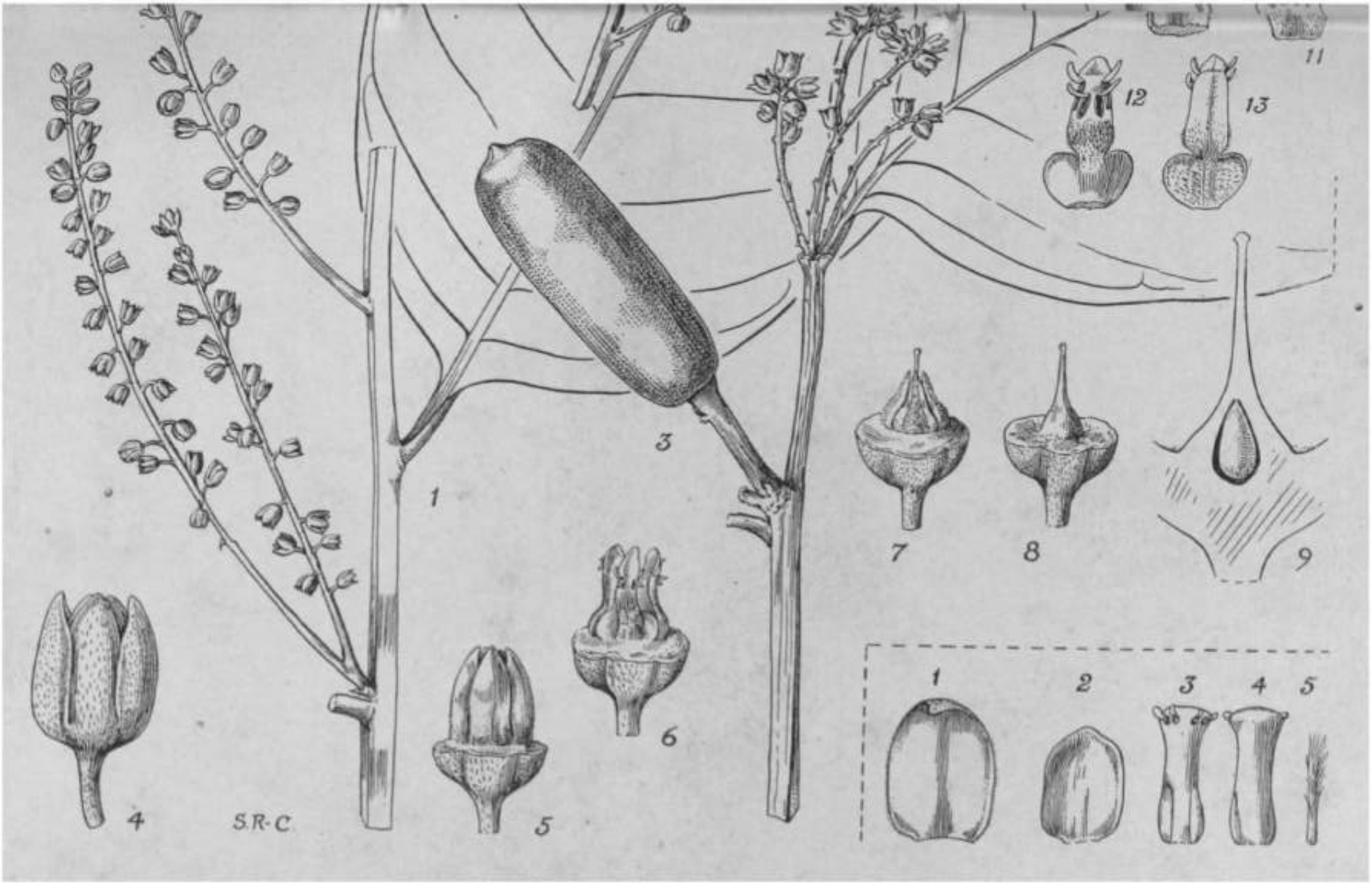
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TABULA 3409.

EUSIDEROXYLON MELAGANGAI *Symington.*

(Inset: Floral parts of E. Zwageri *Teysm. et Binnend.)*

LAURACEAE. **Tribus EUSIDEROXYLEAB.**

E. Melagangai *Symington*; species nova, *E. Zwageri* Teysm. et Binnend. arete affinis, sed ramulis angulatis, inflorescentia pseudo-spicata, staminum indole alieno, fructibus minoribus facile distinguenda.

***Arbor* amplicomata, glabrescens, trunco usque circiter 5 m. ambitu. *Rami juniores* minute ferrugineo-pubescentes, conspicue tetragoni, demum subteretes. *Folia* oblonga vel elliptico-oblonga, basi cordata usque acuta (plerumque truncata, interdum leviter inaequalia), apice breviter acute acuminata acumine usque 1-5 cm. longo, circiter 20 cm. longa et 9 cm. lata sed magnitudine valde varia, chartacea, siccitate plerumque supra obscure griseo-brunnea, subtus saturatius purpureo-brunnea, matura glaberrima sed pagina superiore minute papillosa ; costa subtus prominens, supra inconspicua ; nervi laterales circiter 11-jugi, subtus prominentes, supra indistincti; reticulatio subtus indistincta, supra haud cernenda ; petioli robustiores, 1-1 *5 cm. longi, supra canaliculati, juniores ferrugineo-pubescentes. *Inflorescentiae* ex axillis superioribus ortae, thyrsoideae, sed cymis lateralibus ad ramulos brevissimos unifloros secundum axem elongatum irregulariter dispositos redactis pseudo-racemos efformantibus ; pseudo-racemi in pedunculo brevi plerumque binatim orti, 3-11 cm. longi, laxiusculi, sparse ferrugineo-pubescentes ; ramuli 2 mm. longi, ferrugineo-tomentosi, flore singulo minute bracteolato terminati. *Fhres* brevissime pedicellati, maturi 4 mm. longi, alabastro globosi, calyce pedicelloque plus minus ferrugineo-pubescentibus. *Perianthii* segmenta 6 (rarius 5), biseriata, 3 exteriora 3 interiora obtegentia, subaequalia, ovata, obtusa. *Stamina* 12, quadriseriata, serierum 2 exteriorum (I et II) subaequalia, petaloidea, apice acuta, introrsa, extra minute pubescentia, thecis 4 oblongis per valvulas sursum reflexas dehiscentibus ; seriei III angustiora et crassiora, basi tomentosa glandulisque binis auriculatis praedita, extrorsa, 4-locellata ; seriei IV sterilia, subconica, cornea, dorso minute puberula, ceterum glabra, basi intus glandula nigra magna instructa. *Ovarium* ovoideo-conicum, glabrum, uniloculare, ovulo solitario ; stylus cylindricus, attenuatus, ovario subaequilongus ; stigma capitatum. *Fructus* drupaceus, ellipsoideo-oblongus vel subovoideus, maturus 8-10 cm. longus et 4 • 5-5 • 5 cm. diametro; sarcocarpium suberosum, 4 mm. crassum ; putamen durissimum, longitudinaliter irregulariter subsinuato-insculptum.**

NORTH BORNEO. **Mile 76, Beaufort-Tenom Road, *Edwards* (For. Dept. F.M.S. 36668; Sandakan Herb. 3891); mile 55J, Beaufort, fr. Nov., *Kandilis* (For. Dept. F.M.S. 44264 ; Sandakan Herb. 8533); Kawang, Papar District, fr. Sept., *Cinserv. For.* A\ *Borneo* (For. De''pt. F.M.S. 44741).**

BRUNEI. Sine loc, fr. Oct., *Dolby*; Sungei Kargu, Belait, *Durant* (For. Dept. F.M.S. 28663) ; Ulu Kumpaya, Belait, *Durant* (For. Dept. F.M.S. 28688); Labi Hills Forest Keserve, 240 m., *Smith* (For. Dept. F.M.S. 30458); Bukit Temajor, Belait, fl. March, *Flemmich* (For. Dept. F.M.S. 32594); Bukit Labi, fl. April, *Flemmich* (For. Dept. F.M.S. 34474; *typus);* Bukit Kempuyoh, fl. and young fr. April, *Flemmich* (For. Dept. F.M.S. 34452); Sungei Biang, *Symington* (For. Dept. F.M.S. 35473).

Eusideroxylon Melagangai is the second species of this hitherto monotypic genus. *E. Zwageri* Teysm. et Binnend., described in 1863, is the well-known Ironwood tree of Borneo, Sumatra, and adjacent Dutch islands. *E. Melagangai* resembles it closely, and has been confused with it both in the field and in the herbarium. Where it occurs, on low-lying land or low hills in the West Coast Residency of North Borneo and Brunei, it is recognized by the natives as " a kind of *belian* "—*belian* being the vernacular name commonly applied to *E. Zwageri.* The name *belian simpor* * is frequently applied by Malays to distinguish it from *belian betid* or *belian batu* which is *E. Zwageri,* but the Dyak name *melagangai* is widely recognized by Dyaks and Malays alike.

Trees of *E. Melagangai* have, as a rule, a shorter bole than those of *E. Zwageri*; the wood is less dense and said to be more readily split but less durable. The most reliable diagnostic field character is the strongly angled branchlet of *E. Melagangai.* In *E. Zwageri* the inflorescence is of a lax thyrsoid type : in *E. Melagangai* the lateral cymes are reduced to short uniflorous branchlets giving the inflorescence a spicate appearance. In *E. Zwageri* the two outer rows of stamens are petaloid and functionless : in *E. Melagangai,* although petaloid, they have anther-cells and are functional. The glands at the base of the third row of extrorse stamens, which are minute in *E. Zwageri,* are large and auriculate in *E. Melagangai.* The innermost row of staminodes is subulate and hairy in *E. Zwageri* but subpyramidal and horny in *E. Melagangai.* The fruits of *E. Melagangai* are only about half the size of those of *E. Zwageri.*—C. F. SYMINGTON.

FIG. 1, part of flowering branch, showing mature leaf and normal paired racemes, *nat. size;* 2, apex of flowering branch, showing immature foliage and single racemes, *nat. size;* 3, apex of branch showing short paired racemes and immature fruit, *nat. size;* 4, flower bud, x 6; 5, flower with perianth removed, showing outer (petaloid) stamens, x 6; 6, the same, with outer stamens removed, x 6 ; 7, the same, all stamens removed, showing staminodes, x 6; 8, gynoecium, x 6; 9, gynoecium, longitudinal section, x 16 ; 10, perianth segment, from within, x 8; 11, outer (petaloid) stamen, from within, x 8 ; 12, 13, inner stamen, from without and within respectively, showing glands, x 8; 14, staminode, from within, x 8; 15, floral diagram; 16, fruit, *nat. size;* 17, sculptured putamen, *nat. size;* 18, shrunken seed, *nat. size*; 19, the same, transverse section, *nat. size.*

INSET. **Floral parts of *E. Zwageri* for comparison with figs. 10-14: *Fig.* 1, perianth segment, from within ; 2, sterile outer (petaloid) stamen ; 3, 4_f extrorse inner stamen, from without and within ; 5, staminode. All x 16.**

• ***Belian simpor* is applied in parts of the East Coast Residency of North Borneo not to *L. Melagangai* but to what appears to be a form of *E. Zwageri.* There is no evidence that *E. Melagangai* occurs in the east of North Borneo.**


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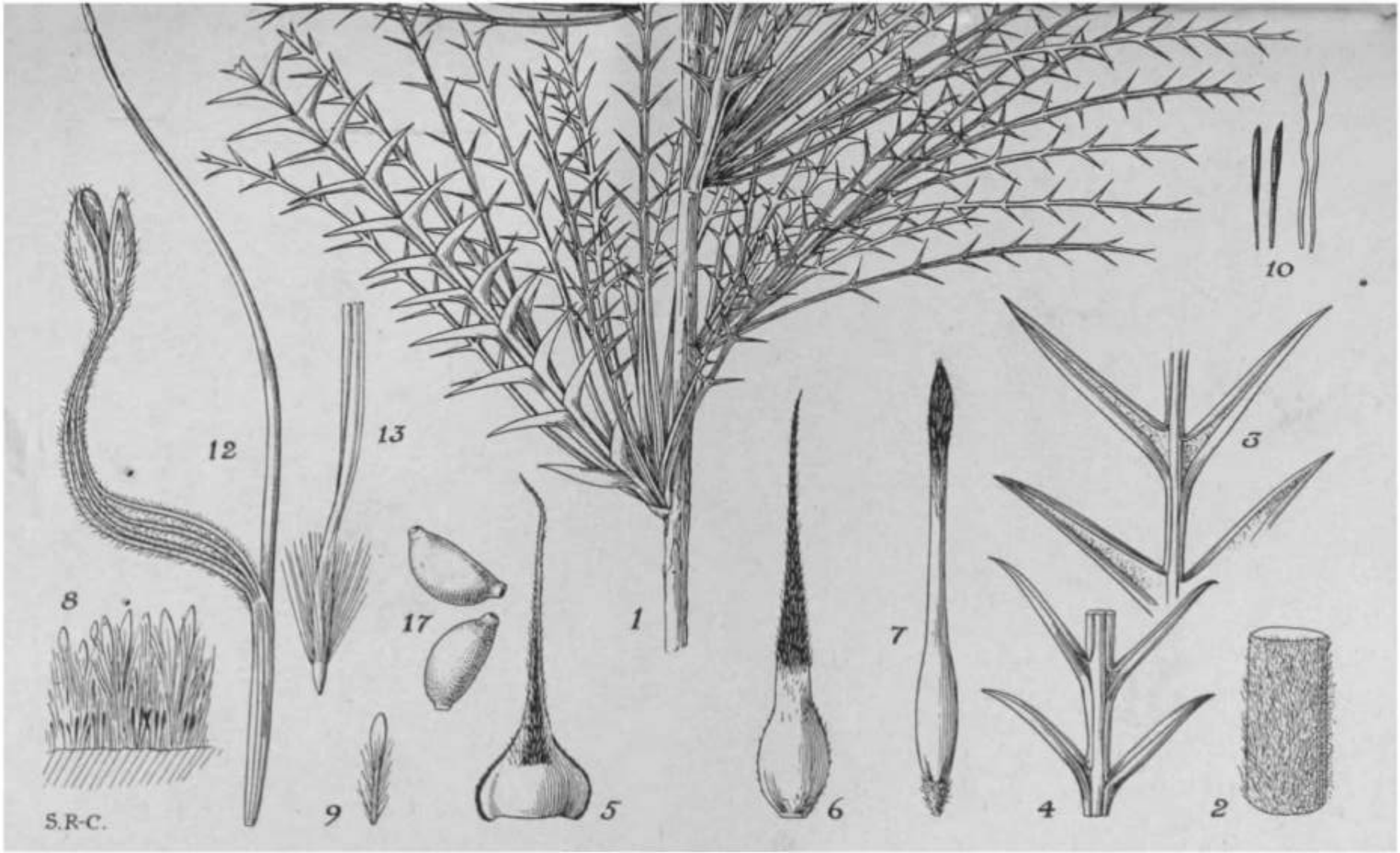
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TABULA 3410.

DRYANDRA FRASERI *R. BR.*

PROTEACEAE. Tribus BANKSIEAE.

D. Fraseri *R. Br.* Suppl. Prodr. Fl. Nov. Holl. Prot. Nov. 39 (1830); Meissn. in Lehm. PL Preiss. i. 596 (1845) et in DC. Prodr. xiv. 476 (1856); Benth. Fl. Austral, v. 568 (1870).—Species *D. Ashbyi* B. L. Burtt * maxime affinis, ramulis dense pubescentibus, foliis longioribus gracilioribus segmentis brevioribus angustioribus pluribus, perianthii segmentis haud glabrescentibus distinguenda.

Suffrutex. Ramuli juniores appresse et densius pubescentes ; vetustiores purpurascentes, lenticellati. *Folia caulina* 5-10 cm. longa, ad costam pinnatisecta ; costa supra impressa, subtus prominens, straminea, basin versus ut ramuli pubescens, ceterum glabra; segmenta linearia, circiter 1 cm. longa, saepissime opposita, inter se circiter 4 mm. distantia, leviter arcuata, pungentia, decurrentia, marginibus subtus revolutis, folii basin et apicem versus breviora. *Folia peri-involucralia* circiter 15, caulinis similia sed interiora exterioribus breviora, basin versus supra applanata, subtus pilis nigris et albis intermixtis pubescentia. *Capitula* in ramulis abbreviatis pseudo-lateralia, vel ramulos elongatos terminantia, sub anthesi circiter 5-6 cm. diametro. *Involucri bracteae* circiter 4-seriatae ; extimae e basi ovata 4 mm. longa et 3 mm. lata in acumen setiforme 7 mm. longum productae, extra basi excepta pilis crassis nigro-brunneis cum aliis longioribus albis intermixtis obsitae, marginibus ciliatae, intus glabrae; intermediae lanceolatae, medio leviter constrictae, 1 cm. longae, in acumen setiforme 5 mm. longum productae, ut extimae pilosae; intimae fere lineares (supra basin leviter ampliatae), 1-7 cm. longae, apice per 5 mm. dense rubro-nigro-pubescentes, medio glabrae, basi ipsa pilis paucis albis crispis instructae. *Receptacvlum* lignosum, late conicum, 7 mm. diametro. *Receptaculi squamae* 4-5 mm. longae, anguste spatulatae, stramineae, infra medium pilis longis albis dense pilosae, sub fructu basibus elongatis in phalanges 1-5 cm. longas irregulariter concretae. *Flores* in capitulo circiter 100, omnes consimiles. *Perianthium* 2 • 8 cm. longum; segmenta 4, linearia, apice in laminam expansa, inferne in tubum persistentem 8 mm. longum glabrum coalita, superne primum cohaerentia, deinde stylo unilateraliter fissa, demum libera, extra dense et breviter pilosa, intus glabra; segmentorum laminae 4 mm. longae, 0*75 mm. latae, apice calloso-acutae, extra pilis setosis subappressis albis et rubro-brunneis vestitae, apicem versus pubescentes, intus concavae, siccitate partibus inferioribus segmentorum pallidiores. *Antherae* 4, 2 mm. longae, 0*5 mm. latae, in laminis perianthii segmentorum subsessiles, basifixae, introrsae, dorso et apice nigrae. *Pollinis grana* simplicia, senii-ellipsoidea. *Squamae hypogynae* 4, fere lineares, 2 mm.

* *Vide* Kew Bull. 1939,183.

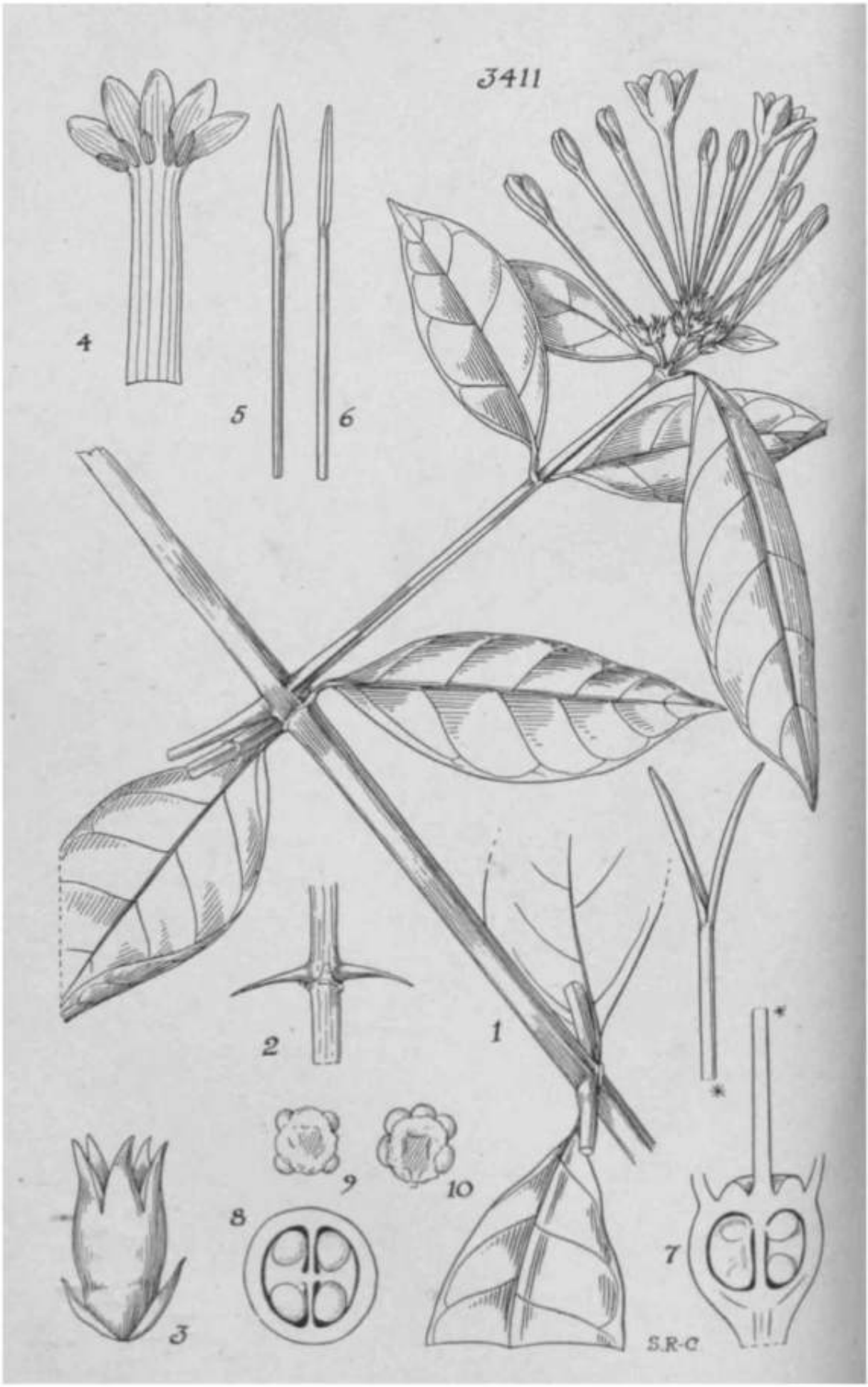
longae. *Ovarium* 1 mm. longum, apice comosum. *Stylus* 3-5-4 cm. longus, leviter arcuatus, glaber, rigidus, stramineus, basin versus sulcatus, sub stigmate levissime geniculatus. *Stigma* 2*5 mm. longum, cylindricum, acutum, glabrum, stylo fuscius. *Fructus* folliculares, dispermi, in infructescentiis visis circiter 9 maturati, stylis persistentibus et perianthiis emarcidis florum abortivorum et squamis receptacularibus elongatis circumcincti, 1 *5 cm. longi, 1 cm. lati, extra breviter pilosi, striati (area suturam dorsalem versus reticulata excepta), intus glabri, nitidi. *Semina* duo, nigra, alata, folliculo conformia, dissepimento libero separata.

SOUTH WEST AUSTRALIA. " Swan River," *Fraser* 53 ; *Drummond* 129, 642. Bridgetown to Kojonup and Slab Hut Gully, 1910, *Dorrien Smith.* Narrogin, Great Southern Railway, 24 June 1903, *Morrison.* Mogumber, Moorek, 19 Aug. 1904, *Morrison.* Cultivated at Blackwood, S. Australia, *Ashby.*

All the 56 species of *Dryandra* are endemic in the South West province of Western Australia (see Diels in Engler & Drude, Veg. der Erde, vii. 314 : 1906). In this area *D. Fraseri* occupies a more or less central position, and does not overlap with its ally *D. Ashbyi,* which is perhaps the northernmost species of the whole genus, being known only from Yuna and the country round the Victoria Range, N.E. of Geraldton.

As the fruit of *D. Fraseri* ripens, the receptacle-scales elongate by basal growth, with the result that two scales sometimes become united in the lower part and appear as though forked (fig. 18). The dissepiment separating the seeds (fig. 21) is a characteristic feature of Sect. *Eudryandra* and has been interpreted as the coherent outer integuments of the two seeds (Benth. Fl. Austral, v. 581).—B. L. BURTT.

FIG. 1, a flowering branch, *natural size;* 2, part of young branch, x 4; 3, part of lower surface of leaf of main branch, A 3 ; 4, part of lower surface of leaf of lateral branchlet, x 3; 5, outermost involucral bract, x 4; 6, intermediate involucral bract, x 4; 7, innermost involucral bract, .• 4; 8, part of receptacle to show scales and dark hairs, *x* 6; 9, a single receptacular scale at time of flowering, x 4; 10, hairs from receptacle, x 18; 11, a young flower showing the perianth split laterally by the style, which is not yet free at the apex, x 2; 12, older flower, x 4; 13, base of perianth and ovary, A 6 ; 14, perianth opened out, x 4; 15, apex of single segment of perianth showing the expanded tip (lamina) and attached anther, x 6; 16, scale from base of perianth, x 8; 17, pollen, x 256; 18, receptacular scales from a fruiting head, x 4; 19, fruit, *natural size;* 20, the same, hairs removed, *natural size;* 21, interaeminal dissepiment, *natural size*; 22, seed, *natural size.* Figs. 1, 3 and 4 are from a specimen collected between Bridgetown and Kojonup and Slab Hut Gully by Dorrien Smith, the remainder from specimens cultivated by E. Ashby.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TABULA 3411.

CLADOCERAS STTBCAPITATUM

(K. Schum. et K. Krause) Bremek.

RUBIACEAE. Tribus GARDENIEAE.

Cladoceras *Bremek.*; genus novum, inter genera hodie ad tribum *Gardeniearum* relata (cf. Bremek. in Fedde, Repert. xxxvii. 12 : 1934) stylo quam corollae tubus breviore apice nee incrassato neque costato ad *Posoqueriam* vergens, corolla actinomorpha et contorta ab ea tamen longe recedens.

FruteXy ramulis axillaribus patentissimis partim in spinas paulum recurvatas mutatis scandens. *Folia* axillis nervorum acarodomatiis munita. *Stipulae* interpetiolares, simplices, apice incrassatae, basi in vaginam brevem connatae. *Inflorescentiae* ramulos axillares uni- vel paucinodales terminantes, dense corymbosae vel subcapitatae, ramulis infimis interdum foliis normalibus vel paulum redactis suffultis, aliis foliis rudimentariis vel bracteis munitis. *Flores* hermaphroditi, pentameri, basi ovarii bracteolati. *Ovarium* biloculare, placenta in utroque loculo peltata ad medium septum affixa, ovulis paucis in placenta immersis. *Calycis* tubus brevis, lobis ovato-triangularibus. *Corolla* hypocrateriformis, extra glabra, fauce haud barbata, lobis aestivatione contortis. *Staminum* filamenta brevia, fauce inserta; antherae oblongae, dimidio inferiore dorsifixis, fissuris longitudinalibus dehiscentibus. *Discus* annularis. *Stylus* glaber, in stigma bilamellatum applanatum exiens, longitudine medium tubum vix transgrediens. *Fructus* drupaceus, globosus, parvus, calyce coronatus, endocarpio tenui. *Semina* in utroque loculo pauca, angulosa, luteo-brunnea, minutissime alveolata, ventre paulum excavata.

Species unica, Africae orientalis incola.

C. subcapitatum *(K. Schum. et K. Krause) Bremek.,* comb. nov.— *Chomelia subcapitata* K. Schum. et K. Krause in Engl. Bot. Jahrb. xxxix. 525 (1907).

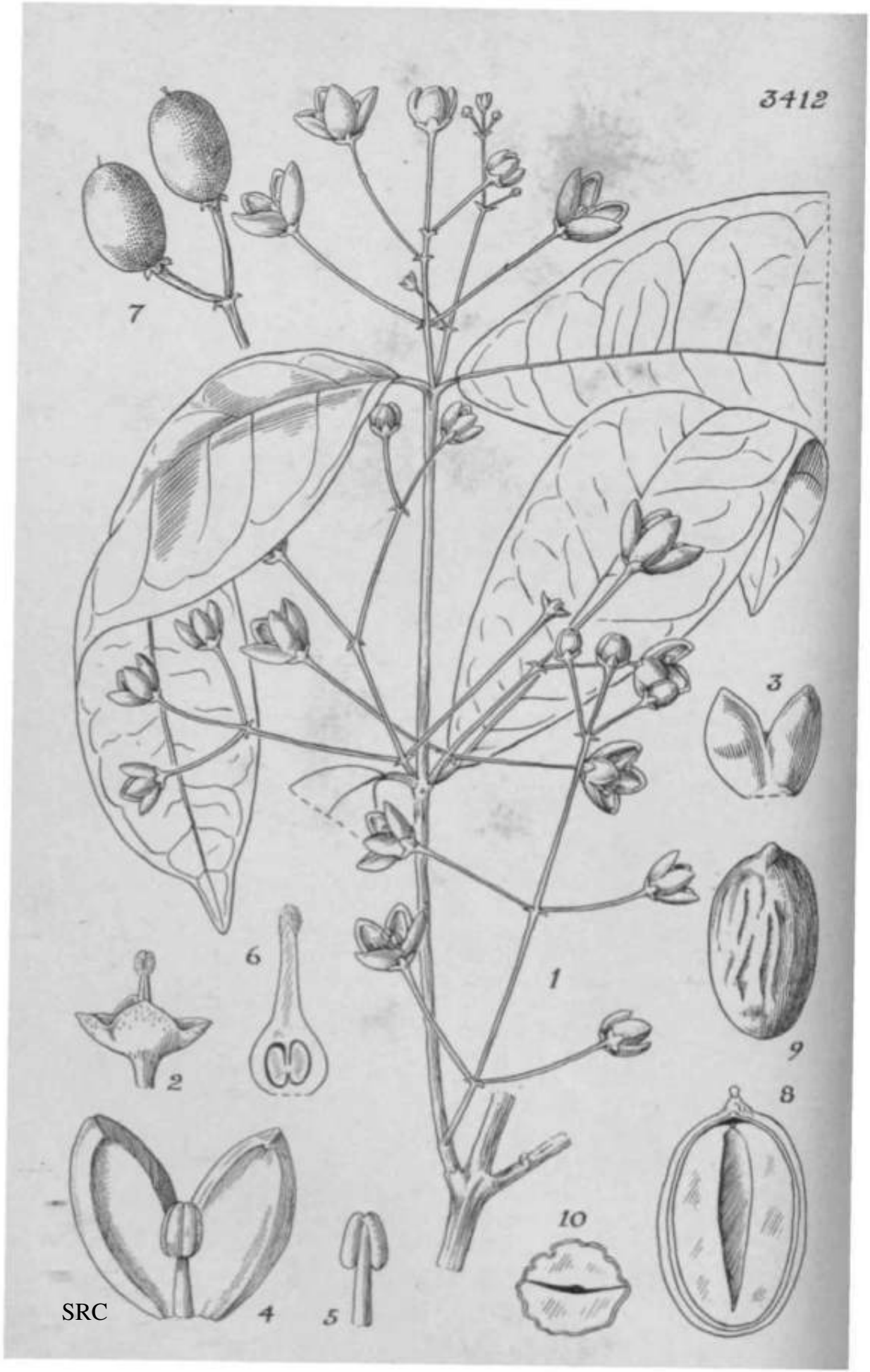
Frutex glaberrimus, circiter 2 m. altus. *Rami* quadricostati, mox cortice rubro-fusco lucido vestiti, parte foliata 2-4-5 mm. diametro. *Ramuli axillares* alii in inflorescentias exeuntes, alii in spinas paulum recurvatas mutati. *Folia:* petiolus 2-4-5 mm. longus; lamina oblonga vel oblanceolata, 4-5-12 cm. longa et 1-8-3-5 cm. lata, acuta vel acuminata et in apiculum callosum exiens, basi acuminata vel subcontracta, margine revoluta, coriacea, supra lucida, siccitate olivacea, costa canaliculata subtus prominente, nervis utroque latere costae 5-7 utrinque prominulis, subtus axillis pluribus acarodomatia ore pilosa exhibentibus, reticulatione laxa utrinque distinguenda. *Stipulae* e vagina brevi in lobos anguste triangulares 2-5-3-5 mm. longos apice callosos exeuntes, axilla colleteribus verniciferis munitae.

Inflorescentiae ramulos patentissimos 3-13 cm. longos terminantes, dense corymbosae vel subcapitatae, floribus 9-15; ramuli infirm plerumque circiter 2 mm., interdum tamen usque 8 mm. longi, foliis nunc ordinariis vel paulum redactis nunc rudimentariis suffulti; ramuli alii foliis rudimentariis vel bracteis suffulti. *Bracteolae* ovario subaequilongae. *Flores* extra toti glabri. *Ovarium* 1-4 mm. altum, ovulis in utroque loculo 4-5. *Calyx:* tubus 0-5 mm. longus; lobi ovato-triangulares, 2*5 mm. longi, apicem callosum versus conduplicati. *Corolla* alba, tubo 2* 5-3* 5 cm. longo 1 mm. diametro intus parce et breviter piloso, lobis oblongis 7 mm. longis et 2-8 mm. latis obtusis. *Stamina:* filamenta 0*5 mm. longa; antherae 2-2-5 mm. longae, apiculatae. *Discus* glaber. *Stylus* stigmate 2-5 mm. longo comprehenso 8-10 mm. longus. *Drupa* 8 mm. diametro. *Semina* in utroque loculo tria vel quattuor.

TANGANYIKA TERRITORY. Mafia Island, near Ndaagoni, alt. 30 ft., fl. Oct., *Greenway* 5392; Mafia Island, s.L, *Busse* 426 (fruiting); Sachsenwald near Dar-es-Salaam, *Engler* 3241 (fr.) and *Stuhlmann* 155 (fl.), both in herb. Berol.

The placentation of the new genus is almost indistinguishable from that of *Tarenna* Gaertn. *(Chomelia* L.): in both genera the placentas are fleshy and the ovules deeply immersed in them. In *Cladoceras,* however, the ovules are inserted near the margin, whereas in *Tarenna* they cover the whole convex side of the placenta. The pollination mechanism, on the other hand, is of an entirely different kind. In *Tarenna,* which I refer to the *Ixoreae,* as well as in the true *Gardenieae* (cf. Bremek. in Fedde, Repert. xxxvii. 11 and 12 : 1934), the anthers are, in the bud, in close contact with the upper part of the style, and before the flower opens the pollen is deposited on the latter, whence it is afterwards removed by visiting insects; in the second stage the stigmatic lobes separate, and pollination can be effected. How in *Cladoceras* pollination is effected, I do not know, but that the upper part of the style cannot serve as a pollen carrier is quite certain : it does not come in contact with the anthers. The stigmatic papillae, moreover, are not found on the inside of the stigmatic lobes, as in *Tarenna* and the true *Gardenieae,* but on the outside. The lobes themselves do not separate. In this respect the new genus resembles *Posoqueria* and the *Hamelieae.* The latter, however, show a different kind of placentation, and *Posoqueria* has a slightly zygomorphic corolla with imbricate aestivation.—C. E. B. BREMEKAMP.

FIG. 1, part of stem, showing leaves and flowering branch, *natural size;* 2, a node, showing branches transformed into spines, *natural size*; 3, calyx with bracteoles, x 6 ; 4, corolla from within, opened out, showing stamens, x 2; 5, 6, style with stigmata in natural position, dorsal and lateral views, x 6; *7,* gynoecium in longitudinal section, showing stigmata artificially separated, lateral view (placenta and ovules in right-hand loculus not sectioned), x 8; 8, ovary, transverse section, x 8 ; 9, placenta with normal four ovules, x ! 2 ; 10, placenta with (exceptionally) five ovules, x 12.



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TABULA 3412.

LINOCIERA LATIPETALA *M. R. F. Taylor.*

OLEACEAE. Tribus OLEINEAE.

L. latipetala *M. R. F. Taylor* in Kew Bull. 1940, 54; species ab omnibus congeneribus pedunculis et pedicellis longioribus valde patentibus, lobis corollae latioribus subcarnosis facile distinguenda.

Arbor vel *frutex scandens,* sempervirens, valde ramosus, usque 13 m. altus. *Ramuli* glabri, plus minusve teretes, rigidi, patentes, cortice pallide griseo-brunneo. *Folia* petiolata; petiolus 5-6 mm. longus, basin versus dilatatus, supra canaliculatus; lamina coriacea, elliptica vel anguste obovata, basi sensim angustata, apice caudata, 10-13-5 cm. longa, 3-5-5 cm. lata, utrinque glabra, margine integra, costa et nervis supra impressis subtus prominentibus, nervis lateralibus utrinsecus 4-8 procul a margine arcuatim confluentibus ; domatia saepe in axiUis nervorum lateralium obvia. *Thyrsi* ex axillis foliorum pedunculati, patentes, 7-13-flori; pedunculi glabri, flexiles, usque 7 cm. longi; bracteae usque 1 mm. longae, ovatae, pubescentes; pedicelli 1-2 cm. longi, valde patentes, apicem versus sensim dilatati, saepe bibracteolati, bracteolis ovatis minutis. *Flores* intus flavo-albidi, extra pallide rosei; alabastra late ovoidea. *Calyx* tenuiter cupuliformis vel patelliformis, extra saepe leviter pubescens, crassus, lobis 4 patentibus latissime triangulatis 0-5-1 mm. longis 2-2-5 mm. latis. *Corolla* 4-lobata ; lobi indupliçato-valvati, alternatim altius et brevius connati, itaque sinus oppositi duo altiores duo breviores, subcarnosi, ovati vel elliptici, apice obtusi vel acuti, 7-8 mm. longi, 4-5 mm. lati. *Filamenta* compressa, circiter 2 mm. longa, inter corollae lobos altius connatos inserta; antherae reniformes, 2 mm. longae. *Ovarium* glabrum, biloculare, subglobosum, in stylum sensim attenuatum, 1-5-2 mm. altum, 1-1-5 mm. diametro ; ovula pro loculo 1-2 ; stylus crassus, profunde 4-sulcatus vel subalatus, 1-1-5 mm. longus; stigma subcapitatum, demum mitriforme, 0-5 mm. longum, sparse pubescens. *Drupae* anguste ovoideae vel ellipsoideae, 1-loculares, usque 1-5 cm. longae, 1 cm. diametro, coccineae, stylo persistente. *Semen* 1, pendulum, anguste ovoideum, testa membranacea; cotyledones crasso-carnosae, extra sulcatus vel rugosus.

UGANDA. Ankole district: Lake Lutoto, west of Ankole, at water's edge, Aug. 1936, *W. J. Eggeling* 3186 (type) -.—climber or scandent bush ; flowers with four petals, sub-fleshy, white-yellow within, pink outside. Bugabe, in forest swamp, 1200 m., Sept. 1922, *R. A. Bummer* 5478 :—evergreen tree, 7-5 m. high ; flowers yellowish ; rare.

KENYA COLOXY. Kericho forest, 2100 m., *E. Battiscombe* 1303 (fruiting material):—a small tree, 6*5 m. high; fruits bright red, no flowers seen; only one specimen seen.

Vernacular name : " Chabagotan " (Lumb).

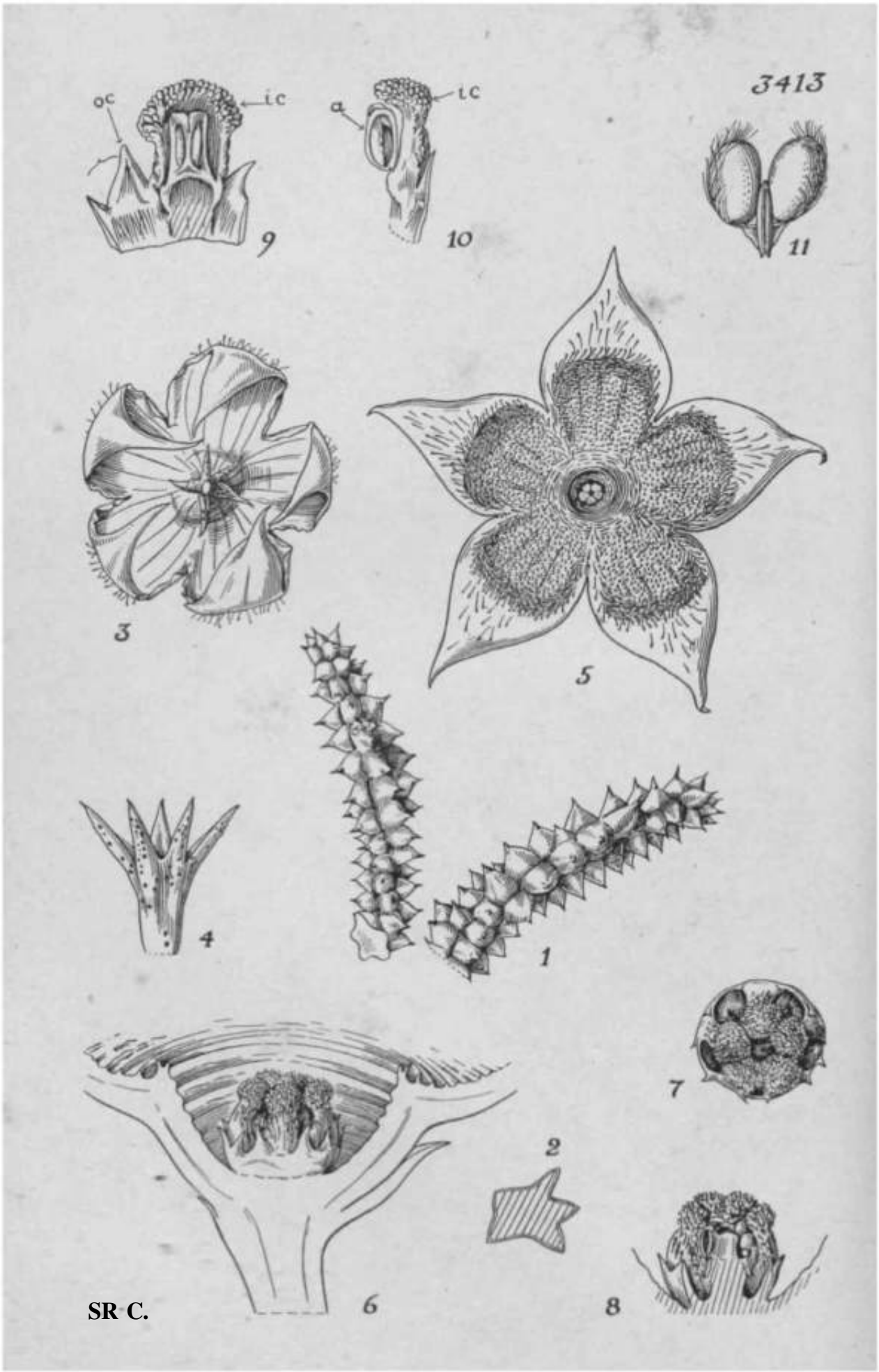
TANGANYIKA TERRITORY. Arusha district: South slope of Mt. Kilimanjaro between Umbwe and Weu Weru rivers, in *Macaranga-Maesa* forest at 1740 m., 1 Sept. 1932, *P. J. Greenway* 3222 :—a much branched evergreen tree up to 12 m. high, with green flowers ; not common.

The above description is based upon that in Kew Bull. 1940, 54, with a few minor additions anxl alterations based on further examination of the material.

This interesting species belongs to Bentham and Hooker's Section *Ceranthus,* characterized by thick fleshy cotyledons in the exalbuminous seeds. It appears to have no very close allies, though among African species it is nearest to *L. nilotica* Oliv. and *L. congesta* Baker. In vegetative characters it is typical of the genus, but the loose, wide-spreading, few-flowered thyrses and the broad fleshy spreading corolla-lobes are very distinctive, and at first sight one would not suspect that it was a member of this genus, though the structure of the flower and fruit leaves no doubt upon that point.

This plant seems to have a fairly wide distribution in Tropical East Africa in rain-forest zones, but appears to be rare in the localities where it has been found.—M. R. F. TAYLOR.

FIO. 1, flowering branch, *natural size;* 2, calyx and gynoecium, x 4; 3, corolla from outside, x 2; 4, pair of corolla-lobes and anther from inside, x 4; 5, anther from outside, x 4; 6, longitudinal section of gynoecium, x 8; 7, part of in-fructescence, *natural size;* 8, longitudinal section of fruit, x 2; 9, outside of seed, x 2; 10, cross section of seed, x 2.



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TABULA 3413.

EDITHCOLEA SORDIDA *N. E. BR.*

ASCLEPIADACEAE. TribuS STAPELIEAE.

E. sordida *N. E. Br.* apud Balf. f. in H. 0. Forbes, Nat. Hist. Sokotra and Abd-el-Kuri, 486 (1903); Vierh. Fl. Siidarab. u. Sokotra, i. 92 (1907), in obs.; Berger, Stapel. u. Klein. 133 (1910); White et Sloane, The Stapelieae, ed. 2, i. 407 (1937).—Affinis *E. grandi* N. E. Br., sed ramis conspicue spiraliter contortis, dentibus approximatis, floribus minoribus colore saturatiore, coroUae lobis angustioribus superne valde reflexis differt.

Herba perennis, decumbens, succulenta ; caulcs ramosi, ascendentes, verosimiliter intricati; rami crassi, glabri, pentagoni, 1-1-5 cm. diametro, spiraliter contorti; anguli spinoso-dentati, dentibus late deltoideo-conicis 3-4 mm. longis basi 5 mm. latis apice brunneo-induratis pungentibus. *Flores* 1 vel 2 caulis apicem versus dispositi. *Calyois lobi* lineari-lanceolati, 4-6 mm. longi, acuminati, subpungenti-indurati, glabri. *Corolla* magna, rotata, 7-7-5 cm. diametro, extra glabra, laevis, profunde 5-lobata, intus pallide brunnea, coccineo-maculata, -notata et -vittata, lobis basin versus saturate apicem versus pallide coccineis, extra hepatica ; tubus parvus, campanulatus, circiter 4 mm. longus, fauce elevato-annulato 8 mm. diametro, glaber, intus prominenter concentrice corrugatus ; segmenta circiter 3-5 cm. longa, 1/6 connata, parte lata inferiore cujusque segmenti transverse elliptica circiter 1 -8 cm. lata tuberculata pilis longis vibratilibus coccineis vittam vei uneam hippocrepiformem efformantibus circumdata (vide iconem), [illegible] basi concentrice corrugata, ceterum tuberculata; in SSL* BUPf10le 1tTMngnlariaf acuminata, laevia, pilis paucis longis interne ornata, valde reflexa. *Corona* duplex, extra glabra : exterior 5-loba, lobis erectis 2 mm. longis profunde bifidis, lobulis 1 mm. longis anguste tnangulanbus acutis basi intus hirtis; lobi interiores 5, ± oblongi, superne ampliati, dense echinulati, inferne marginem versus leviter echinulati, medio laeves, 3 mm. longi (parte libera 2 mm. longa), mflexi et anthens incumbentes. *Pollinia* margine exteriore pilosa.

SOCOTRA. Garieh plain and eastern slopes of Hughier Mts., 360-450 [illegible] (type), Tamarida in Western Chalk Mts., April 1881. *Schweinfurth* 793. Without locality, Feb.-March 1880, *Balfour* 585. Cult, in hort. Mrs. E. E. Moreau, Amani, and Col. the Hon. M. T. Boscawen. Mtotohovu, Moa (origin uncertain but probably originally collected by Col. Boscawen on Socotra), *Greenway* 4928 (spirit).

The accompanying plate was prepared from a specimen preserved in spirit and presented to Kew by Mr. P. J. Greenway, who also contributed some valuable notes, which have been most useful in

drawing up the description. A specimen of *Edithcolea grandis,* also in spirit, has been presented by the same donor, so that it is possible to compare the two species. The main points by which *E. sordida* can be distinguished are the spirally-twisted closely-toothed stems and the much smaller flowers, in which the corolla-lobes are strongly reflexed in the upper half. *Edithcolea* was named after Miss Edith Cole, who collected in British Somaliland, and was the discoverer of the first species, named *Edithcolea grandis.* The genus is most nearly allied to *Caralluma,* but differs in the strange echinulate inner corona, the hairy pollinia and the larger different-shaped corolla. The hairy pollinia (fig. 10) are a point of special interest as these have not been observed in any other member of the *Asclepiadaceae.* The arrangement of the vibratile hairs on the corolla is also noteworthy : these form five narrow bands radiating from the centre to the sinuses and then circumscribing the tuberculate lower half of the corolla-lobes (fig. 2). *Edithcolea sordida* has not yet been recorded outside Socotra, although the distribution of the sister species *grandis* now extends from Somaliland through Abyssinia and Kenya to Tanganyika.—E. A. BRUCE.

FIO. 1, part of stem, *natural size*; 2, transverse section of stem, *natural size*; 3, flower from the back, *natural size ;* 4, calyx, x 2 ; 5, flower from above, *natural size ;* 6, section through corolla showing gynostegium, x 4; 7, gynostegium from above, x 4 ; 8, gynostegium with section removed, x 4 ; 9, part of corona from within (flattened out), x 8 ; 10, inner corona-lobe and anther from the side, x 8 ; 11, pollinia, x 24 :—a, anther ; ic, inner corona ; oc, outer corona.

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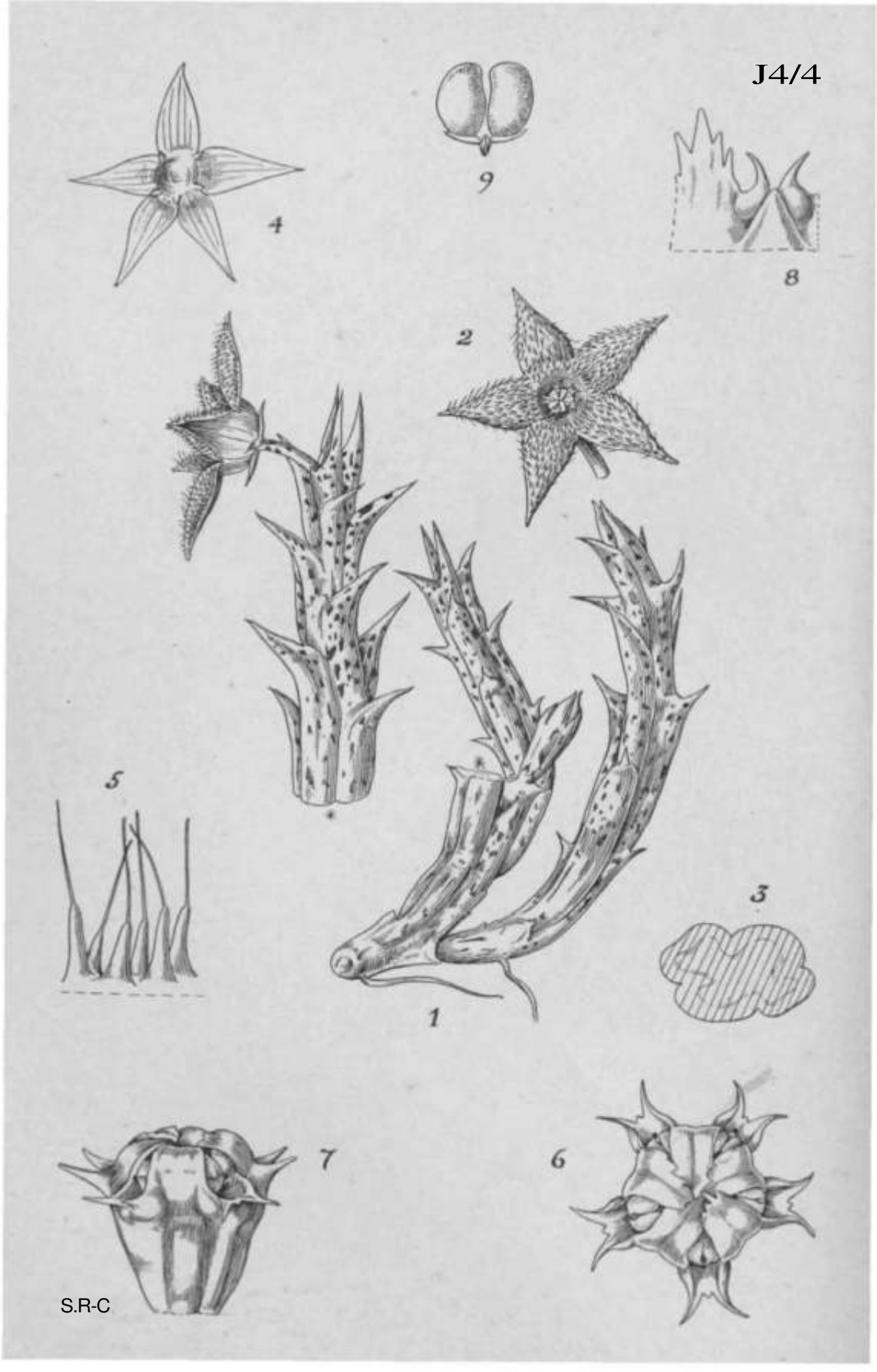

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TABULA 3414.

CABALLUMA. DUMMERI *(N. E. Br.) White et Shane.*

ASCLEPIADACEAE. TrfbuS STAPELIEAE.

C. (Boucerosia) Dummeri *(N. E. Br.) White et Shane* in Cact. & Succ. Journ. Amer. xii. 82, fig. 3 (1940).—*Stapelia Dummeri* N. E. Br. in Gard. Chron. Ser. 3, lxi. 132 (1917); White et Sloane, The Stapelieae, ed. 2, ii. 429, fig. 362-365 (1937).—Affinis *C. venenosae* Maire, sed corolla majore lobis dense papillosis, coronae exterioris lobis bicornutis valde distincta.

Herba perennis, erecta vel subdecumbens, succulenta, usque 12 cm. alta ; caules simplices vel basin versus parce ramosi, tetragoni, angulis obtusis, circiter 1 cm. diametro (dentibus exclusis), griseo-virides, hepatico-vittati; dentes oppositi et decussati, patentes vel patuli, inferne conico-deltoidei, caudato-acuminati, crassi, 0-5-1 cm. longi. *Fhres* caulis apicem versus 1-4 fasciculati; pedicelli erecti, 1-1-5 cm. l°ngi> glabri. *Calycis hbi* patentes, lanceolati, acuminati, 4-5 mm. longi, circiter 1-5 mm. lati, glabri, corollae sinus non attingentes, cum glandulis parvis alternantes. *Corolla* prasina, 3-3-5 cm. diametro, circiter j lobata; tubus cupuliformis, circiter 0-6 cm. longus, fauce 1-1'2 cm. diametro, extra glaber, intus fauce tuberculatus, ceterum glaber et laevis; lobi 5, patuli vel patentes, nonnunquam margine recurvi, lanceolati vel ovato-lanceolati, circiter 1-4 cm. longi, basi ♀·8 u-Cm, k** ^n(^e acuminati, extra glabri et laeves, intus dense urbmato-papillosi, papillis vix 1 mm. longis flavido-viridibus apicibus 3 mi n. pilis coronatis. *Corona* duplex, interiore et exteriore in corpus unum confluentibus, basi in tubum 2«5-3 mm. longum producta; coronae exterioris lobi poculiformes, patentes, cornubus 2 lateralibus leviter recurvo-divergentibus vix 1 mm. longis, medio breviter 1-dentati; lobi interiores super staminum columnam arete incumbentes, circiter 2 mm- l°ngi> 1-3 mm. lati, apice irregulariter 5-dentati.

UGANDA. Bukoba, cultivated by the natives in Plantain Gardens, **• Jan. 1916, and Hort. Dr. N. E. Brown, 9 Jan. 1917, *Dummer* s.n. (typus in Herb. Kew.):—flowers olive-greenish-ochre, slightly fleshy, nearly 4 cm. in diameter. Kampala, Mengo, 1200 m., Nov. 1930, *nargreaves* 1855:—succulent 7-5-15 cm. high, flowers green and red outside, yellowish inside with long greyish hairs, semi-cultivated, **indigenous.**

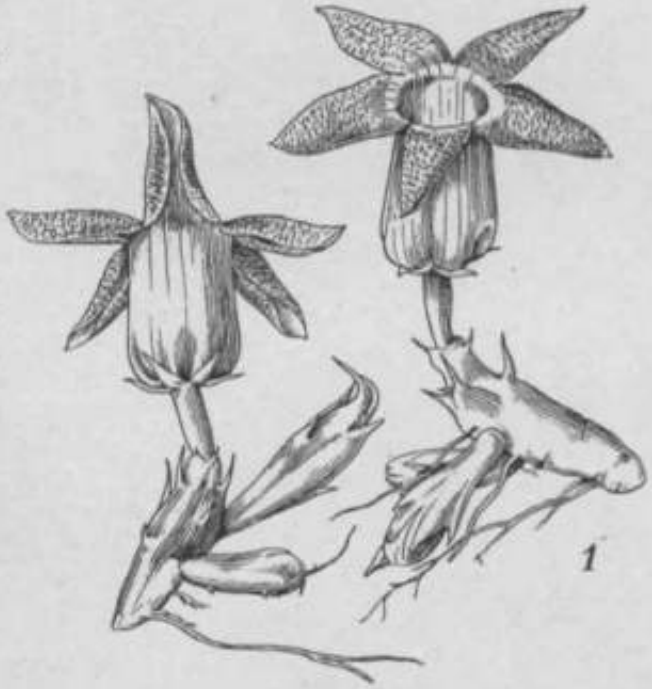
IQV ?l^ °n«NY;r Withou t locality, dry rocky country, 30 Oct. i;wu, *Miss h ,,R. Napier* 476 :—succulent 4-angled stem, flowers olive covered with warts » from each of which a hair arises.

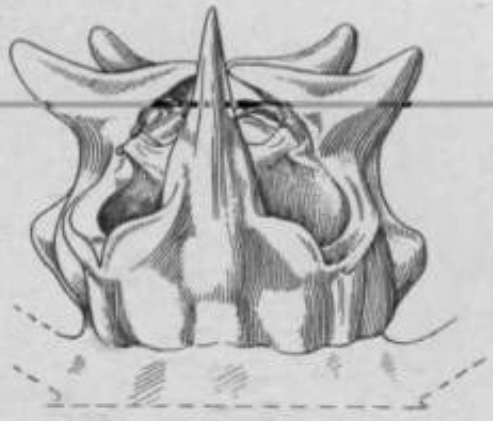
J P T ^ TE^ITORY. Plant cultivated at Mtotohovu, Moa, Dy Lol. iioscawen from plants collected by Mr. P. J. Greenway on

brown volcanic soil between the Lumi Eiver and swamp forest at Taveta, *Greenway* 4600 (spirit material):—plants in scattered patches forming a local dominant with scattered tussocks of *Chloris myriostachyus.*

Caralluma Dummeri has been removed from the genus *Stapelia* on account of the structure of its corona. Dr. N. E. Brown in his original description was in some doubt as to its position, as he writes, " . . . in its coronal structure it closely agrees with that of some species of *Caralluma* . . ." The generic distinction between *Stapelia* and *Caralluma* is in the outer corona, the lobes of which are free to the base in *Stapelia* whilst in *Caralluma* they are united to the inner ones. In *C. Dummeri* the inner and outer corona-lobes are distinctly united at the base into one body, so there is no doubt that the true position of this species is in *Caralluma. C. Dummeri* appears to be most closely allied to the " Ango Group " of White and Sloane (op. cit. i. 161, 262) and is characterized by the same type of stem and arrangement of flowers and also by a comparable coronal structure. The species is easily distinguished by the peculiar papillate surface of the corolla-lobes : each of these conical or turbinate papillae bears at its apex a single long hair, so that the corolla-lobes have superficially a hairy rather than papillate appearance.—E. A. BRUCE.

FIO. 1, plant, *natural size;* 2, flower, *natural size;* 3, section of stem, x 2; 4, calyx from within, showing glands, x 3; 5, part of upper surface of corolla-lobe, showing papillae, x 8; 6, gynostegium from above, x 6; 7, gynostegium from outside, x 6 ; 8, inner and outer corona-lobes (flattened out), from outside, x 6; 9, pair of pollinia, x 16.





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TABULA 3415.

CABALLUMA DISTINCTA *E. A. Briice.*

ASCLEPIADACEAE. Tribus STAPELIEAE.

C. (Boucerosia) distincta *E. A. Bruce*; species nova, a ceteris speciebus caulibus subcylindricis procumbentibus, corolla magna tubo campanulato valde distincta.

Herba perennis, procumbens, succulenta; caules parce ramosi, procumbentes, subcylindrici, crassi, 5-8 mm. diametro, basin versus leviter angustati, griseo-olivaceo-virides, brunneo- vel hepatico-vittati; dentes parvi et graciles, oppositi et decussati, subulati, 3-5 mm. longi, basi 1 mm. diametro, ascendentes. *Flores* caulis apice erecti, 1-2 fasciculati; pedicelli circiter 9 mm. longi, crassi, glabri. *Calycis lobi* patentes, ovati vel ovato-lanceolati, acuminati, 5-6 mm. longi, 2-3 mm. lati, glabri, cum glandulis parvis alternantes. *Corolla* magna, 3 • 5—4 cm. diametro, fere usque ad medium 5-lobata ; tubus campanulatus, extra glaber, cremeus vel subalbidus et hepatico-vittatus, intus cremeus infra medium vitta pilorum 5 mm. alta ornatus, 1-5-1-7 cm. longus, fauce leviter contractus 1 cm. diametro; lobi erecti vel patuli, oblongo-ovati, 1 * 6 cm. longi, 1 cm. lati, apicem versus sensim rotundati et apiculati, margine valde recurvi leviter imbricati, extra glabri et laeves, intus- intense punicei vel rubro-chocolatini, glabri et rugosi, lineis 5 impressis e basi in apicem percurrentibus. *Corona* duplex, interiore et exteriore in corpus unum confluentibus, basi in tubum circiter 2 mm. longum producta ; corona exterior in pocula 5 ovato-reniformia vel cordiformia emarginata circiter 1 • 7 mm. diametro crasse marginata divisa; lobi interiores 5, inferne triangulares, superne lateraliter compressi, antheris incumbentes, dorso in cornu vix 2 mm. longum producti (cf. iconem).

TANGANYIKA TERRITORY. Umba Steppe, between Moa and Mwaki-jembi, c. 30 m., in Acacia-Desert—Grass country, under shade of Acacia, *Greenway* 4260. Plant cultivated at Mtotohovu, Moa, by Col. Boscawen and at Amani by Mrs. Moreau.

Caralluma distincta is a very remarkable species and was at first thought to represent a new genus. The coronal structure, however, is comparable to that of some species of *Caralluma,* and as this genus already contains a fairly varied assortment of species it was thought possible to admit *C. distincta.* The corolla of *C. distincta* is rather similar to that of *C. Awdeliana* (Defl.) Berger from Arabia; both species have a long cylindrical corolla-tube and lobes with reflexed margins. According to Mr. Greenway the lobes in *C. distincta* are erect, though in the spirit material from which the accompanying plate was drawn the lobes were spreading at right-angles to the tube.

The rugose corolla-lobes and the band of hairs within the corolla-tube* probably serve as aids to pollination, by directing the insect to the essential organs of the flower. The coronal structure is analogous to that of *C. venenosa,* for both species have the outer corona divided into pockets, but the inner lobes differ, and in *C. distincta* they are laterally compressed and supplied with dorsal horns (see figure).

The habit of this species is also unusual in the genus: it is a procumbent herb forming small open mats with *Edithcolea grandis.* The stems are subcylindrical in section and narrowed to the base, so that the branches form loose joints with the main stem in the same way as some species of *Duvalia.*—E. A. BRUCE.

FIG. 1, plant, *natural size;* 2, section of stem, x 2 ; 3, calyx from within, showing glands, x 3; 4, corolla-tube from within, showing hairs, x 1-5; 5, corolla-lobe from within, x 1-5; 6, gynostegium from outside, x 6; 7, gynostegium from above, x 6; 8, pair of polMnia, x 12.

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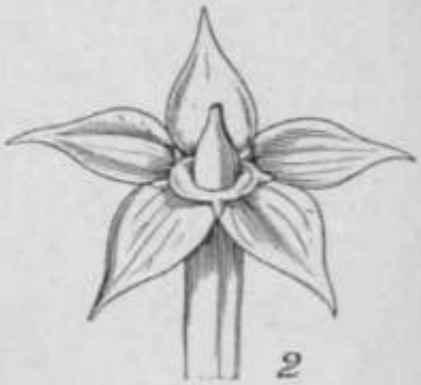

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TABULA 3416.

STAPELIA SEMOTA *N. E. Br.*

ASCLEPIADACEAE. Tribus STAPELIEAE.

S. (Podanthes) semota *N. E. Br.* in Cact. & Succ. Journ. Amer. iv. 393 (1933); White et Sloane, The Stapelieae, ed. 2, ii. 436, fig. 370, et iii. 1146, 1184, fig. 1207-A, 1207-B, 1233 (1937).—& *Molonyae* White et Sloane, I.e. ii. 435, fig. 369. *S. discoidea* Oberm. in White et Sloane, l.c. iii. 1167, fig. 1217-A.—Affinis *S. Woodii* N. E. Br., a qua floribus majoribus, corollae lobis angustioribus, annulo crasso recedit.

Herba perennis, procumbens, succulenta; caules simplices vel ramosi, tetragoni, griseo-virides vel atro-virides, nonnunquam hepatico-maculati; rami 2-10 cm. longi,* circiter 1 cm. diametro (dentibus exclusis); dentes plerumque oppositi et decussati, patentes vel patuli, conico-deltoidei, acuminati, crassi, 5-10 mm. longi. *Flores* 1-3 fasciculati, succedanei, humo appressi; bracteae minutae, lanceolatae, circiter 1 mm. longae; pedicelli 2-3 • 5 cm. longi, 2-3 mm. crassi, glabri. *Calycis lobi* patentes, lanceolati, ovato-lanceolati vel ovati, acuminati, 4-7 mm. longi, circiter 3 mm. lati, glabri, corollae sinus attingentes, cum glandulis parvis alternantes. *Corolla* rotata, 3*5-4*5 cm. diametro, margine excepto glabra, fere usque ad basin 5-lobata ; lobi hepatici, apicem versus luteo-maculati, patentes vel leviter reflexi, ovato-lanceolati vel oblongo-lanceolati, apice acuti, 1 • 5-1 • 7 cm. longi, 0*9-1 cm. lati, supra parce transverse rugosi, pilis longis vibratilibus clavatis intense coccineis 3 mm. longis ciliati; annulus intense hepaticus, crassus, subcircularis, rugosus, 0*9-1 cm. diametro. *Corona* duplex, glabra : lobi exteriores 5, patentes, annulo appressi, laeves, subquadrati, basin versus leviter expansi, 2-2*5 mm. longi, 2 mm. lati, apice subtruncati vel inconspicue emarginati; lobi interiores 5, lanceolati vel ovato-lanceolati, apice rotundati emarginati vel subacuti, antheris oppositi, decumbentes.

KENYA COLONY. Doryo Sabuk, 1500 m., grown in cultivation, April 1931, *Lady Muriel Jex-Blake* 865 :—corolla dark reddish-brown with yellow spots and hairs on the margins, lobes thicker in the middle; stem succulent and spiny. Nairobi Arboretum, on stony dry ground, 1710 m., June 1932, *Miss E. R. Napier* 1874:—flowers deep purple-maroon with a few yellow markings on the tips of the lobes. Doryo Sabuk District, 1710 m., June 1932, *Miss E. R. Napier* 1875. Nairobi River Valley, behind Government House, on rocky and marram ground, 1710 m., 21 May 1934, *Miss E. R. Napier* 3247 (dried and spirit material) :—stems more or less quadrangular, red, green or mottled according to situation, flowers deep maroon with a few yellow markings at the tips of the lobes (plants with mottled stem have

* The measurements in the description have been taken from spirit material (*Greenway* 4599).

flowers without markings). Without locality, Sept. 1934, *Miss E. R. Napier* 3472 (spirit material).

TANGANYIKA TERRITORY. Between Kondoa Irangi and Mondo village, on low rocky hills, Jan. 1928, *B. D. Burtt* 1450 (typus in Herb. Kew.). East side of South Pare Mts., above Kisiwani, in local patches in *Eragrostis* stands in brown sandy soil on a stony gneiss hill slope, 1050 m., Feb. 1936, *P. J. Greenway* 4592:—flowers reddish-brown with club-shaped hairs on the margins and a fleshy circular deep crimson disk. Cult. Hort. Col. Boscawen, Mtotohovu, Moa, c. 300 m., March 1936, *P. J. Greenway* 4599 (spirit material).

Stapelia semota is a most interesting plant as it is not typical of the genus, but combines some of the characters of other members of the *Stapelieae.* The coronal structure, in which the outer coronal lobes are united at the base, approaches that of *Caralluma,* whereas the fleshy annulus is characteristic of *Duvalia* and *Stultitia.* These features are also present in *Stapelia Woodii,* the nearest ally of *S. semota,* though there the central disk is not developed into a definite annulus.*

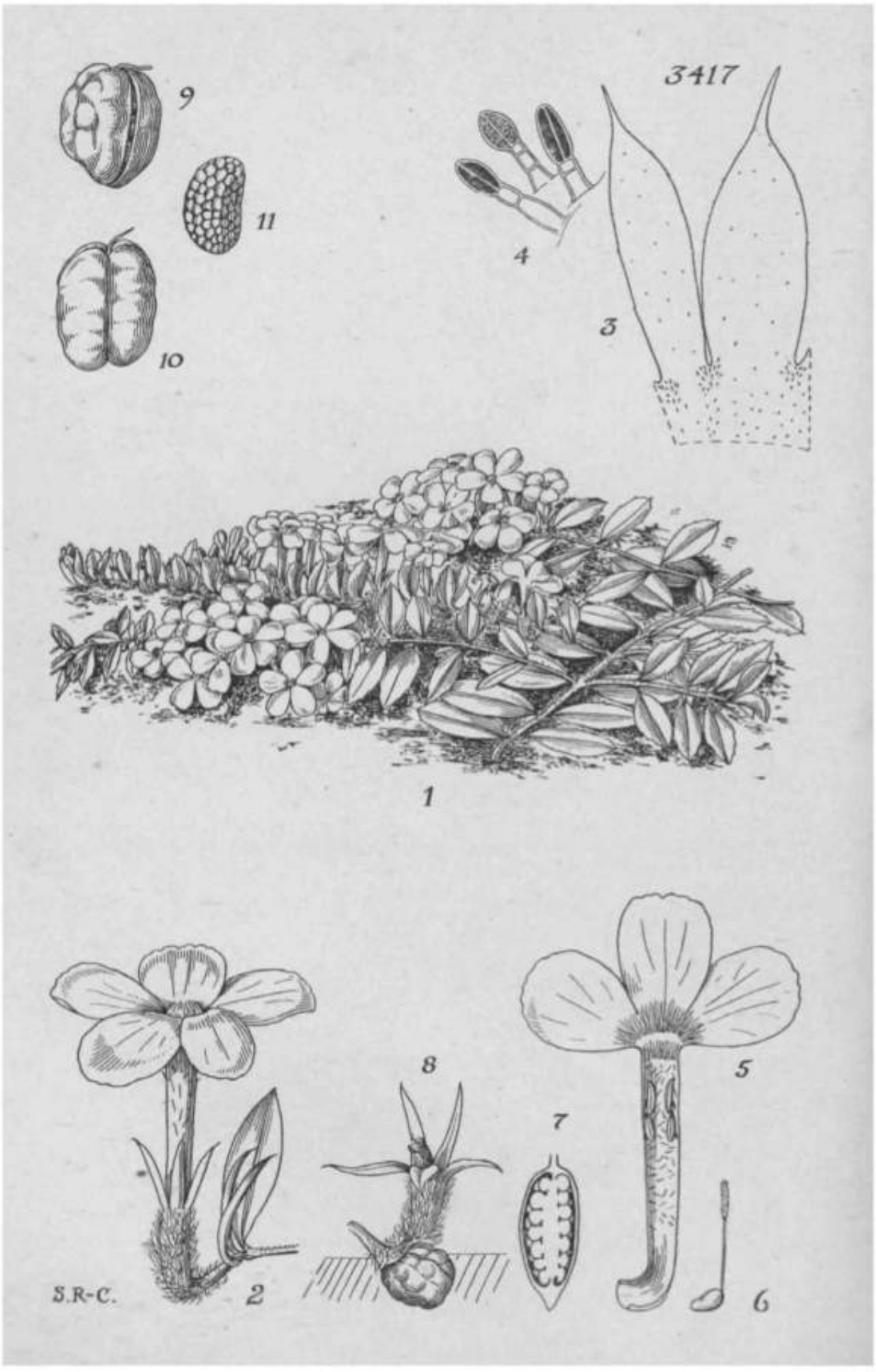
S. semota seems to vary considerably in the colour and size of the flower. Mr. Greenway, who has collected the plant in Tanganyika and has also seen it under cultivation, states that none of his specimens resembles the very spotted flowers collected by Mr. Burtt and Mr. Haselton and figured by White and Sloane in The Stapelieae, figs. 370, 1207-A & B, 1233. Miss Napier also remarks on the variation in flower colour of plants collected in Kenya, and notes that plants with mottled stems have self-coloured flowers.† The type-specimen of *S. discoidea* has not been examined, but a photograph of the type-plant has been studied in conjunction with the description, and there seems nothing of specific importance to separate this from *S. semota*; the minute pubescence of the disk is also visible in some dried specimens of *S. semota* from Kenya, though not in all. These observations indicate that colour-markings and slight variations in size and indumentum are not in this case of specific value. *S. Molonyae* and *S. discoidea* have accordingly been reduced to synonymy.

The accompanying plate has been prepared from excellent spirit material presented to Kew by Mr. Greenway.—E. A. BRUCE.

FIO. 1, plant, *natural size;* 2, calyx and carpels, x 3 ; 3, longitudinal section through corolla, showing corona and annulus, x 3 ; 4, gynostegium from outside, X 6; 5, inner corona-lobe and anther from the side, x 12; 6, pair of pollinia, x 12.

* A new section has been made for these and two other species by White and Sloane (The Stapelieae, ed. 2, ii. 411, 422) and named *Stapelluma.* This name combines the first two syllables *of Stapelia* with the last two of *Caralluma,* suggesting the very close relationship of the species in this group to the genus *Caralluma.* One of*h® sPecies, *S. Dummeri,* is now transferred to *Caralluma* (tab. 3414, *ante).*

† Mr. P. R. O. Bally, Botanist at the Coryndon Museum, Nairobi, has lent colour sketches of the species. These show three distinct forms :—a maroon form with a few yellow markings at the tips of the lobes, a pure yellow form, and lastly a bronze-yellow form. This latter was developed from the same plant as that which first bore the pure yellow form, thus proving that colour is a variable character.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TABULA 3417.

BUCHNERA PROREPENS *Engl. et Gilg.*

SCROFHULARIACEAE. Tribus GERARDIEAE.

B. prorepens *Engl. et Gilg* in Warburg, Kunene-Sambesi Exped. 368 (1903); Skan in Thiselton-Dyer, Fl. Trop. Afr. iv. 2. 398 (1906); S. Moore in Journ. Bot. lxvii. suppl. 2, 120 (1929); species habitu prostrato inflorescentiisque axillaribus egregia.

Herba annua, prostrata. *Caules* basi laxe .ramosi, tenues, elongati, usque 40 cm. longi, valde prostrati, glabri vel sparse crispule hirsuti, superne simplices vel ramosi, usque ad basin foliosi, internodiis brevibus. *Folia* sessilia, disticha, oblanceolata, obovata, oblonga vel elliptica, 8-12 mm. longa, 4-5 mm. lata, apice acuta vel interdum obtusa, basi cuneata, integra vel leviter crenata, margine apicem versus interdum minute scabridula, herbacea, glabra. *Flores* in foliorum fere omnium axillis solitarii; pedicelli circiter 3 mm. longi, valde geotropici, inferne bibracteolati; bracteoli lineari-lanceolati, circiter 7 mm. longi, acuti, inferne valde curvati, glabri. *Calycis titbits* cylindricus, circiter 6 mm. **longus, inferne per 180° curvatus, superne rectus et verticalis, extra inferne pilis longis albidis densiuscule obtectus, superne glaber ; lobi 5,** lanceolati, 3-4 mm. longi, acuti, glabri. *Corollae tubus* cylindricus, circiter 11 mm. longus, inferne cum calyce curvatus, extra glaber vel **apice sparsissime adpresse hirsutus, intus pilis patentibus albidis sparse obtectus, apicem versus et ipso apice pilis densissimis albidis annulos duos formantibus instructus; lobi 5, subaequales, oblongo-obovati,** 5*5 mm. longi et 3-5 mm. lati, obtusi, glabri; limbus planus, circiter 12 mm. diametro. *Stamina* 4, didynama, supra medium tubum affixa, aequalia, glabra; filamenta circiter 0-3 mm. longa; antherae vix 1 mm. longae. *Ovarium* ellipsoideum vel pyriforme, leviter compressum, circiter 0*8 mm. longum, glabrum; stylus filiformis, circiter 3-5 mm. longus, glaber, apice stigmatosus minute bifidus. *Capsula* breviter ellipsoidea, lateribus plus minus obscure sulcata, circiter 4 mm. longa et 2-5 mm. diametro, geotropica, basin calycis tubi rumpens. *Semina* irregulariter sphaerico-ellipsoidea, 0-6-0-7 mm. diametro, brunnea, reticulata, glabra.

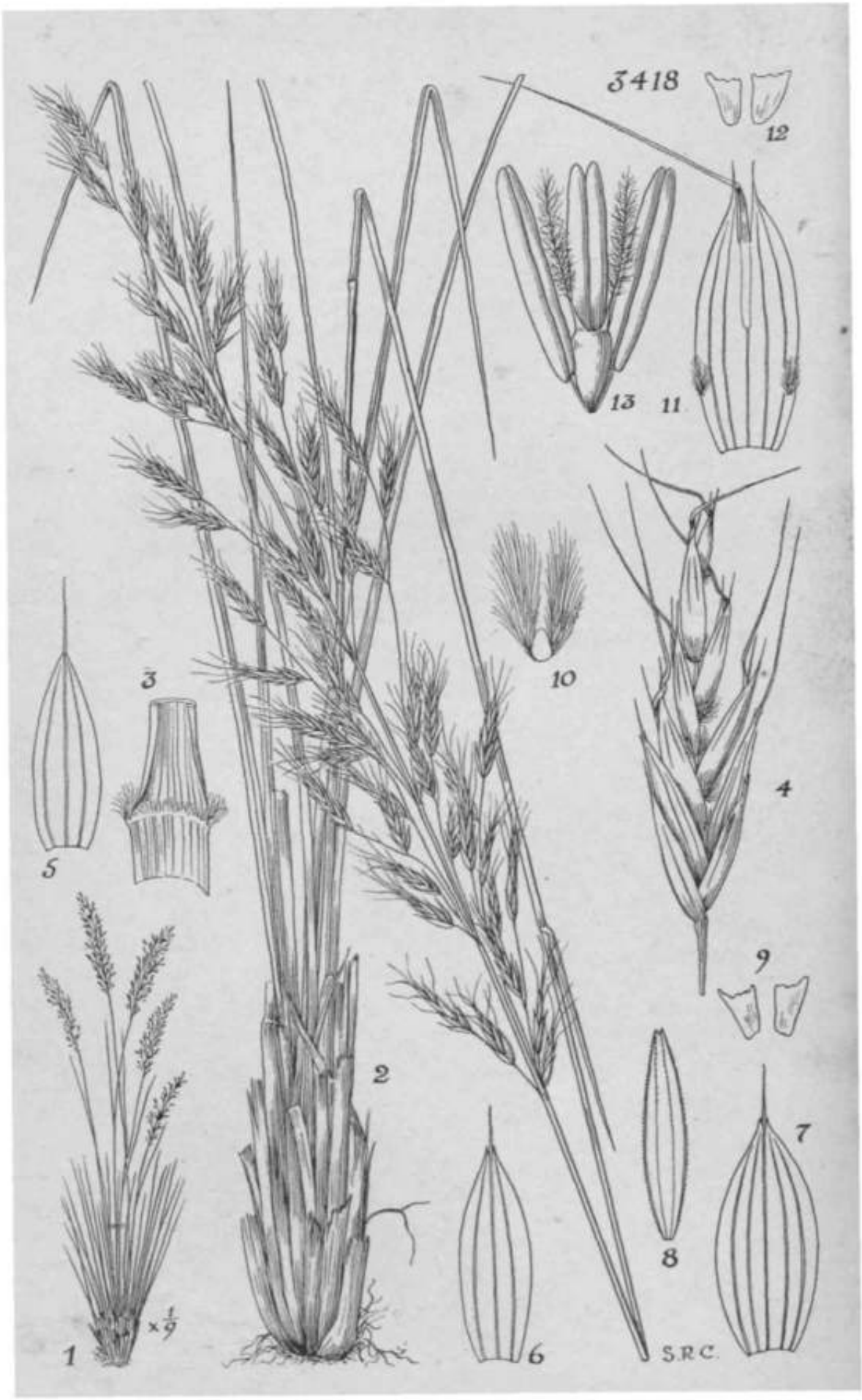
ANGOLA. Bié District. Between Rivers Cuelei and Cuchi, in sandy ground among grass at the margin of a maramba, 1300 m., April 1900, *Baum* 875 (type). Chana Canona near R. Cuchi, in open thicket-grown pastures, *Gossweiler* 3979. Forte P. Amelia (now known as Vila da Ponte) on R. Cubango, in open mixed thickets on ferruginous stony ground, *Gossweiler* 2006. " A beautiful violet-blue-flowered prostrate **herb, in herb-grown short thickets of the praesidium of Princeza Amelia, Cubango, Ganguellas, 1400 m. above sea-level," sent with seeds to Kew, March 1907, by *Mr. J. Gossweiler* (sine num.).**

N. RHODESIA. Mwinilunga District. Mwinilunga Aerodrome, on sandy ground at edge of plain and *Bracfyystegia* woodland, 30 Nov. 1937, *Milne-Redhead* 3447 :—Annual with absolutely prostrate stems ; leaves green or more often reddish; flowers close together, forming masses ; corolla lilac. Near Matonchi Farm, at edge of plain and *Brachystegia* woodland S.W. of Dobeka Bridge, on sandy ground, 3 Jan. 1938, *Milne-Redhead* 3447A (further material in spirit).

B. prorepens Engl. et Gilg stands alone in the genus on account of its prostrate habit and axillary inflorescences. But the most remarkable characters of the species were not recognized by its authors nor by Skan who wrote the account of *Buchnera* L. for the Flora of Tropical Africa. The pedicels are strongly geotropic so that the bottom of the calyx-tube is directed downwards. The calyx-tube bends through about 180° in its lower half so that the upper half and the exserted part of the corolla are held erect in the normal manner. The lower bent portion of the tube is covered with long white hairs to which the soil clings, whilst the upper straight portion is glabrous. In fruit the capsule, which is unusually small for the genus, bursts through the lowest part of the calyx-tube and remains covered with the soil on which it rests, as it is held round it by the long white hairs, whilst the upper part of the tube remains intact. The dehiscence of the capsules has not actually been observed. The soil, sometimes sandy, sometimes ferruginous loam, is most noticeable adhering to the calyces even in the dried state.

E. MILNE-REDHEAD.

FIG. 1, part of plant *in situ, natural size* ; 2, a flower, x 4 ; 3, part of calyx from within, showing glands, x 12; 4, glands from calyx, x 300; 5, corolla in longitudinal section, x 4 ; 6, gynoecium, x 4 ; 7, ovary in longitudinal section, x 16 ; 8, fruiting calyx *in situ,* showing capsule bursting through lower part, and remains of withered corolla, x 4; 9, 10, capsule in half-lateral and dorsal views, x 6; 11, a seed, x 16.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TABULA 3418.

ALLOEOCHAETE ANDONGENSIS *(Rendle) C. E. Hubbard.*

GBAMINEAE. Tribus AVENEAE.

Alloeochaete *C. E. Hubbard.* Genus novum, *Danthoniae* DC. affine, sed glumis mucronatis vel breviter aristatis, anthoeciis glumas multo superantibus, rhachilla inter glumam superiorem et anthoecium infimum continua, anthoecio infimo masculo, lemmate infimo glabro apice subintegro vel minute bilobo arista brevi recta terminali praedito, lodiculis glabris divergens.

Spiculae a latere compressae, ambitu lanceolatae vel oblongae, aristatae, in ramis gracilibus paniculae ortae; rhachilla glabra, inter glumas et anthoecium infimum continua, supra anthoecium infimum et inter anthoecia cetera disarticulans. *Anthoecia* 5-8, e glumis exserta, infimum <J ovario vestigiali, cetera $ vel summum sterile et plus minusve redactum; anthoeciorum fertilium callus rotundato-obtusus, dense barbatus. *Glumae* persistentes, subaequales, a latere visae oblique lanceolatae, acutae vel minute bidentatae, mucronatae vel breviter aristatae, carinatae, firme membranaceae vel tenuiter chartaceae, 3-nerves. *Lemma infimum* elliptico-ovatum vel ellipticum (explanatum), apice subintegrum vel minute bilobum, arista recta brevi terminatum, firme membranaceum vel scarioso-chartaceum, glabrum, 5-nerve. *Lemmata fertilia* oblongo- vel ovato-elliptica (explanata), breviter biloba, lobis acutis breviter setiferis, inter lobos aristata, dorso rotundata, demum tenuiter coriacea, marginibus membranaceis, 5-nervia, glabra vel marginibus prope medium fasciculis duobus densis pilorum brevium praedita ; arista geniculata, columna leviter torta applanata. *Paleae* anguste oblongae vel anguste oblongo-lanceolatae, bicarinatae, membranaceae. *Lodiculae* duae, truncatae, glabrae. *Stamina* 3. *Ovarium* glabrum ; styli distincti; stigmata plumosa, ex anthoeciis lateraliter exserta.—*Gramen* perenne, dense caespitosum; foliorum laminae anguste lineares; ligulae ad seriem ciliorum brevium redactae.

Species unica, Angolae incola.

A. andongensis *(Bendle) C. E. Hubbard,* comb. nov.—*Danthonia andongensis* Rendle in Cat. Afr. PL Welw. ii. 212 (1899).

Gramen 30-60 cm. altum; innovationes intravaginales. *Culmi* erecti, graciliusculi, simplices, 2-3-nodes, rigidiusculi, teretes, glabri, Jaeyes. *Folia* laevia ; vaginae basales bases culmorum dense vestientes, latiusculae, nitentes, basi lanuginosae, ore breviter villosae, ceterum glabrae, in fibras demum fissae, superiores arete appressae, internodiis demum breviores, glabrae ; laminae usque 30 cm. longae et 4 mm. latae (explanatae), pungentes, erectae, rigidae, siccitate convolutae, supra tenuiter striatae, e vaginis demum disarticulantes. *Panicula* erecta, ambitu vel linearis vel lanceolata vel anguste elliptica, contracta, 10-20 cm. longa, usque 4 cm. lata ; rhachis superne minute scaberula,

ceterum laevis; rami fasciculati, ascendentes, simplices vel sparse divisi, filiformes, minute scaberuli, inaequales, inferiores usque 8 cm. longi; pedicelli laterales, usque 3 mm. longi. *Spiculae* 12-15 mm. longae (aristis exclusis), pallide stramineae. *Ghimae* 5-6 mm. longae, aristis usque 1*8 *mm.* longis, margines versus minute asperulae, intus supra medium minutissime pubescentes ; inferior vel lanceolato-oblonga vel elliptico-ovata vel elliptica (explanata); superior elliptica vel elliptico-oblonga (explanata). *Lemma infimum* 5-6 mm. longum, arista 1-2-5 mm. longa. *Lemmata fertilia* 5-6*5 mm. longa, lobis 2-2'5 mm. longis, glabra vel fasciculis pilorum alborum usque 1 mm. longorum praedita; arista scaberula, 6-9 mm. longa, columna 1-2 mm. longa; callus 0*5 mm. longus, pilis usque 1*5 mm. longis dense barbatus. *Paleae* 4-5-5-5 mm. longae, carinis minute ciliolatis. *Antherae* 2-3 mm. longae.

ANGOLA. Pungo Andongo : Malanje, 1000 m., March 1937, *Gossweiler* 11810 ; plentiful on the rocks of the praesidium, Nov. 1856, *Welwitsch* 2744 ; on the higher rocks of the praesidium at Pedra Cazella, Pungo and Cabondo, May 1857, *Welwitsch* 7417.

The tribe *Aveneae,* to which *Alloeochaete* belongs, may be divided into two major groups. The first *{Aveneae* subtribe *Euaveneae* Beck, Fl. Nied.-Osterr. i. 66 :1890), although occurring in the southern hemisphere, is on the whole more northerly in distribution and favours a cooler and moister climate. In this group, whenever the lemma is awned, the awn is dorsal and its column often subterete, or at least not flattened or laterally winged. The column is formed by the continuation of the middle nerve and *not* by the splitting of the lemma into three segments. On the other hand, the second group *(Aveneae* subtribe *Danthonieae* Beck, I.e. 64) has its greatest concentration in the southern hemisphere and favours a warmer and drier climate. The lemmas in this group are usually two-lobed, and the awn when present arises in the sinus of the lobes. Here the column of the awn is flattened and its formation is due to the gradual splitting of the apex of the lemma into three segments. H. Prat (Ann. Sci. Nat., Bot. sér. 10, xviii. 206, 235 : 1936) has already separated *Danthonia* from the other members of the *Aveneae* on account of anatomical differences, and it is very probable that cytological distinctions will be found when the chromosomes of *Danthonia* and other genera of the second group have been investigated. This group of the *Aveneae* contains the new genus *Alloeochaete* and such genera as *Danthonia, Sieglingia, Phaenanthoecium, Pentameris, Chaetobromus, Pentaschistis, Afrachneria, Schismus,* etc., while it seems probable that the genera *Triodia, Plectrachne* and *Astrebla* also should be referred to this group on account of their apparent relationship to *Danthonia.*—C. E. HUBBARD.

Ffi. 1, habit figure, x j ; 2, plant, *natural size* ; 3, junction of sheath and blade to show ligule, x 6 ; 4, spikelet, x 4 ; 5, lower glume, x 6 ; 6, upper glume, x 6 ; 7, lowest lemma, x 6; 8, palea, x 6; 9, lodicules from lowest floret, x 16; 10, callus of fertile floret, x 8 ; 11, second lemma, x 6 ; 12, lodicules from fertile floret, x 16 ; 13, stamens and pistil, x 12.


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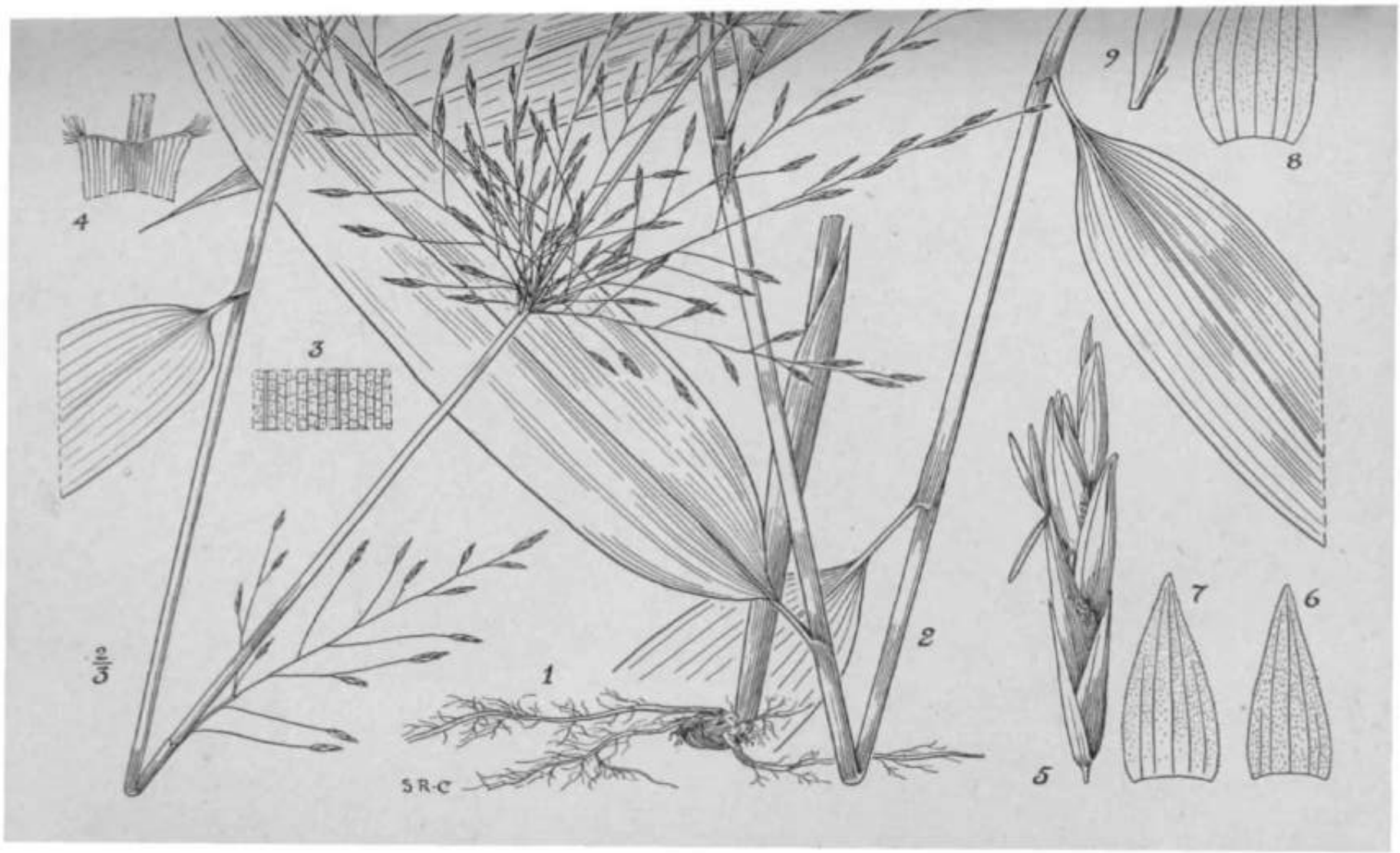
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TABULA 3419.

ORTHOCLADA APRICANA *C. E. Hubbard.*

GRAMINEAE. Tribus CENTOTHECEAE.

Orthoclada *Beanv.* Agrost. 69, t. 14, fig. 9 (1812); Nees, Agrost. Bras. 520 (1829); Kunth, Rév. Gram. i. 319, t. 71 (1830) et Enum. PL i. 423 (1833) ; Steud. Syn. PL Glum. i. 339 (1854) ; Doell in Mart. FL Bras. ii. n. 116, t. 35 (1878); Benth. in Benth. et Hook. f. Gen. PL iii. 1190 (1883); Hack, in Engl. u. Prantl, Nat. Pflanzenfam. ii. Abt. 2, 71 (1887); Hitchc. in Contrib. U.S. Nat. Herb. xx. 456 (1922), xxiv. 350 (1927), 583 (1930) ; Niles et Chase, I.e. xxiv. 178 (1925) ; Hitchc. in U.S. Dept. Agric. Misc. Publ. no. 243, 55 (1936).—Descriptio hie emendata.

Spiculae a latere compressae, vel oblique lanceolatae vel lanceolato- vel angusto-oblongae, acutae, exaristatae, demum a pedicellis disarticulantes, in ramis longis gracilibus paniculae ortae ; rhachilla glabra vel superne minute pubescens, internodiis basin versus inter carinas paleae adnatis, supra glumas et inter anthoecia tarde disarticulans, vel continua, supra anthoecium supremum producta. *Anthoecia* 1-5, e glumis exserta, gl, vel suprema redacta. *Glumae* plus minusve carinatae, acutae vel obtusae, aequales vel inferior superiore paullo brevior, herbaceo-membranaceae, demum chartaceae, 3-5-nerves; inferior anguste vel late lanceolata ; superior late lanceolata vel lanceolato-oblonga. *Lemmata* contigua, carinata vel dorso plus minusve rotundata, a latere visa oblique lanceolata, elliptica vel elliptico-ovata (explanata), vel obtusa vel acuta vel acute acuminata, integra, herbaceo-membranacea, demum cartilaginea, 5-7-nervia, nervis lateralibus tenuibus. *Paleae* a latere. compressae, lemmatibus paullo breviores, bicarinatae, carinis approximatis, dorso curvatae, 2-4-nerves. *Lodiculae* 2, glabrae. *Stamina* 2-3 ; antherae anguste oblongae. *Ovarium* glabrum; styli 2, liberi; stigmata plumosa, ex anthoeciis lateraliter exserta. *Caryopsis* a latere compressa, oblique elliptico-oblonga, inter lemma paleamque libera; scutellum circiter quartam partem caryopseos aequans ; hilum parvum, basale.—*Gramina* perennia ; culmi erecti vel adscendentes, simplices ; laminae planae, latae, vel anguste oblongo- vel elliptico-lanceolatae vel lanceolatae, basi in pseudo-petiolum attenuatae, prominenter nervosae, nervis transversis numerosis; ligulae truncatae, membranaceae ; panicula diffusa, ramis laxe divisis, spiculis laxe dispositis.

Species 2, Americae tropicae centralis et australis et Africae tropicae australis incolae. Typus : *Orthoclada laxa* (L. Rich.) Beauv.

a. Spiculae 1-3-florae ; paniculae rami solitarii sed plerumque basi divisi, ab axibus primariis maturitate disarticulantes, apice vel prope apicem spiculas 1-3 gerentes; antherae 2, 0-5-1 mm. longae; foliorum laminae basi sensim attenuatae. . . . . 1. O. *laxa.*

a. Spiculae 3-5-florae ; rami plerumque verticillati, persistentes, spiculis secus ramos dispositis; antherae 3, 2-3 mm. longae ; foliorum laminae basi abrupte contractae. . . . . 2. O. *qfricana.*

1. O. laxa *(L. C. Rich.) Beauv.* Agrost. 70,149,168 (1812).—*Aira laxa* L. C. Rich, in Act. Soc. Hist. Nat. Paris, i. 106 (1792). *Panicum rariflorum* Lam. Encycl. Méth." Bot. iv. 746 (1798). *Orthoclada rariflora* (Lam.) Beauv. Agrost. 70, t. 14, fig. 9 (1812). *Poa subumbellata* Roem. et Schult. Syst. Veg. ii. 570 (1817). *P. rariflora* (Lam.) Beauv. ex Roem. et Schult. I.e.

Distrib. South Mexico, central America and the West Indies to Brazil, Bolivia and Peru ; in forests and damp shaded situations generally.

2. O. africana *C. E. Hubbard,* species nova.

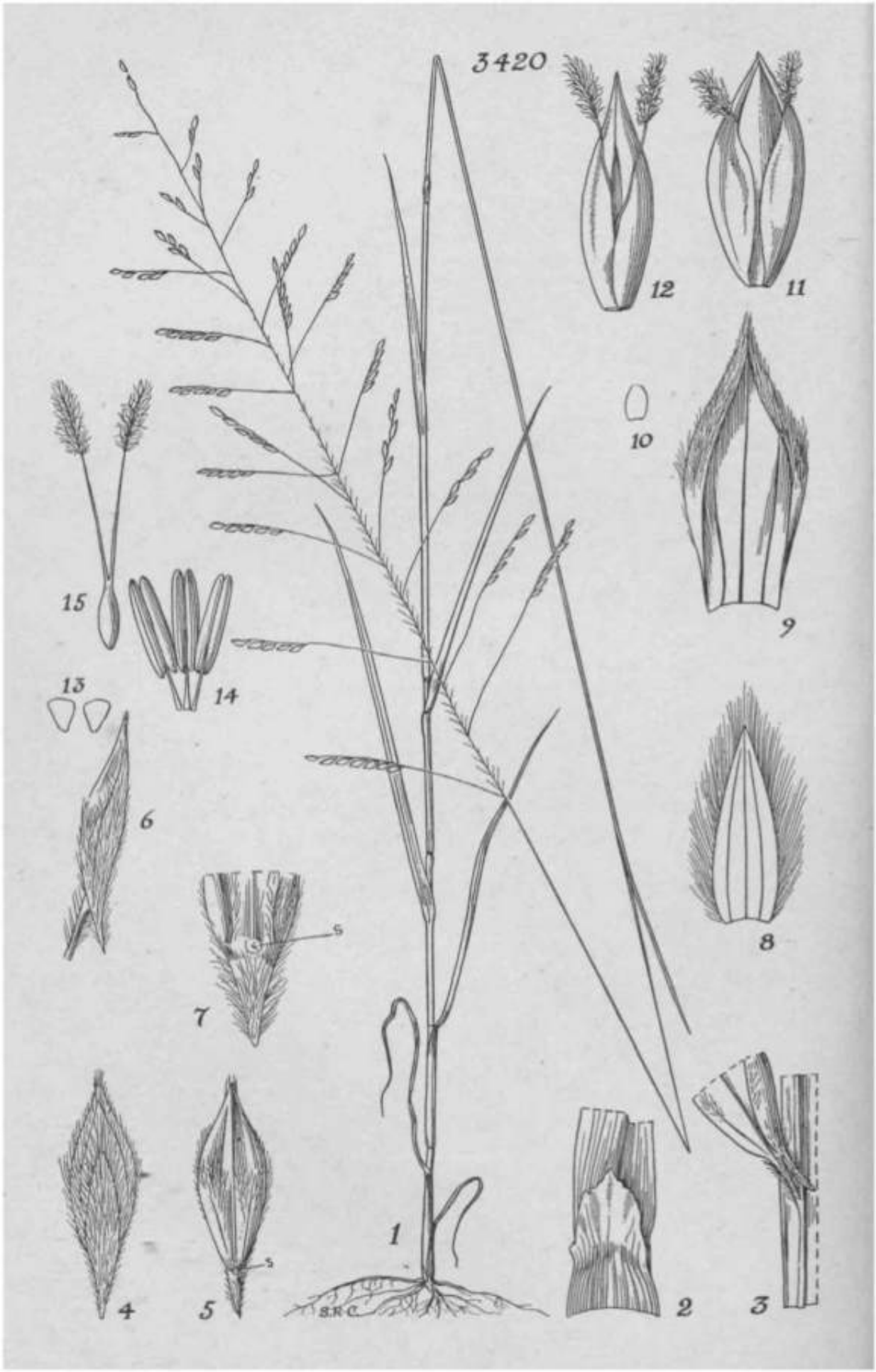
Gramen perenne, usque 1-8 m. altum. *Culmi* e rhizomate repente orti, erecti, validiusculi, simplices, usque 9-nodes, subteretes, pubescentes. *Foliorum vaginae* carinatae, ore truncatae, striatae, pubescentes vel glabrescentes, purpureo-tinctae, inferiores internodiis longiores, superiores internodiis breviores; ligulae brevissimae, minute ciliolatae; pseudo-petioli 0 • 5—1 • 7 cm. longi ; laminae anguste oblongo-lanceolatae vel lanceolatae, acuminatae, tenuiter acutae, basi abrupte contractae, plerumque 12-25 cm. longae et 2—4 cm. latae, minutissime et sparse pubescentes vel glabrescentes, supra virides, subtus glauco-virides, costa media gracili, nervis lateralibus 10-14 tenuissimis. *Panicula* ovata vel late ovata, erecta, laxissima, 25-35 cm. longa, usque 20 cm. lata ; rhachis pubescens, internodio inflmo usque 11 cm. longo ; rami plerumque verticillati, demum oblique vel horizontaliter patentes, gracillimi, simplices, recti, rigidiusculi, scaberuli, inferiores usque 10 cm. longi; pedicelli tenuissimi, 3-23 mm. longi. *Spiculae* anguste oblongae, 8-12 mm. longae, 1-3-1-5 mm. latae, virides, glabrae, 3-5-florae. *Glumae* 3-5-5 mm. longae, obtusae vel subacutae, minute asperulae, carina scaberulae. *Lemmata* 4-5-5-5 mm. longa (inferiora), obtusa vel subobtusa (explanata), minute asperula; internodia rhachillae 2-2-8 mm. longa. *Paleae* 4-5 mm. longae, carinis angustissime alatae et scaberulae. *Antherae* 3, 2-3 mm. longae.

NORTHERN RHODESIA. Mwinilunga District: Luakera Falls, north of Mwinilunga, in evergreen vegetation by river, in shade, 25 Jan. 1938, *Milne-Redhead* 4333 ; Feb. 1939, *Patterson* (type).

The recent discovery in tropical Africa of this new species of the hitherto monotypic American genus *Orthoclada,* although somewhat surprising, is on floristic grounds not entirely unexpected, for the floras of tropical Africa and tropical America possess much in common.

Orthoclada was placed by Bentham in his subtribe *Centotheceae* of the *Festuceae* (Journ. Linn. Soc, Bot. xix. 31 : 1881). It seems best to treat this subtribe as a tribe distinct from the *Festuceae,* as appears to have been done by Ridley (Mat. Fl. Mai. Pen. iii. 122: 1907 ; Fl. Mai. Pen. v. 190: 1925). Whilst the *Centotheceae* are lowland tropical forest grasses, the *Festuceae* occur mainly in temperate regions or only at Sigh altitudes in the tropics. The former differ from the latter by their broad flat leaf-blades, which are prominently transversely veined between the lateral nerves.—C. E. HUBBARD.

FIG. 1, rootstock, x $; 2, portion of plant, x § ; 3, portion of leaf-blade, x 2; 4, junction of sheath and pseudo-petiole to show ligule, x 2 ; 5, spikelet, x 6; 6, lower glume, x 8 ; 7, upper glume, x 8; 8, lemma, x 8 ; 9, palea, side view, x 8; 10, palea, back view, x 8; 11, lodicules, x 8; 12, stamens and pistil, x 12.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TABULA **3420.**

DIGITABIOFSIS BEDHEADII *C. E. Hubbard.*

GRAMINEAE. Tribus PANICEAE.

Digitariopsis *C. E. Hubbard.* Genus novum, *Digitariae* Hall, valde affine, sed spiculis solitariis anguste rhomboideo-ellipticis basi in callum gracillimum tenuiter acutum productis divergens.

Spiculae a dorso visae anguste rhomboideo-ellipticae, acute acuminatae, muticae, basi in callum tenuiter acutum gracillimum productae, dorso compressae, omnes similes, abaxiales, solitariae, breviter pedicellatae, demum totae a pedicellis persistentibus disarticulantes, laxe biseriatae, contiguae, rhachi gracili anguste alatae racemorum spiciformium secundorum pedunculatorum adpressae ; callus breviter pilosulus. *Anthoecia* duo: inferum sterile, ad lemma et paleam minutam redactum ; superum $, infero paullo brevius. *Gluma inferior* nulla; gluma superior lanceolata, spicula brevior, tenuiter membranacea, 3-nervis. *Anthoecium inferum:* lemma spiculae aequilongum, ellipticum (explanatum), acutum, dorso planum, membranaceum, 5-nerve; palea minuta, oblonga, obtusa, hyalina. *Anthoecium superum* ellipticum, acutum : lemma tenuissime 3-nerve, laeve, tenuiter chartaceum, marginibus latis planis hyalinis; palea lemmati aequilonga, dorso plana. *Lodiculae* duae, minutissimae. *Stamina* tria; antherae lineari-oblongae. *Ovarium* glabrum; styli distincti, terminales; stigmata plumosa, ex anthoeciis lateraliter exserta.—*Gramen* annuum; culmi gracillimi, erecti; ligulae membranaceae ; laminae angustissime lanceolatae, planae; racemi in paniculis laxissimis plerumque elongatis orti; spiculae argenteo-pilosulae.

Species unica, Africae tropicae australis incola.

D. Bedheadii *C. E. Hubbard,* species nova (adhuc unica).

Gramen 10-60 cm. altum. *Culmi* solitarii, simplices vel e nodis inferioribus ramosi, 4-6-nodes, teretes, laeves, glabri vel prope paniculam pubescentes. *Folia* glauca, glabra, laevia; vaginae internodiis breviores, teretes, inferiores rubidae ; ligulae oblongae, obtusae vel subacutae, usque 4 mm. longae, glabrae ; laminae in apicem tenuem obtusum attenuatae, 0-5-7 cm. longae, 1-3-5 mm. latae, erecto-adscendentes. *Panicula* lanceolata vel anguste ovata, **2-17** cm. longa, 0-5-6-5 cm. lata; axis primarius tenuiter filiformis, laxissime pilosus; rami plerumque solitarii, tenuiter capillares, demum oblique patentes, basi usque 2 cm. nudati, glabri, laeves; racemi usque 30, simplices, 0-5-•5 cm. longi, graciles, stricti vel leviter curvati, demum horizontaliter patentes ; rhachis usque 0-5 mm. lata, glabra, laevis ; pedicelli 1 mm. longi, minute pubescentes. *Spiculae* 2-3-2-7 mm. longae (callo excluso), argenteo-virides vel purpureo-tinctae ; callus 0-6-0-7 mm.

longus. *Gluma superior* acuta, 1*5-1*7 mm. longa, inter nervos et prope margines pilis brevibus adpresse pilosula et ciliata. *Lemma inferum* prope margines et dorso infra medium pilis brevibus adpressis dense pilosulum; palea 0-2-0-3 mm. longa. *Lemma superum* 1-7-2 mm. longum. *Antherae* 0-7-1 mm. longae, atro-purpureae.

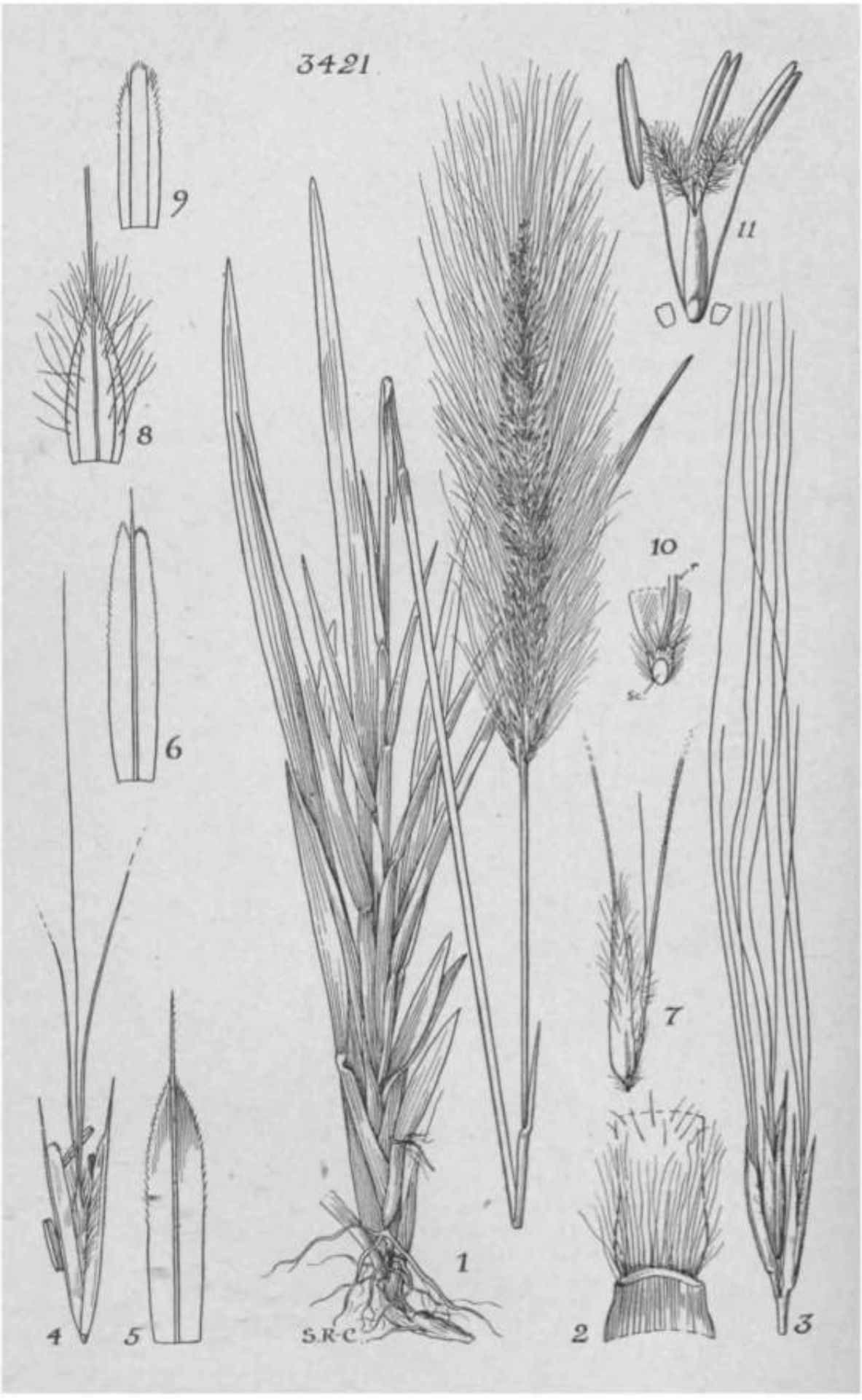
NORTHERN RHODESIA. Mwinilunga District: near source of R. Matpnchi, on bare sandy patch in *Cryptosepalum* woodland, 16 Feb. 1938, *Milne-Redhead* 4591.

The spikelets of grasses have been modified in various ways in order to assist in the dispersal of their grain. One modification is the presence of a pointed and retrorsely bearded spur or callus at the base of the spikelet. Such a spur, although of frequent occurrence in the tribe *Andropogoneae,* is rarely met with in the *Paniceae.* In addition to *Digitariopsis,* only two other genera of the latter tribe possessing this basal appendage are known to the writer. The first example, *Spheneria* Kuhlm., with one species, *8. Kegelii* (C. Muell.) Pilger, from Brazil, has the spur longitudinally adnate to the pedicel. In the second example, *Centrochloa* Swallen, based on *C. singularis* Swallen from Brazil, the spur is free from the pedicel and borne on the abaxial side of the spikelet. On the other hand, in *Digitariopsis,* the spur, although free from the pedicel, is borne on the adaxial side of the spikelet (i.e. between the pedicel and the rhachis). The close similarity in the general structure of the spikelets of *Digitariopsis* and *Digitaria,* of *Spheneria* and *Paspalum,* and of *Centrochloa* and *Axonopus,* strongly suggests relationship between the members of each pair. The presence of a basal spur in a genus of each of the above three pairs should not, however, be regarded as evidence of close affinity between these genera : it rather indicates another example of parallel development.

Amongst the species of *Digitaria,* those of the subsection *Flaccidulae* Stapf (in Prain, Fl. Trop. Afr. ix. 425 : 1919) bear the greatest resemblance to *Digitariopsis,* but all are caespitose perennials with their bases enveloped by a dense mass of matted wool. The upper glume in each species of this subsection is minutely saccate at the base, whilst their inflorescences are composed of peduncled racemes; it is in these respects that they approach most closely to *Digitariopsis.*

C. E. HUBBARD.

FIG. 1, plant, *natural size,;* 2, ligule, x 4; 3, base of spikelet and rhachis of raceme, x 12 ; 4, 5, 6, spikelet, in back, front and side views respectively, x 12 ; 7, base of spikelet to show callus and scar of pedicel (s), x 24; 8, upper glume, x 20 ; 9, lower lemma, *x* 20; 10, palea, x 20 ; 11, upper floret, showing broad margins of lemma, x 20 ; 12, palea, with styles protruding, ; 20 ; 13, lodicules, x *c.* 40; 14, stamens, x 20 ; 15, pistil, x 20.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TABULA 3421.

POGONOCHLOA GBEENWAYI *C. E. Hubbard.*

GRAMINEAE. Tribus CHLORIDEAE.

Pogonochloa *C. E. Hubbard.* Genus novum, *Chloridi* Swartz affine, a qua inflorescentiis spiciformibus elongatis, glumis subaequalibus apice breviter aristatis, lemmate infimo glumis breviore tenuiter membranaceo integro apice aristato, aristis longissimis differt.

Spiculae ambitu anguste oblongae vel demum hiantes, lateraliter compressae, longissime aristatae, brevissime pedicellatae, alternae, biseriatae, in rhachi gracili racemorum secundorum spiciformium dense imbricatae ; racemi in paniculis densis terminalibus dispositi; rhachilla inter glumam superiorem et lemma infimum disarticulans, inter anthoecia continua, glabra. *Anthoecia* 2-3, infimum £, secundum sterile vel raro masculum, plerumque ad lemma vel aristam redactum, tertium ad aristam redactum. *Glumae* persistentes, subaequales, spiculae aequilongae, anguste oblongae (explanatae), carinatae, apice breviter aristatae, membranaceae, 1-nerves; inferior acuta vel subobtusa ; superior truncata vel breviter biloba. *Lemma infimum* glumis brevius, lanceolatum (explanatum), acutum, integrum, apice longissime aristatum, carinatum, tenuiter membranaceum, hyalinum, 3-nerve, nervibus lateralibus brevibus tenuibus marginibus approximatis, superne laxe pilosum ; arista tenuissima, flexuosa ; callus obtusus, brevissimus, breviter barbatus. *Palea* lemmate paullo brevior, bicarinata, 2-nervis, anguste oblonga (explanata), hyalina. *Lemma secundum* infimo simile sed brevius, angustius, 1-nerve. *Lodiculae* 2, late truncatae. *Stamina* 3 ; antherae lineari-oblongae. *Ovarium* glabrum ; styli distincti; stigmata plumosa, ex anthoeciis lateraliter exserta. *Caryopsis* ambitu lanceolato-oblonga, trigona, inter lemma paleamque inclusa; hilum subbasale, punctiforme.—*Gramen* perenne, caespitosum ; ligulae brevissimae, membranaceae; laminae anguste lanceolato-lineares, planae vel convolutae ; panicula spiciformis ; racemi numerosi.

Species unica, Africae tropicae australis incola.

P. Greenwayi *C. E. Hnbbard,* species nova (adhuc unica).

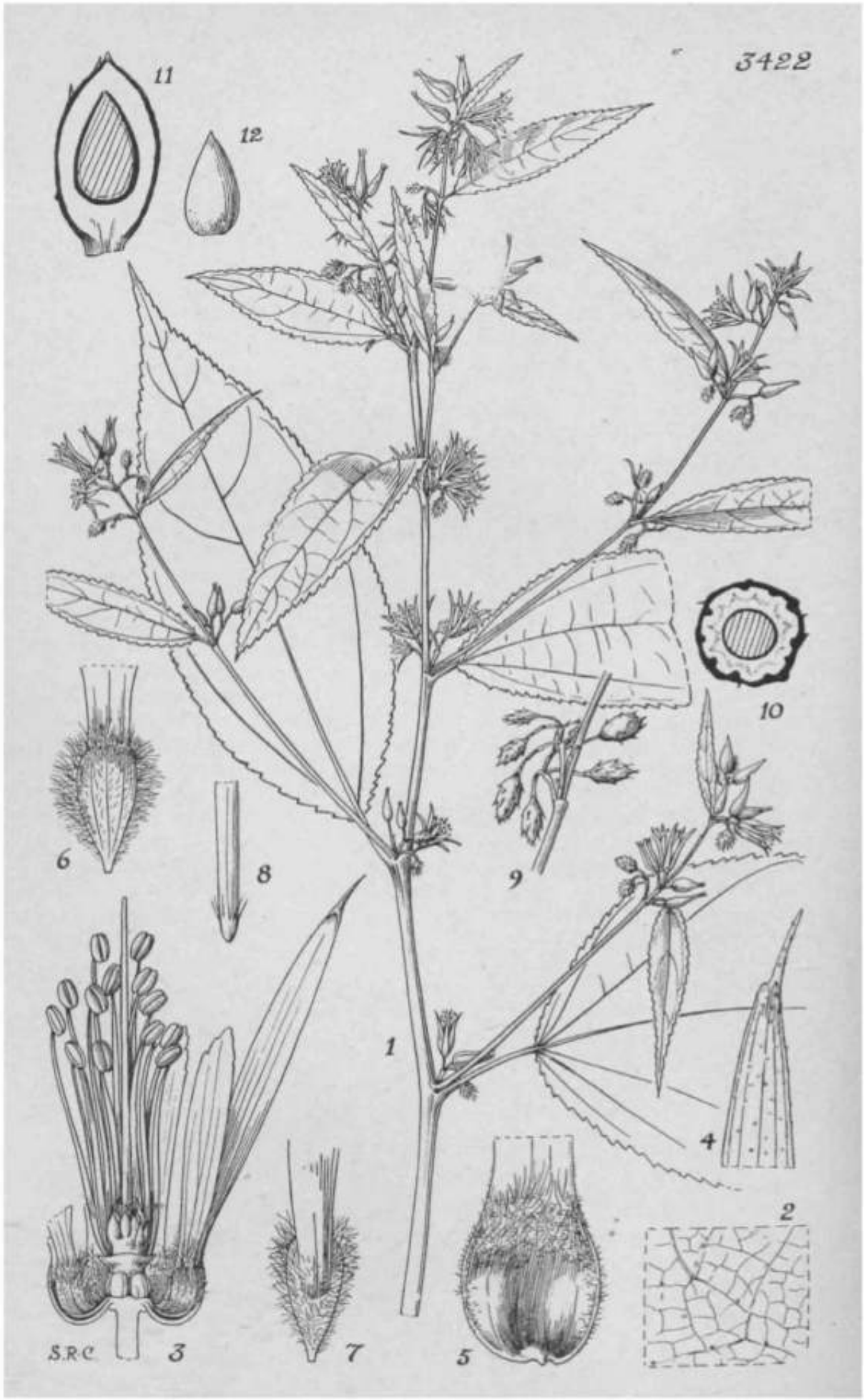
Gramen 30-40 cm. altum, e rhizomate erecto vel oblique adscendente ortum; rhizoma validiusculum, vaginis vetustis dense obtectum. *Culmi* erecti, graciliusculi, simplices, 2-nodes (basi exclusa), teretes, glabri, laeves, internodio summo valde elongato. *Folia* plerumque basalia, glauca; vaginae dorso rotundatae, glabrae, laeves, basales dense imbricatae, latae, pallidae, superiores internodiis demum breviores; ligulae truncatae, glabrae ; laminae erectae vel oblique adscendentes, in apicem obtusum callosum attenuatae, rigidiusculae, pone ligulam pilis longis albis mollibus laxe pilosae, ceterum glabrae,

marginibus et apicem versus scaberulae, inferiores usque 13-5 cm. longae et 6 mm. latae, superiores multo breviores. *Panicula* erecta, lineari-oblonga, 5-8 mm. lata, purpureo-variegata vel demum rubiginosa ; axis primarius glaber; rami erecti, dense imbricati, solitarii sed approximati, usque 1 cm. longi, glabri ; pedicelli circiter 0-3 mm. longi. *Spiculae* 3-3-5 mm. longae (aristis exclusis). *Glvmae* carinis scaberulae, aristis usque 1 • 5 mm. longis. *Lemma infimum* 2 • 3-2 • 6 mm. longum ; arista usque 4*5 cm. longa, minutissime scaberula, tenuissima, flexuosa; palea 1*8-2 mm. longa, marginibus apicem versus ciliolata; rhachillae internodium usque 1 mm. longum, glabrum. *Lemma secundum* usque 2 mm. longum, angustum, laxe pilosum, vel ad aristam redactum ; arista usque 2*4 cm. longa. *Antherae* 1-1-5 mm. longae, purpureae.

NORTHERN EHODESIA. Shiwa Ngandu, 1530 m., very local amongst *Aristida, Loitdetia* and *Hyparrhenia* spp. and *Lycopodium cernuum,* in grey sand on banks of an irrigation ditch, 23 Sept. 1938, *Greenway* 5768.

The species of *Chloris,* with which genus *Pogonochloa* has been compared, are usually stoloniferous, and possess keeled leaf-sheaths, leaf-blades folded in the bud, unequal glumes and indurated lemmas bearing a straight awn from just below the apex. Their racemes are usually digitately arranged or clustered on a short axis. In *C. myriostachya* Hochst., however, they are very numerous and are borne on an elongated axis; the inflorescence then bears a slight resemblance to that of *Pogonochloa.*—C. E. HUBBARD.

FIG. 1, *natural size;* 2, junction of sheath and blade to show ligule, x 4; 3, upper part of raceme, x 6 ; 4, spikelet, x 8 ; 5, lower glume, x 12 ; 6, upper glume, x 12; 7, florets, x 12; 8, lemma, x 12; 9, palea, x 12; 10, base of fertile floret, showing callus-scar (Sc) and part of rhachilla-interoode (r), x 16; 11, parts of flower, x 12.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TABULA 3422.

TRIUMPETTA HINTONII *Sprague.*

TILIACEAE. Tribus GREWIEAE.

T. Hintonii *Sprague* in Kew Bull. 1937, 294; species perdistincta, fructibus oblongo-ellipsoideis, aculeis paucis brevibus incurvis, petalis apicem versus irregulariter dentatis a speciebus congeneribus distinguenda.

Frutex 1-4 m. altus, caule inferne circiter 2 cm. diametro, cortice areolis rhomboideis elevato-reticulato; ramuli graciles, 3-4 mm. diametro 4-6 dm. infra apicem, superne stellato-puberuli, inferne glabrati; internodia 3-5 cm. longa. *Folia* anguste ovata usque lanceolata, manifeste acute acuminata, in basin interdum perangustam subtruncatam vel subcordatam plus minusve cuneata, usque 11 cm. longa et 4-5 cm. lata sed plerumque minora, saepe circiter 6 cm. longa et 3 cm. lata, tenuiter herbacea, basi 5-nervia, nervis ceteris utrinque circiter 3, crebre subdupliciter serrata, saepe serraturis inferioribus 1-3 hydathodiis terminatis, supra pilis sparsis stellatis atque simplicibus basi bulbosis puberula, subtus mesophyllo minute punctato, venulis nervisque fulvo-stellato-puberulis, nervis subtus inferne necnon supra axillas venarum lateralium pilis simplicibus albidis patule hirsuta; petioli usque 2-5 cm. longi, saepe breviores, nonnunquam minus quam 0-5 cm. longi, purpurei, pilis fulvis stellatis furfuraceo-pubescentes vel puberuli. *Ramuli floriferi* graciles, acute ascendentes, 1-4 dm. longi, bracteis foliaceis anguste lanceolatis vel oblongo-lanceolatis 1-5-4 cm. longis 0-4-1 cm. latis. *Cymulae* triflorae, pedunculatae, usque quaternae pro folium ; pedunculi plerumque 3-5 mm. longi; pedunculi interdum bracteis foliaceis inferius instructi, cymulas circiter 4 gerens; pedicelli 2-5-4 mm. longi, infra medium articulati, minute stellato-pubescentes. *Alabastra* matura 9-10 mm. longa, inferne ampliata, deinde leviter constricta, superne angustata, appendiculis circiter 0-3 mm. longis. *Sepala* 1 cm. longa, medio 0-7 mm. lata, extra minute stellato-puberula, inferne sparse tantum, in insertionem valde incurva, parte inferiore ampliata convexa oblongo-elliptico-rotundata vix ultra 2 mm. longa intus a basi per 1-5 mm. glabra marginibus stellato-pubescentibus exceptis, deinde intus per 1-5 mm. pilis stellatis atque simplicibus (longioribus) densiuscule pubescentia, ceterum glabra ; pars superior lineari-lanceolata, apice intus subcucullata, extra rotundata sed apiculo caudiformi 0-4 mm. longo lateraliter terminata. *Petala* tota vix 7 mm. longa, e parte basali obovata et parte apicali (quasi appendice) oblongo-oblanceolata sistentia, appendice e medio partis basalis exorta eique adnata; pars basalis circiter 1-5 mm. longa et 0-8 mm.lata,extra villosa, intus linea villosa e parte superiore disjuncta, ceterum leviter pubescentia ; pars superior 5-6 mm. longa, 1-1-5 mm. lata, glabra, apicem versus irregulariter pauci-crenato-dentata, apice

ipso subacuta. *Androgynophorum* cum annulo vix ultra 1 mm. longum; glandulae oblongae vel subquadratae, 0-6 mm. longae et usque 0*6 mm. latae, manifeste non contiguae vel fere contiguae ; annulus circiter 0-3 mm. altus, breviter ciliatus. *Stamina* 15-20; filamenta usque 8 mm. longa, supra basin pilis paucis ascendentibus praedita,.ceterum glabrae; antherae 0*7 mm. longae. *Ovarium* breviter oblongo-ellipsoideum, glabrum, biloculare, tuberculis spinuliferis circiter 11-14 obsitum; spinula cum tuberculo suo 0 • 4 mm. longa ; stylus usque 9 mm. longus; stigmata 2, minuta. *Fructus* oblongo-ellipsoidei, 6 mm. longi, 3-5 mm. diametro, pro genere sparse aculeati, triente inferiore saepe inermes, glabri, viridi-fusci, uniloculares ; aculei incurvo-ascendentes, circiter 1(-1-5) mm. longi; semen solitarium, ovatum.

MEXICO. District of Temascaltepec, State of Mexico: La Labor, 2060 m., 10 July 1932 (fl., fr.), *Hinton* 980, "2-5 m. high" ; *ibid.,* 2000 m., by the water, 2 May 1933 (fl., fr.), *Hinton* 3837, " shrub 3 m. high, from the same plant as No. 980 " ; *ibid.,* 2000 m., by the water, 27 May 1933 (fl., fr.), *Hinton* 3883, " shrub 3 m., rare, on one hill, —not found elsewhere in this district; wood very pliable " ; *ibid.,* 19 Oct. 1934 (fl., fr.), *Hinton* 6594 ; Cajones, 2480 m., on a hill, 17 July 1933 (fl.), *Hinton* 4224, " 3 m. high " ; Nanchititla, by the water, 11 Dec. 1933 (fr.), *Hinton* 5324, " shrub 4 m. high " ; Cumbre de Tejupilco, in oak woods, 22 Nov. 1934 (fl., fr.), *Hinton* 7018 (type), " 1 m. high " ; Pantoja, in oak woods, 23 Nov. 1934 (fr.), *Hinton* 7027, " 15 m.

The most striking feature of this species is the form and fewness of the prickles on the fruit. In this respect it is not approached by any other species of the genus. The ovary is covered in a regular manner with spinuliferous tubercles, but some of these frequently become smoothed out as the fruit develops, with the result that the mature fruit is often irregularly dotted with a very small number of aculei of unequal size, whilst a few fruits have been seen which are almost smooth. The irregularly toothed petals also constitute an unique feature. As shown clearly in figs. 3, 6 and 7, these consist of two very dissimilar portions, the larger (upper) one being a kind of appendage to the smaller basal part.—A. A. BULLOCK.

FIG. 1, flowering branch, with very young fruit, *natural size* ; 2, portion of lower surface of a leaf, x 8 ; 3, flower with most of the petals and sepals removed, to show the androgynophore, x 6 ; 4, upper part of a sepal, from the outside, x 12 ; 5, lower part of a sepal, from the inside, x 12 ; 6, lower part of a petal, from the inside, x 12; 7, the same, from the outside, x 12 ; 8, lower part of a filament, x 12 ; 9, portion of a fruiting branch, *natural size;* 10, fruit in transverse section (diagrammatic), x 4; 11, fruit in longitudinal section (diagrammatic), x 4; 12, seed, x 4.


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TABULA 3423.

TRIUMFETTA SANCTAE-LUCIAE *Spray tie.*

Tiu\< 'KAK. Tribus UREWIEAE.

T. Sanctae-Luciae *Sprayae* in Kew Bull. **1«#23,**114; Standl. in Contrib. U.S. Nat. Herb, xxiii. 1074 (1920).—*T. ijmmliftora* Seem. Hot. Voy. Herald, 272 (1850), non Vahl, Ed. Amer. ii. 34 (1798). *T. pUyandm* DC. Fee. Hemsl. Hiol. Centr.-Amer. i. 138 (1879) partira, non DC. in DC. Prodr. i. 508 (1824).—Specie* distincta, foliis pro genere pan-is lanceolatis caudato-acuminatis glabri*.

Frutex, statura ignota ; ramuli graciles, 1·1-5 mm. <liam<tro *:)* dm. infra apicem, superne minute stcllato-pubcruli, mox glal»rvs<·rntes, obscure brunnei. *Folia* lanceolata, vel interdum ovato-Ianceolata, acute caudato-acuminata, basi rotundata, levissime sed nuinifeste emarginata, 2-5-5 cm. longa, 1-2 cm. lata, tenuiter herbacea (siccitate pergamentacea), basi 5-nervia (nervis basalibus 2 exterioribus brevibus vel interdum obsoletis), nervis ceteris utrinque circiter 3 (iis caudac exclusis), crenato-sc»rrata, serraturis 2-4 inferioribus hydathodiis terminatis, nervis stellato-puberulis, cetenim glabrata vel levissime Htellato-puberula; **j>etioli** 1-2 cm. longi, stellato-puberuli, sursum 2-3 mm. infra laminam leviter incra««atum. *Ramuli ftoriferi* in paniculas terminale.s subaphvllas aggregati ; rami primarii apice bracteas solitarias subfoliaceasangU8te Ianc4?olatas acuminatas 1 -5-1 -8cm. longas 3*5-5 mm. latas gerentes, inferiores ter ramificati ; cymulae ultimae triflorae vel abortu 1-2-florae, pedunculit* circiter 1 cm. longis ; pedicelli 5-7 mm. vel usque 1 cm. longi, graciles, leviter stcllato-puberuli, laterales basi articulati. *Se]xila* circiter 1 *8 cm. longa, sujwrne linearioblonga, 0*0 mm. lata, basin versus elliptico-ampliata, 1 *5 mm. lata et ciliata, ceterum extra intusque glabra, apice appendicibus corniformibus 0-75 mm. longis tirminata, intus subcucullata. *Petala* anguste lanceolata, unguiculata, ungue villoso 1 • 5 mm. longo, tota circiter 1 • 2 cm. longa et fere 2 mm. lata. *Androgynophorum* cum annulo 0-9 mm. longum ; glandulae oblongae, 0-5 mm. longac, haud contiguae ; annulus 0*2 mm. alt us, minute ciliatus. *Stamina* circiter 20; filamenta inaequalia, longiora circiter 1 -0 cm. longa, basin versus pilis ascendentibus leviter induta ; antherae 1 mm. longae. *Omrium* 3- vel 4-loculare, ovoideum, aculeiserecto-ascendentibus nunierosis dense obsitum, vix ultra 1 mm. longum ; stylus fere 2 cm. longus. *Fructus* immaturi tantum visi, dense aculeati; aculei spinulis solitariis arcuatis vel rectis terminati; loculi 3 v-•' «· . . .riiina in loculis solitaria.

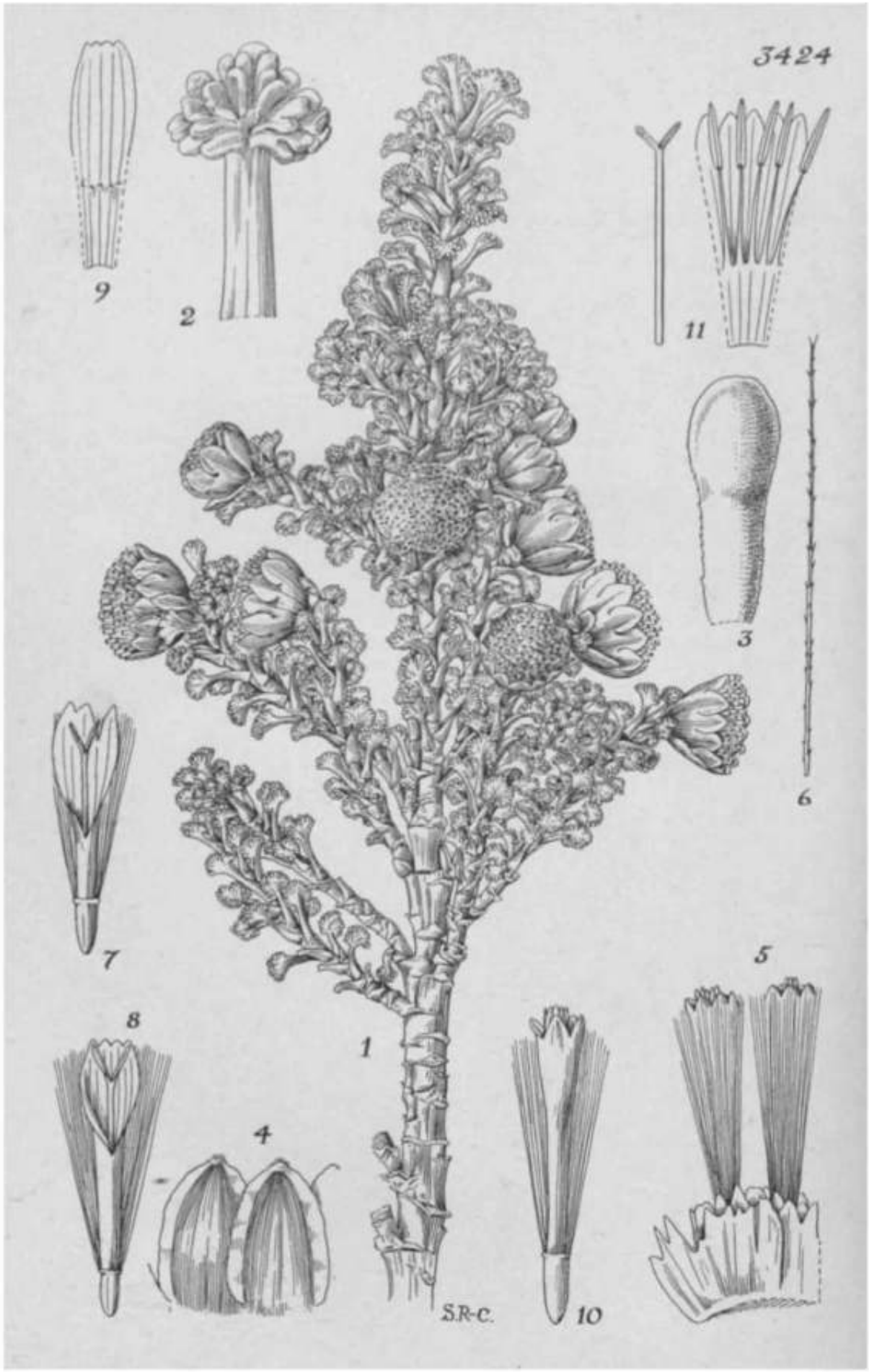
MEXKO. banta Lucia, State of Sinaloa, about 1200 m., Nov. 1849 (fl., young fr.), *Seetnann* 2147 (tyjie).

This species is still incompletely known, and one reason for its inclusion here is to stimulate collectors to look for it in the type-locality and similar areas. This may lead to the rediscovery of many species hitherto known only from Seemann's collections.

T. Sanctae-Luciae is a very floriferous shrub, the terminal panicles often being very much larger than the one selected (on space considerations) for figuring. The flowers are fairly large, but from the taxonomic point of view the chief feature of interest lies in the leaves which, with their long, caudately acuminate apices, render the species quite distinct from any other Mexican or Central American species of the genus.

The description is adapted from that of Sprague in Kew Bull. 1923, 114.—A. A. BULLOCK.

FIQ. 1, flowering branch, *natural size*; 2, portion of leaf surface, to show stellate hairs, x 24; 3, part of a peduncle and pedicels, showing articulation of lateral pedicels, x 6; 4, flower, dissected to show androgynophore, x 6; 5, upper and lower parts of sepal, from inside, x 8; 6, petal, from outside, x 6; 7, stamen, x 6; 8, immature fruit, *natural size*; 9, transverse section of a 4-locular fruit (diagrammatic), x 4; 10, longitudinal section of a 4-locular fruit (diagrammatic), x 4; 11, part of surface of immature fruit, showing aculei, x 12.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TABULA 3424.

WERNERIA STAFFORDIAE *Sandwith.*

COMPOSITAE. Tribus SENECIONEAE.

W. Staffordiae *Sandwith* ; species nova, *W. dactylophyUae* Sch. Bip. ex Wedd. atquc II[7]. *incisae* Phil, affinis, ab ambabus capitulis pseudo-discoideis floribus radii brevissimissub involucri lobis conditis, praeterea ab ilia caulibus foliisque glabris lobis involucri late ovato-oblongis vel ovatis, ab hac foliis majoribus apice semper (summis sub capitulis nonnunquam exceptis) multipartitis, involucro multo majore statim distinguitur.

Fruticnlus **ramosissimus, glaberrimus, resinoso-gummifer, caule principali supraterraneo crasso carnoso ad 40 cm. longo inferne circiter 1 cm. diametro cicatricibus elongatis horizontalibus ubique notato; ramuli permulti, inferiores iterum ramosi, 2-9 cm. longi, dense foliati, apicem versus caulis principalis valdc abbreviati atque velut rosulas foliorum axillares formantes, apice capitulo singulo terminati.** ***Folia*** **petiolo carnoso 6-8*5 mm. longo circiter 2-3-2*5 mm. lato basi dilatato ac amplexicauli-vaginante praedita; lamina late ovata, 4 mm. longa, 6-7 mm. lata, obtusa, basi truncato-cuneata vel truncato-cordata, 5-lobata, lobis ipsis conspicue 3-4-lobulatis, lobo terminali 5-lobulato, lobulis insigniter carnosis inflatis truncato-rotundatis intricate crispule involutis et saepe superpositis vulgo 1-1-5 mm. longis terminali 1 -5 mm. lato.** ***Capitula*** **neglegentius perscrutanti discoidea sed revera radiata, breviter (circiter 4 mm.) pedunculata, pedunculo bracteas paucas foliaceas spathulato-oblongas integras secus marginem praesertim prope medium minute obtuse eroso-denticulatas 8-10 mm. longas ad 3 mm. latas gerente.** ***Involucrum*** **campanulato-hemisphaericum, 8 • 5-11 mm. longum, siccitate 1 • 5-2 cm. la turn, usque ad medium in lobos 13-14 ovatos vel ovato-oblongos obtusos 4-6 mm. longos 3-4-3 mm. latos margine subscarioso eroso-denticulatos apice albo-lanatos dorso 1-3-vittatos divisum.** ***Receptaculum*** **convexum, alveolis profundis conspicue longe irregulariter dentatis atque laceris.** ***Flores disci*** **flavi, glabri, 7-75 mm. longi, fauce infundibuliformi circiter 2 mm. longa, lobis triangulari-ovatis obtusis circiter 0-8 mm. longis atque 0-75 mm. latis.** ***Antherae*** **2-2 mm. longae, basi minute auriculatae.** ***Styli*** **rami apice rotundati atque papillosi.** ***Achaenia*** **glabra, 2 mm. longa; pappi setae sordide albo-flavae vel albo-brunneae, 7 mm. longae.** ***Flores radiales*** **$, porinconspicui, illis disci aequilongi, sub involucri lobis conditi; tubus 3-2 mm. longus ; ligula 4-4-3 mm. longa, plana vel marginibus involutis, apice 3-4-loba, lobis magnitudine variabili 0-3-0-8 mm. longis triangulari-ovatis; stylus cum ramis ligulae aequilonjrus.**

PERU. Dept. Puno; San Antonio de Esquilache, on dry bare slopes below a wall of rock, 4650 m., 11 May 1937, *Miss Dora Stafford* [illegible] (typus):—"Flower yellow, used by Indians as a remedy in cases of gastric trouble." *Ibid.*, on rocky slopes of volcanic ash, 4860 m., July 1937, *T. G. Tutin* 1201 (Herb. Mus. Brit.).

This very striking new *Werneria* may claim to be the largest and most shrubby member of the genus, the only species comparable with it in both habit and in height being the conspicuously ray-flowered *W. digitata* Wedd. and *W. dactylophylla* Sch. Bip. ex Wedd. All three are members of S. F. Blake's "group of *W. dactylophylla*" as defined in his conspectus of the genus in Journ. Wash. Acad. Sci. xviii. 487 (1928); and of the Subgen. *Euwerneria*, Sect. *Digitifoliae* of M. Rockhausen's revision published last year in Engl. Bot. Jahrb. [illegible] (1939). Rockhausen recognizes thirty-seven species of *Werneria* occurring on the high Andes of South America. They show a remarkable range in leaf form and habit, while the heads may be discoid or ligulate with yellow, white, pink, reddish-purple or blue rays. Miss Stafford has collected at least a dozen Wernerias in southern Peru, the finest of them to horticultural eyes being no doubt *W. Orbignyana* Wedd. which has large heads with deep blue rays and long fleshy spathulate leaves; but this shrubby resinous, apparently quite truly discoid species, with its extraordinary narrow leaf-lobes folded in so as to resemble a boxing-glove, is of greater morphological interest and, being quite new, is equally worthy to bear the name of a distinguished collector.

N. Y. SANDWITH.

FIG. 1, [illegible] of plant, *natural size*; 2, leaf, [illegible] flattened, × 4; 3, bract, × [illegible]; 4, [illegible] lobes, × [illegible]; 5, [illegible] florets, × 4; 6, pappus bristle, × 8; 7, ray floret, × [illegible]; 8, [illegible] ray floret, × 4; 9, the same, [illegible], × [illegible]; 10, disk floret, × [illegible]; 11, disk floret, opened out to [illegible], × 4.


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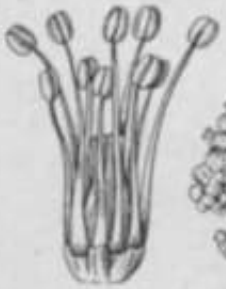
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TABULA 3425.

OXALIS TACORENSIS *B. L. Burtt.*

OXALIDACBAB.

0. (Sect. Alpinae) tacorensis *B. L. Burti*; species nova, ex affinitate *O. erythrorhizae* Gillies ex Hook, et Am., a qua foliis crassioribus, petiolis robustioribus stipulatis, staminibus glabris usque ad basin liberis differt.—*Nototriche Azorella* A. W. Hill sec. Ulbrich in Notizbl. Bot. Gart. Berlin, xi. 528 (1932), non A. W. Hill.

***Herba* perennis, lignosa, caespitosa, usque 5 cm. alta ; caules hypogaei, puberuli, squamis brunneis 2-3 mm. longis obtusis puberulis induti. *Folia* pernumerosa, densissime congests. *Stipulae* parvae, petiolo adnatae, margine et apice pilosae, truncatae, 1-5-2 mm. longae. *Petiolus* circiter 4 mm. longus, basi excepta pilis longis cum aliis brevioribus glandulosis indutus. *Lamina* trifoliolata, foliolis obcordatis 2 mm. longis 1-5 mm. latis, ut petiolus pilosa. *Flares* axillares, solitarii, breviter pedicellati. *PediceUi* 2 mm. longi, bracteolis duabus oppositis 0*75 mm. longis membranaceis oblongis obtusis marginibus pilosis instructi. *Sepala* 5, lanceolata, acuminata, apice ipso obtusiuscula, 2-5-3 mm. longa, extra pilis longis simplicibus cum aliis brevioribus glandulosis instructs, intus apicibus et marginibus exceptis glabra. *Petala* basi in tubum 2 mm. longum coalita, partibus liberis oblongo-ellipticis 2*5-3 mm. longis, 1-1-5 mm. latis apice intus et extra pilosis, sepala valde superantia. *Stamina* 10, basi libera, alterna breviora basi glandula magna externe praedita. *Filamenta* filiformia, glabra, in flore longistylo altera 1-5 mm. altera 2 mm. longa ; in flore brevistylo altera 2 mm. altera 3 mm. longa. *Antherae* dorsifixae, vix 0*5 mm. longae. *Carpella* 5, marginibus intcrioribus cohaerentia, glabra, uniovulata, in stylum attenuata. *Styli* in flore brevistylo fere 1 mm. longi, in flore longistylo 2 mm. longi, pilosi, stigmatibus capitatis. *Fructus* adhuc ignotus.**

CHILE. **Prov. Tacna, Cordillera Volcán Tacora, Co. Quinuta, in kleiner Quebrade (auch in Pampa!) in Schutze von Felsen häufig, circiter 5000 m., *Werdermann* 1152 (typus; herb. Kew. et Berol.): " an Steine geschmiegt, Bliiten nicht gesehen." Chislluma, circiter 4800 m., *Werdermann* 1477 (herb. Berol.). Prov. Tarapacá, Cordillera Co. Colamtasca, Apacheta, circiter 4500 m., *Werdermann* M10 (herb. Berol.): " unter Felsen, bisweilen zwischen Stipabiischeln, vereinzelt. Keine entwickelte Bliite gesehen, scheinbar schon abgebliiht.*'**

Vernacular name : " Chincura."

***Oxaiis tacorensis* has hitherto been mistaken in herbaria for a *Nototriche* and it certainly has a strong superficial resemblance to *N. Azorella,* with which Ulbrich (I.e.) identified it, though dissection shows at once**

that it is no *Nototriche.* The closest ally of this new species is 0. *erythrorhiza* Gillies, about which there has been an unfortunate confusion in the recent literature. In Gay's *Flora chilena* (i. 429, 430: 1845) the names *0. erythrorhiza* Gillies and 0. *compacta* Gillies were somehow transposed and this error was not "detected by R. Knuth in his account of the family in *Das Pflanzenreich.* Consequently the name *0. erythrorhiza* in that work (Pflanzenr. Oxalid. 220) must be replaced by 0. *compacta,* and the name *0. compacta* (I.e. 227 and fig. 17, J-P, p. 221) must be replaced by 0. *erythrorhiza.*

0. tacorensis belongs to section *Alpinae* Reiche, which consists of some 14 species, all natives of the Andes of Chile and the Argentine except *0. androsacea* R. Knuth, an Ecuadorian species which I have not seen. Nevertheless *0. tacorensis* is the first species of this group to be recorded from the province of Tacora and serves to emphasize once more its richness in endemic alpine species.—B. L. BURTT.

FIG. 1, part of plant, *natural size*; 2, a young branch, x 3 ; 3, leaf, upper surface, lobes closed, x 6; 4, the same, lobes spread open, x 6; 5, the same, lower surface, lobes spread open, x 6; 6, leaf-lobe in transverse section, x 12; 7, hairs from leaf, x 20; 8, setose hair, x 80; 9, glandular hair, x 256; 10, flower, x 6; 11, bracteole, x 16; 12, part of calyx from within, x 6; 13, corolla spread open, x 6 ; 14, androecium and gynoecium of short-styled flower, x 8; 15, androecium and gynoecium of long-styled flower, x 8.


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TABULA 3426.

FRITILLARIA TUNTASIA *Heldr. ex Hal.*

LILIACEAE. Tribus TULIPEAE.

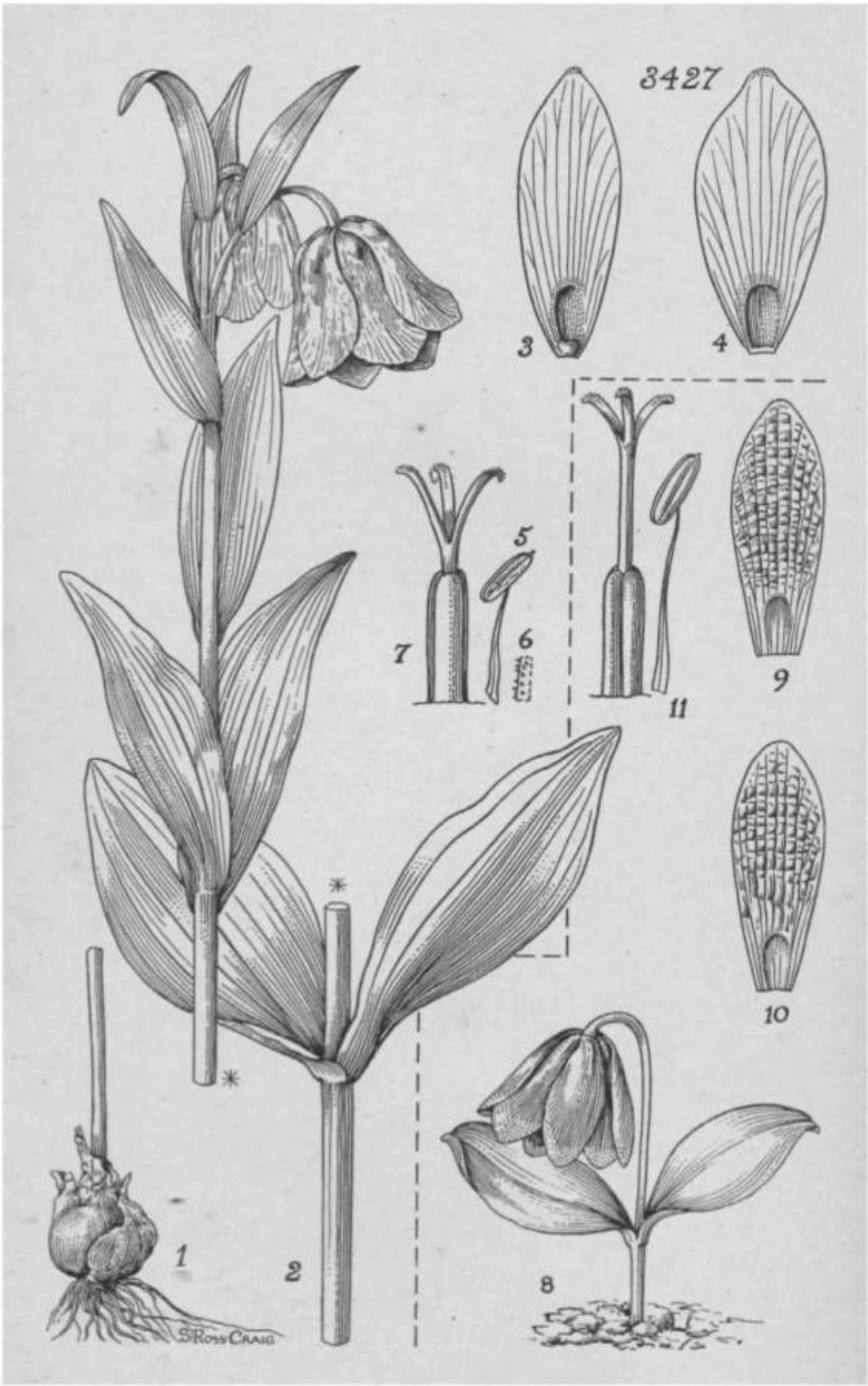
F. Tuntasia *Heldr. ex Hal.* Consp. Fl. Graec. iii. 222 (1904); Hayek, Prodr. Fl. Penins. Balcan. iii. 67 (1932); Rosenheim in Alp. Gard. Soc. Bull. vii. 119 (1939); Davis, ibid. 48 (1939).—A *F. Ehrharti* Boiss. et Orph. foliis numerosioribus longioribus, floribus [illegible] numero-sioribus, tepalis atropurpureis [illegible] differt.

Herba [illegible]. Bulbus ovoideo-globosus, [illegible] cm. diam. *Caulis* 1·8–3·0 dm. altus, teres, erectus, viridis, [illegible] et [illegible] *Folia* [illegible] sublinearia, apice obtusa leviter apiculata et [illegible], usque ad 1·7 cm. longa et 6 mm. lata; [illegible] 11–23, [illegible] subopposita, inferiora opposita vel subopposita vel spiralia; cetera spiralia; inferiora 5–10 cm. longa, 4–15 mm. lata, apice acuta vel [illegible] saepe leviter apiculata et [illegible]; superiora angustiora, linearia, acuta, 3–4 cm. longa, [illegible] mm. lata. *Flores* 1–[illegible], nutantes; perigonium obconicum. *Tepala* [illegible] oblonga vel leviter obovato-elliptica, apice obtusa vel rotundata, 2–2·4 cm. longa, 0·9–1 cm. lata, atropurpurea, leviter [illegible], basi [illegible], [illegible] nullis, apice leviter papillosa; nectaria parva, inconspicua, probabiliter elliptica. *Filamenta* matura 9 mm. longa, leviter papillosa; antherae (post dehiscentiam) anguste oblongae, apice rotundatae vel leviter emarginatae haud apiculatae, 5–6 mm. longae. *Ovarium* [illegible] obconicum, 4·5 mm. altum, 2·5 mm. diam.; stylus 9 mm. longus, integer.

CYCLADES. Kythnos (Cythnos, Thermia), near the town, 120 m., 8 April 1938, on [illegible], of tea growing on fallen terraces but not reaching to [illegible] growing in unploughed land, undisturbed, *Peter Davis* 2. Vernacular name "Nuns."

F. Tuntasia is known only from the island of Cythnos where it [illegible] on [illegible] in [illegible]. It is very similar in many characters to *F. Ehrharti* Boiss. et Orph. which is known from the Cyclades [illegible] of Syra and Andros and from the Petali [illegible] off the south coast of Euboea. Its main distinguishing character is the uniform dark purple (almost black) colour of the tepals on both inner and outer surfaces. Other differential characters, which, however, overlap in the available material of the two species, are: the more numerous, longer, and crowded leaves in *F. Tuntasia*, the lower narrower and more drawn out in the upper part, a tendency to more numerous flowers, and a greater uniformity in the shape of the inner and outer tepals in the same species.—W. B. TURRILL.

Fig. 1, bulb and base of stem, *natural size*; 2, flowering plant, *natural size*; 3, outer tepal, inner surface [illegible]; 4, inner tepal, inner surface [illegible] *S;* [illegible], × 3; 4, part of filament to show papillae, × c. 10; 7, [illegible], × 1.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S. Ross Craig

TABULA **3427.**

Figs. 1-7: **FRITILLARIA DAVISII** *Turrill.*

Figs. 8-11: **FRITILLARIA FUSCA** *Turrill.*

LILIACEAE. Tribus TULIPEAE.

F. Davisii *Turrill* in Kew Bull. 1940, 265.—A *F. rhodocanalris* Orph. ex Baker *(F. macrandra* Baker ?) foliis inferioribus latioribus, stylo breviore ramis longioribus differt.

Bulbi late ovoidei vel hemispherici, circiter 10 mm. alti et 8-10 mm. diam. *Caulis* 2-0-2*7 dm. altus, 1-3 mm. diam., erectus, teres, glaber, viridis, vel inferne (supra solum) et probabiliter infra florem leviter purpurascens. *Folia* viridia, 2 infima opposita (vel subopposita), caetera omnia spiralia; infima elliptica vel oblongo-elliptica, apice obtusa vel subobtusa, inferne plus minusve angustata, 4*4-7*1 cm. longa, 1*35-3*2 cm. lata, media lanceolata vel anguste elliptico-lanceolata, suprema anguste lanceolata vel lanceolato-linearia superne angustata 2*5-3*2 cm. longa, et 3*5-6*0 mm. lata. *Flores* 1 (rarissime 2), nutantes; perigonium campanulatum. *Tepala* omnia 2-2*5 cm. longa, apice obtusa vel rotundata papillosa haud reflexa, extra purpureo-brunnea glauca inconspicue vel vix tessellata, fasciis haud manifestis, intus flavo-virentia vinoso-tessellata, exteriora elliptico-oblonga 7-9 mm. lata, interiora elliptico-obovata 12-13 mm. lata. *Filamenta* matura gracilia, 8 mm. longa, leviter papillosa ; antherae (post dehiscentiam) oblongae, 3*5-4*5 mm. longae, apiculatae, flavae. *Ovarium* cylindricum, 8-9 mm. altum, 1*5-2 mm. diam. ;• stylus 2-2*5 mm. longus, ramis tribus 5-7 mm. longis exclusis.

GREECE. Laconia, Mani promontory, near Pyrgos south of Areopolis, 15 Feb. 1940, 92 m., in young olive plantations, *Peter Davis* 1152. Also found between Yerolimena and Porto Kalia on the same promontory, among phrygana on the limestone hills. Vernacular name dtvyoupt (angouri).

A number of different species of *Fritillaria* have a limited distribution on the Greek mainland, the Cyclades, and the Ionian islands. Their morphological characters correlated with their distribution suggest that they have evolved from a widespread basic species or group through differentiation following geographical isolation. *F. Davisii,* for example, has many characters in common with *F. rhodocanakis* Orph. ex Baker from the island of Hydra (and doubtfully also from Syra) and with *F. ionica* Hal. from Corfu (and also perhaps from Epirus, etc.) and its geographical range is intermediate between the known ranges of these two species. The arrangement and breadth of the leaves give distinguishing characters but the most distinctive

feature of *F. Davisii* is the length of the style-arms (5-7 mm.) relative to the length of the undivided part of the style (2-2-5 mm.).—W. B. TURRILL.

F. fusca *Turrill*; species nova a *F. hurdica* Boiss. et Noé foliis caulinis 2 haud oblongo- vel lineari-lanceolatis, tepalorum colore praecipue differt.

Bulbus non visus. *Caulis* gracilis, erectus, 8-22 cm. altus supra bulbum, 3-6 cm. supra solum. *Folia* caulina 2, opposita vel fere opposita, 2-3-2 cm. infra florem, elliptica vel anguste oblonga, apice obtusa vel rotundata, leviter cucullata, basi plus minusve angustata et saepe amplexicaulia vel semiamplexicaulia, 1-9-3-3 cm. longa, 0-7-2-0 cm. lata, multinervia, nervis subconspicuis. *Flos* solitarius, subnutans. *Tepala* subsimilia, anguste obovato- vel elliptico-oblonga, apice obtusa vel rotundata, 1-6-1-8 cm. longa, 6-7 mm. lata, extra fusco-brunneo-cana, intus rugulosa atropurpurea fere nigra sed apicem versus cana. *Filamenta* subulata, 5-6 mm. longa, glabra ; antherae post dehiscentiam oblongae, 3 mm. longae, pallide brunneae. *Ovarium* subcylindricum, 4 mm. longum, glabrum ; stylus ramis stigmatosis tribus 2-5 mm. longis inclusis 6-7 mm. longus, canus, glaber. *Fructus* ignotus.

S. TIBET. Le La, Chagul-Charme Rd., 5080 m., 27 July 1936, in open wet scree, *F. Ludlow & G. Sherriff* 2459. The collectors' note on flower and leaf colour is : " Corolla outside a dull gray, tinged brown. Inside surface very rough, deepest purple almost black, the tips of the petals shading to gray. Filaments and style gray, anthers fawn. Leaves dull slightly greenish gray."

Fritillaria fusca appears to be a remarkably distinct species, which differs greatly from *F. cirrhosa* Don, which, in the broadest sense, is the common species of the Himalayan region, in number, size, and shape of leaves and in many details of flower structure. No close affinity can be suggested for it but it has to be placed on technical morphological characters in the section *Eufritillaria* § *Trichostyleae* in the sense of Boisser, Flora Orientalis, V. 178 (1884). Comparison can be made with a number of species placed in this section (e.g. with *F. hurdica* Boiss. et Noé, *F. aurea* Schott, and *F. Michailovskyi* Fomin), but from all it differs in its two opposite or nearly opposite stem leaves and in flower morphology.—W. B. TURRILL.

FRITILLARIA DAVISII.

Fig. 1, bulb, *natural size;* 2, flowering plant, *natural size* ; 3, outer tepal, inner surface, X 1-5; 4, inner tepal, inner surface, X 1-5; 5, stamen, X 2; 6, part of filament to show papillae, x c. 30 ; 7, gynoecium, X 2.

FRITILLARIA FUSCA.

Fig. 8, flowering plant, *natural size*; 9, outer tepal, inner surface, X 2 ; 10, inner tepal; inner surface, X 2 ; 11, stamen and gynoecium, X 4.


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TABULA 3428.

THALICTBUM POENICULACEUM *Bunge.*

RANUNCULACEAE. Tribus ANEMONEAE.

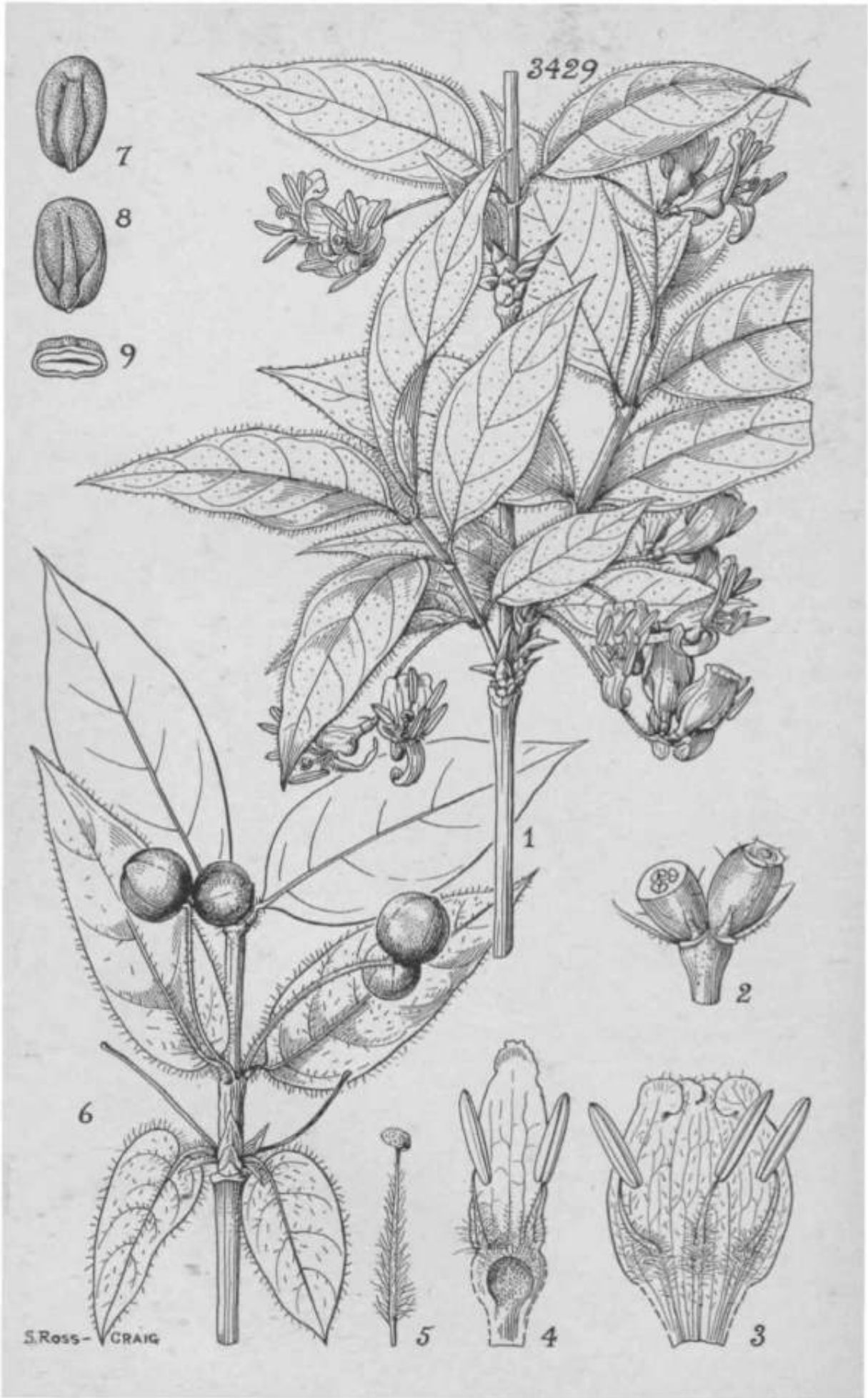
T. foeniculaceum *Bunge,* Enum. PL Chin. Bor. Coll. 2 (in Mém. Sav. Etrang. Acad. Sc. St. Pétersb. ii. 76) (1833); Walp. Rep. i. 13 (1842); Regel, Uebers. Art. Gatt. Thalictrum Russ. Reiche (in Bull. Soc. Nat. Mosc. xxxiv. No. 1) 5, 16, t. 3 (1861); Lecoyer in Bull. Soc. Bot. Belg. xvi. 198-200, t. 4 fig. 11 (1877) et Monogr. Gen. Thalictrum (in Bull. Soc. Bot. Belg. xxiv. 222, 324) 38, 44, 147, 199, t. 5, fig. 12 (1885) ; Forbes & Hemsley in Journ. Linn. Soc. London, Bot. xxiii. 8 (1886); Finet & Gagnepain in Bull. Soc. Bot. France, 1. 623 (1904) et Contrib. Fl. Asie Or. 59, 64 (1905); Kitagawa, Lineam. Fl. Manch. 227 (1939); Raffill in Journ. Roy. Hort. Soc. London, lxv. 252 (1940)—T. *psilotifolium* K. Wada ex Quart. Bull. Alpine Gard. Soc. viii. 239, cum fig. p. 255 (1940). *Isopyrum trichophyllum* Léveillé in Fedde, Rep. Sp. Nov. ix. 224 (1911) et Cat. PI. Yun-Nan, 225, fig. 57 (1917).—Species distinctissima, foliis filiformi-dissectis et inflorescentiis laxis paucifloris cum floribus magnis statim recognoscenda.

Herba perennis glabra. *Rhizoma* grumosum, radicibus crassis carnosis, quotannis folia radicalia et 1-2 caules floriferos emittens. *Folia* 3- ad 5-ternata, nodis articulatis, saturate viridia, 8*5-24 cm. longa ; lamina 4-14*5 cm. longa, rhachi in parte infima 4-angulata superne costata, segmentis acicularibus 2-6 cm. longis in sicco sulcatis longissimis in parte media albo-articulatis; petiolus 2-9 cm. longus, costatus (in sicco), ad basim leviter vaginatus. *Caules floriferi* 10-5-52 cm. alti, inflorescentiam paucifloram laxe corymbosam formantes, sparse foliati, plerumque ex axilla folii cuiusque ramum emittentes, axillis infimis raro sterilibus ; pars inferior scaposa, longitudine variabili, folia radicalia vix aequans vel valde superans et 22 cm. longa ; folia caulina superne diminuta, infima foliis radicalibus similia sed minora, breviter petiolata, suprema ad segmenta pauca sessilia reducta ; rami ad 24 cm. longi, striati, cymosi, 2-flori et integri, vel uni vel ultra ramosi ramulis bifloris; pedicelli ad 7*5 cm. longi; bracteae aciculares, 6-25 mm. longae. *Flores* ad 3 cm. diametro. *Sepala* obovata ad late elliptica, acuta ad rotundata et obtuse apiculata, basi cuneata, 6-16 mm. longa, 2-6*5 mm. lata, alba vel apice rosea et dimidio vel triente apicali erubescentia. *Stamina* umbonem compactum formantia, 3*5-4 mm. longa; filamenta filiformia, 1-2 mm. longa, antheris flavis; pollen viridi-flavum. *Carpella* 4-15, sessilia viridia, curvata, plano-convexa, vix 2 mm. longa, costata, stigmate oblique dicoideo sessili. *Achaenia* leviter curvata, anguste oblonga ad lanceolata, acuta, 4*5-6 mm. longa, valde costata.

NORTH CHINA. **Chihli: Lung ts'iian sze (" Lun ziian-ssy ") north of Pekin, *Bunge*; Kin Yang, August 1912, *Chanel* 635 ; near Pekin, *Bretschneider, Tatarinow*; Shansi, Kiang-chow, 23 May 1916, *Licent* 1969; Kansu, Hai-tch'eng-ze, 18 June 1918, *Licent* 3939. Cult, in hort. bot. reg. Kew. (812-36/Haysho) et cult. S. 6. Fiedler, Claygate, Surrey.**

This is the most distinct of all *Thalictrum* species and is at once recognised by the filiform-segmented leaves in conjunction with the lax, relatively few-flowered inflorescence, and the large anemone-like flowers. The only Thalictrums which resemble it in leaf-character are *T. bulgaricum* Vel. and *T. lucidum* L. var. *stenophyllum* (Wimm. & Grab.) Hayek *(T. angustifolium* var. *stenophyllum* W. & G.), both of which differ completely by their dense paniculate inflorescences of very numerous small flowers. Those species which resemble *T.foeniculaceum* in the flowers, *T. tuberosum* L., *T. orientate* Boiss., *T. pedunculatum* Edgew., etc., all have leaves with broad suborbicular segments. *T. foeniculacewm* has come into cultivation in this country during recent years and a plant was exhibited at the Royal Horticultural Society's Show on 21 May 1940 under the name *T. psilotifolium,* having been purchased under this name from the Japanese nurseryman K. Wada.—J. R. SEALY.

Fig. 1, base of plant and part of one radical leaf, *natural size*; 2, upper part of flowering-stem, *natural size;* 3, outer sepal, X 2 ; 4, inner sepal, X 2 ; 5 and 6, stamens, X 4 ; 7 and 8, carpel in front and side views, X 8 ; 9, transverse section of carpel, X 8; 10, achene, X 6; 11, transverse section of achene, x 6. Figs. 1, 2, 6, from *Bunge* (sine num.); figs. 3, 4, 5, 7, 8, 9, from a specimen cult, in hort. bot. reg. Kew. (812-36/Haysho); figs. 10, 11, from *Chanel* 635.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TABULA 3429.

LONICERA HETEROLOBA *Batalin.*

CAPRIFOLIACEAE. Tribus LONICEREAE.

L. heteroloba *Batalin* in Acta Horti Petrop. xii. 174 (1892); Wolf in Gartenflora, xlii. 333 (1893); Rehder, Syn. Gen. Lonicera (in Ann. Rep. Missouri Bot. Gard. xiv.) 104, 109, t. 15 (1903) et in Journ. Am. Arb. ix. 123 (1928) et Man. Cult. Trees and Shrubs, Ed. 2, p. 863 (1940); Walker in Contrib. U.S. Nat. Herb, xxviii. 662 (1941).—Species sectionis *Isikae* DC. emend. Rehd. subsectionis *Alpigenarum* Rehd. *L. heterofhyllae* Decne. affinis, sed laminis foliorum plerumque ovatis vel lanceolatis ad anguste ellipticis acuminatis subtus villosis, petiolis longe pilosis, calyce obsoleto, corolla purpurascente, filamentis brevioribus recedit.

Frutex deciduus, erectus, ad 3 m. altus ; rami vetustiores grisei cortice exfoliato longitudinaliter diffindente ; rami hornotini virides, glabri vel sparse pilosi *(Purdom* 1080), laeves. *Gemmae hiemales* terminales, *in* ramis hornotinis sterilibus robustis etiam laterales, ovatae, 3-3*5 mm. longae, pallide brunneae ; perulae persistentes, ad anthesin patentes, exteriores semiorbiculares vix 1*5 mm. altae et squamosae, interiores subherbaceae lamina oblonga rotundata 7-5 mm. longa 4 mm. lata et petiolo brevi lato ciliato 3 mm. longo. *Folia* laminae ovatae vel lanceolatae ad ellipticae, acuminatae ad acutae basi cuneatac ad rotundatae, plerumque 3-6-5 cm. longae et 1-3-2-5 cm. latae, integrae, papyraceae, supra virides sparsissime glandulosae in venis praecipue in costa breviter sparse pilosae, infra pallide virides in venis sparsissime ad basin costae densius villosae, reticulo (in sicco) supra et infra distincto, margine longe ciliatac ; petioli 5-7 mm. longi, pilis paucis longis patentibus et glandulis pedicellatis tenebrosis obtecti. *Inflorescentiae* in quoque ramulo plerumque 2 interdum 4 dispositae, ex axillis foliorum imorum enatae ; pedunculi 2-4 cm. longi, ad apicem leviter incrassati, pilis albis subsparsis longis patentibus ad apicem densioribus obtecti vel glabrescentes ; bracteae liberae, lineari-subulatae, 2-3 mm. longae ; bracteolae liberae, oppositae, oblongae, rotundatae, circiter 1-1-5 mm. longae, 0*5 mm. latae, longe ciliatae. *Calyx* obsoletus, in marginem reductus. *Corolla* zygomorpha, valde 2-labiata, purpurascens, extra glabra vel sparsissime pilosa, intra villosa ; tubus 3 mm. longus, ad 1-5-2 mm. cylindricus et 1-5 mm. latus, deinde abiupte campanulatus et 4 mm. latus, in parte inferiore gibbo hemisphaerico 1-5-2 mm. alto ornatus; labium superius erectum, subquadratum, ad marginem recurvum, (5)-7-8 mm. longum, 6-5-7 mm. latum, breviter imbricatim inaequaliter 4-lobatum, segmentis rotundatis ad margines leviter erosis lateralibus quam mediis latioribus; labium inferius valde deflexum recurvumque, ligulatum,

8-5-10 mm. longum, 3*5 mm. latum, ad apicem obtusum ad rotundatum leviter erosum et ciliatum. *Stamina* ad summum tubum inserta ; filamenta 3*5-5 mm. longa, purpurascentia, in dimidis inferiore vel in duabus tertiis partibus inferioribus dense albo-villosa, supra sparse villosa vel fere glabra ; antherae purpurascentes, 3 • 5-4 • 5 mm. longae. *Ovaria* haud connata, 2*5-3 mm. longa, 2 mm. lata, viridia ; stylus curvatus, 10 mm. longus, dense albo-villosus; stigma capitatum, 1-1-5 mm. latum. *Fructus* rutilantes, translucentes, plerumque inaequales, liberi, 6-5-9 mm. diametro. *Semina* brunnea, comprasso-ovalia, 4-5-5-5 mm. longa, 3-3-5 mm. lata.

WESTERN CHINA. Kansu: south of Low River, 8000-9000 ft., 1911, *Purdom* 1080; T'ao River basin, Tatsuto, Minshan range, 9000 ft., *Rock* 12437, Tatsuto, Kadjaku valley, west Tebbu, *Rock* 13585, Poyuku near Choni, 9000 ft., *Rock* 14890. Cult, in hort. bot. reg. Kew. e seminibus in Kansu a Rockio lectis ; cult, in hort. bot. reg. Edin. a seminibus a Rockio sub numero 13509 (Maerhku, Choni district) lectis.

L. heterohba was originally described from a specimen collected by Potanin in 1885 in the vicinity of Choni, southern Kansu. The seed from which the plant here illustrated was grown was collected by J. F. Rock in the same area. The plant was raised in the Edinburgh Botanic Garden and we are indebted to Sir William Wright Smith for the opportunity of figuring it. The Edinburgh plant agrees closely with Batalin's description, the only discrepancies being that whereas Batalin described the lower lip as " parte tertia labio superiore longius," and the free part of the filaments as " glabra," in the Edinburgh plant, as in the other available flowering material (all of which came from the Choni area), the lower lip is only slightly longer than the upper lip, and the free part of the filaments is hairy. The degree of hairiness varies, and in some plants, e.g. *Purdom* 1080, the filaments are sometimes hairy only at the base. Occasionally the hairy base was found to remain appressed to the corolla, even after boiling, and since the corolla is very hairy where the filaments arise, the free part of the filament appears, at first sight, to be glabrous. It has not been possible to examine the type-specimen, one cannot therefore say whether or not Batalin's description is correct. Render uses the glabreity of the filaments as one of the characters distinguishing *L. heterohba* from *L. tatsiensis* Franchet, but in the flowering material seen by me (all being numbers determined by Render), the filaments are hairy. The relative lengths of corolla and filaments, and of filaments and anthers are also used as diagnostic characters by Render. In *L. heterohba* the filaments are half, or less than half, the length of the upper lip, ari3 are shorter than or equal to the anthers, whereas in *L. tatsieiiensis* the filaments are only slightly shorter than the upper lip and are much longer than the anthers. On these characters the flowering specimens from Kansu, like the cultivated material, are referable to *L. heteroloba,*

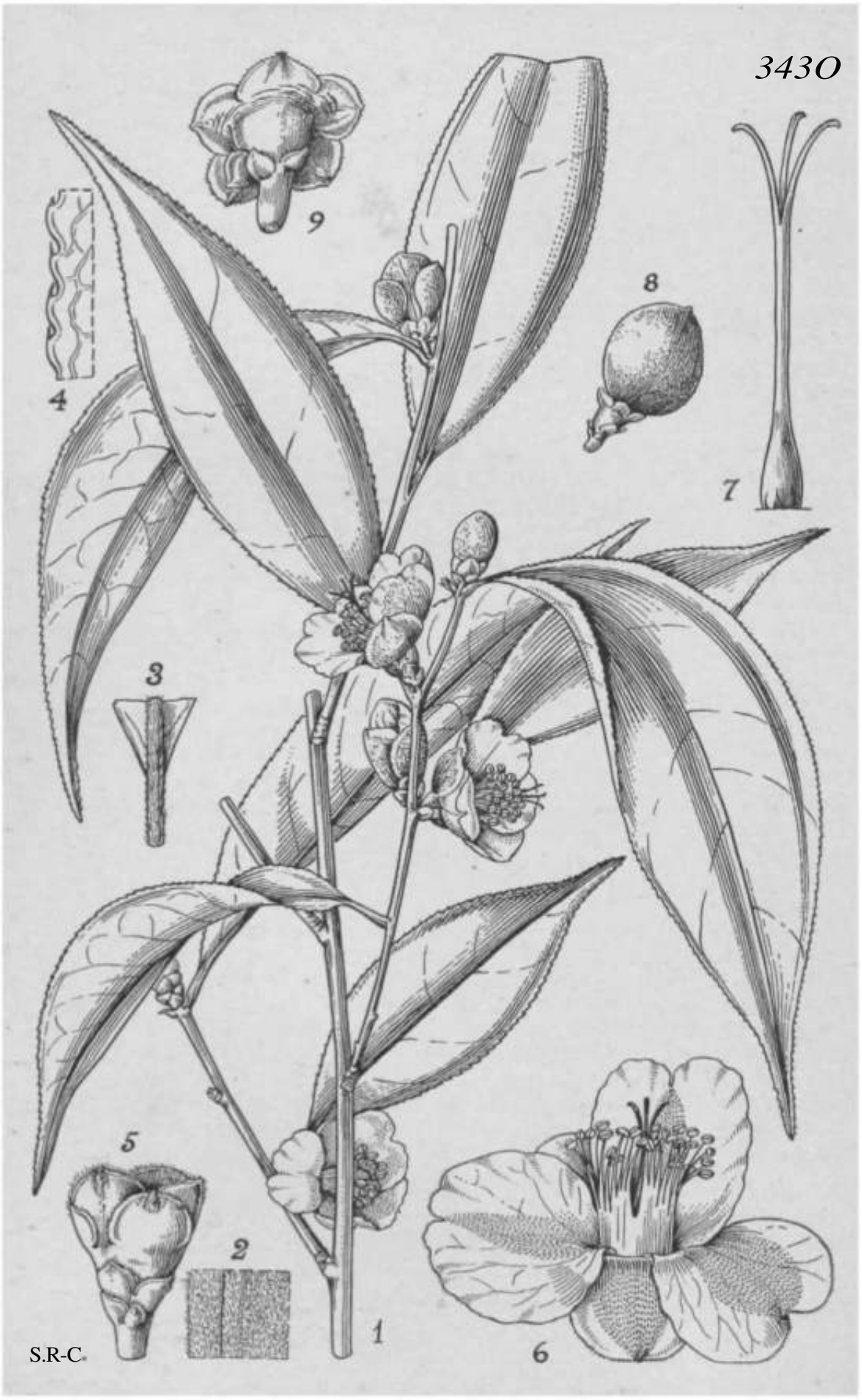
whilst *Wilson Am. Arb. Exped.* 1870, from Szechwan, agrees with *L. tatsienensis.*

L. tatsienensis was described from a specimen collected near Tatsienlu, Szechwan, by Louis Faurie,* and, from the description, is evidently very similar to *L. heteroloba,* but the floral details given are insufficient to enable its position to be decided. The blades of the leaves are described as 3-4 cm. long and 2-3 cm. broad, and the only specimen seen which has leaves approaching these dimensions at all closely is *Purdom* 1080, here referred to *L. heteroloba,* in which the blades are 3-4 cm. long and 1 • 6–2 • 3 cm. wide. Rehder does not refer to the Faurie specimen, but cites two Soulié numbers, 195 and 108, both from Tatsienlu. There is a sheet of 195 in the Kew Herbarium, and this has leaf-blades 5-7 cm. long and 2-2-3-3cm. wide, but there are no good flowers. It is, however, very similar to *Wilson* 1870 (mentioned above), and to another Szechwan specimen, *Fang* 4449 (in fruit), and they are no doubt conspecific. Whether or not they are referable to *L. tatsienensis* cannot be decided until the type of that species is available for examination.

Of the other species of subsection *Alpigenae, L. heteroloba* seems most closely allied to *L. heterophylla* Decne., from the western Himalayas (Kashmir to Gahrwal), which differs in having leaf-blades broad oblong-oval to elliptic, apiculate to acute, glabrous to sparsely pilose and ciliate, petioles glabrous or glandular, calyx-lobes distinct though small, corolla yellow and often very hairy outside though sometines only glandular, and longer stamens with filaments usually 4-5-7 mm. long.—J. R. SEALY.

Fig. 1, part of a flowering branch, *natural size*; 2, apex of peduncle with bracts and bracteoles and two ovaries, one cut transversely to show the three loculi, x 4 ; 3 and 4, corolla split lengthwise into two and seen from within, showing the upper and lower lips respectively, X 3 ; 5, style, X 3 ; 6, part of a fruiting shoot, *natural size*; 7 and 8, back and face views of seed, X 3 ; 9, transverse section of seed, X 3.

• Bretschneider, Hist. Eur. Bot. Disc. China, 922 (1898) refers to two French missionaries named Louis Faurie, in addition to the well-known Urbain Faurie. Mr. W. Edgar Evans has very kindly pointed out (in litt.) that in this Bretschneider has made a mistake, and that there was actually only one Louis Faurie, of whom a brief notice is given by Fournier, Voy. & Découv. Sc. Miss. Nat. Franç. Pt. 2, p. 52 (1932) in Lechevalier, Encyl. Biol. X.



S.R-C.

TABULA 3430.

CAMELLIA TSAII *Hu.*

THEACEAE. Tribus CAMELLIEAE.

C. Ttaii *Hu* in Bull. Fan. Mem. Inst. Biol. Bot. viii. 132 (1938).—Species *C. cuspidatae* Kochs affinis sed ramis junioribus dense pubescentibus, foliis minute serrulatis, filamentis valde connatis distincta.

Frutex 1-b m. altus ; ramuli juniores dense pubescentes ; vetustiores grisei vel brunneo-fusci cortice in fragmenta parva decidente. *Folia* breviter petiolata ; laminae ellipticae vel oblongo-ellipticae, caudatae ad acuminatae, basi cuneatae, 5-9 cm. longae, 1-3-2-9 cm. latae, tenuiter coriaceae, supra saturate virides costa leviter elevata et venis obscuris, subtus pallide virides costa prominente et venis elevatis, in costa supra brevissime hirsutae ceterum glabrae, margine minute serrulato dentibus incurvatis et glandulosis; petioli 3-7 mm. longi, dense pubescentes. *Flores* pseudoterminales et axillares, solitarii vel geminati, breviter pedicellati; pedicelli circiter 4 mm. longi sursum dilatati glabri; bracteae 4 vel 5, pedicello adpressae, subimbricatae, semiorbiculatae, vix 1 mm. longae et 1-5 mm. latae (infimae), 1-5 mm. longae et 3 mm. latae (supremae), ad apicem breviter pubescentes, ciliatae. *Sepala* 5, inaequalia, semiorbiculata, 1-5-3 mm. longa, 3-4-5 mm. lata, coriacea, margine angusto membranaceo perobscuro, ciliata, ad apicem utrinque breviter pubescentia. *Petala* alba, inter se ad basin per 2-2-5 mm. connata et ad filamenta breviter adnata, inaequalia ; duo exteriora 9-10 mm. longa, parte libera suborbiculata 6*5-10 mm. lata, coriacea margine petalina, ad apicem minute pubescentia, ciliata ; tria interiora suborbiculata ad obovata, late et breviter emarginata ad bifida, 11-17 mm. longa, 10-12 mm. lata, tenuia media parte coriacea excepta, plus minusve ciliata vel interiora glabra. *Stamina* exteriora 9-15 mm. longa filamentis in cupula crassa 4-7 mm. alta connatis et ad corollam per 3-4 mm. adnata; 5 interiora libera 7-10 mm. longa; antherae 1-5-2 mm. longae, obcordatae, apice retusae, connectivo albo crasso et thecis flavis. *Pistillum* glabrum; ovarium ovoideum, 1-5-2 mm. longum; stylus crassus 12-15 mm. longus, in ramos 2-4-5 mm. longos marginibus incurvatis divisus. *Fructus* subglobosi, apiculati, 1-4-1-5 cm. diametro, viridescentes, uniloculati, in valvas tres tenues dehiscentes, 1-spermi; pedicelli 5 mm. longi sepalis bracteisque persistentibus. *Semina* subglobosa, circiter 1 • 25 cm. diametro, brunnea.

WESTERN CHINA.—West Yunnan, Luhsi Hsien, 1750 m., 9 Feb. 1934, *H.T. Tsai* 56865 (holotype); Shweli valley, 25° N., 1830-2130 m., Feb. 1913, *Forrest* 9647; Shweli-Salween divide, 25° 20' N., 2130-2440 m., Feb. 1914, *Forrest* 12225 ; ibid., Nov. 1917, *Forrest* 16016; ibid., 25° 45' N., 98° 58' E., 2440 m., Sept. 1924, *Forrest* 25252.

The Forrest specimens cited above differ from the Kew sheet of the type-collection in having larger leaves (blades mostly 6-9*5 cm. long and 1-8-2*9 cm. wide against 5-7*2 cm. long and 1-3-2 cm. wide) and larger flowers (outer petals 9-10 mm. long against 7 mm., inner petals 14-17 mm. against 11-14 mm., outer stamens 11-15 mm. against 9-12 mm. and inner free stamens 8-10 mm. against 7 mm.), the differences being most noticeable in the case of *Forrest* 12225 (part of which is figured here), where the majority of the leaves have blades 7-9-5 cm. long and 2-4-2-9 cm. wide. In all other respects, however, the Forrest material agrees so closely with the type that it must be regarded as conspecific ; and since all the material comes from one comparatively small area,* it seems better to regard it as representing a somewhat variable species, and not to give taxonomic status to the more robust examples. Forrest records it as growing in open scrub and thickets, whilst Tsai gives the habitat as " forest."

In the original description the species is said to be closely allied to C *euryoides* Lindl., but that species differs very considerably by its much smaller leaves (blades 2-5-4 cm. long and 1-1-8 cm. wide) which are appressed villose on the back, and by its longer pedicels (5-9 mm. long) with scattered bracts. In general appearance *C. Tsaii* more closely resembles *C. cuspidata* Koch (see Bot. Mag. t. 9277) which, however, has glabrous (rarely minutely pubescent) branches, filaments united among themselves only at the base, and leaves which arc not so finely and regularly toothed.—J. R. SEALY.

Fig. 1, part of a flowering branch, *natural size;* 2, part of young shoot, X 16; 3, petiole and base of leaf, lower surface, X 2; 4, leaf-margin, x 6; 5, pedicel, bracts and calyx, X 4; 6, flower with petals spread out, X 2; 7, pistil, X 4; 8, fruit, *natural size;* 9, pedicel, bracts and sepals, from fruit, X 4. Figs. 1-7 from *Forrest* 12225, 8 and 9 from *Forrest* 16016.

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* It has not been possible to determine the position of Lu Hsi for certain. According to Hu (I.e.) Tsai also collected *C. Tsaii* there on March 1,1934 (no. 56363), and four days later he was apparently at Mengka (see Bull. Fan. Mem. Inst. Biol. vii. 122 : 1936), but unfortunately it is not stated which of the two places of that name in western Yunnan Tsai visited. Hu cites the locality for *C, Tsaii* as " Lu Hsi Hsien, Mong Ban "; there is a Mōng Pan in 24° 9' N., 98° 30' E. which is very near the Mengka in 24° 17' N., 98° 29' E., and most likely represents " Mong Ban," so that Tsai*s specimens were probably collected about twenty-five miles south-west of Lungling, i.e. some fifty miles south of the southernmost locality where Forrest found the plant.

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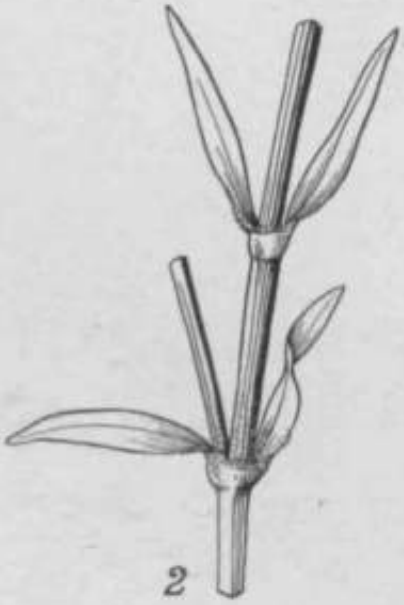

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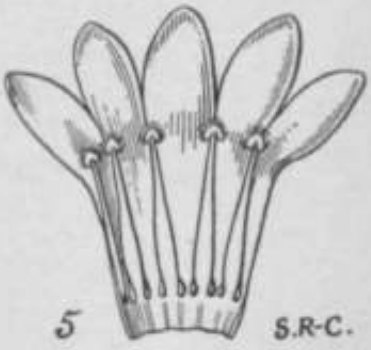

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TABULA 3431.

GENTIANELLA GLANDULIGERA *Airy-Shaw.*

GENTIANACEAE. Tribus SWERTIEAE.

0. glanduligera *Airy-Shaw*; species nova, a *G. Maddeni* (C. B. Clarke) Airy-Shaw * foliis angustius linearibus, floribus multo minoribus, corolla intus basi 10-glandulosa distat.

***Herba* annua, caespitosa, glabra, a basi valde ramosa, ramis gracilibus ramulosis quadrangularibus usque 8 cm. longis exterioribus arcuato-adscendentibus demum erectis purpureo-rubris. *Folia* sessilia, linearia, acuta, basi brevissime connata et minute scaberulo-papillosa, 6-10 mm. longa, supra saturate viridia, subtus saepe plus minus purpurascentia. *Flores* solitarii, axillares vel terminales; pedicelli ramulis similes, 0*8-2 cm. longi. *Calycis* tubus 2 mm. longus, purpurascens, costis 5 alternisepalis haud prominentibus praeditus; segmenta 5, linearisubspathulata, acuta, usque 6-5 mm. longa et 1 mm. lata, carnosula, minute papillosa, intus saturate viridia, extra purpurascentia, sub anthesi plus minus patcntia. *Corolla* tubuloso-infundibularis : tubus 5*5-6-5 mm. longus, inferne viridis, superne vittis purpurascentibus sursum ampliatis pictus, ore nudus, intus albidus, inter filanientum bases glandulis binis minutis ellipticis intense viridibus instructis; lobi 5, aestivatione dextrorsum contorti, sub anthesi leviter patuli, oblongi, obtusi vel subacuti, 5-5-5 mm. longi, 2-3-2-7 mm. lati, intus purpureo-caerulei, extra dimidio exposito purpurascentes ceterum viridi-caerulei; plicae interstitiales nullae. *Stamina* 5: filamenta anguste ensiformia, 6 mm. longa, prope basin tubi inserta, dimidio suo inferiore tubo adnata marginibus liberis, alba vel viridi-alba, inferne minute muriculata, triente superiore purpurascentia ; antherae late oblongae, 0-5 mm. longae, basifixae, extrorsum reflexae, saturate purpureae. *Ovarium* elongate ellipsoideum vel oblongo-lanceolatum, teres, laete viride, 7-7-3 mm. longum, stipite obconico 0-75 mm. longo ; stylus 0; stigmata lorata, 1-5 mm. longa, recurva, caerulescentia, dense papillosa, area papillifera in ovarium utrinque breviter decurrente. *Fructus* non visus.**

NEPAL. **Unknown in wild state ; grown by Mr. C. T. Musgrave in his garden at Hascombe, Godalming, Surrey, from seed obtained from Nepal by Mr. T. Hay under the number "69." The plants flowered early in October, 1939. (Type specimen in Herb. Kew.)**

The accompanying drawing, and the original English description drawn up by Mr. C. E. C. Fischer (of which the above is largely a

* **Gentianella Maddeni** *(C. B. Clarke) Airy-Shaw,* comb. nov.—*Oentiana Moorcroftiana* Wall, ex Griseb. var. *Maddeni* C. **B. Clarke in Hook, fil., Fl. Brit. Ind. iv. 108 (1883).**

translation), were made from the living specimen received at Kew from Mr. C. T. Musgrave in October 1939.

The genus *Gentianella* Borkh. is here maintained distinct from *Gentiana* L., *sensu stricto,* in deference to the opinion of my former colleague, Mr. C. V. B. Marquand, whose work on the Asiatic Gentians is well known. I do not venture to express a personal opinion from my own very limited experience. *Gentianella* differs from *Gentiana,* according to Marquand in Kew Bull. 1931, 71, "in the calyx-tube being homogeneous instead of being provided with an adnate inner membrane, and in the corolla, which lacks the plicae between the lobes."

C. B. Clarke (in Hook. fil. Fl. Brit. Ind. iv. 109 : 1883) observes, under *Gentiana aurea,* concerning the presence or absence of glands at the base of the corolla-tube : " This character considered by Grisebach as of sectional value is probably hardly specific." The limited material available makes it impossible to say how far this may be true in the present case.

There seems no doubt that *Gentianella Maddeni* is specifically distinct from *G. Moorcroftiana.** Even from depauperate forms of the latter it is readily distinguishable by its narrowly linear, acute leaves and the purplish suffusion over the whole plant. The affinity between *G. Maddeni* and *G. glanduligera* is considerably closer and more ample material may show that the latter should be reduced to varietal rank.

H. K. AIRY-SHAW.

Fig. 1, portion of flowering plant, *natural size;* 2, portion of stem, with leaves, X 4; 3, flower, X 2; 4, calyx, opened out, seen from within, X 3 j 5, corolla, opened out, showing stamens and basal glands, X 3 ; 6, portion of corolla showing three lobes, *seen* from outside, X 3 ; 7, corolla-segment, with stamen, *showing* insertion, x 3; 8, gynoecium, x 4-5.

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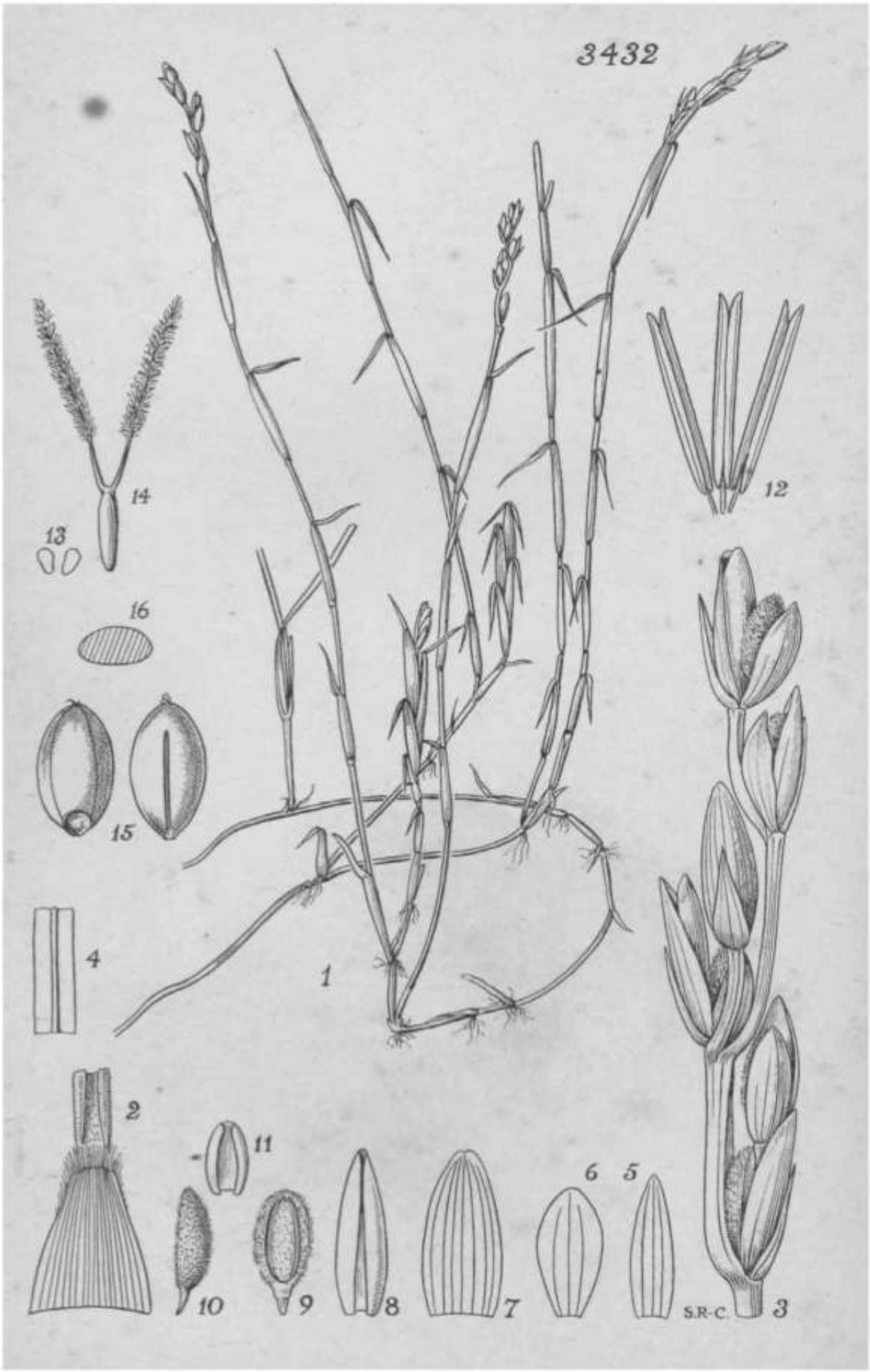
* Gentianella Moorcroftiana *(Wall, ex Griseb.) Airy-Shaw,* comb. nov.—*Oeniiana Moorcroftiana* Wall, ex Griseb. in DC. Prodr. ix. 96 (1845).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TABULA 3432.

LIMNOPOA MEBBOLDII *(C. E. C. Fischer) C. E. Hubbard.*

GBAMINEAE. Tribus LSACHNEAE.

Limnopoa *C. E. Hubbard.* Genus novum, *Isachnae* R. Br. affine, a qua spiculis in rhachi applanata vel concava racemi solitarii spiciformis binatis vel superne solitariis, rhachilla inter anthoecia tandem facile disarticulante, glumis trinervibus, anthoecio infero masculo supero femineo differt.

Spiculae omnes similes, a dorso visae anguste ellipticae vel lanceolato-ellipticae, a latere visae oblique ovatae vel late semi-ovatae, obtusae, muticae, abaxiales, binatae altera sessilis altera pedicel lata, vel racemi apicem versus solitariae et sessiles, alternae, in rhachi applanata vel concava flexuosa continua racemi solitarii spiciformis appressae ; rhachilla lente basi disarticulans, inter anthoecia internodio brevissimo applanato secundum lineam transversam facile disarticulante praedita, glabra, supra anthoecium superum haud producta. *Anthoecia* duo, dissimilia; inferum <*$,* e glumis exsertum ; superum $, infero multo brevius, glumam superiorem subaequans. *Glumae* leviter dissimiles, subaequalcs," spicula breviores, membranaceae, trinerves; inferior lanceolato-oblonga vel anguste elliptico-oblonga; superior anguste obovata vel oblonga, concava. *Anthoecium inferum:* lemma spiculae aequilongum, dorso fere planum, marginibus angustissime incur vis, cxplanatum ovato-ellipticum vel ellipticum, obtusissimum, firme membranaceum, 5-7-nerve, glabrum; palea lemmati subaequilonga, anguste elliptica, obtusissima, bicarinata, dorso plana, marginibus latis inflexis, membranacea, glabra ; stamina 3; antherae linearioblongae. *Anthoecium superum:* lemma a dorso visum oblongo-ellipticum, obtusissimum, a latere visum semi-ellipticum, dorso convexum, marginibus angustissimis involutis, cartilagineum, obscure 5-nerve, dense et minute pubescens; palea lemmati aequilonga, oartilaginea, dorso plana et minute pubescens ; lodiculae duae, brevissimae, tenuissimae ; ovarium glabrum ; styli distincti, terminales ; stigmata plumosa, ex apice anthoecii exserta. *Caryopsis* a dorso visa elliptica, plano-convexa, inter lemma et paleam arete inclusa ; scutellum parvum ; hilum lineare, elongatum.—*Gramen* annuum vel perenne (?), fluitans, humile ; culmi debiles, multinodes, ramosi; foliorum laminae breves, angustae ; ligulae ad seriem ciliorum redactae ; racemi graciles, breves.

Species unica, Indiae meridionalis incola.

L. Meeboldii *(C. E. C. Fischer) C. E. Hubbard,* comb. nov.—*Coelachne Meeboldii* C. E. C. Fischer in Kew Bull. 1934, 169.

Culmi gracillimi, implicati, flaccidi, e basi procumbente elongata flexuosa multinodi raniosa leviter ascendentes, usque 16 cm. vel ultra longi, e nodis inferioribus radicantes, glabri, laeves. *Folia* siccitate glauca; vaginae inflorescentiam versus internodiis longiores, ceterae mternodiis demum multo breviores, laxae, laeves, glabrae, 0-8-2 cm. longae, laminis longiores, ore truncatae ;[x] laminae explanatae lanceolato-

lineares, subacutae, 4-13 mm. longae, basi usque 1*5 mm. latae, planae, vel siccitate involutae, glabrae, scaberulae, demum reflexae. *Racemi* stricti, 1-2*3 cm. longi, paria spicularum usque quattuor gerentes, e vagina superiore demum exserti; ihachis 1-1 * 2 mm. lata, glabra, internodiis usque 5 • 5 mm. longis ; pedicelli 2 • 5-3 • 5 mm. longi. *Spiculae* pallidae, 3-8-4-5 mm. longae. *Glumae* 2-7-3-5 mm. longae, glabrae, laeves. *Rhachillae intemodium* 0-5 mm. longum. *Anthoedum superum* 2-2-3 mm. longum. *Antherae* 1-8-2-6 mm. longae. *Caryopsis* 1-5-1-6 mm. longa.

INDIA. Cochin State : Chalakudi, in tanks, Nov. 1910, *Meebold* 12520.

This curious grass apparently grows on the surface of water, with its closely entangled stems forming a dense mat, from which the slender few-spiculate inflorescences arise only a few inches. The dispersal of the upper floret containing the grain is effected by the rhachilla disarticulating along a transverse line between the florets. The lower floret and glumes also fall away, probably separately, the rhachilla disarticulating above the upper glume. In the structure and sexes of their florets, and especially in the method of breaking-up of their mature spikelets, there is a marked similarity between *Isachne* R. Br. and *Limnopoa.* The latter also shows resemblances to *Heteranthoecia* Stapf, but fewer with *Coelachne* R. Br., under which it was originally placed. It may be distinguished from that genus by the characters tabulated below :—

LIMNOPOA.	COELACHNE.
1. Inflorescence a solitary spike-like raceme.	1. Inflorescence an open or contracted panicle.
2. Rhachis and pedicels flattened or concave.	2. Rhachis, branches and pedicels filiform.
3. Rhachilla readily disarticulating between the florets, but only slowly between the upper glume and lower floret, the glumes and lower floret finally falling.	3. Rhachilla disarticulating between the upper glume and lower floret and between the florets ; glumes persistent.
4. Lower floret (J.	4. Lower floret $.
5. Lower lemma 5-7-nerved, membranous, thinner and much larger than the upper.	5. Lower lemma nerveless or obscurely few-nerved, becoming coriaceous and then firmer than the upper, subequal to it or slightly larger.
6. Upper floret closed at maturity.	6. Upper floret gaping at maturity.
7. Upper lemma and palea cartilaginous.	7. Upper lemma and palea membranous.
8. Caryopsis with a narrowly linear elongated hilum extending almost the whole of its length.	8. Caryopsis with an oblong subbasal hilum.

When describing his new genus *Heteranthoecia,* Stapf compared it with *Isachne* and *Coelachne,* and pointed out that Bentham's earlier conception of the latter as a member of his tribe *Isachneae* was much more in accord with its structure and whole facies than was his later treatment of it in the Genera Plantarum as a genus of the *Aveneae.* The writer agrees completely with Stapf s remarks, but after a close study of *Coelachne, Isachne* and *Heteranthoecia,* he is of the opinion that they should be removed from the tribe *Paniceae* in which they are usually classified. It is proposed therefore to revive for them Bentham's tribe *Isachneae* and to include in it also *Limnopoa* and *Sphaerocaryum* Nees ex Hook. f. The latter genus is obviously out of place amongst the temperate genera of the *Agrosteae.* These five genera .have much in common. They are all grasses of tropical or warm regions and usually favour wet habitats. It is unfortunate that nothing is known of their cytology and very little about their anatomy. It should be noted, however, that Avdulov (Bull. Appl. Bot. Genet. & PI. Breed. Suppl. 44, 38 : 1931) lists an " *Isachne elegans* W." as possessing type II (festucoid) leaf-anatomy, whereas all members of the *Paniceae* listed by him have type I (panicoid) leaf-anatomy. In the *Paniceae* the spikelets have an articulation below the lower glume, so that the spikelet normally falls entire at maturity. In the *Isachneae,* however, the articulation is above the upper glume, and at maturity although the glumes may also fall, their spars can be seen below the minute stump of the lowest internode of the rhachilla. Whenever the spikelets are two-flowered in the *Isachneae,* the lower floret is male or hermaphrodite and the upper female or hermaphrodite, whereas in the *Paniceae* the lower floret is male or barren and the upper always hermaphrodite (except where the sexes are in different inflorescences). An emended description of the *Isachneae* is given below ; this conception of the tribe includes only two of the genera, *Isachne and Coelachne,* referred to it by Bentham.

Isachneae *Benth.* (Journ. Linn. Soc, Bot. xix. 30, 92: 1881, pro parte). *Spikelets* similar, small to very small, obtuse to acute, often plump, awnless, hermaphrodite, breaking up at maturity, arranged in panicles, racemes or spikes; rhachilla disarticulating above the upper glume and usually between the florets, normally not produced beyond the uppermost floret. *Florets* 1 or 2, very rarely 3, çj when 1, similar or dissimilar when 2, with the lower <J or $ and the upper ? or <J, the two often separated by a very short or minute rhachilla-internode, the third floret when present reduced and barren. *Glumes* persistent, or more often finally deciduous (sometimes separately) after the remainder of the spikelet, equal or nearly so, from half the length of to as long as the spikelet, membranous, 3-9-nerved, rarely nerveless or 1-nerved. *Lower lemma* (when more than one) as long as the spikelet, firmly membranous to chartaceous or coriaceous, nerveless or obscurely 5-7-nerved ; palea as long as the lemma or slightly shorter. *Upper lemma* similar to the lower, or often smaller, firmer in texture and frequently minutely hairy. *Lodicules* 2. *Stamens* 2 or 3. *Caryopsis*

free between the lemma and palea, plano-convex, ovoid or ellipsoid; hilum very small and basal, or oblong and subbasal, or linear and elongated.—*Annual* or perennial grasses, usually with low herbaceous culms ; leaf-blades linear to lanceolate or ovate ; ligule a row of hairs.

KEY TO* THE GENERA OF ISACHNEAE.

Spikelets usually 2-flowered:
- Upper lemma becoming indurated ; glumes finally deciduous :
  - Spikelets pedicelled in open or contracted panicles . . 1. *Isachne.*
  - Spikelets borne on the more or less flattened rhachis of secund spikes or spike-like racemes :
    - Inflorescence a solitary spike-like raceme, the rhachis terminated by a spikelet; hilum linear, elongated . 2. *Limnopoa.*
    - Inflorescence narrow, composed of several to many loosely arranged spikes, the rhachi of the spikes pungent-tipped; hilum basal. . . . . 3. *Heteranthoecia*
- Upper lemma remaining membranous ; glumes persistent; spikelets borne in open, contracted or spike-like panicles . . 4. *Coelachne.*

Spikelets 1-flowered, borne in small panicles; glumes separately deciduous. . . . . 5. *Sphaerocaryum.*

ENUMERATION OF GENERA.

1. Isachne *R. Br.* Prodr. Fl. Nov. Holl. 196 (1810). Tropical and subtropical regions. Species 70-80. Type-species :—*I. australis* R.Br.

2. Limnopoa *C. E. Hubbard* in Hook. Ic. Plant, xxxv. t. 3432 (1943). South India. Species 1. *L, Meeboldii* (C. E. C. Fischer).

C. E. HUBBARD.

3. Heteranthoecia *Stapf* in Hook. Ic. Plant, xxx. t. 2927 (1911). Tropical Africa. Species 1. *H. isachnoides* Stapf [= *H. guineensis* (Franch.) Robyns].

4. Coelachne *R. Br.* Prodr. Fl. Nov. Holl. 187 (1810). Tropical east Africa eastwards to Japan and northern Australia. Species 8-10. Type-species :—*C. pulchella* R. Br.

5. Sphaerocaryum *Nees ex Hook. f.* Fl. Brit. Ind. vii. 246 (1896). *Graya* Arnott ex Steud. Syn. PL Glum. i. 119 (1854). *Steudelella* Honda in Journ. Fac. Sci. Imp. Univ. Tokyo, Sect. Ill, Bot. iii. pt. 1, 258 (1930). Tropical Asia. Species 1. *Sphaerocaryum elegans* Nees ex Hook. f. [= *S. malaccense* (Trin.) Pilger].—C. E. HUBBARD.

FIG. 1, plant, *natural size;* 2, junction of sheath and blade to show ligule, X 6 ; 3, inflorescence, X 6 ; 4, portion of rhachis, X 6 ; 5, lower glume, X 6 ; 6, upper glum*, X 6 ; 7, lemma of lower floret, X 6 ; 8, palea of same, X 6 ; 9 and 10, upper floret, front and side views respectively, X 6 ; 11, palea of upper floret, X 6 ; 12, stamens from lower floret, X 16; 13, Jodicules from upper floret, X 12; 14, pistil from upper floret, X 12; 15, caryopsis, back and front views, X 12; 16, transverse section of caryopsis, x 12.


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TABULA 3433.

CABEX EUPREPES *Nelmes.*

CYPERACEAE. Tribus CARICEAE.

C. (Sect. Euprepes) euprepes *Nelmes* in Kew Bull. 1929, 305.—Ab omnibus congeneribus praesertim culmo centrali superne folioso inferne vaginis aphyllis emarcidis exceptis nudo, foliis ellipticis vaginantibus distincta.

Herba **ut videtur breviter stolonifera ; stolonibus lignosis, crassis.** ***Culmus*** **centralis, circiter 70 cm. altus, inferne validus (3 mm. crassus), superne gracilior (1-5 mm. crassus), prominenter sed obtuse triqueter, faciebus concavibus, strictus, erectus, rigidus, striatus, laevis, triente infero excepto foliatus, basi vaginis (usque 10 cm. longis) aphyllis paucis membranaceis emarcidis sed integris parce pubescentibus circumdatus.** ***Folia*** **elliptica, acuminata, basi breviter subpetiolata, 17-22 cm. longa, 3-3-7 cm. lata, patula, plana, vaginantia, superiora 1-4 inflorescentiam superantia, interdum valde congesta, suprema 1-2 in axillis ramos inferiores inflorescentiae gerentia, multinervia sed nervo medio et nervis 2 lateralibus validioribus et magis prominentibus, his (a medio et marginibus aequidistantibus) cum tenuioribus prominenter elevatis, nervo medio tantum in pagina inferiore elevato supra planiusculo vel tenuiter canaliculato, supra laevia (nisi apicem versus praesertim in nervis 2 lateralibus scabra), infra nervis omnibus adpresso-hispidula; vaginae 1-5-2 cm. longae, costatae, inferne glabrescentes, superne hispidulae, ore appendice tenui brunnea liguliformi instructae.** ***Inflorescentia*** **composite paniculata, 10-15 cm. longa, graciliuscula, erecta ;** ***jpaniculae secundariae*** **suberectae, suboblongae, bracteatae, inferiores subfastigiatae, superiores minores, pedunculis angulis parce hispidulis.** ***Rhachis.*** **glabra vel angulis parce hispidula.** ***Spicae*** **androgynaeceae, sessiles usque subsessiles, divaricatae, 8-10 mm. longae, pauciflorae, parte irlascula parti femineae aequilonga, basi cladoprophyllo rudimentario ligulato 1 mm. longo ciliato instructae.** ***Bracteae*** **foliis multo breviores, inferiores subfoliaceae vel subherbaceae, superiores squamiformes sed longe scabrido-aristatae, omnes paniculis suis secundariis plerumque breviores, vaginantes ;** ***bracteolae*** **squamiformes, magnitudine formaque variae, saepe oblongae vel ovato-oblongae, apice plerumque obtusae, emarginatae, marginibus albido-hyalinae, ventre glabrae, dorso parce hispidulae, aristatae ; arista hispidula.** ***Squamae femineae*** **2-2-5 mm. longae, 1-1-5 mm. latae, ovatae vel ovato-lanceolatae, cymbiformes, apice subacutae, glabrae, tenuiter striatae, albido-stramineae vel brunneo-albidae, marginibus albido-hyalinae, erosae, saepe mucronulatae (nervo medio breviter excurrente).** ***Utriculi*** **4-4*5 mm. longi, circiter 1-25-1-75 mm. lati, late ellipsoidei, trigoni, divaricati, glabri, laeves, circiter 15-18-nerves, superne anguste marginati, marginibus hispiduli,**

pallide viridi-brunnei vel laete straminei, brevissime stipitati, in rostrum 1*5-2 mm. longum planiusculum basi deflexum saepe levitcr tortum marginatum marginibus hispidulum ore oblique sectum bidentatum (dentibus strictis) subabrupte contracti. *Nux* arcte inclusa, rhomboideo-elliptica, triquetra, faciebus praesertim inferne concaviusculа, aurea vel laete brunnea, brevissime stipitata, infra apicem ipsum discoideum abrupte constricta. *Styli* basis incrassata, persistens. *Stigmata* 3.

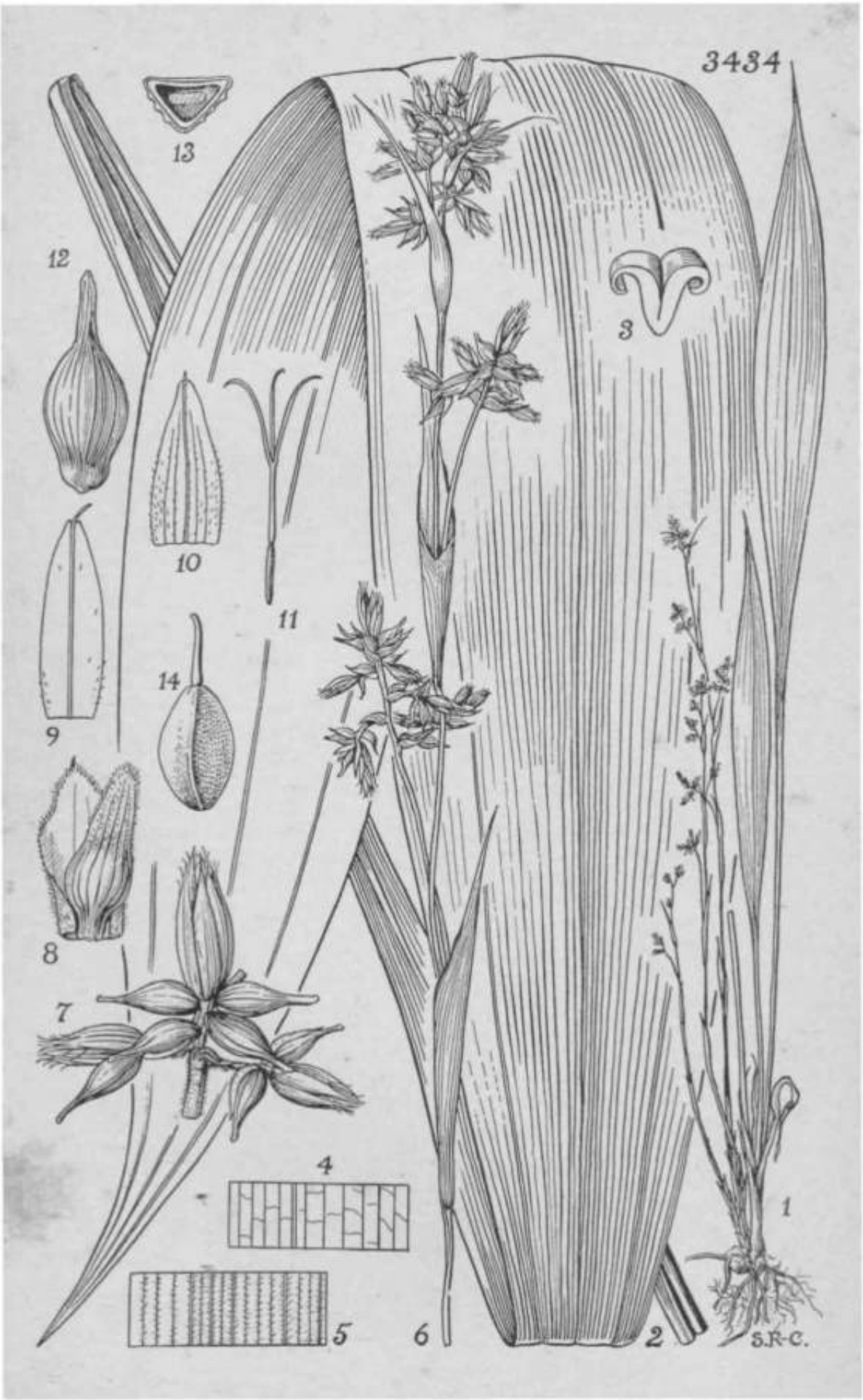
INDO-CHINA. **Laos: Tawieng, Chiengkwang, in evergreen forest, c. 900 m., 6 April 1932, *Kerr* 20927.**

In leaf characters *C, euprepes* resembles C. *Adrienii* E. G. Camus. Both species have more or less elliptical leaves, bearing, on the under surface, small adpressed bristly hairs directed outwards from both sides of the nerves. *C. euprepes* differs, however, from all its known congeners in its flowering stem bearing leaves only in the upper part, the lower part being naked except for a loosely enveloping mass of withered, persistent, leafless sheaths at the base, and in its cladoprophyllum, which shows a reduction from a utriculiform to a ligulate condition.

In recent months I have discussed the morphology and affinities of these species and their allies at some length with my colleague, Mr. H. K. Airy-Shaw, who is greatly interested in the flora of the Malay region and in the evolution and classification of plants in general. He agrees with me as to the claims of this species, and of two groups of species discussed under *C. Adrienii* E. G. Camus (tab. 3434), to consideration as distinct sections and associates himself with me in their formal description.* Tentatively, these sections are included in the Subgenus *Indocarex* Baill.—E. NELMES.

FIG. 1, plant, one-sixth natural size ; 2, leaf, *natural size* ; 3 and 4, part of leaf showing upper and lower surfaces, X 3 ; 5, infructescence, *natural size ;* 6 upper part of secondary panicle, X 4; 7, bracteole, X 6 ; 8, bracteole and cladoprophyllum, X 6 ; 9, male part of spike, X 4 ; 10, female scale, X 6; 11, utricle, dorsal face showing angle, X 6 ; 12, transverse section of utricle and nut, X 6; 13, nut with style and stigmas, X 6.

• Sect. **Euprepes** *Nelmes et Airy-8haw*₉ sect. nov. *Culmus florifer* centralis, folia infra inflorescentiam sed in caulis parte superiore gerens, inferne exceptis vaginis aphyllis elongatis emarcidis circa basin persistentibus nudus. *Folia* e culmo florifero orta, elliptica, valde vaginantia, breviter subpctiolata, nervis subtus adpresso-hispidulis. *Panicula* composita, continua; paniculac secundariae plus minus oblongae, subdensae. *Cladoprophyllum* ligulatum, cilia turn, rudimentarium. *Squamae* albidae. *Utriculus* albidus, rostro planiusculo saepe nonnihil torto marginato hispidula basi rlcflexo. *Nucis* apex discoideus.—Species 1 : *C. euprepes* Nelmes, Laos.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TABULA 3434.

CABEX ADBIEJSTII *E. 0. Camus.*

CYPERACEAE. Tribus CARICEAE.

C. (Sect. Hemiscaposae) Adrienii *E. G. Camus* in Lecomte, FL Gén. Indo-Chine, vii. 186-7 (1912). *C. scaposa* C. B. Clarke var. *baviensis* Franch. in Nouv. Arch. Mus. Hist. Nat. sér. 3, viii. 255 (1896); C. B. Clarke in Journ. Linn. Soc. Bot. xxxvii. 8 (1904); Kiikenthal in Engl. Pflanzenreich, IV, xx. 286 (1909).—A *C. scaposa* C. B. Clarke culmis superne dense pubescentibus, foliis majoribus dorso nervis adpresso-hispidulis petiolis longioribus, paniculis simplicibus, spicis longioribus, squamis multo longioribus mucronatis femineis pubescentibus, utriculis multo majoribus nervis pluribus, nuce majore distinguenda.

Herba **caespitosa et brevitcr stolonifera, stolonibus lignosis, crassis.** ***Culmi*** **laterales, subscapiformes, 30-60 cm. alti, graciles (1-2 mm. crassi), obtuse vel obscure triquetri, ut videtur suberecti, striati, supcrnc dense pubescentes.** ***Folia caulina*** **(bracteis inclusis) vaginiformia, 7-9, subherbacea, laxe vaginantia, anguste infundibuliformia, dense et plerumque adpresse hispidulo-pubescentia, ore late ferrugineo-hyalina, intervallis regularibus sejuncta (infimis subconfertis), omnia subaequalia, 3-6 cm. Tonga, in laminam brevem abrupte transeuntia.** ***Folia sterilia*** **per 2-3 fasciculatim orta et caespitem validum efformantia, vaginis aphyllis paucis magnis longis emarcidis sed integris circumdata, elliptico-oblanceolata, superne longe acuminata, in petiolum subaequilongum robustum pseudo-triquetrum (marginibus recurvis) anguste sed profunde canaliculatum decurrentia, petiolo incluso 53-98 cm. longa, 4-6*7 cm. lata, ut videtur arcuata, plana, subcoriacea, evaginantia, inflorescentiam longe superantia, multinervia sed nervo medio et nervis 2 lateralibus validioribus et magis prominentibus, his (a medio et marginibus aequidistantibus) cum tenuioribus prominenter carinatis, nervo medio tantum in pagina inferiore carinato supra planiusculo vel tenuiter canaliculato, supra laevia (nisi apicem versus scabra), infra nervis omnibus adpresso-hispidula.** ***Inflorescentia*** **simpliciter paniculata, 14-39 cm. longa ; rami 4-6, plus minus pyramidales, 4-7-spicati, singuli, pedunculis longis vel longissimis gracilibus dense- pubescentibus e bracteis exsertis.** ***Spicae*** **androgynaeceae, laterales sub anthesi subpatentes, fructiferae patentes, 7-13 mm. longae, pauciflorae, parte feminca interdum 0, parte mascula quam pars feminea paullo longiore, c cladoprophyllis ramealibus utriculiformibus sterilibus enatae, sessiles vel inferiores interdum breviter pedunculatae.** ***Bracteolae*** **squamiformes, oblongo-lanceolatae vel oblongo-ovatae, intus glabrae, dorso parce marginibus dense hispidulae, breviter scaberulo-aristatae.** ***Squamae femineae*** **circiter 3* 5-4-5 mm. longae, circiter 1*5-2 mm. latae, oblongo-ovatae, oblongo-lanceolatae, vel ovato-lanceolatae, interdum acuminatae, apice acutae vel obtusae,**

marginibus apice et prope apicem erosae, intus glabrae, dorso lateribus et marginibus hirtellae et adpresso-hispidulae, vitta mediana pallidiore trinervi rubido-punctata excepta castaneae, nervo medio tenuiter carinato, plerumque breviter scaberulo-excurrente ; ***squamae masculae*** **circiter 4 '5-^5* 5 mm. longae, circiter 1-1-75 mm. latae, oblongae vel oblongo-ellipticae, plus minus cymbiformes, interdum acuminatae, apice acutae vel obtusae, tenuiter membranaceae, marginibus sub-erosae, plerumque utraque pagina glabrae, lateribus pallide castaneae, medio pallidiores rubido-punctatae, nervo medio plerumque in aristam brevem scaberulam excurrente.** ***Utriculi*** **squamis plerumque manifeste longiores atque sublatiores, circiter 5 mm. longi, circiter 1*75-2 mm. lati, trigoni, elliptico-lanceolati, primo suberecti, demum patentes usque subreflexi, glabri, laeves, ventre (facie adaxiali) angulati, valde circiter 9-nerves, dorso (facie abaxiali) plani usque leviter concavi, tenuiter vel obscure 4r-5-nerves, castaneo-brunnei, basi spongiosi sed vix stipitati, in rostrum 1-5-2 mm. longum subteretem strictum glabrum haud marginatum ore oblique sectum apice eroso-truncatum subabrupte contracti.** ***Nux*** **arete inclusa, elliptica, triquetra, angulis prominentibus et faciebus subconcavis, basi in stipitem crassum brevissimum angustata, apice leviter rotundata abrupte vix rostrata, brunneo-straminea.** ***Stylus*** **basi leviter incrassatus.** ***Stigmata*** **3.**

INDO-CHINA. Tonkin: " Forêts du Mont Bavi, vers 800 mètres d'altitude, 28 Octobre 1887," ***Balansa*** **2815 (typus in Herb. Mus. Paris. ; dupl. in Herb. Kew.). Laos : Wiengchan, Pak Munung, in evergreen forest, c. 1200 m., 22 April 1932,** ***Kerr*** **21201 (Herb. Kew.).**

C. B. Clarke based his Section ***Hemiscaposae*** **on** ***C. scaposa*** **C. B. Clarke and** ***C. cryptostachys*** **Brongn. His short diagnosis, however, agrees mainly with** ***C. scaposa,*** **which is therefore regarded as the type of the section.** ***C. cryptostachys*** **was removed by Kiikenthal to his Section** ***Mitratae,*** **and Clarke's section was reduced by him to the rank of a subsection, which he called** ***Scaposae,*** **comprising** ***C. scaposa, C. scaposa*** **var.** ***baviensis*** **Franch. (i.e.** ***C. Adrienii)*** **and** ***C. Helferi*** **Boeck. In** ***C. scaposa*** **and** ***G. Adrienii*** **the leaves are borne on short sterile shoots, and the leafless flowering stems arise laterally. This arrangement is comparatively rare in** ***Carex,*** **where the flowering stems usually arise centrally, surrounded by sheathing and mainly basal leaves. The leaves of** ***C. scaposa*** **and** ***C. Adrienii*** **do not sheathe, but have long winged petioles, loosely enveloped at the base by withered persistent leafless sheaths. Principally on these grounds the Subsection** ***Scaposae*** **is here restricted to these two species and restored to the sectional rank * assigned it by Clarke.**

* Sect. **Hemiscaposae** *C. B. Clarke* in Journ. Linn. Soc. xxxvii. 2, 4 (1904), ***emend.*Nelme8 et Airy-Shaw.—Subsect. Scaposae*** **Kükenth. I.e. 285 (1909).—*Culmus florifer*** lateralis, vaginas infundibuliformes subherbaceas in loco foliorum per totam longitudinem (inferne confertas) gerens. *Folia* ex innovationibus brevibus sterilibus orta, elliptico-oblanceolata, haud vaginantia sed longissime alato-**petiolata,** nervis subtus nonnunquam adpresso-hispidulis. *Panicula* simplex vel

C. Hdferi Boeck. was included by Kiikenthal in Subsection *Scaposae* partly because he supposed that its flowering stems were lateral. But in this species, and in *C. mapaniifolia* Eidl., described in 1920 from Peninsular Siam, the flowering stems arise from the centre of a few loose and scarcely sheathing radical leaves, a condition extremely rare in the genus *Carex.* This mode of origin of the flowering stems, taken together with characters of inflorescence, flowers, and fruits, seems to justify the establishment of a new section, *Mapaniifoliae,** for the reception of *C. Hdferi* and *C. mapaniifolia.*

Some other species, such as *C. laosensis* Nelmes, *C. pandanophylla* C. B. Clarke (described from Pegu, in Burma), and *C. spatiosa* Boott (from Cochin-China), which appear to be related to one or other of these new sections, cannot at present be precisely placed owing to the absence of adequate material.

The *Carices* here discussed exhibit, on the whole, more ancient characters than any others. They seem to be most closely allied to the Subgenus *Indocarex* Baill., which, of Kükenthal's subgenera, probably approaches most nearly to the ancestral type of the genus, particularly in the paniculate inflorescence and in the cladoprophyllum. It is true that in *C. euprepes* the cladoprophyllum is reduced, but this may be connected with the somewhat condensed inflorescence of this species, which shows signs (e.g. in the presence of redundant bracts) of having sprung from an ancestor with a more luxuriantly branched inflorescence. The exceptional breadth and more or less elliptical shape of the leaves in these species recall members of monocotylcdonous families generally regarded as less advanced than the *Cyperaceae.* For example, the name *C. pandanophylla* clearly shows the comparison suggested to its author, while another *Carex,* resembling *C. Adrienii* but without flowers and at present unidentified, was described some years ago as an *Aspidistra.*

It seems significant that the broad-leaved *Carices* under discussion are restricted to the south-eastern Asiatic region, which may well have been the scene of the early development of the genus. Kreczetowicz (Joura. Bot. URSS, xxi. 413-420: 1936 f) has brought forward considerable evidence to show that *Indocarex* originated at all events in

composita; rami distantes, pyramidales, laxi. *Cladoprophyllum* utriculiforme. *Squamae* plus minus castaneae. *Utriculus* plus minus castaneus, rostro subterete haud torto immarginato laevi recto. *Nucis* apex haud discoideus.—Species 2 : *C. acaposa* C. B. Clarke, S. China ; *C. Adrienii* E. G. Camus, Tonkin and Laos.

* Sect. Mapaniifoliae *Nelmes et Airy-Shaw,* sect. nov. *Culmus florifer* centralis, vaginas infundibuliformes subherbaceas in loco foliorum per totam longitudinem (inferne confertas) gerens. *Folia* radicalia, culmum floriferum circumdantia sed ab eo fere libera, lineari-oblanceolata usque oblanceolata, modice usque longe alato-petiolata, nervis haud adpresso-hispidulis. *Panicula* composita; paniculae secundariae subapproximatae usque distantes, densissimae, plus minus oblongo-ovoideae. *Cladoprophyllum* subutriculiforme vel subsquamiforme. *Squamae* brunnescentes. *Utriculus* brunnescens, rostro longissimo saepe torto planiusculo immarginato hispidulo prope basin deflexo. *Nucis* apex discoideus.—Species 2 : *C. Helferi* Boeck., S. Burma ; *C. mapaniifolia* Ridl., Peninsular Siam.

t Kindly translated for me by Mr. H. K. Airy-Shaw.

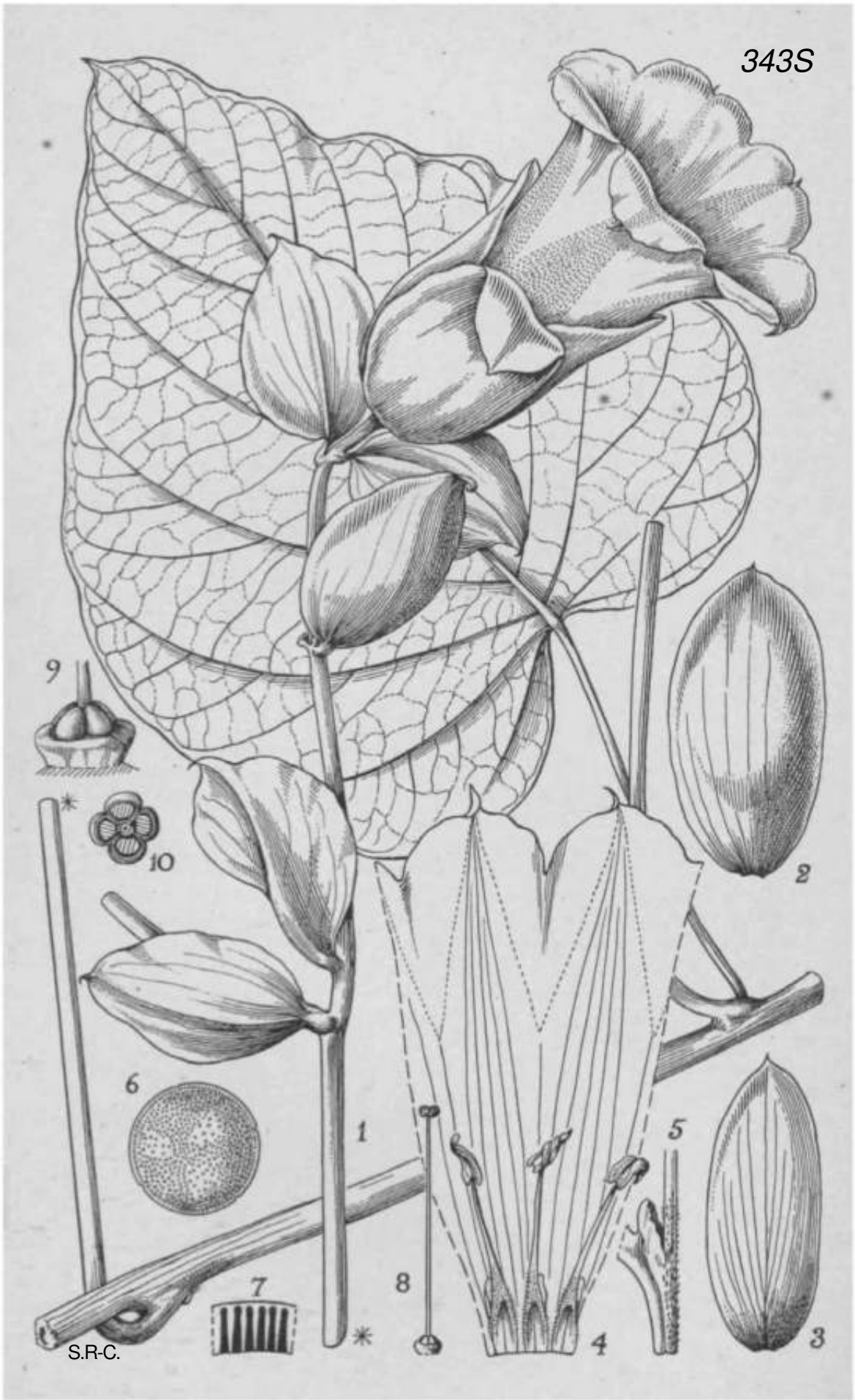
the equatorial region, which in Tertiary times is believed (by Kreichgauer, Wegener and others) to have passed through Australasia, Malaya, India, the Mediterranean and northern South America. The *Indocarices* are to-day most numerous in Indo-Malaya, with fewer species in tropical Africa, and still fewer in tropical America. The African members of the group, all of which have central flowering culms, may have moved southwards from the Mediterranean area as South Africa ceased to be polar, leaving behind a few representatives which, in the cooling of that region, gave rise to such reduced forms as *C. distachya* Desf., *C. oedipostyla* Duv.-Jouve, and *C. phyllostachys* C.A.Meyer.

Some at least of the species comprising Section *Careyanae* Tuckerm., which Kiikenthal places near the centre of Subgenus *Eucarex* Coss. et Germ., approach the *Hemiscaposae,* both in their broad leaves and in their lateral flowering stems, which bear subfoliaceous infundibuliform sheaths; but the leaves are smooth and scarcely petioled, and the inflorescence shows a much reduced paniculate condition, while the cladoprophyllum has apparently been eliminated, and the utricle has lost nearly the whole of the beak of the *Hemiscaposae.* These species are mainly confined to the eastern United States and, like the Mediterranean species mentioned above, may, through the southward withdrawal of the equator, have undergone reduction.

A comprehensive account of the *Indocarices* is in contemplation.

E. NELMES.

FIG. 1, plant, one-sixth, *natural size;* 2, leaf, *natural size;* 3, transverse section of petiole, 10 cm. above base, X 3; 4 and 5, part of leaf showing upper and lower surfaces, X 3; 6, upper part of infructescence, *natural size*; 7, part of partial inflorescence, X 3; 8, bractcole and cladoprophyllum, X 6; 9, male scale, flattened out, X 6; 10, female scale, flattened out, X 6; 11, very young utricle with style and stigmas, X 6; 12, utricle, ventral face, showing angle, X 6; 13, transverse section of utricle and nut, X 6; 14, nut with style, X 6.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TABULA 3435.

REMIREMA BRACTEATA *A. F. G. Kerr.*

CONVOLVULACEAE.

Remirema *A. F. G. Kerr.* Genus novum, inter genera *Convolvulacearum* floribus magnis atque simul ovario alte 4-lobato distinguendum.

Plantae scandentes. *Folia* ovata, cordata. *Inflorescentia* axillaris, folia excedens, bracteis magnis praedita. *Sepala* 5, ad basin libera, irnbricata. *Corolla* campanulata, breviter 5-lobata, intus basin versus squamis 5 praedita. *Antherae* spiraliter contortae; pollinis granula globosa, inermia, laevia. *Ovarium* alte 4-lobatum, 4-loculare, 4-ovulatum; stylus longus, simplex; stigma biglobosum. *Fructus* immaturus tantum visus, ex utriculis 3-4 uniovulatis compositus.

Species unica, regionis siamensis incola.

R. **bracteata** *A. F. G. Kerr,* species nova (adhuc unica).

Suffrutex scandens, glaber. Rami teretcs, siccitate tenuiter et crebre longitudinaliter striati, fistulosi. *Folia* late ovata, basi cordata, sinu patulo lobis rotundatis, apice abrupte et acute acuminata, mucronulata, usque 9-5 cm. longa et 7 cm. lata ad 14 cm. longa et 11 cm. lata, membranacea, siccitate supra brunnea, subtus pallidiora, sub lente copiose et minute perlucidc punctata, costa cum nervis lateralibus subtus prominente supra leviter impressa, nervis lateralibus 6-9-paribus e quibus 2-3 e basi orientibus leviter curvatis, nervis transversis subparallelis subtus cum rete venularum manifestis ; petiolus gracilis, 3-5-8 *5 cm. longus, siccitate longitudinaliter sulcatus. *Inflorescentia* axillaris, plerumque dichotoma, interdum trichotoma, glabra, 2-4-flora ; pedunculus communis petiolo multo crassior et longior, 11-19 cm. longus ; bracteae late ellipticae, interdum fere orbiculares, breviter acuminatae, ad 3-3 cm. longae, 2 cm. latae, binae inflorescentiae nodo quoque et basi pedicelli dispositae ; pedicelli 1-1-5 cm. longi, superne incrassati, siccitate rugosi. *Alabastra* ovoidea, apice longe attenuata, acuta. *Sepala* glabra; duo exteriora oblongo-obovata, apiculata, 4-4 cm. longa, 2-2 cm. lata ; tria interna oblongo-elliptica vel oblonga, acuta, 4 cm. longa, 1-6 cm. lata. *Corolla* alba (ex *Marcari),* campanulata, breviter 5-lobata, circiter 8*5 cm. longa, lobis triangularibus 1-5 cm. longis, extra glabra, intus supra staminum insertionem squamis 5 obovatis margine leviter erosis 5 mm. longis 3-5 mm. latis praedita, infra staminum insertionem lineis 10 tomentosis instructa. *Staminum* filamenta 2-6 cm. longa, basin versus sensim dilatata et tomentosa, 7 mm. supra basin corollae inserta; antherae sub anthesin spiraliter contortae, 5-5 mm. longae. *Discus* pulvinato-annularis, obscure sinuatus, 1 mm. altus. *Ovarium* glabrum, 2 mm. altum, fere ad basin

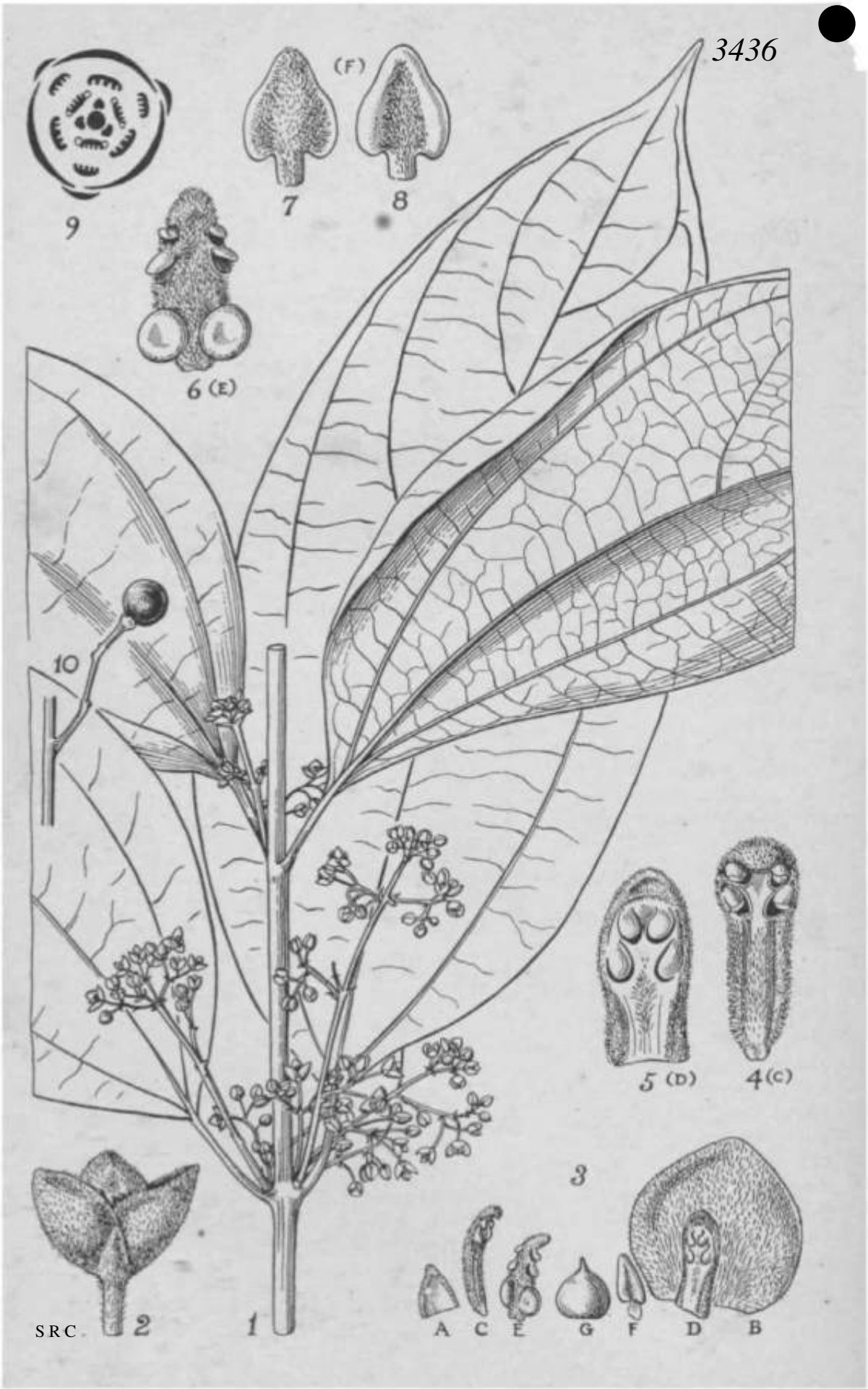
4-lobatum, 4-loculare, 4-ovulatum; stylus inter ovarii lobos oriens, 2*9 cm. Iongus, glaber; stigma biglobosum. *Fructus* immaturus tantum visus, ex utriculis 4 vel abortu paucioribus obovatis glabris circiter 7*5 mm. altis 6-5 mm. latis compositus.

THAILAND. Kanburi, Sai Yok, c. 100 m., woody climber with white flowers, on limestone hill, *Marcan* 2349.

The general facies of this plant suggest a species of *Merremia* of the section *Hailale,* to which, at first sight, it was considered to belong. The structure of the ovary and fruit is, however, very different from that of *Merremia,* recalling rather that of the tribe *Dichondreae,* with which otherwise it seems to have no affinity. The unarmed pollen grains put it out of the *Echinoconiae* group While on the whole its affinities seem to be with the *Convolvuleae,* it seems sufficiently distinct to be kept in a tribe apart; but this question may well be left till more material is available. The name *Remirema* is an anagram of *Merremia.*

The writer has to thank Dr. C. R. Metcalfe, Assistant Keeper of the Jodrell Laboratory, and Dr. C. L. Hare for an exposition of the morphology of the pollen grains of *Remirema.* On first view the surface of the grains appears to be papillate, or possibly porous. This appearance is due to the presence, in the thickness of the grain wall, of closely set dome-like structures, having a different refractive index from the rest of the wall. Actually, these structures do not quite reach the outer layer of the grain, so form no projections. The writer's thanks are also due to Miss Ross-Craig, who took a particular interest in the pollen grains, and made the very faithful drawing of the plant reproduced here.—A. F. 6. KERR.

FIG. 1, portion of flowering shoot, *natural size;* 2, outer sepal, *natural size*; 3, inner sepal, *natural size;* 4, part of corolla seen from inside showing 3 stamens, *natural size*; 5, base of stamen in side view, showing scale X 2 ; 6, pollen-grain, approx. x 280; 7, part of periphery of pollen-grain, semi-diagrammatic, greatly magnified; 8, gynoccium, *natural size;* 9, disc, ovary, and base of style, X 4; 10, transverse section of ovary, X 4.



TABULA 3436.

CARYODAPHNOPSIS TONKIN EN SIS *(Lecomte) Airy-Shaw.*

LAURACEAE.

C. tonkinensis *(Lecomte) Airy-Shaw* in Kew Bull. 1940, 75.—*Nothaphoebe tonkinensis* Lecomte in Nouv. Arch. Mus. [Par.] v. 106 (1913) et in Lecomte, PL Gén. Indo-Chine, v. 118 (1914); Liou Ho, Laur. Chine et Indoch. 76 (1934). *Persea pyriformis* Elm. Leaf. Philipp. Bot. viii. 2727 (1915); Merr. Enum. Philipp. PL PL ii. 188 (1923). *Nothaphoebe pyriformis* (Elm.) Merr. in Unif. Calif. Publ. Bot. xv. 77 (1929).—A *C. baviensi* (Lecomte) Airy-Shaw ramulis, petiolis, foliis glaberrimis, a *C. Henryi* Airy-Shaw inflorescentiis floribusque dense tomentcllis, ab utraque insuper floribus subduplo majoribus 5-6 mm. diametro diifcrt.

Frutex (teste *Balansa)* usque *arbor* parva vel mediocris (testibus *Elmer* et *Poilane),* 10-15 m. alta, trunco 3-9-5 dm. diametro (testibus *Elmer* et *Poilane)* valde longitudinaliter (? anteridum ad instar) costato-angulato (teste *Poilane),* cortice crasso nigro-brunneo crebre tessellato (teste *Elmer)*; rami late patentes, valde ramulosi (teste *Elmer),* ramulis gracilibus 1 • 5-4 mm. diametro subrectis teretibus laevibus glabris siccis brunnescentibus vel saepius fere nigris. *Folia* plerumque elliptico-oblonga, interdum ovata vel obovata, 5-25 (plerumque 12-15) cm. longa, 2-5-8-5 (plerumque 5-7) cm. lata, basi cuneata usque late rotundata, apice breviuscule et saepe abruptiuscule caudato-acuminata, cauda obtusa usque acuta vel adeo mucronata, margine integro piano vel levissime et angustissime revoluta, chartacea vel tenuiter coriacea, glabra, siccitate supra obscura brunnea subtus pallida vel glaucescentia, triplinervia ; costa modice gracilis, supra nonnihil impressa, subtus valde prominens ; nervi laterales 2-4-jugi, uno jugo subrecto 3-15 mm. supra basin e costa orto et longe ultra medium folium percurrente, ceteris prope vel supra medium ortis alternis raro suboppositis magis arcuatis marginem apicemque versus anastomosantibus ; nervi secundarii e lateralibus praecipue marginem versus extensi, conspicue arcuato-anastomosantes; omnes graciles, prominentes; venulae minores tenuissimae, angulo recto e majoribus exortae et inter se conjunctae, rete venularum in pagina inferiore conspicuo et pulchro ; petioli 8-20 mm. longi, graciles, supra canaliculati, subtus teretes, glabri. *Inflorescentiae* usque 11 cm. longae, angustae, graciles, rhachi minute pubescente, ramis brevibus oppositis vel suboppositis saepe serialibus simplicibun vel parce ramulosis magis ferrugineo-pubescentibus, cymulis apicalibus subumbelliformibus, bracteis subulatis 1-2 mm. longis ferrugineo-pubescentibus. *Flores* 5-6 mm.* diametro, vivi albescentes (teste *Elmer),* in cymulas 3-7-floras dispositi; pedicelli gracillimi, 3-5 mm. longi, minute adpresse ferrugineo-pubescentes, basi minute bracteolati. *Perianthii* segmenta exteriora minuta, triangularia, 1 mm. longitudinis vix excedentia, extra pube-

*** Nee 3-5 mm., ut erronee in Kew Bull. 1940, 74, in clavi, datum.**

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sceutia, intus glabra; segmenta interiora late ovato-triangularia, 3-3*5 mm. longa, fere 3 mm. lata, subacuta, crassiuscula, extra dense adpresse ferrugineo-pubescentia, intus dense longiuscule ferrugineo-tomentella. *Stamina* ordinis I 2 mm. longa, incurva, ob pubescentiam densam ferrugineam ut videtur elliptico-clavata, sed revera antheris quadra to-rotundatis filamento distincto stipitatis, locellis 2 inferioribus quam superiores majoribus et saepe magis lateralibus ; ordinis II subsimilia, sed breviora et latiora, medio intus glabra ; ordinis III angustiora, suboblonga, conniventia, locellis sublateralibus, glandulis binis disciformibus glabris sessilibus basi aucta ; staminodia sagittato-triangularia, extra pubescentia, intus (medio excepto) glabra, breviter late stipitata, circum ovarium conniventia. *Ovarium* ovoideum, 1 mm. longum, glabrum, stylo brevissimo, stigmate minuto. *Fructus* (etiamnunc e speciminibus incompletis Philippinensibus *Elmer* 13311 et *Ramos & Edaño* 43955 et descriptionibus ab *Elmer* et *Liou Ho* datis tantum mihi cognitus) obovoideus usque elongate pyriformis, maturus 6*5-8 cm. longus, 4-5 cm. diametro, teres, durus, nitenti-viridis (siccitate nigrescens), pedunculo 3-15 cm. longo, pedicello usque 1 cm. longo crasso subterete apice expanso ; calycis segmenta statu adhuc juvenili (teste *Liou Ho* e specimine Tonkinensi *Poilanei)* " leviter accreta " fructum basi cingunt, sed in specimine Philippinensi *Ponce* 23897 fructus etiam juniores 4*5-6*5 mm. diametro exhibente perianthii segmenta jam delapsa, basi breviter cupuliformi tantum relicta.

INDO-CHINA. Tonkin : Tu-phap, dans les bois, Apr. 1887, *Balansa* 2441 (typus *Nothaphoebes tonkinensis* Lee.); " Route de Hoa-binh à Cho-bo, *Poilane* 13021 " (ex *Liou Ho*; non vidi); " Village Man de Mo-me près de Cho-bo, forêt, sol argileux, 500 m. alt., *Poilane* 13036 " (ex *Liou Ho* ; non vidi). Annam : " Prov. Thuan-thien : Lang-vit, *Poilane* 1406 " (ex *Liou Ho* ; non vidi).

PHILIPPINES. SAMAR (ex *Merrill,* singulis haud indicatis; non vidi). LEYTE. Mt. Abucayan, Feb. 1923, *Edaño* 41720. MINDANAO. Surigao Prov.: sine loc, Apr. 1915, *Ponce* 23897 ; Placer, Jun.-Jul. 1916, *Wenzel* 1907 ; sine loc, 23 Apr. 1927, *JVenzel* 2538; 28 Mai. 1927, *Wenzel* 2658 ; 18 Jun. 1927, *Wenzel* 2717 ; 23 Apr. 1928, *Wenzel* 3296; Agusan Prov. : Cabadbaran (Mt. Urdaneta), " standing among dense woods on the gravelly banks of the Catangan creek," 300 m. alt., Jul. 1912, *Elmer* 13311 (typus *Perseae pyriformis* Elm.); Bukidnon Prov.: sine loc, Mar.-Apr. 1926, *Ablaza* 30282 ; Zamboanga Distr. : sine loc, Jan. 1916, *Franco* 24955.

SULU ARCHIP. Tawitawi, Jul.-Aug. 1924, *Ramos & Edaño* 43955.

BRIT. N. BORNEO. Near Tawao, in forested flats, Oct. 1922-Mar. 1923, *Elmer* 21857 ; Segaliud, Sandakan, along the river bank, alt. 1 m., 16 Jul. 1938, *Keith (B.N.B. For. Dept.)* 9310: "Shrub, 12 ft. high, 4in^girth; flower light yellow." Vernacular name : *salimuat* (Dusun, Kinabatangan).

In his account of the *Lauraceae* for the Flora of British India, v. 116 (1886), J. D. Hooker wrote : " The genera are in some cases far from natural; the character of 2- and 4-celled anthers separating generically plants otherwise very nearly related." Of the genus *Apollonias* he

wrote (I.e. 121) : " This I should regard as forming . . . a section of *Phoebe* with 2-ccllcd * anthers, which would, however, upset the present artificial arrangement of the genera in the Order." And of *Dehaasia* (I.e. 125) : " The 2-celled * anthers alone distinguish this genus from *Alseodaphne."* To anyone with an eye for *facies,* the justice of these remarks is very apparent; yet only five years after the publication of Hooker's work, Pax's treatment of the *Lauraceae,* in Engler's Pflanzenfamilien, III. ii. 107 (1891), appeared, in which this very character was used for the primary subdivision of the family, and the two resulting groups were given the rank of subfamilies *(Perseoideae,* 4-locellate; *Lauroideae,* 2-locellate). The Pflanzenfamilien being not unnaturally regarded as a standard work, Pax's system has unfortunately been followed by many subsequent workers : e.g. Koorders and Valeton, Bijdr. Kenn. Boomsoorten Java, x. 66 (1904); Koorders, Exkfl. Java, ii. 260 (1912); Lecomte, PI. Gén. Indo-Ch. v. 107 (1914) (except for *Cassytha).* Koorders and Valeton, however, admitted that Pax's scheme was " eenigszins kunstmatig " (I.e. 67).

Hooker's scheme was far more natural. lie had two principal subdivisions, to which he gave the rank of tribes, based upon the outward (" *Perseaceae* ") or inward (" *Litseaceae* ") dehiscence of the third row of stamens. This arrangement has been in the main employed by Liou Ho, Laur. Chine et Indoch. 18 (1934), who shows that this stamen-character is generally f correlated with two other important characters—the hermaphrodite or dioecious flowers, and the exinvolucrate or involucrate inflorescences, respectively.

The genus *Caryodaphnopsis* clearly belongs to Hooker's " *Perseaceae."* But its affinities, as I have previously indicated (K.B. 1940, 74), lie, not with the other genera of this group possessing 4-locellate anthers, but with some of the 2-locellate ones. It combines, in fact, the foliage of *Cryptocarya* sect. *Caryodaphne* (and to a less extent of *Cinnamomum)* with the inflorescence of *Alseodaphne,* the unequal perianth-segments of *Dehaasia* (and *Nothaphoebe)* and the staminodes of *Beilschmiedia.* There is, perhaps, some affinity with *Neocinnamomum* Liou Ho (I.e. 82 ; cf. *N. yunnanense,* fig. 8, p. 91).

The geographical distribution of *Caryodaphnopsis,* even as far as at present known, is peculiar and interesting. The species occur in two distinct areas: south-eastern Yunnan, Tonkin, northern Annam ; and the southern Philippines and North Borneo. *C. tonkinensis* occurs m all the countries named, except Yunnan ; *C. Henryi* is known only from Yunnan ; *C. baviensis* oiriy from Tonkin. This type of distribution appears to be without an exact parallel. Merrill, in his essay on the Ploristic Relationships of the Philippines (Enum. Philip]). PI. PI. jy« 77 : 1926), states that " a few species are known only from southern China and the Philippines, but the list is rather insignificant, including

* Sphalm, " 4-celled."

* The only Asiatic exception is the genus *Pseudosassafras* Lecomte, which has the third row of stamens introrse but the flowers hermaphrodite and the inflorescences exinvolucrate. It appears to be a less specialised member of the " *Litseaceae,*" *na not a relative of *Nothaphoebe* as might be supposed from Liou Ho's key.

Morinda parvifolia Bartl. [also Indo-China and Formosa, teste Merr. op. cit. iii. 573 (1923)], *Flemingia prostrata* Merr. and Rolfe [not elsewhere mentioned by Merrill; cf. op. cit. ii. 316, 317 (1923)], ' *Eremochloa leersioides* Munro' [i.e. *E. lea sioides* (Munro sub *Ischaemum)* Hack. = *E. ciliaris* (L.) Merr.; also in Tonkin and Burma, teste Merr. op. cit. i. 39 (1922)], and *Ardisia reptans* Merr." Lecomte (Fl. Gén. Indo-Ch. iii. 942 : 1930 ; cf. Bakh. in Bull. Jard. Bot. Buitenz. sér. 3, xv. 176-8: 1938) records the Philippine species *Diospyros nitida* Merr. from Tonkin (var.), Annam and Cochin-China ; this is merely quoted, without confirmation or denial, by Bakhuizen, I.e., who apparently did not examine Indo-Chinese material. It is at once apparent from the published records of the *Morinda, Eremochloa, Ardisia,* and *Diospyros* in Merrill and Bakhuizen that in the Philippine Islands these species are almost confined to Luzon. The *Morinda* occurs also in the Babuyan Is. between Luzon and Formosa (cf. Merrill's list of Philippine-Formosan endemics, op. cit. iv. 88). Only the *Diospyros* reaches southwards, to Mindoro, Guimaras (between Panay and Negros) and Mindanao, where it appears to be far less common than in Luzon. The *Ardisia* is reduced by Walker (Philipp. Journ. Sci. lxxiii. 132 : 1940) to *A. pusilla* A.DC, which occurs also in Japan and S. Korea (Quelpart I.) and thus belongs to a more widely distributed northern type, comparable with the plants in Merrill's second list (op. cit. iv. 88-9). The evidence therefore seems to suggest that these few " continental " species probably arrived from the north. None of them has reached Borneo. If *Caryodaphnopsis* belongs to the same element, it is unique in this respect. Let us now examine the Bornean element in the Philippine flora.

The " Bornean Philippine " distribution of *Caryodaphnopsis tonkinensis* is eastern North Borneo (Tawao)—Sulu (Tawitawi)—Mindanao (Zamboanga—Bukidnon—Agusan—Surigao)—Leyte—Samar, forming a well-defined south-west-north-east " track" suggesting invasion from Borneo. Sixteen * of the " Bornean Philippine " species listed by Merrill (I.e. 91) and 15 others f noted by myself have a more or less

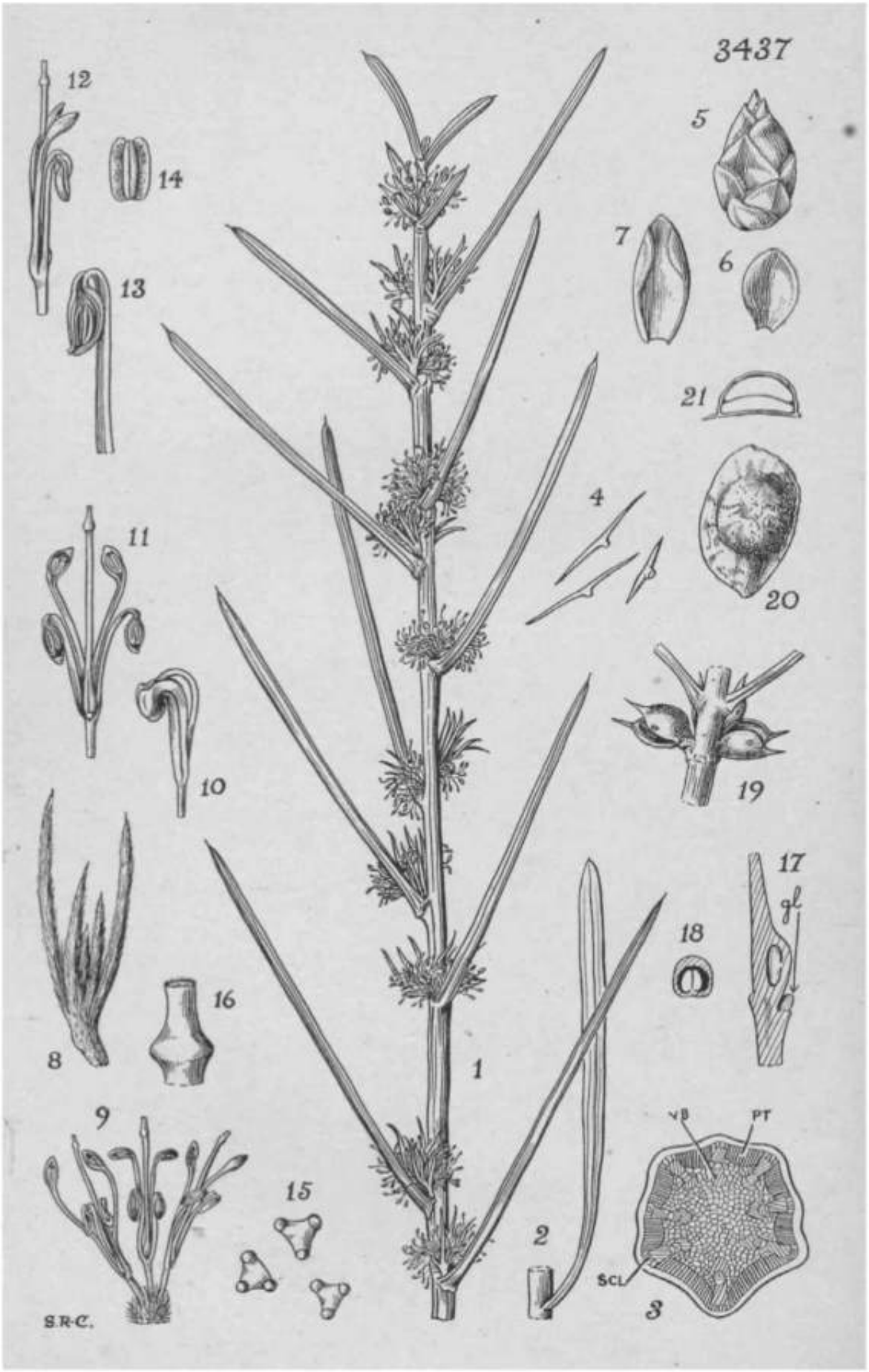
*** *Dinochloa luçoniae* (Munro) Merr., *D. pubiramea* Gamble, *Mapania affinis* Merr., *Artocarpus superba* Becc. (P.), *Ellipanthus mindanaēnsis* Merr., *Dalbergia subalternifolia* (Elm.) Merr. (P.), *Chisocheton macranthus* (Merr.) Airy-Shaw, ? *Cleistanthus Blancoi* Rolfe (given as " endemic " by Merrill, *op. cit.* ii. 419 : 1923), *C. megacarpus* C. B. Rob., *Mallotus Lackeyi* Elm. (P.), ? *Camptostemon philippinensis* (Vid.) Becc. (P.), *Hydnocarpus Hutchinsonii* Merr., *Carallia mindanaēnsis* (Merr.) Merr. (P.), *Eugenia elliptilimba* Merr., *Embelia philippinensis* A.DC, *Diospyros Everettii* Merr. The species marked (P.) occur along the Palawan track also, but without reaching Mindoro.**

f *Qoniothalamus suluensis* Merr., *Erythroxylum platyphyllum* Merr., ? *Atalantia disticha* (Blanco) Merr., *Aglaia affinis* Merr. (P.), *Xanthophyllum hypoleucum* Merr., *Dichapetalum holopetalum* Merr., *Dracontomelum edule* (Blanco) Skeels, *D. sylvestre* Bl. 4P.), *Solenospermum toxicum* (Loher) Loes., *Gonocaryum Calleryanum* (Baill.) Becc. (incl. *G. cognatum* Elm.), *Xylosma suluensis* Merr., *Casearia leucolepis* Turcz. (*C. polyantha* Merr.; P.), *Eugenia sablanensis* Elm., *Diospyros elliptifolia* Men\, *Ochrosia littoralis* Merr. These are recorded from North Borneo on the basis of my o'wn determinations of material received from the North Borneo Forest Department, the majority being published in Keith, Prelim. List N. Born. PI. Names (N. Born. For. Rec. No. 2, 1938).

similar local distribution and appear to belong to the same " army of invasion " *via* the Sulu track, as distinct from the Palawan track. Some of these extend into Luzon, though the majority do not get farther than Mindanao, but none of them has been found in Formosa or on the continent of Asia. It therefore seems improbable that *Caryodaphnopsis* belongs to this " Bornean—Sulu " component of the Philippine flora, in spite of the striking similarity in local distribution.

On the whole, I incline to regard this genus as a *relict* type, perhaps comparable with some of those referred to by Merrill (I.e. 80, 81), e.g. *Erythrophleum* (also in North Borneo, cf. Airy-Shaw in K.B. 1939, 180). It should also be compared with some of the low altitude " Asiatic (continental) elements " listed by Merrill (I.e. 81,83), especially with *Stixis* (about a dozen species in Burma and Indo-China and one in the Philippines) and with *Strophioblachia* (Merr. op. cit. ii. 213: 1923; Gagnep. in Lecomte, Fl. Gén. Indo-Ch. i. 199-206 : 1908). The special interest of *Caryodaphnopsis* lies in the fact that not only does the genus occupy a disjunct area of a peculiar type, but one of its constituent species occupies this area as well.—H. K. AIRY-SHAW.

FIG. 1, portion of flowering branch, *natural size;* 2, flower, side view, X 6; 3, separate parts of flower, X 8 :—A outer perianth segment, B inner perianth segment, C introrse stamen of 1st order, D introrse stamen of 2nd order, E extrorse stamen of 3rd order, showing glands, F staminode, G ovary (A, B, C, D, F in J face view, E in | back view); 4, stamen of 1st order, face view, X 16 ; 5, stamen of 2nd order, face view, X 16 ; 6, stamen of 3rd order, back view, X 16; 7 and 8, staminode, back and face views, X 16 ; 9, floral diagram; 10, very young fruit, **showing** cup **left** by **fallen** perianth-segments, *natural size.*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TABULA 3437.

HAKEA SULCATA *R. Br.*

PROTEACEAE. Tribus GREVILLEEAE.

H. sulcata *R. Br.* in Trans. Linn. Soc. London, x. 180 (1810) et Prodr. FJ. Nov. Holl. i. 382 (1810) ct Suppl. Prodr. PL Nov. Holl. Prot. Nov. 27 (1830); Bentham, PL Austr. v. 528 (1870)—excl. var.—Species sectionis *Conogynoidei* seriei *Teretifoliarum* fructibus parvis, scminibus anguste alatis valde distincta.

Suffrutex 30-75 cm. altus; caulis primuin pilis mediofixis griseo-pubescens, glabrescens ; rami in axillis foliorum inferiorum solitarii, in axillis foliorum superiorum geminati utroque latere inflorescentiae dispositi. *Folia inferiora* (? semper) plana, lineari-oblanceolata apice acute mucronata, ad basin sensim attenuata, 6-16 cm. longa, infima breviora, usque 5 mm. lata. *Folia superiora* fere teretia (subtus basin versus leviter carinata), 2-14-5 cm. longa, suprema breviora, 1—l-5 mm. diametro, apice breviter pungentia, basi leviter expansa et semi-orbiculata, striata vel leviter 8-sulcata, primum pilis mediofixis dense aureo-brunneo-pubescentia, mox glabrata. *Inflorescentiae* axillares, bracteis alabastrum acutum formahtibus mox deciduis involucratae, circiter 21-23-florae, floribus in racemum brevem rhachi dense pilosa congestis. *Bracteae* squamiformcs, brunneae apice nigrescentes, plus minusve ovatae, acutae, ciliatae. *Pedicelli* duo terminates 2 mm. longi, alii 1 mm. longi. *Perianthium* glabrum; segmenta 4, manubrio lineari 4-5 mm. longo, lamina oblonga vel ovata minute cucullata 1 - 25 mm. longa. *Antherae* in laminis segmentorum sessiles, oblongo-ovales apice retusae, 1 mm. longae. *Receptaculum* leviter obliquum. *Olans hypogyna* discoidea, lateralis. *Ovarium* ovale, vix 1 mm. longum, uniloculare, apice in stylum 6 mm. longum stigmate conico truncato coronatum attenuatum. *Fructus* oblique late ovoideus usque sub-sphaericus, 5-6 mm. longus, 4-5 mm. latus, brunneus usque griseus, saepe apice subulato (basi styli persistente) ad 3-5 mm. longo. *Seynina* subovalia, altera facie plana altera ventricosa, inaequaliter alata, 4-5• 5 mm. longa, 2*5-3 mm. lata, circiter 1-5 mm. crassa, griseo-nigra.

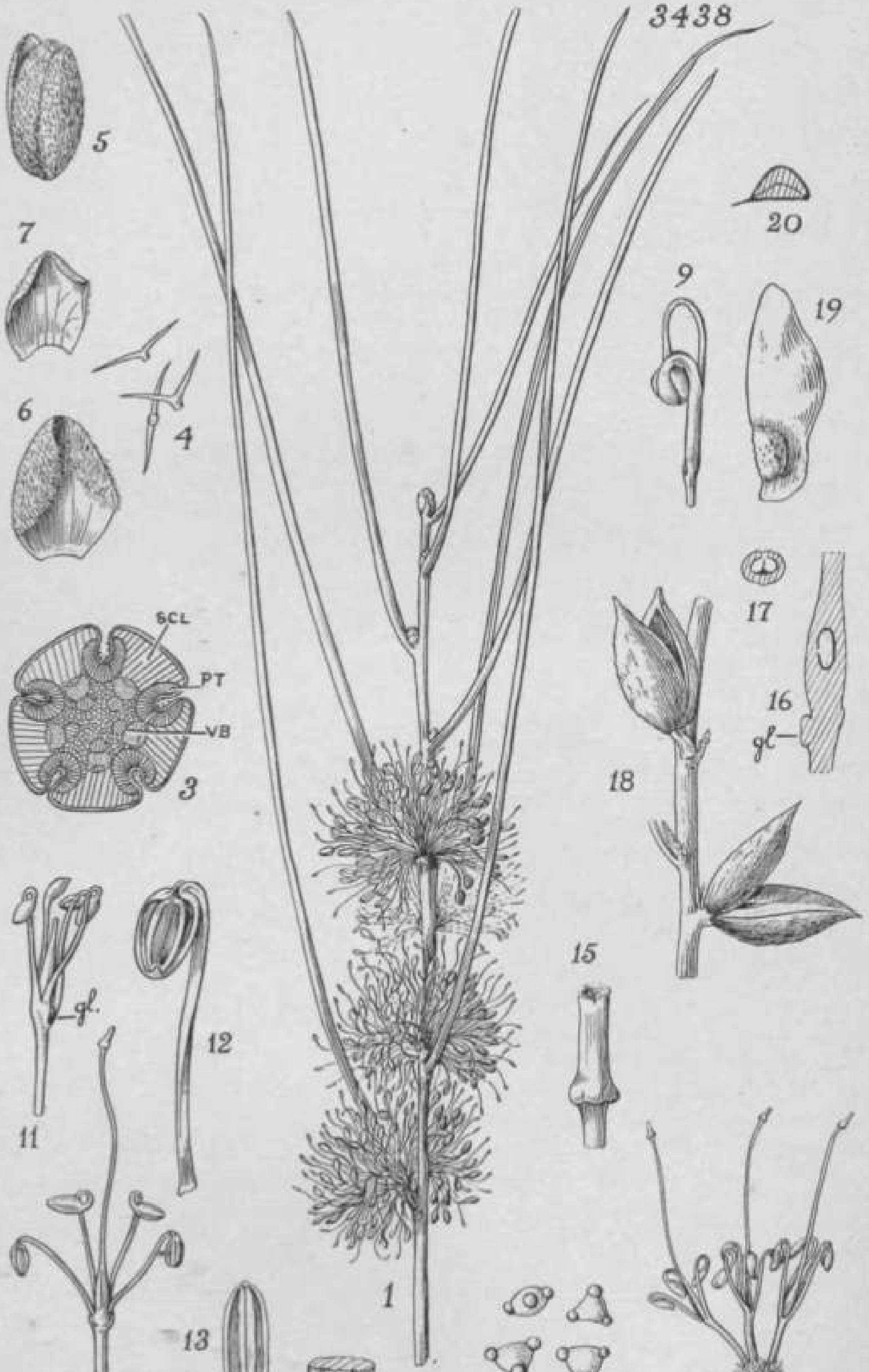
WESTERN AUSTRALIA. Swan Eiver, *Drwnmond* 1st Coll. 181, 599, 5th Coll. 411. King George's Sound, *Baxter.* Guildford, near Perth, m sand, 6 Sept. 1901, *Andrews* 1st Coll. 806. Claremont, Lower Swan River, 18 Sept. 1908, *Morrison.* Cannington, Lower Canning River, 1 June & 12 Sept. 1910, *Morrison.* Cult, at Blackwood, South Australia, *Ashby* 5.

The remarkably small fruits of *Hakea sulcata* render it such a distinct species that it should never have been confused with any other, yet

three quite different plants have been considered varieties of it. One of these, var. *intermedia* Ewart & White, is the subject of the next article and is there recognized as a new species, *H. invaginata.* The other two were originally described as species, but were reduced to varieties of *H. suhata* by Bentham. They are *H. scoparia* Meissn. and *H. Gilbertii* Eippist and both must be reinstated in specific rank.

Of these three, *H. Gilbertii* is most closely allied to *H. sulcata,* but it is readily distinguished by its finer, long-pointed leaves and its more woody fruits, which are more like those of *H. invaginata,* though smaller (1 cm. long). *H. scoparia* agrees with *H. invaginata* in having much longer leaves than *H. suhata* and *H. Gilbertii.* The leaves of *H. scoparia* differ from those of *H. invaginata,* however, in being only shallowly grooved.—B. L. BURTT.

FIG. 1, flowering branch, *natural size*; 2, leaf from lower part of plant, *natural size*; 3, transverse section of leaf, x 16 (PT = pallisade tissue, SCL = sclerenchyma, VB = vascular bundle); 4, hairs from young stem, x 24; 5, inflorescence bud, X 4; 6 and 7, bracts of same, from within, X 4; 8, young vegetative shoot from alongside inflorescence, X 3; 9, part of inflorescence, X 3; 10, flower-bud, X 4; 11, open flower, X 4; 12, flower, side view, X 4; 13, perianth-segment, X 8; 14, anther, X 12; 15, pollen grains, X c. 80; 16, stigma, X 12; 17, longitudinal section of ovary, x 12 (gl = gland); 18, transverse section of ovary, X 12; 19, fruits, *natural size;* 20, seed, X 4; 21, transverse section of seed, X 4.



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TABULA 3438.

HAKEA INVAGINATA *B. L. Burtt.*

PROTEACEAE. Tribus GREVILLEEAE.

H. **invaginata** *B. L. Burtt*; species nova, olim pro varietate *H. sulcatae* R. Br. habita, sed foliis longioribus profunde 5-sulcatis, alabastris inflorescentiae obtusis bracteis rotundatis, floribus fructibusque majoribus facile distinguenda. *Hakea sulcata* R. Br. var. *intermedia* Ewart & J. White in Proc. Roy. Soc. Victoria, n. ser., xxiii. 293 (1911).

Frutex usque 2 m. altus. *Ramuli* primum pilis mediofixis densissimc pubescentes, demum glabrescentes. *Folia* teretia, usque 23 cm. longa, primum ut ramuli pubescentia, mox glabrata, longitudinaliter profunde 5-sulcata, apice pungentia, basi lcviter dilatata et subtriangularia. *Inflorescentiae* axillares, circiter 60-florae; bracteae chartaceae, apice rotundatae, extra dense pubescentes, alabastrum ovale obtusum formantes, mox deciduae ; axis inflorescentiae (receptaculum commune) circiter 6 mm. longus, dense albo- vel fulvo- tomentosus. *Pedicelli* 5-6 mm. longi, glabri. *Perianthium* glabrum ; segmenta 4, manubrio lineari 5-5 • 5 mm. longo, lamina oblonga 1*5-1-75 mm. longa, minute cucullata. *Antherae* in laminis segmentorum sessiles, anguste oblongae, 1-25-1-5 mm. longae, 0-5 mm. Tatac, apice minute apiculatae. *Receptaculum* leviter obliquum. *Glans hypogyna* discoidea, lateralis. *Ovarium* suboblongum vel anguste conicum, 2 mm. longum, ventraliter levissime canaliculatum, uniloculare, apice in stylum 1 cm. longum stigmate 1 mm. longo truncato-conico coronatum attenuatum. *Ovula* duo, collateralia, parieti ovarii ventrali mediofixa. *Fructus* ovoideus, circiter 1-5 cm. longus et 9 mm. latus, ad apicem in rostrum (basin styli persistentem) usque 4 mm. longum productus, brunneus, subglaucus, rugosus, fere solidus praeter loculum 5 mm. longum et 3 mm. latum. *Semina* nigra, ovalia, 3 mm. longa, 2 mm. lata, ala oblique lanceolato-ovata 12-13 mm. longa et 4-5 mm. lata praedita.

WESTERN AUSTRALIA. Cowcowing, Sept. 1904, *M. Koch* 1056 (typus). Yuna, Sept. 1930, *Ashby* (2573 in herb. Morris). Cult, at Blackwood, S. Australia, *Ashby* 94.

Hakea invaginata was originally described by Ewart and White (I.e.) as variety *intermedia* of//, *sulcata,* but even the most casual comparison of the accompanying plate with that preceding (tab. 3437) will show that this view is quite untenable. Structure of leaf and fruit provide the most obvious differential characters, but there are differences throughout, from the mode of branching to the shape of the seed.

The leaf-structure of *H. invaginata* (fig. 3) is highly characteristic and easily distinguishes the species from other members of the group. **It might easily have been derived from the swfcato-type (tab. 3437, fig. 3)**

By the expansion of the peripheral bands of sclerenchyma (and a reduction in their number) and the sinking of the chlorenchyma into deep grooves. The processes shown in the grooves in fig. 3 are the bases of T-shaped hairs. When young the whole leaf surface is covered with these hairs but only those protected by the grooves persist for any length of time and they are quickly broken in section-cutting.

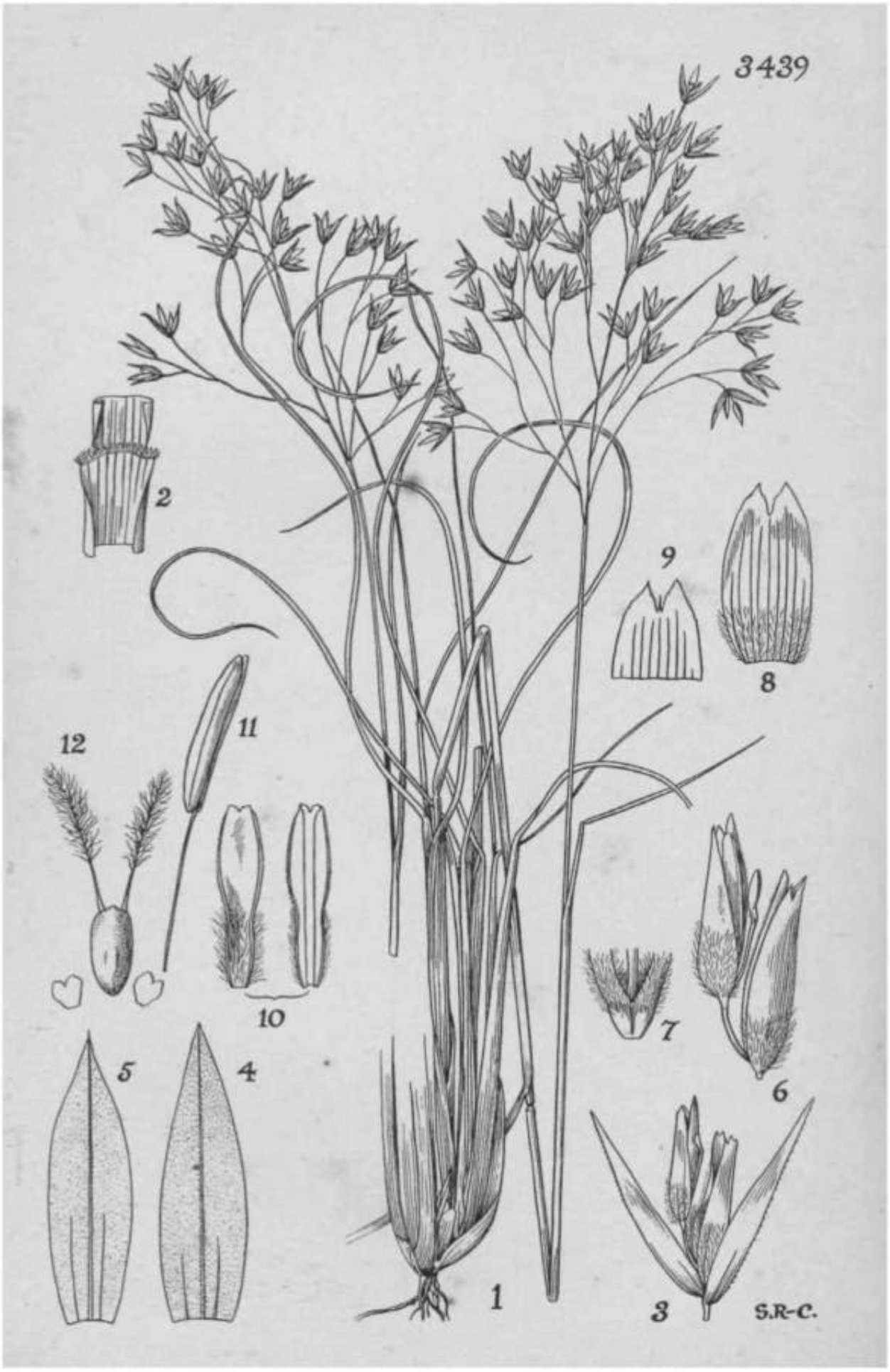
An interesting difference between *H. sulcata* and *H. invaginata* is in the mode of branching. In *H. invaginata* vegetative branches are borne only in the axils of leaves that do not subtend inflorescences. In *H. sulcata* vegetative branches arise in normal axillary buds in the lower part of the plant, but in the flowering region a young vegetative shoot springs from either side of each inflorescence (tab. 3437, fig. 1 and 8); thus in older specimens upper branches arise in pairs with the fruits nestling between them.

H. invaginata is one of the many native Australian plants grown by Mr. B. Ashby in his garden at Blackwood, S. Australia. He also grows another closely allied form of which he obtained seed from Pithara, W. Australia. This differs from *H. invaginata* in its more swollen, wide ovoid to oval-ovoid fruit with shorter beak, and in its distinctly smaller seeds. In other characters it agrees closely with *H. invaginata,* especially in the structure of the leaf. The differently shaped fruits would seem to justify varietal rank, the plant being comparable to the variety *rhynchocarpa* F. Muell. of *H. multilineata,* and I therefore propose the name:—

H. invaginata *B. L. Burtt* var. pachycarpa *B. L. Burtt,* var. nov. a typo fructibus late ovoideis vel ovali-ovoideis crassioribus brevioribus (1 • 1—1 -3 cm. longis) minus rostratis (rostro ad 3 mm. longo), seminibus (cum ala) ovalibus brevioribus (8*5-9 mm. longis) differt.

W. AUSTRALIA. Seed collected at Pithara, cult, at Blackwood, S. Australia, *Ashby* 95.—B. L. BURTT.

FIG. 1, flowering branch, *natural size*; 2, part of young branch, X 8; 3, transverse section of leaf, X 16 (PT = palisade tissue, SCL = sclerenchyma, VB == vascular bundle); 4, hairs from young stem, X 24; 5, inflorescence-bud, X 3; 6 and 7, bracts of same, X 4; 8, part of inflorescence, X 2; 9, flower-bud, x 3; 10, open flower, x 3; 11, flower from side, x 3 (style cut off short, gl = gland); 12, perianth-segment, X 8; 13, anther, x 12; 14, pollen grains, X c.80; 15, stigma, x 12; 13, ovary in longitudinal section, x 8 (gl. = gland); 17, ovary in transverse section, X 8; 18, branch with fruits, *natural size*; 19, seed, X 2; 20, transverse section of seed, x 4.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TABULA 3439.

DANTHONIA BODWAYI *C. E. Hubbard.*

GRAMINEAE. Tribus AVENEAE subtribus DANTHONTNAE.

D. Rodwayi *C. E. Hubbard,* species nova; a *D. Vickeryi* C. E. Hubbard (vide infra) spiculis paullo minoribus, lemmatibus exaristatis distinguenda.

Gramen perenne, dense caespitosum, circiter 35 cm. altum, innovationibus intravaginalibus. *Culmi* leviter geniculati, graciles, teretes, simplices, glabri, laeves, 2-3-nodes, nodis flavidis. *Foliorum vaginae* glabrae, laeves, basales imbricatae, papyraceae, pallidae, superiores internodiis paullo longiores, arete appressae ; ligulae ad seriem densam ciliorum redactae; laminae gracillimae, setaceae, obtusae, usque 20 cm. longae, involutae vel convolutae, cxplanatae usque 2 mm. latae, flexuosae, demum recurvatae, virides, glabrae, supra arete nervatae, apicem versus et nervis et marginibus scaberulae. *Paniculae* ovatae, laxae, 4-8 cm. longae, 4-6 cm. latae; rhachis scaberula ; rami solitarii,' filiformes, laxe dichotomo-divisi, scaberuli, inferiores usque 5 cm. longi; pedicelli 4-10 mm. longi. *Spiculae* oblongae, demum late hiantes, 5-6*5 mm. latae. *Glumae* a latere visae anguste et oblique lanceolatae, acutae, carinatae, marginibus et apice tenuiter scariosis exceptis chartaceae, minutissime asperulae, carina scaberulae, 1- vel 3-nerves, nervis lateralibus brevibus, circa carinam virides, ceterum purpureo- et pallidc brunneo-variegatae, subaequales vel superior inferiore paullo longior, 4-5-6-5 mm. longae. *Anihoecia* 3, glumis breviora, duo $, summa vestigialia ; callus brevissimus, obtusissimus, glaber; rhachillae internodia glabra, circiter 1*3 mm. longa. *Lemmata* explanata elliptico-oblonga, apice bidentata vel breviter biloba, emucronata vel e sinu brevissime mucronata, 3-4 mm. longa, apicem versus et marginibus membranacea, ceterum finna, (7)-9-nervia, nervis viridibus, infra medium inter nervos pilis brevissimis patulis dense vestita. *Paleae* lemmati subaequilongae vel plerumque paullo longiores, oblongae, apice emarginatae vel truncatae, prope medium leviter constrictae, infra medium dense pubescentes et firmae, supra medium glabrae membranaceae et carinis scaberulae. *Antherae* 1*5 mm. longae.

NEW SOUTH WALES. Mt. Currockbilly, near Braidwood, 50 miles S.S.W. of Nowra, 1080 m., 2 Jan. 1938, *F. A. Rodway* 2661.

The facies of *Danthonia Rodwayi* is very unlike that of most species of *Danthonia* and its taxonomic position may require reconsideration when the genus has been studied in greater detail. There seems no doubt, however, that it is very closely related to the anomalous species *D. paradoxa* R. Br. and to *D. Vickeryi* (described below). These

three species form a natural group, for one of which—*D. paradoxa*—Bentham (Fl. Austral, vii. 591 : 1878) established the section *Micrathera.* Judging from the material available, they have a rather restricted distribution in Australia, occurring only in New South Wales from the Port Jackson district and Blue Mountains (Wentworth Falls) in the central coastal region to Mt. Currockbilly near Braidwood in the south. In many species of *Danthonia* the hairs of the lemmas are frequently gathered together in variously arranged tufts, and the basal callus is mostly well-developed, but in the section *Micrathera* the hairs of the lemma are very short and borne on the lower part between the nerves, whilst the callus is extremely short. The three species may be distinguished by the characters given in the following key:—

Spikelets 3-6-flowered, 6-10 mm. long ; lemmas with broad obtuse or shortly acute lobes and a flattened cusp up to 1 mm. long between the latter ; panicles 10-15 cm. long . . . . . 1. *D. paradoxa.*

Spikelets 2-3-flowered, 5-7 mm. long ; panicles 4-8 cm. long :

Lemmas with well-developed geniculate awns and with acute lobes ; panicle-branches smooth or nearly so . . 2. *D. Vickeryi.*

Lemmas awnless, two-toothed or shortly two-lobed at the apex, with or usually without a minute mucro in the sinus ; panicle-branches scaberulous . . . . . 3. *D. Rodwayi.*

1. **D. Paradoxa** *R. Br.* Prodr. Fl. Nov. Holl. 177 (1810); Benth: Fl. Austral, vii. 591 (1878).

NEW SOUTH WALES. Port Jackson, *Brown,* s.n., 6230; French's Forest, 12-1912, *Blakely*; near Huskisson, Jervis Bay, swampy area, 18 Dec. 1930, *F. A. Rodway* 272.

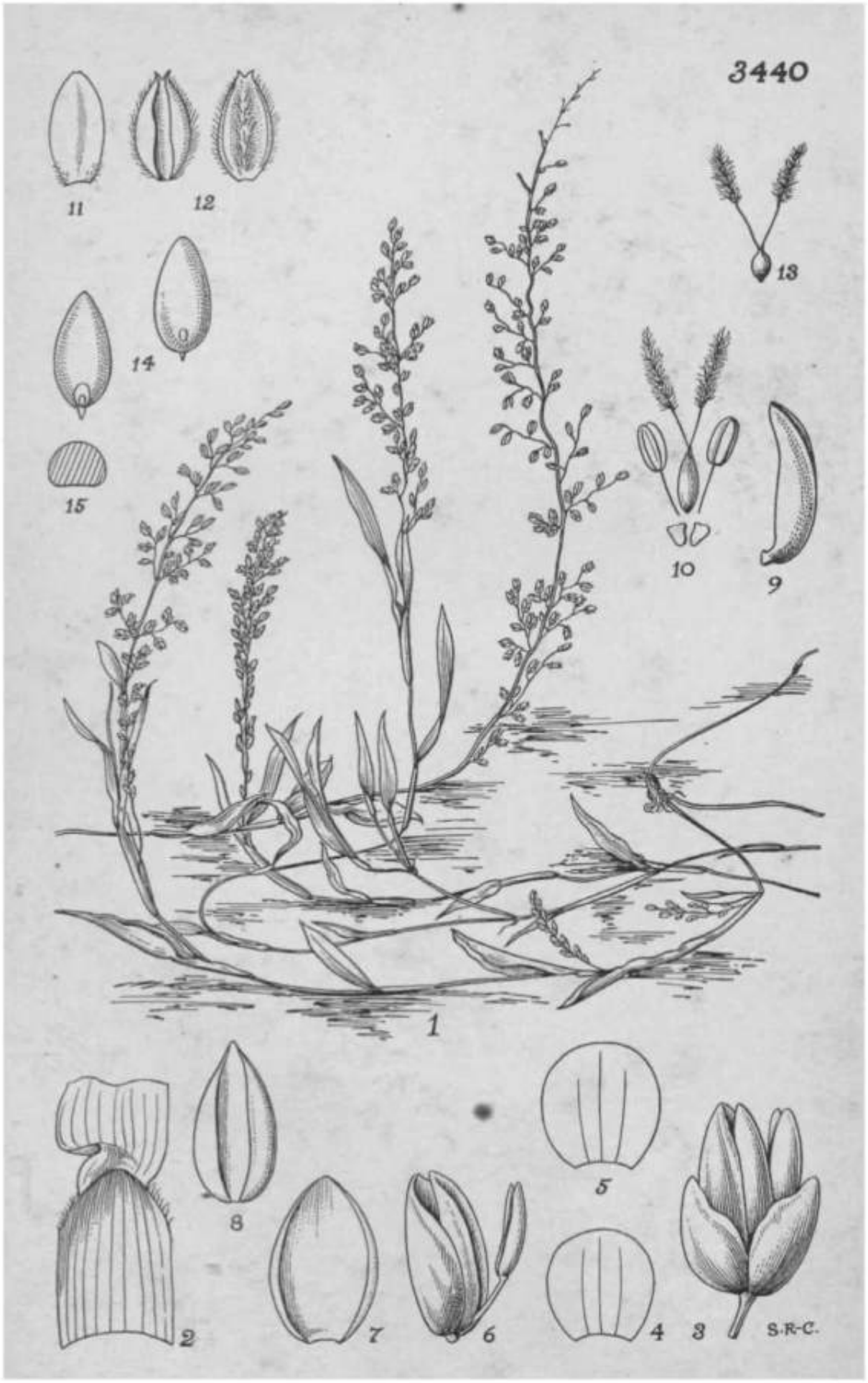
2. **D. Vickeryi** *0. E. Hubbard,* species nova.

Gramen perenne, caespitosum, circiter 40 cm. altum. *Culmi* graciles, teretes, leviter geniculati, 2-nodes, simplices, laeves. *Foliorum vaginae* laeves, ore pubescentes, ceterum glabrae, inferiores imbricatae, superiores internodiis breviores; ligulae ad seriem densam ciliorum redactae ; laminae setaceae, obtusae, usque 26 cm. longae, convolutae vel involutae, explanatae usque 1-5 mm. latae, supra arete nervatae et nervis minutissime hispidis, subtus laeves. *Panicula* ovata, laxa, 5-7 cm. longa, usque 4 cm. lata ; rhachis, rami et pedicelli laeves vel fere laeves ; rami solitarii, laxe divisi, filiformes, inferiores usque 5 mm. longi; pedicelli 4-14 mm. longi. *Spiculae* hiantes, 6-7 mm. longae, albido-viridi- et purpureo-variegatae. *Glumae* a latere visae oblique et anguste lanceolatae, acutae, subaequales, 6-7 mm. longae, chartaceae, trinerves, nervis lateralibus brevibus, carina supra medium scaberulae. *Anthoecia* fertilia 2-3; rhachillae internodia circiter 1 mm., longa; callus brevissimus, obtusissimus. *Lemmata* explanata oblongo-elliptica, 3-5-4 mm. longa, biloba, lobis tenuiter acutis brevissime setiferis,

infra medium 11-nervia, firma, pilis appressis inter nervos dense sericeo-pubescentia, supra medium membranacea, glabra, inter lobos aristata, arista geniculata 2-5-4 mm. longa columna leviter torta. *Paleae* lemmatibus paullo breviores, oblongae, dorso infra medium pubescentes. *Antherae* 2 mm. longae.

NEW SOUTH WALES. **Blue Mountains ; Wentworth Falls, c. 900 m,, 11—1931, *Vickery* K. 14.—C. E.** HUBBARD.

FIG. 1, plant, *natural size* ; 2, junction of sheath and blade to show ligule, X 6 ; 3, spikelet, X 6; 4, lower glume, X 8; 5, upper glume, X 8; 6, florets, X 8; 7, callus of floret, *X 24;* 8, lemma, flattened out, X 8 ; 9, apex of another lemma, X 8; 10, palea, in front and back views, X 8; 11, stamen, X 16; 12, lodicules and pistil, X 16.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TABULA 3440.

COELACHNE PULCHELLA *R. Br.*

GRAMINEAE. Tribus ISACHNEAE.

Coelachne *R. Br.* Prodr. Fl. Nov. Holl. 187 (1810); Benth. in Benth. et Hook. f. Gen. PL iii. 1156 (1883).—Descriptio hie emendata.

Spiculae vel ovato- vel elliptico-oblongae vel oblongae, obtusae, parvae, exaristatae, binae vel solitariae, in ramis gracillimis paniculatarum pedicellatae ; rhachilla supra glumas et demum inter anthoecia disarticulans, glabra, inter anthoecia leviter elongata, supra anthoecium terminale haud producta. *Anthoecia* 2 (rarissime 1 vel 3), dissimilia, e glumis exserta, apice maturitate hiantes ; inferum $; superum $, inferiore minus; callus brevissimus, obtusus. *Glumae* persistentes, subaequales vel inferior superiore paullo brevior, concavae, latae, apice obtusae vel rotundatae, membranaceae, plerumque glabrae; inferior enervis vel obscure 1-5-nervis, usque dimidiam partem spiculae aequans, late ovata vel late elliptica vel subrotunda ; superior 3-7-nervis, usque duas partos spiculae aequans, late elliptica vel subrotunda. *Lemmata* obtusa, dorso rotundata, enervia vel paucinervia; inferum late ovatum vel ellipticum vel subrotundum, marginibus incurvis, demum induratum, coriaceum, basi pubescens, vel glabrum ; superum lanceolato- vel elliptico-oblongum vel oblongum, membranaceum, praecipue prope margines et basin versus plus minusve pubescens. *Paleae* lemmatibus aequilongae, lanceolato- vel ovato-oblongae vel late ellipticae, bicarinatae, marginibus inflexis; inferior demum indurata ; superior membranacea, pubescens. *Lodiculae* 2 (in anthoecio infero), minutae. *Stamina* 2-3; antherae lineari-oblongae vel oblongae. *Ovarium* glabrum; styli distincti; stigmata angusta, plumosa. *Caryopsis* ovoidea vel ellipsoidea, inter lemma et paleam libera; scutellum quartam vel tertiam partem caryopseos aequans; hilum oblongum, subbasale.—*Gramina* annua vel perennia, humilia; culmi gracillimi, imbecilli, e basi decumbente saepe adscendentes; foliorum laminae lineares- vel lanceolatae, plerumque planae, tenues; ligulae ad seriem ciliorum redactae, vel nullae; paniculae vel lineares vel lanceolatae vel ovatae vel anguste oblongae, laxae vel densae et spiciformes.

Species 8-10, Africae tropicae orientalis, Madagascariae, Indiae, Japoniae, Chinae, Malayae et Australiac septentrionalis incolae. Typus :—0. *pukhella* R. Br.

C. pulcheUa *R. Br.* Prodr. Fl. Nov. Holl. 187 (1810); Kunth, Rev. Gram. i. t. 143 (1829); Benth. Fl. Austral, vii. 626 (1878); F. M. Bailey, Syn. Queensl. Fl. 654 (1883) et Queensl. Fl. vi. 1889 (1902) et Compreh. Cat. Queensl. PI. 624 (1913). *C. pukhella* var. *pulcheUa* (R. Br.) Hook f. Fl. Brit. Ind. vii. 271 (1896).—Affinis *C. simpliciusculae*

(Wight et Am.) Munro ex Benth., a qua panicula latiore et laxiore flexuosa, ramis deinuin horizontalitcr patentibus, spiculis patentibus diffcrt.

Gramen annuum vel perenne (?), imbecillum, usque 15 cm. altum. *Culmi* e basi ramosa répente adscendentes, gracillimi, multinodes, glabri, laeves. *Foliorum vaginae* internodiis multo breviores, laxae, striatae, laeves, nodis minute pubescentibus exceptis glabrae ; ligulae ad seriem ciliorum minutorum redactae, vel nullae; laminae angustc lanceolatae vel lanceolatae, basi contractae, apice acutae, 8-25 mm. longae, 2-5 mm. latae, planae, virides, tenues, glabrae, supra nervosae, nervis et marginibus scaberulae. *Paniculae* anguste oblongae vel lanceolato-oblongae, laxae, flexuosae, 4-10 cm. longae, pallide virides ; rhachis tenuissima, laevis; rami solitarii, demum horizontaliter patentes, paucispiculati, tenuiter filiformes, laeves, usque 1 cm. longi; pedicelli laterales 0*5-1 mm. longi. *Spiculae* oblique late ovato-oblongae vel elliptico-oblongae, 1-5-1-8 mm. longae, demum hiantes. *Glumae* apice rotundatae, tenuiter membranaceae, glabrae ; inferior late elliptica vel subrotunda, 1-1-2 mm. longa, tenuissime 3-5-nervis ; superior subrotunda, 1-1-3 mm. longa, tenuissime 3-7-nervis. *Lemma inferum* late ellipticum, obtusum, usque 1-7 mm. longum, enervc, glabrum vel basi pilis paucibus praeditum; palea ovato-oblonga; antherae 2, 0*3-0*4 mm. longae. *Lemma superum* ellipticum vel ovato-ellipticum, obtusum, 1 mm. longum, enervc, marginibus basin versus sparse et minute pubescens; palea carinis rigide ciliolata, dorso minute pubescens. *Caryopsis* ovoidea, 0*6-0'8 mm. longa.

QUEENSLAND. Cook District: Endeavour River, margins of fresh-water pools, 1770, *Banks & Solander* (Herb. Mus. Brit.); ibid., July 1819, *A. Cunningham* 353.

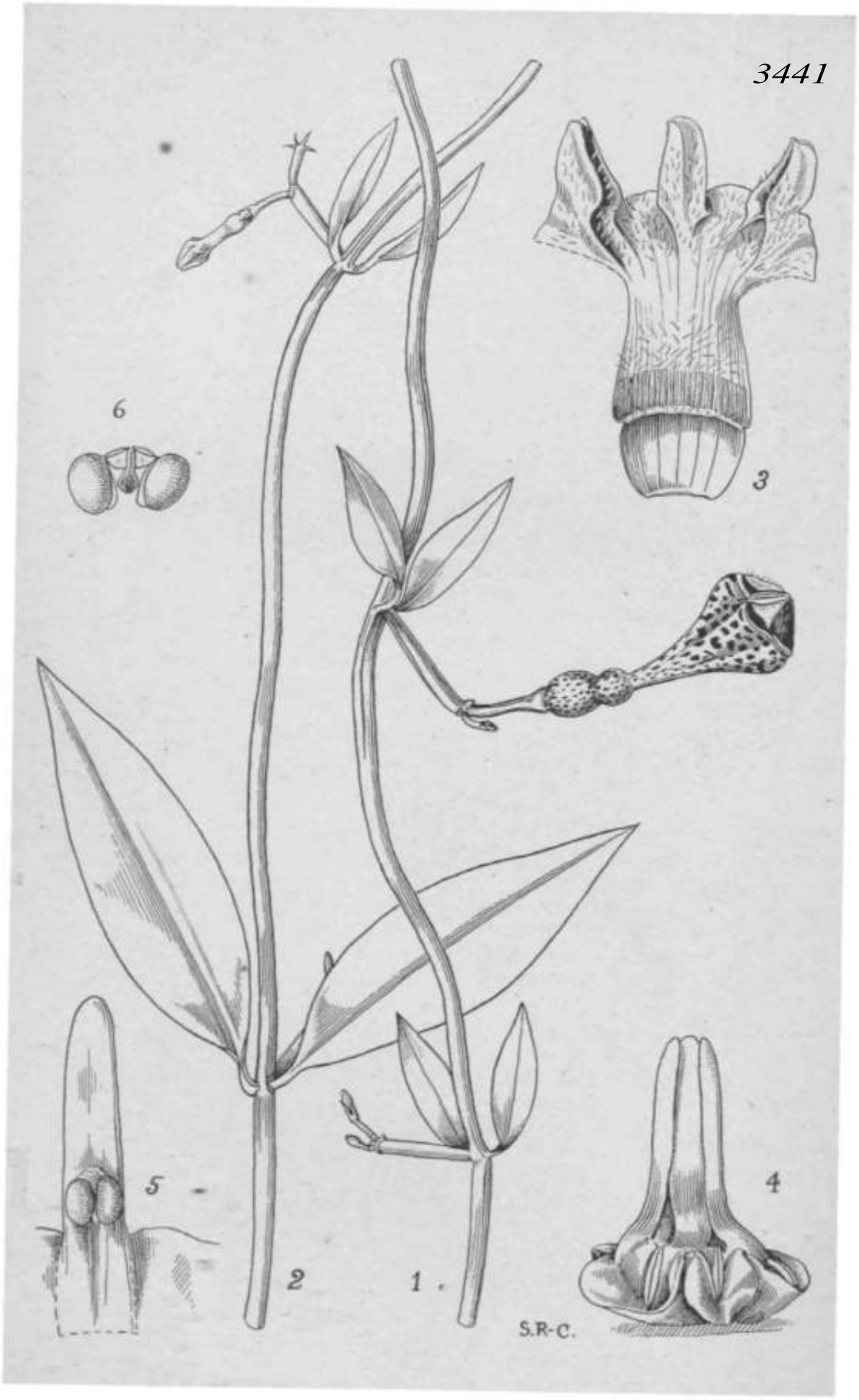
Considerable additions have been made to the Kew material of *Coehchne* since Sir J. D. Hooker noted in the Flora of British India (vii. 271 : 1896), that after a long study he concluded there was but one known species in the genus. He*referred the Indian specimens to seven varieties under the oldest species, *C. pukhella.* Those identified by him with C. *pukhella* var. *pulchella* (R. Br.) Hook. f. and collected by Wallich (8909) at the source of the Chappedong River, Burma, have looser inflorescences, with more widely spaced spikelets than in typical 0. *pukhella* R. Br. A few years later in Trimen's Flora of Ceylon (v. 270: 1900), Hooker slightly modified his earlier views and now accepted two to three species, one of which was *C. perpusilla* Thwaites. Hooker's arrangement under one species has been widely accepted, al^Jiough others have described several new species and resurrected some of the older ones. These " species " or " varieties " show varying degrees of difference, depending on spikelet-shape and -size, the number of anthers in the lower floret, on leaf-shape, and in the density of the inflorescence. Such distinctions, although sometimes slight, are

correlated with differences in geographical distribution. Pending a more detailed investigation of the genus, the following might be regarded as distinct species:—1, *C. puhhella* R. Br. (Queensland); 2, *C. infirma* Buse (Java and Sumatra); 3, *C. Hackelii* Merrill (Philippines); 4, *C. japonica* Hack. (Japan); 5, C. *perpusilla* Thwaites (Ceylon and south India); 6, 0. *simpliciuscida* Munro (Madagascar, India, Indo-China, and south China); 7, *C. afrkana* Pilger (tropical east Africa); 8, *C. Friesiorum* C. E. Hubbard (Kenya Colony).

In *Coehwhne* the spikelets are normally 2-flowered, but exceptions have been found in two gatherings. In specimens of *0. japonica* Hack. (Japan: *Faurie* 13805), a few spikelets were 1-flowered, with the rhachilla produced beyond the floret as a minute point. On the other hand, in a gathering of *C. simpliciuscuh* Munro (Hong Eong: *Faber* 279/87), some spikelets had three florets, the terminal floret being smaller and sterile.

Coelachne has been referred to such diverse groups as the tribes *Festuceae, Aveneae, Mileae, Paniceae* and *Isachneae,* giving some indication of the difficulties encountered in classifying grasses when one or more characters are given greater prominence than others. After a reconsideration of its structure, habitat and geographical distribution, the writer proposes to place it with *Isachne* and a few other genera in Bentham's tribe *Isachneae,* a brief account of which is given under tabula 3432 of this work.—C. E. HUBBARD.

FIG. 1, plant, *natural size;* 2, junction of sheath and blade, X 8; 3, spikelet, X 16; 4, lower glume, X 16 j 5, upper glume, X 16; 6, florets, side view, X 16; 7, lemma of lower floret, X 16; 8, palea of lower floret, X 16; 9, the same, side view, X 16; 10, lodicules, stamens and pistil from lower floret, X 16; 11, lemma of upper floret, X 16; 12, palea of upper floret, front and back views, X 16; 13, pistil from upper floret, x 16; 14, caryopsis, back and front views, X 24; 15, transverse section of caryopsis, X 24.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TABULA 3441.

CEROPEOIA MOZAMBICENSIS *SchUr.*

ASCLEPIADACEAE. Tribus CEROPEGIEAE.

C. mozambicensis *Schltr.* in Journ. Bot. xxxiii. 273 (Sept. 1895); N.E. Br. in Dyer Fl. Trop. Afr. iv. 1. 447 (1903). *C. constricta* N.E. Br. in Kew Bull. Oct. 1895, 260.—Affinis *C. plicatae* E. A. Bruce, n qua foliis angustioribus basi cuneatis, lobis corollae depresso-cohaerentibus subacutis recedit.

Herba, caulibus simplicibus volubilibus glabris circiter 2*5 mm. diametro, internodiis 9-13 cm. longis. *Folia* erecta vel patula, glabra, carnosiuscula, lanceolata, apice acuta, basin versus angustata, 1-4-2*1 cm. longa, 6-7 mm. lata, petiolis 2-5 mm. longis. *Cymae* 3-5-florae, e nodis lateraliter ortae, floribus succedaneis ; pedunculi glabri, 1-2-1-7 cm. longi; pedicelli 6-10 mm. longi, saepe cum floribus decidui et apice pedunculi cicatrices relinquentes. *Calyx* fere ad basin lobatus ; lobi 5, lanceolato-deltoidei, circiter 2 mm. longi, 1 mm. lati, glabri. *Corolla* 3 • 6-4 • 3 cm. longa ; tubus 3-3 • 5 cm. longus, 8-10 mm. supra basin constrictus circiter 5 mm. diametro, superne 5 mm. inflatus 7 mm. diametro, deinde 1 '2 cm. cylindricus et apicem versus dilatatus, late infundibuliformis, fauce circiter 1-8 cm. diametro, extra glaber, albicans, purpureo-notatus (apicem versus intensius notatus), margine apicali sub lobis viridis, intus e constrictione ipsa in rugam paucipilosam plicatus, infra constrictionem levis et glaber, supra constrictionem per 4 mm. sulcatus et glaber, superne parce pilosus ore densius piloso; lobi apice connati, circiter 8 mm. longi, replicati, basi latissime deltoidei, apice depressi cohaerentes, subacuti, intus virentes basi zona cremea cum zona triangulari atropurpurea superposita ornati, pilis purpureis longis pilosi. *Corona* exterior cupuliformis, circiter 0-7 mm. longa, columna staminum brevior, 5-saccata, undulato-truncata, glabra; lobi coronae interioris circiter 2 mm. longi, erecti, lineari-subulati, glabri, columnam staminum superantes.

KENYA COLONY. Mazens, 150 m., 7 Nov. 1921, *Butler* 17 ; Mwachi, *Graham* 1958 :—" small succulent climber; flowers bright green when viewed from above . . . chocolate bars on the interior divisions of the flower; lobes hairy at edges."

BELGIAN CONGO. Kawala Islands (" Kavala ils.") in Lake Tanganyika about 5° 40' S., May 1888, *Carson* 35.

PORTUGUESE EAST AFRICA. Mozambique, 23 miles from Beira, 2 March 1909, *Johnson* 303:—"flowers very striking: outside of corolla-tube slaty-pink with purple dots or blotches, tip of corolla dark green; inside tube dark maroon with white shading and stiff hairs, a curious depression about a third of the way up the tube."

Ceropegia mozambicensis is closely allied to *C. plicata* E. A. Bruce and * C. *Brownii* Ledger. This latter species has been reduced to *C. nilotica* Kotschy by Dr. Werdermann. I have not seen a specimen of 0. *nilotica* but have no reason to doubt the synonymy. These species are all characterized by having a peculiar fold or annulus within the corolla-tube at its constriction near the base. This is probably an additional aid to pollination, guiding the insect to the essential organs of the flower. The plant figured was cultivated at the Royal Botanic Gardens, Kew, and the measurements of the flowers in the description have been taken from spirit material.—E. A. BRUCE.

FIG. 1 & 2, part of flowering plant, *natural size;* 3, corolla, opened out, X 1*5; 4, corona, X 12; 5, part of inner corona, with poliinia attached, x 16; 6, pollinia, X 24.

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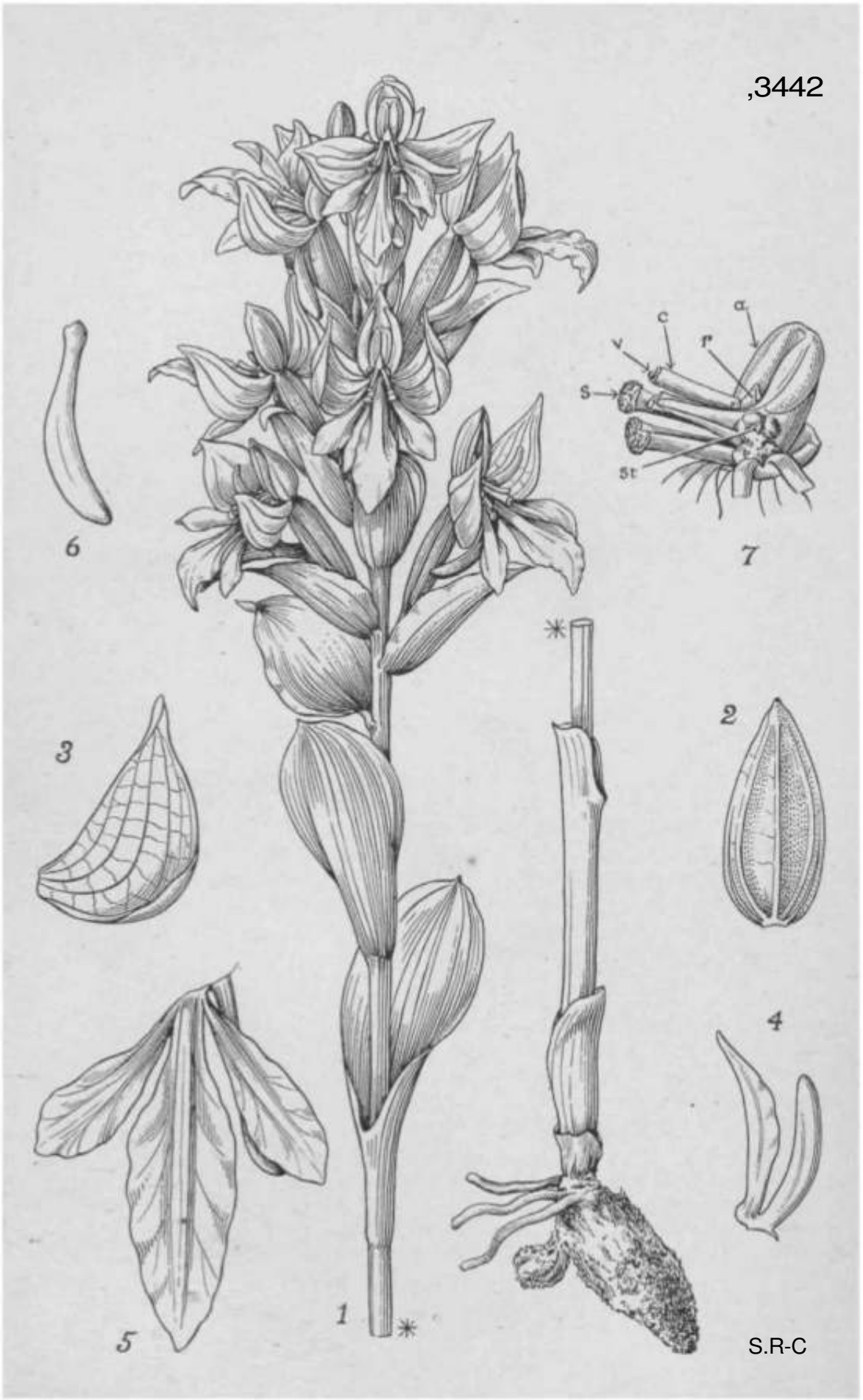

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TABULA **3442.**

HABENABIA MIBABILIS *Rolfe.*

ORCHIDACEAE. Tribus OPHRYDEAE.

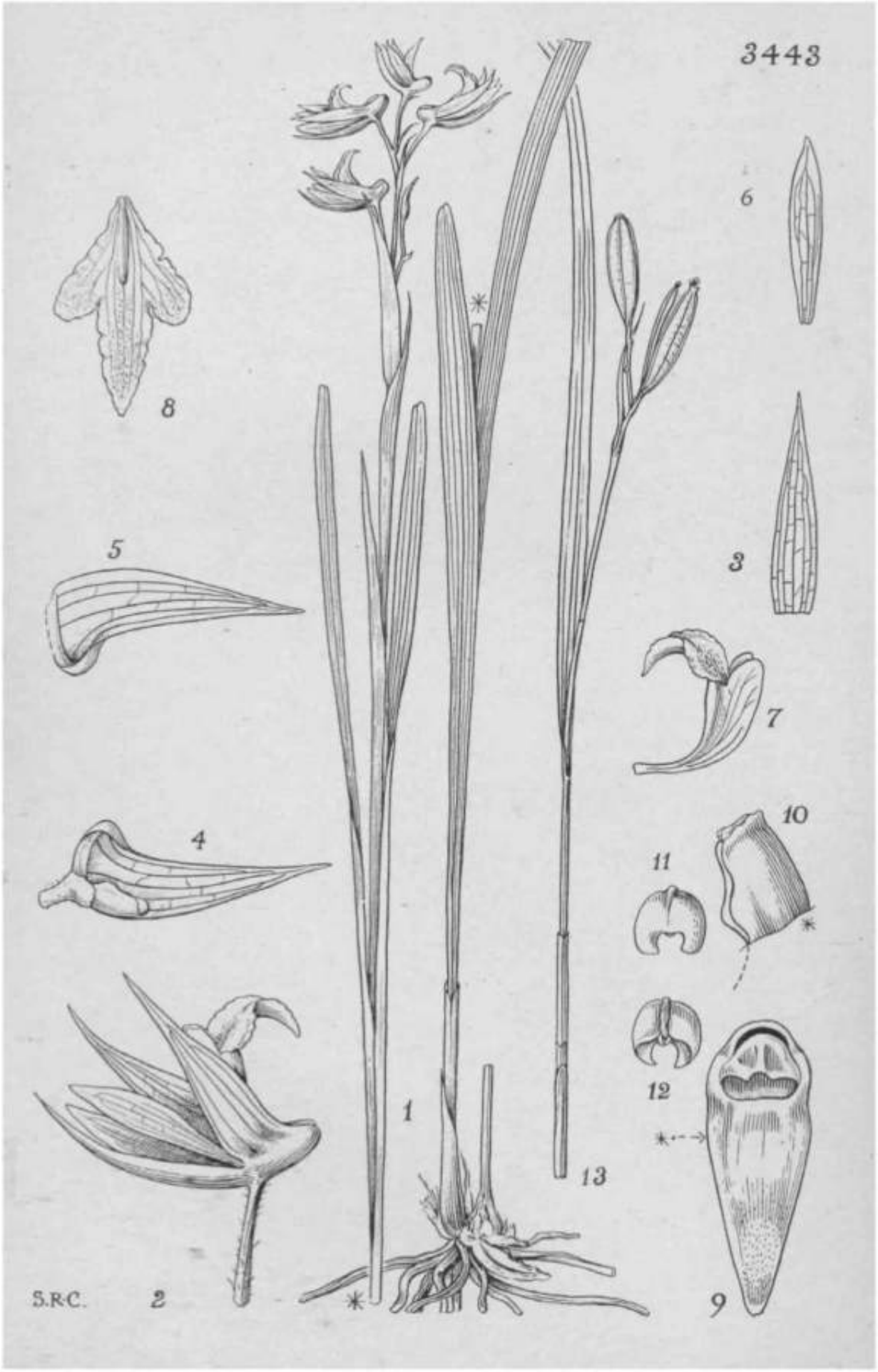
H. (§ **Macrurae) mirabilis** *Rolfe* in Dyer, Fl. Trop. Afr. vol. vii, p. 572 (1898); *H. insignis* Kolfe, I.e. 234, non Schlechter.—Species distinctissima, foliis fere ad vaginas redactis, inflorescentia densiflora, labelli partitionibus quam eis petalorum multo majoribus, calcari vix 1*5 cm. longo facile distinguenda.

Herba terrestris, erecta, glaberrima, 25^50 cm. alta; tubera ± ovoidea, 1-5-2 -5 cm. longa, circiter 1 cm. diametro. *Caulis* teres, laevis, basi usque ad 4 mm. diametro, fere aequaliter 5-6-foliatus. *Folia* omnino caulina, vix vel leviter imbricata, 2 infima laxe tubulosa, truncata vel obtusissima, usque ad 2*5 cm. longa, turn unum oblanceolatum, vaginiforme, apiculatum vel obtusum, 3-5-6 cm. longum, turn unum spathulato-oblanceolatum, apiculatum, totum 5-5-9-5 cm. longum, 1-2 cm. latum, 2-3 superiora oblanceolata vel lanceolato-elliptica, apiculata vel acuta, sensim decrescentia, in bracteas abeuntia. *Racemus* 7-12 cm. longus, 3-5 cm. diametro, densiuscule 5-10-florus ; bracteae foliaceae, ovato- vel late lanccolatae, acutae vel acuminatae, inferiores usque ad 3-5 cm. longae, floribus breviores; pedicelli (cum ovariis) 2-2-5 cm. longi. *Flores* suberecti, virides et albi. *Sepalum* intermedium erectum, ovato-lanceolatum, leviter acuminatum, valde concavum, 11-15 mm. longum, 6*5-7-5 mm. latum; sepala lateralia incurvatim patentia, oblique semiorbiculari-ovata, acuminata, 12-5-18-5 mm. longa, 7-9 mm. lata; omnia sepala viridia, quinquenervia, nervis dorso carinatis. *Petala* bipartita, papillata ; partitio posterior erecta, falcatim ligulata, 9-13 mm. longa, acuta, 1-3-2 mm. lata, viridis ; partitio anterior sursum recurvatim patens, curvatim ligulata, obtusa, 6-5-10-5 mm. longa, 1-2-1-5 mm. lata, marginibus recurvatis, viridi-alba. *Labellum* ex ungue ligulato tripartitum, incurvatum, totum 15-24 mm. longum, album, papillosum; partitio intermedia elliptico-lanceolata vel oblanceolata, acuta, 12-5-20-5 mm. longa, 4*5~7-5 mm. Jata, basi marginibus leviter recurvatis; partitiones laterales divergentes, spathulato-oblanceolatae, subacutae vel rotundato-obtusae, 8-5-13 mm. longae, 3-4 mm. latae, marginibus praesertim basi leviter recurvatis; calcar dependens sed leviter recurvatum, inferne modice inflatum, obtusum, 12-13-5 mm. longum, supra medium 1-5-2-5 mm. diametro, pallide viride. *Anthera* erecta, 0-6-5 mm. alta, connectivo apice cucullato rotundato leviter retuso ; canales porrecti, 3-5-4-5 mm. longi; staminodia quadrata vel semi-orbicularia, carnosa, circiter 1 mm. longa et lata. *Brachia* stigmatifera porrecta, apice capitatim truncata, superne canaliculata, 5-6-5 mm. longa; rostelli lobus intermedius erectus, triangularis, acutus, 1-5-3 mm. longus, quam anthera multo brevior, lobi laterales canales antherae aequantes.

NORTHERN EHODESIA. Abercorn District, Fwambo, Feb. 1893, *Carson* 9 (type); same locality, 1894, *Carson* 2. Mwinilunga District, near Eiver Kamwezhi, in *Brachystegia* woodland on sand, 3 Jan. 1938, *Milne-Redhead* 3936. " Basal leaves 0; lowest sheaths mainly whitish with green veins, others bright green with transparent margin; bracts similar; sepals green; posterior lobe of petals green, anterior lobe greenish-white, margin folded downwards; lip, stigma and rostellum all appear white; anthers and connective green, loculi yellow; ovary and spur pale green."

Apparently correctly referred to sect. *Macrurae* on account of the leaves being all more or less reduced to sheaths, and the general structure of the flower, particularly the broad petal and lip segments. The rather dense inflorescence, short spur and rather dark brown hue assumed on drying separate the species readily from *H. Walleri* Rchb. f. The leaf-pattern appears to be very constant, the central leaf being easily the largest.—V. S. SUMMERHAYES.

FIG. 1, flowering plant, *natural size;* 2, dorsal sepal, X 2; 3, lateral sepal, X 2 ; 4, petal, X 2 ; 5, labellum, flattened out, X 2; 6, "spur, x 2 ; 7, column, with perianth members cut off, X 3 :—a, anther-loculus; c, anther-canal; r, rostellum middle-lobe ; s, stigma; st, staminode; v, viscidium.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TABULA 3443.

POLYSTACHYA ISOCHILOIDES *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

P. (§ **Affines) isochiloides** *Summerhayes* in Kew Bull. 1939, p. 498.—Affinis *P. Goetzeanae* Kraenzl. et *P. Shega* Kraenzl., ab ilia floribus minoribus, labolli lobis lateralibus majoribus intermedio acutioro marginibus undulatis, ab hac caulibus longioribus, sepalis glabris vcl fere glabris, labello latiore basi callo lineari instructo distinguitur.

Herba epiphytica ; caules approximati e rhizomate brevi exorientes, erecti, infiorescentiis inclusis usque ad 38 cm. alti, teretes, 1-3 mm. diametro, basi ipso incrassati vaginis 1-2 arctis cincti, superne usque ad 3-4-foliati. *Folia* fere erecta, linearia vel ligulato-linearia, apice breviter obtuse vel subacute bidentata, 4-17 cm. longa, 2-6 mm. lata, superiora inflorescentiam saepius aequantia vel superantia. *Inflorescentia* simplex vel pauciramosa, usque ad 17 cm. longa, pluriflora ; pedunculus usque ad 12 cm. longus, vaginis membranaceo-papyraceis omnino obtectus; rami 1 vel 2, usque ad 1 cm. longi; rhachis dense pubescens; bracteae lanceolatae vel rarius ovatae, acuminatissimae, membranaceae, 1*5-7 mm. rarius usque ad 1*5 cm. longae; pedicelli (cum ovariis) 5-7 mm. longi, sparsissime usque densiuscule pubescentes. *Flores* adscendentes, cremei, fragrantes. *Sepalum* intermedium incurvatum, lanceolatum, acutum, convexum, 8-10 mm. longum, 2*5-3 mm. latum, quinquenervium ; sepala lateralia subfalcatim lanceolato-triangularia, acuta, margine antico basi dilatata, circiter 10 mm. longa, basi 4-5 mm. lata, mentum subconicum leviter incurvatum, 3*5-4-5 mm. longum formantia; sepala glabra vel rarius sparse pubescentia. *Petala* curvatim ligulato-oblanceolata, acuta vel leviter acuminata, 7-9 mm. longa, 1*7-2 mm. lata, trinervia. *Labellum* basi breviter unguiculatum, supra medium trilobatum, 8*5-9-5 mm. longum, 6-6*5 mm. latum, recurvatum, lobus intermedius ovato-lanceolatus vel late oblongo-lanceolatus, acutus vel acuminatus, marginibus crispato-undulatis, 4 mm. longus, 2*75 mm. latus, valde recurvatus; lobi laterales fere semi-orbiculares, rotundati, circiter 1 mm. longi, 2 mm. lati; lobi omnes pubescentes vel rarius capitatim (? glanduloso-) pubescentes; discus callo (vel carina) lineari laevi antice sensim dilatato apice ipso rotundato 3*5-4 mm. longo instructus. *Columna* leviter incurvata, 2 mm. longa, semi-teres; androcliniurn leviter excavatum; anthera hemisphaerica, antice sinu rotundato excavata, dorso leviter carinata; pollinia non visa; rostellum truncatum. *Capsulae* anguste ellipsoideae, 1*5-2 cm. longae.

TANGANYIKA TERRITORY. Handeni District, Mgera, Nyogi Mts. near Kwediboma, c. 1333 m. alt., in forest margin facing great precipice,

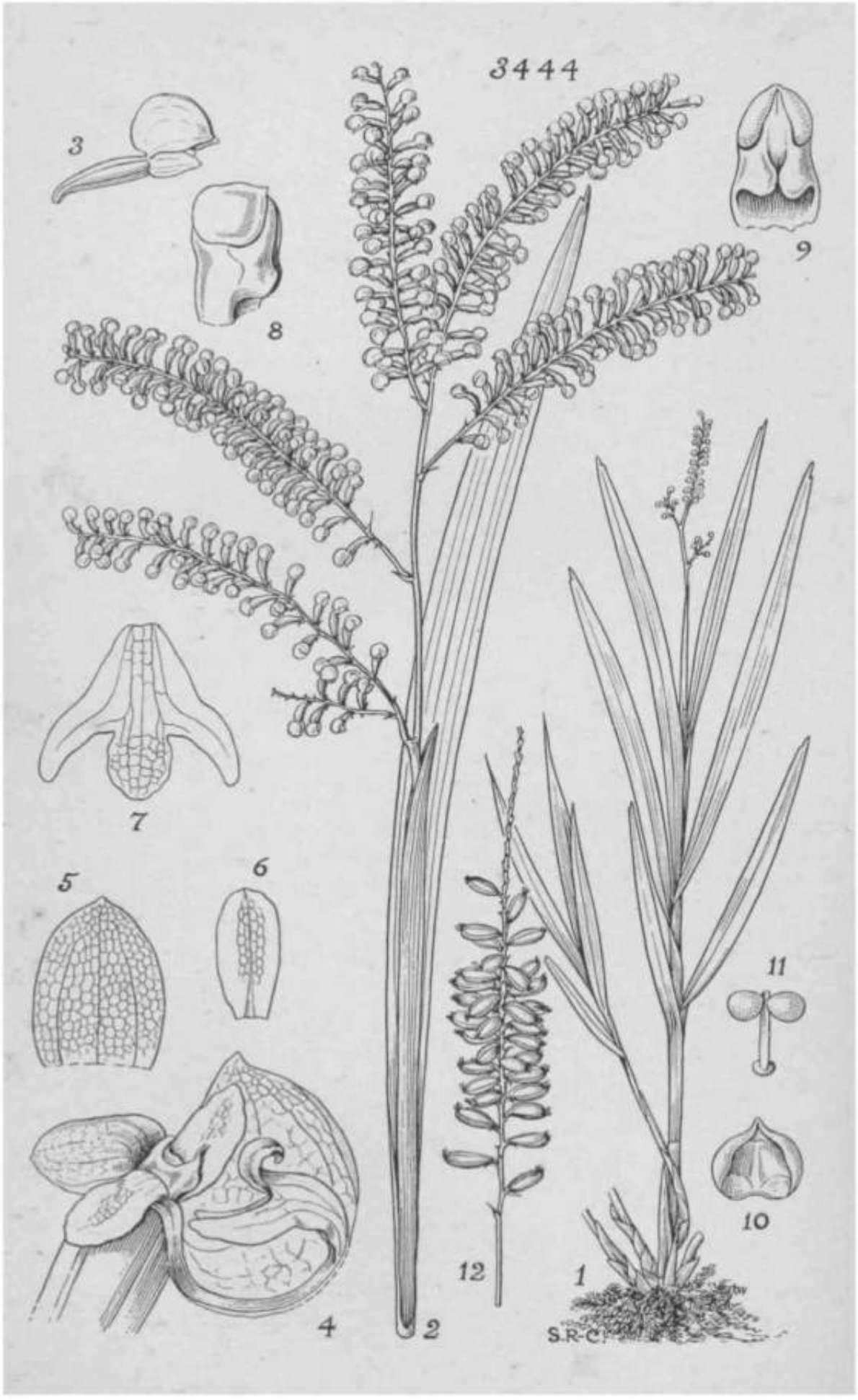
Sept. 1933, *Burtt* 4870 (type). Mt. Armfield, Koboriani Range, c. 1677 m. alt., on *Acacia* in *Berlinia-Brachystegia* woodland, Sept. 1933, *Hornby* 541.

KENYA COLONY. Mutha Hill, on trees outside forest, Aug. 1938, coll. *Boy Joanna,* Herb. Coryndon Memorial Museum, Nairobi, No. 7403. Chyulu Hills, above 1500 m., common on exposed trees, June 1938, *Bally* in Herb. Coryndon Memorial Museum, No. 8399.

I am placing this species, together with *P. Shega* Kraenzl. and *P. Goetzeana* Kraenzl., provisionally in Kraenzlin's sect. *Affines,* with which they agree in floral structure, but in habit, leaves and inflorescence they differ to such an extent from typical members of sect. *Affines* as to suggest that they should form a new section. The slender stems, almost leafless at the base, recall sect. *Caulescentes* but in other respects there is little similarity with members of that section. The present species is strongly reminiscent of *Isochilus linearis* in general habit, hence the specific epithet.

The species appears to be a widely distributed epiphyte in the dry open forests of eastern Kenya Colony and north eastern Tanganyika Territory. The Kenya Colony specimens are much dwarfer than those from Tanganyika and have sparsely pubescent instead of glabrous sepals, but agree in other respects.—V. S. SUMMERHAYES.

FIG. 1, flowering plant, *natural size;* 2, flower, lateral view, X 3; 3, dorsal sepal, x 3; 4, one lateral sepal and column, in natural position, X 3 ; 5, lateral sepal, X 3 ; 6, petal, X 3; 7, labellum, lateral view, X 3 ; 8, labellum, flattened out, front view, X 3; 9, column, front view with anther removed, foot almost straightened, the asterisk denotes level of Attachment of dorsal perianth segments, X 8; 10, column, lateral view, x 8; 11 & 12, anther, front and back views, X 8; 13, infructescence, *natural size.*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TABULA 3444.

POLYSTACHYA STAUROGLOSSA *Kraenzlin.*

ORCHIDACEAE. Tribus VANDEAE.

P. (§ **Caulescentes) stauroglossa** *Kraenzlin* in Engl. Pflanzenw. Ostafr. vol. C, p. 155 (1895) et in Engl. Bot. Jahrb. xxii. 22 (1895); Rolfe in Dyer, Fl. Trop. Afr. vii. 117 (1897); Kraenzlin in Fedde, Repert. Nov. Spec. Beih. xxxix. 21 (1926); Summerhayes in Kew Bull. 1939, p. 492 ; *P. graminoides* Kraenzlin in Kew Bull. 1926, p. 289.—*P. rhodoplerae* Rchb. f. similis, sed habitu elatiore, floribus duplo minoribus, labelli lobo intermedio triangulari usque semi-ovato lobis lateralibus pro rata longioribus, rostello verticaliter producto acuto facile distinguenda.

Herba saepius epiphytica sed rarius terrestris, usque ad 50 cm. alta. *Caules* approximate, erecti, teretes, 1-4 mm. diametro, fere aequaliter foliati, basi vaginis 2-3 arctis acutis instructi et radices flexuosas pubescentes emittentes. *Folia* propria 5-7(-9), suberecta, late linearia vel lineari-lanceolata, apice inaequaliter et acute bilobulata, supra articulum usque ad 22 cm. longa, 2-11 mm. lata, plurinervia. *Infiorescentia* terminalis, paniculata, 10-20 cm. longa; pedunculus 5-10 cm. longus, spathis 1-3 imbricatis arctis paleaceis acuminatis fere omnino vel omnino obtectus ; rami 1-5, patentes, saepius simplices vel rarissime prope basin ramulis brevibus instructi, usque ad 6 cm. longi$_j$ terminalis usque ad 9 cm. longus, floribus inclusis circiter 1 cm. diametro, fere ad basin subdense multiflori; rhachides graciles, teretes ; bracteae minutae, triangulares, acuminatae, floribus multo breviores. *Flores* erecto-patentes vel suberecti, fere globosi, albido- vel flavido-virides, purpureo-marginati, glabri; pedicellus (cum ovario) 2-3 mm. longus. *Sepalum* intermedium erectum vel leviter incurvatum, concavum, late elliptico-ovatum, obtusum, 1-7-2-5 mm. longum, 1-5-2 mm. latum ; sepala lateralia oblique rotundato-triangularia, acuta vel breyiter apiculata, margine breviore (postico) 2-2-2-4 mm., margine antico 2-9-3-4 mm. longa, mentum late rotundatum, 2-1-2-4 mm. longum formantia ; omnia sepala trinervia. *Petala* elliptico- vel subspathulato-ligulata, obtusa vel rotundata, 1-4-2-2 mm. longa, 0-6-0-8 mm. lata, uninervia. *Labellum* ex ungue flabellato-ligulato trilobatum, 2-4-2-8 mm. longum, 2-5-3-3 mm. latum; lobus intermedius rotundato-triangularis vel semi-ovatus, obtusus, apice recurvatus, 0-8-1 mm. longus, basi 1-1-2 mm. latus; lobi laterales erecti, ex intermedio divergentes, oblique curvatim ligulato-lanceolati; discus ecallosus. *Columna* brevis, fere teres, circiter 1 mm. alta, androclinio excavato; anthera hemisphaerica, umbonata, filamento distincto; pollinia ovoidea, stipite ligulato infra apicem dilatato 0-7 mm. longo, viscidio ovato vel elliptico 0-3 mm. longo ; rostellum verticaliter proauctum, acutum. *Capsula* obovoideo-fusiformis, circiter 5 mm. longa, 0-4-0-5-2 mm. diametro.

BELGIAN CONGO. **Ituri Distr., W. Lendu (W. of Lake Albert), 1100 m., in gallery-forest, Sept. 1891, *Sluhlmann* 2670 (type).**

UGANDA. **Bunyoro, Budongo Forest, Sept. 1933, *Eggeling* 1357 ; Sept. 1935, *Eggeling* 2186 ; Ankole, 1350 m., 1905, *Dawe* 387 ; Kampala-Mubende Road, 15 miles from Kampala, in forest, Sept. 1932, *Eggeling* 1070; Mukono (E. of Kampala), common in forests, Oct. 1914, *Maithnd* 14 B ; Entebbe, 1170 m., Oct. 1905, *Brown* 338 ; no locality, *Liebenburg* 801.**

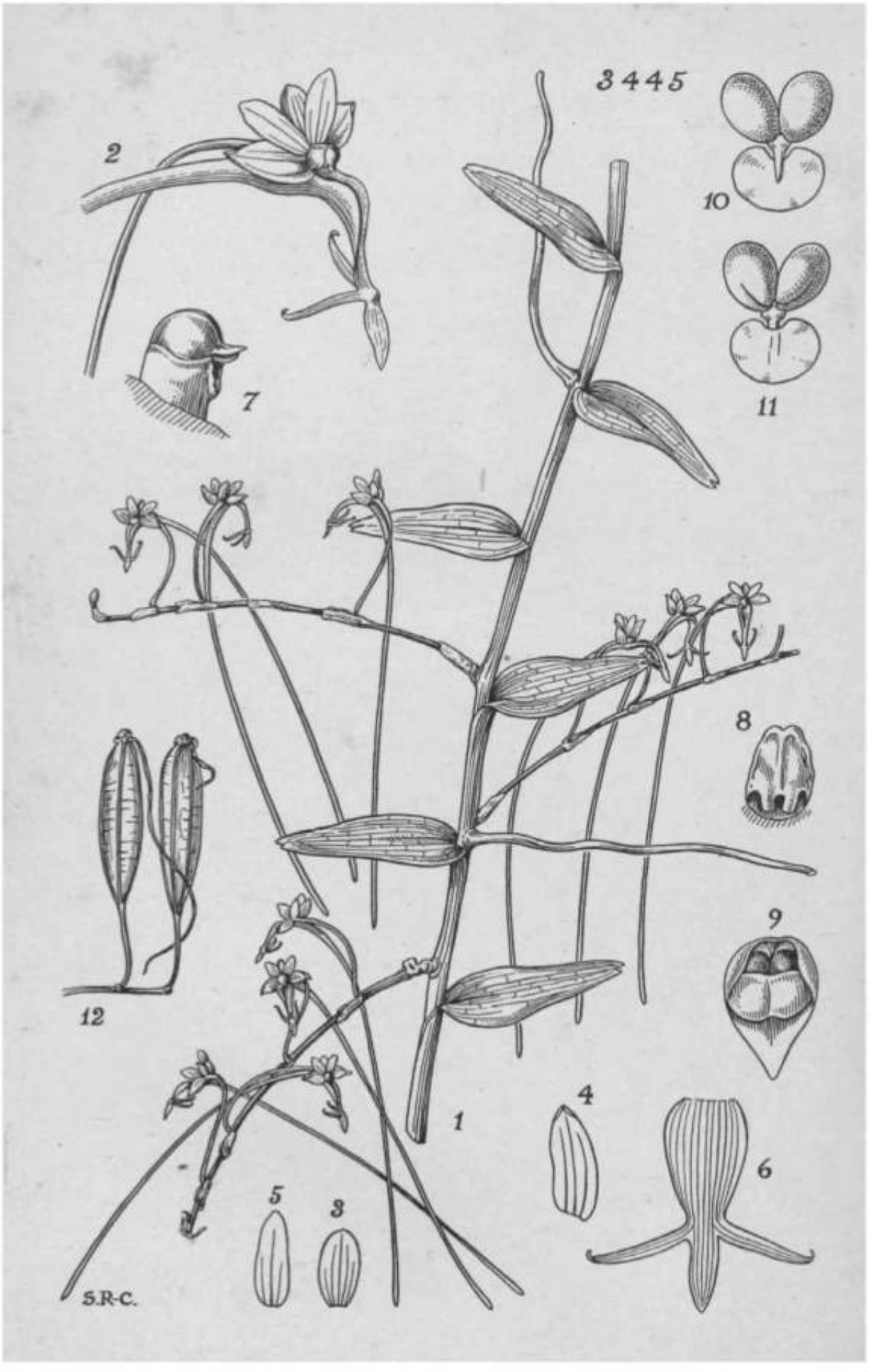
Like *Polystachya parviflora* Summerh. (see Kew Bull. 1937, 463-4) this is a species which is intermediate in character between sects. *Caulescentes* and *Calluniflorae.* The habit of P. *stauroglossa* is in general that of sect. *Caulescentes,* among the species of which it closely resembles *P. rhodoptera* Rchb. f. From this it may be distinguished by the characters given in the diagnosis.

In floral characters, particularly the small, almost globular flowers, the distinct anther-filament and the strongly produced very acute rostellum, *P.. stauroglossa* approaches several species in sect. *Calluniflorae,* notably P. *polychaete* Kraenzl., P. *Adansoniae* Rchb.f. and P. *Stuhlmannii* Kraenzl. All these species have relatively broader and blunter leaves, simple inflorescences and long setaceous reflexed bracts.

P. *ra?nulosa* Lindl. has an acute produced rostellum and distinct filament and a similar lip in which, however, the undivided part is relatively longer, this being associated with a much longer mentum. The general habit is very different from that of P. *stauroglossa,* the leaves being more or less basal and much broader, although in var. *angustifolia* Summerh. the leaves are narrower than in the normal form.

At present it seems advisable to retain P. *stauroglossa* in sect. *Caulescentes,* but with further knowledge of the genus it may be necessary to transfer it and also P. *parviflora* to a modified sect. *Calluniflorae.*—V. S. SUMMERHAYES.

FIG. 1, flowering plant, to show habit, *one-half natural size*; 2, uppermost leaf and inflorescence, *natural size;* 3, flower, lateral view, X 4; 4, flower with one of lateral sepals removed to show labellum and column, X 12; 5, dorsal sepal, X 12; 6, petal, X 12; 7, labellum, spread out, X 12; 8 and 9, column, side and front views, X 16; 10, anther, from below, X 16; 11, pollinarium, X 16; 12, branch of infructescence, *natural size.*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TABULA 3445.

TRIDACTYLE WAKEFIELDII *(Rolfe) Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

T. Wakefieldii *(Rolfe) Summerhayes* in Kew Bull. 1936, p. 232. *Angraecum Wakefieldii* 'Rolfe in Dyer, Fl. Trop. Afr. vii. 146 (1897), partim.—Species distinctissima, caulibus longis gracilibus, foliis brevibus ± patentibus, labelli lobis lateralibus quam intermedio longioribus sed integris, calcari 6-7 cm. longo, viscidio pro genere magno distinguenda.

Herba epiphytica, scandens, ultra 1 m. alta, caule longo gracili 1*5-3 mm. diametro radices numerosas flexuosas ramosas tenues emittente. *Folia* 1-2*5 cm. distantia; laminae patentes vel leviter reflexae, oblongo-lanceolatae, lanceolatae vel ovato-lanceolatae, apice breviter, aequaliter vel paulo inaequaliter, acute bilobulatae, 1-5-3 cm. longae, 5-13 mm. latae : vaginae arctae, longitudinaliter pluricostatae, internodiis paulo breviores. *Infiorescentiae* racemosae, patentes, graciles, 4-6 cm. longae, laxe 4-6-florae, basi vaginis duabus membranaceis imbricantibus truncatis instructae; bracteae praesertim inferiors vaginiformes, membranaceae, obtusae vel truncatae, usque ad 5 mm. longae. *Flores* ± erecti, albi, ovario (cum pedicello) 1-2 cm. longo. *Sepalum* intermedium oblongo-ellipticum, obtusum vel apiculatum, 3 mm. longum, 1-7 mm. latum, quinquenervium; sepala lateralia oblique oblongo-lanceolata vel oblonga, subacuta, 4-4*5 mm. longa, 1-6 mm. lata, trinervia. *Petala* paulo oblique lanceolato-oblonga, obtusa vel subacuta, 3*5 mm. longa, 1 -5 mm. lata. *Labellum* e parte basali concava ± elliptica vel ovata anguste trilobatum, totum 1 cm. longum, inter apices loborum lateralium 1 cm. latum ; lobus intermedius lanceolato-ligulatus, acutus, 3-5 mm. longus, 1-2 mm. latus; lobi laterales patentes, lanceolato-lineares, apice breviter recurvati, 4*5-5 mm. longi, basi 0-6 mm. lati; calcar ex ore circiter 2 mm. diametro sensim angustatum, filiforme, 6-7 cm. longum. *Columna* brevis, circiter 1 mm. longa ; anthera hemisphaerica, antice anguste et acute rostrata, pollinii stipite unico apice spathulato basi angustissimo, viscidio magno reniformi-suborbiculari postice cordato; rostellum deflexo-productum, latum, truncatum, bifidum. *Capsulae* anguste fusiformi-ellipsoideae, obtuse 6-angulatae, 2-2*5 cm. longae.

KENYA COLONY. Nyika Country, *Wakefield* (type); Mombasa, Nov. 1884, *Wakefield* (partly).

ZANZIBAR. NO exact locality, May, *Vaughan* 2011, 2109.

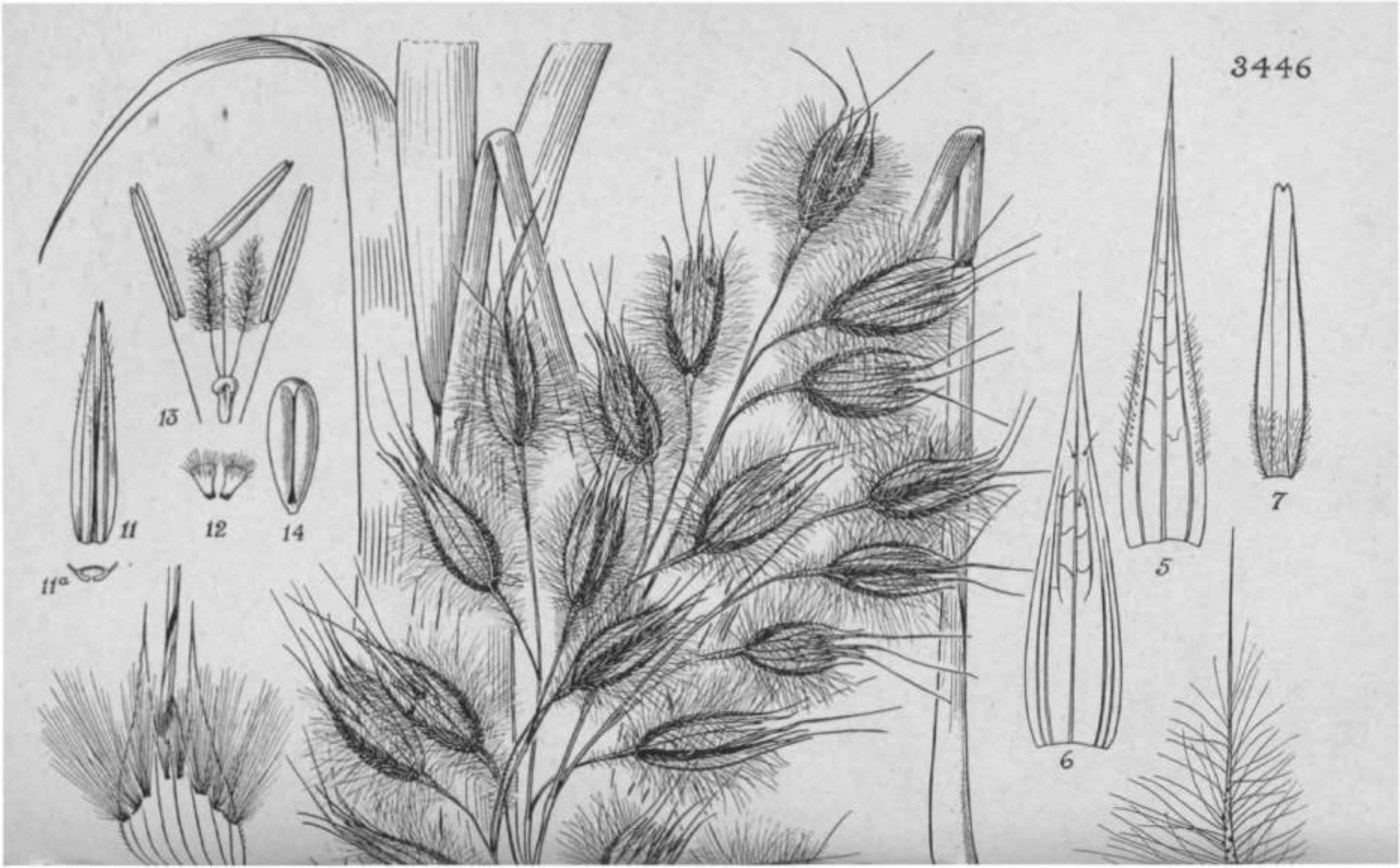
I have previously (see reference above) dealt with the mixture in the original material of Rolfe's *Angraecum Wakefieldii* and have given reasons for considering that the species here figured is that which Rolfe

had primarily in mind. The drawings were all made from *Vaughan* 2109 & 2011, but these specimens are undoubtedly identical with what I consider to be the types of Rolfe's species.

T. Wahefieldii is easily distinguished from all other species of *Tridactyle* by the combination of characters given in the diagnosis above.

V. S. SUMMERHAYES.

FIG. 1, flowering branch, *natural size*; 2, flower, end of spur, and base of pedicel cut off, lateral view, X 4; 3, dorsal sepal, X 4; 4, lateral sepal, X 4; 5, petal, X 4; 6, labellum, spread out, spur removed, X 4; 7, column, with anther, lateral view, X 10; 8, column, from above, showing androclinium and rostellum after removal of pollinia, X 10; 9, anther, from below, with pollinia, x 16; 10 and 11, pollinarium, front and back views, X 16; 12, part of infructescence, *natural size*.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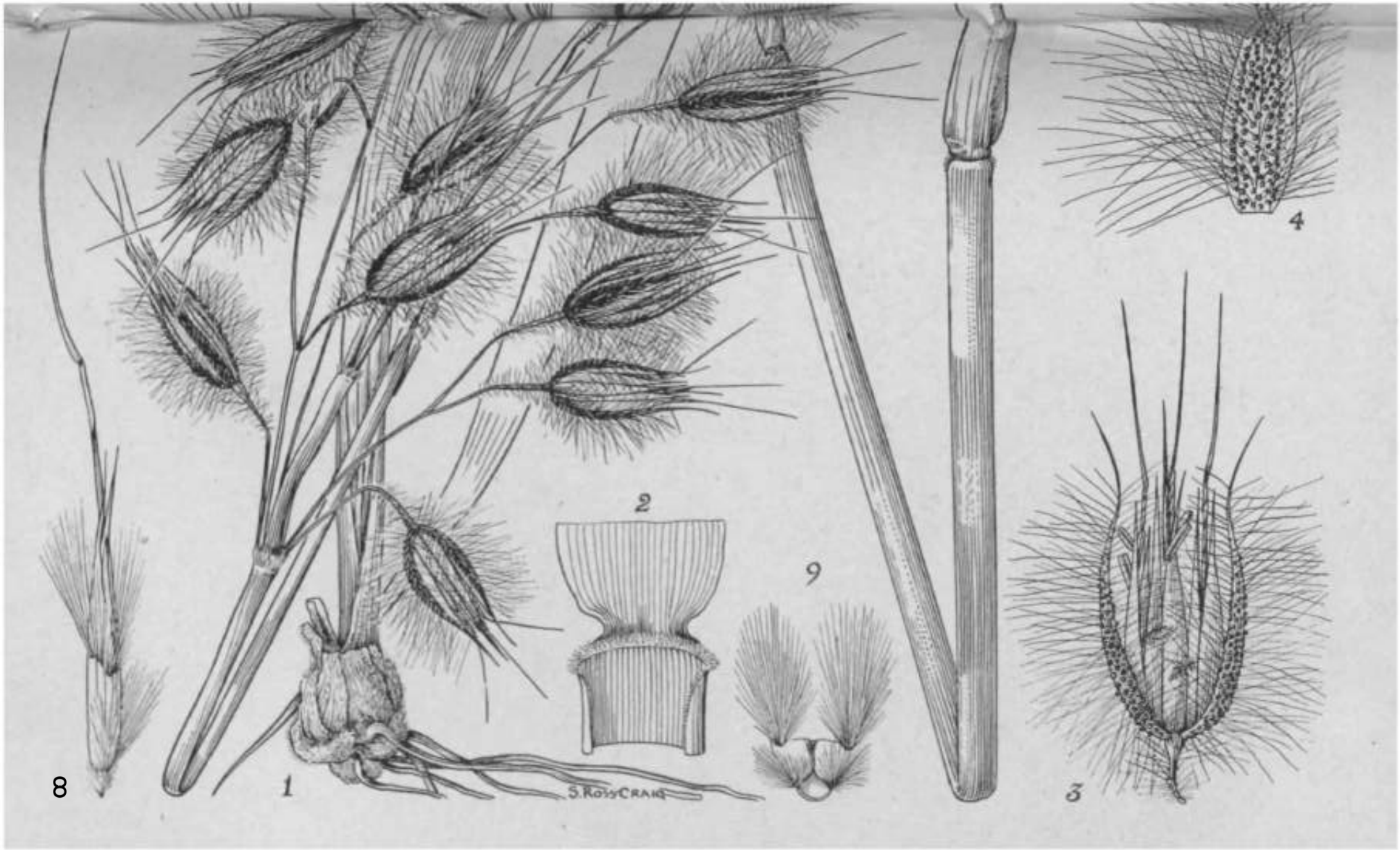
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TABULA 3446.

TRISTACHYA DECORA *Stapf.*

GRAMINEAE. Tribus ARUNDINELLEAE.

T. decora *Stapf* in Kew Bull. 1895, 75 ; C. E. Hubbard in Hill, Fl. Trop. Afr. x. 72 (1937). *T. Pilgeriana* Buscal. et Muschl. in Engl. Bot. Jahrb. xlix. 459 (1913); De Wild, in Bull. Jard. Bot. Brux. vi. 54 (?).—A speciebus ceteris pedicellis connatis vel fere connatis, spicularum triadibus facile deciduis, spiculis pilis albis longis ornatis, lemmate infero 5-7-nervi, lemmate supero apice bilobo (lobis tenuiter acutia) dorso supra medium fasciculis 6-8 pilorum transverse barbato, anthoecii superi callo rotundato-obtuso, ovario glabro differt.

Gramen perenne caespitosum, usque 1*2 m. altum. *Culmi* erecti, e rhizomate brevi orti, validiusculi, teretes, usque 5 mm. diametro, basi bulbosiformes et cataphyllis sericeo-viltosis obtecti, simplices, 2-4-nodes, glabri vel pilosi, laeves vel paniculam versus scaberuli. *Foliorum vaginae* arete appressac, marginibus pubescentes, serie transversa densa pilorum brevissimorum apice praeditae, ceterum glabrae vel laxe pilosae, apicem versus nonnunquam tuberculatae vel laeves, superiores internodiis breviores; ligulae ad seriem densam ciliorum brevium redactae ; laminae lineares vel lanceolato-lineares, basi abrupte contractae, in apicem durum acutum vel subobtusum attenuatae, usque 25 cm. longae et 12 mm. latae, apice involutae, ceterum planae, firmae, virides et purpureo-tinctae, glabrae vel marginibus basin versus pilis e tuberculis ortis sparse ciliatae, marginibus scaberulae, demum e vagina disarticulantes. *Panicula* erecta, oblonga vel ovata, laxa, 9-26 cm. longa, 5-8 cm. lata, 8-32 triades spicularum gerens ; rhachis asperula, nonnunquam pubescens, nodo infimo villosa; rami ad medium vel ultra erecti vel adscendentes, deinde abrupte curvati et patuli vel deflexi, usque 10 cm. longi, graciles, simplices vel triades 2-4 gerentes, inferne scaberuli, pubescentes, apicem versus gradatim incrassati et pilis longis albis e tuberculis atro-brunneis ortis laxe vel dense barbati; pedicelli brevissimi vel connati; triades patulae vel nutantes, cum parte supera rami demum deciduae. *Spiculae* anguste lanceolatae, 17-30 mm. longae. *Glumae* 3-nerves; inferior anguste lanceolata, in apicem setaceum vel aristatum longum flexuosum gradatim attenuata, spiculam aequans, rigida, minute pubescens et pilis numerosis albis nitentibus patentibus rigidiusculis usque 8 mm. longis e tuberculis atro-brunneis vel atris ortis arete barbata ; superior **lanceolata, setaceo-acuminata, inferiori aequilonga vel plerumque brevior, glabra vel marginibus infra medium pilis brevibus e tuberculis minutis ortis ciliata, luteo-brunnea.** ***Anthoecium inferumtf:*** **lemma lanceolatum, setaceo-acutum, 12-18 mm. longum, 5-7-nerve, minute asperulum, ceterum glabrum vel prope margines pilis rigidis paucis e tuberculis ortis praeditum ; palea anguste oblonga, 9-11 mm. longa,**

basin versus pubescens. *Anthoecium superum* lariceolato-oblongum: callus rotundato-obtusus, 0*6-1 mm. longus, utrinque fasciculis pilorum sericeorum usque 4 mm. longorum barbatus; lemma involutum, 6-6*5 mm. longum (parte integra), lobis tenuiter acutis vel breviter aristatis usque 5 mm. longis bilobum, coriaceum, 7-9-nerve, dorso supra sed prope medium fasciculis 6-8 densis pilorum sericeorum alborum usque 5 mm. longorum transverse barbatum, intus supra medium dense pubescens, ceterum glabrum; arista usque 22 mm. longa, columna scaberula usque 8 mm. longa ; palea anguste lanceolata, bidentata, 7-9 mm. longa, carinis infra medium anguste alata, superne minute pubescens. *Lodiculae* ciliolatae. *Antherae* 3, 4-6 mm. longae. *Ovarium* glabrum.

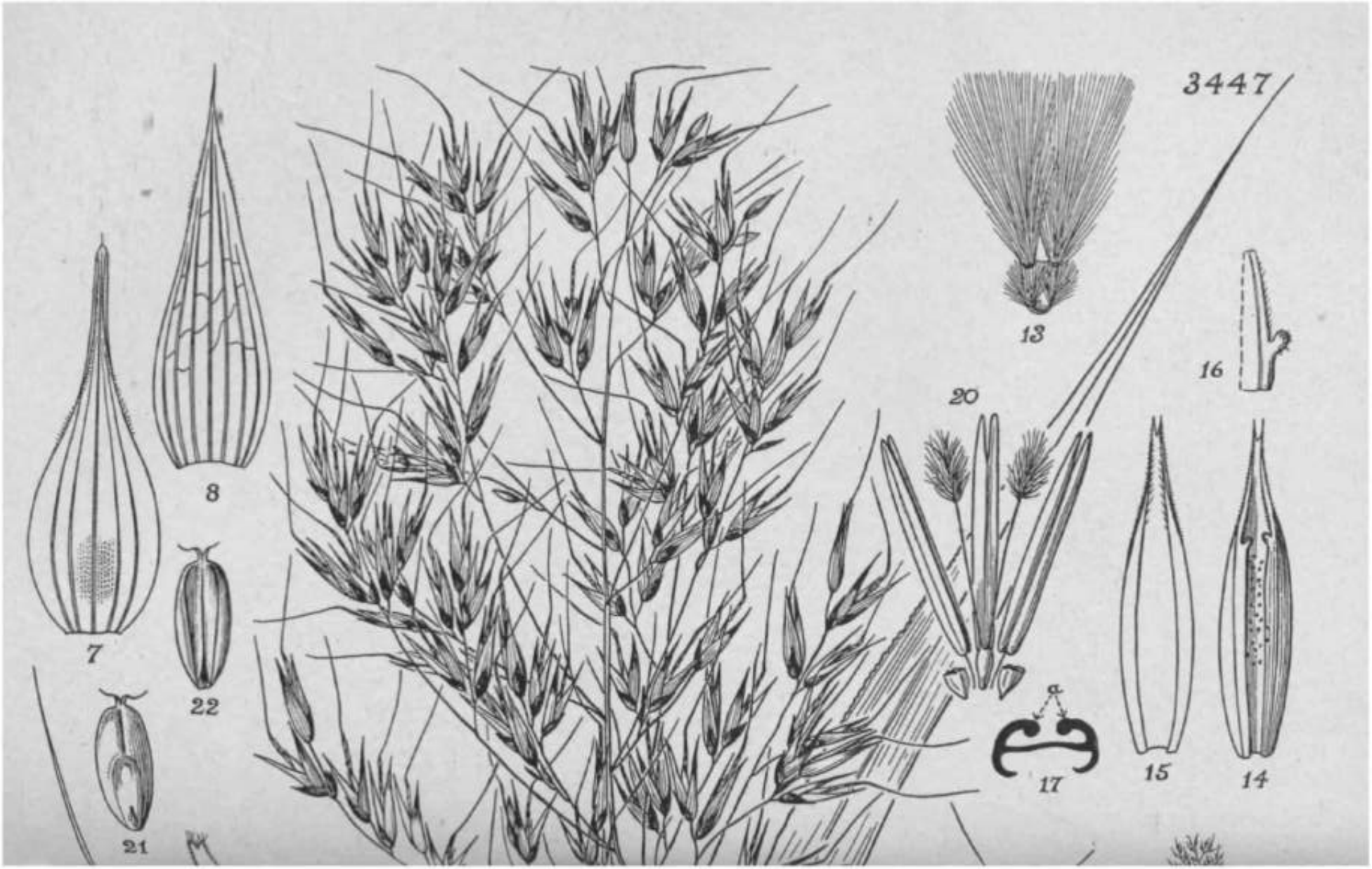
BELGIAN CONGO. Katanga : Luente, under trees, *Kassner* 2494 ; without precise locality, *S. RJiod. Dept. Agric. Herb.* 3066.

. NORTHERN RHODESIA. Tanganyika: Abercorn District; near Mwambeshi River, on rocky hills clothed with *Brachyslegia,* 1500 m., *Burtt* 6315; Urungu; Fwambo, *Carson* 36 (type); between Lake Bangweulu and Lake Tanganyika, 1170 m., *Duchess of Aosta.*

This emended description and the accompanying plate of this very beautiful grass have been prepared from excellent material collected by the late Mr. B. D. Burtt whilst on a journey through Northern Rhodesia.

A brief account of *Tristachya* Nees has been given in the Kew Bulletin (1936, 321-22), where the genus is divided into seven well-defined sections. These sections have in common the arrangement of the spikelets in clusters of three (triads) and the more or less narrowly lanceolate glumes, but individually each is characterised by some special development or modification of parts of the upper floret. Thus in the section *Zonotriche,* of which *T. decora* is at present the sole representative, the upper lemma is transversely bearded with 6-8 tufts of long white hairs and its finely acute lobes are shortly awned. The structure of this upper lemma is remarkably similar to that of species of *Danthoniopsis* (e.g. *D. Dinteri,* t. 3447), indicating either a case of parallel development or of closer connection in their past history than a superficial examination would suggest. The apparently restricted range of *Trislachya decora,* when considered in relation to the adaptation of its spikelets for widespread seed dispersal, may be due to the species being of comparatively recent origin, or to some special requirements regarding soil and moisture.—C. E. HUBBARD.

FIG. 1, plant, *natural size ;* 2, junction of sheath and blade to show ligule, X 3 ; 3, triad of spikelets, x 2; 4, lower glume, X 4 ; 5, upper glume, X 4 ; 6, lemma of lower floret, x 4 ; 7, palea of lower floret, X 4 ; 8, upper floret, side view, X 4 ; 9, basal callus of upper floret, x 6 ; 10, lemma of upper floret, X 4 ; 11, palea of uflier floret, back view, x 4; 11a, transverse section of palea of upper floret, X 4; 12, lodicules from upper floret, X 4; 13, stamens and pistil, X 4; 14, immature caryopsis, X 4.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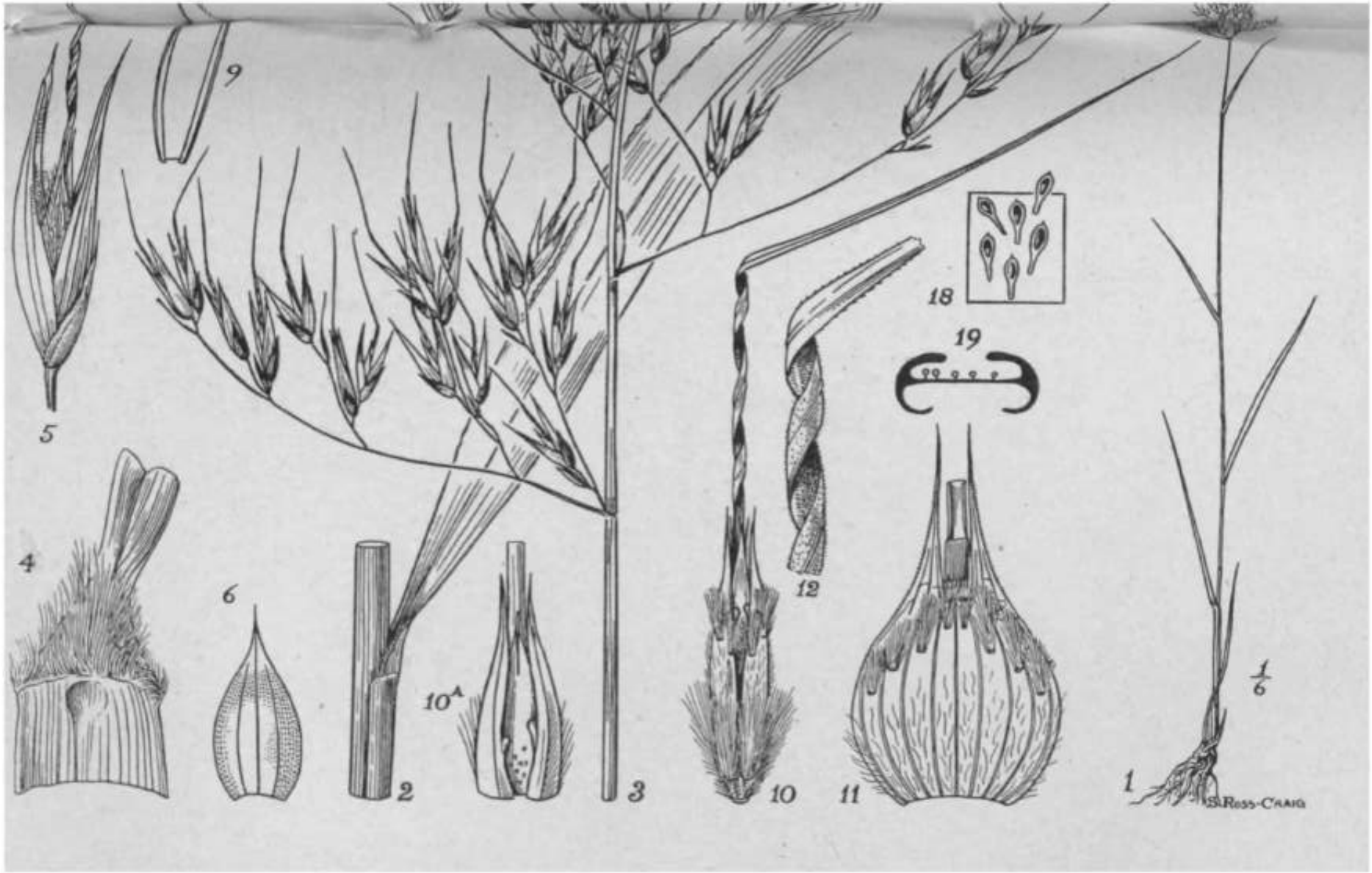
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TABULA 3447.

DANTHONIOPSIS DINTEBI *(Pilger) C. E. Hubbard.*

GRAMINEAE. Tribus ARUNDINELLEAE.

D. Dinteri *(Pilger) C. E. Hubbard* in Kew Bull. 1934, 436, et in Hill, Fl. Trop. Afr. x. 81 (1937); Obermeijer, Schweickerdt et Verdoorn in Bothalia, iii. 227 (1937). *Trichopteryx Dinteri* Pilger in Engl. Bot. Jahrb. li. 414 (1914); Garabedian in Ann. S. Afr. Mus. xvi. 398 (1925).— A speciebus ceteris habitu annuo, spiculis et aristis multo majoribus differt,

Gramen annuum, 0-5-2*8 m. altum. Culmi erecti vel leviter geniculati, graciliusculi vel plerumque validi, teretes, usque 6 mm. diametro, simplices vel e nodo infimo ramosi, 2-6-nodes, nodos inferiores versus puberuli, vel glabri, laeves. *Foliorum vaginae* firmae, teretes, internodiis inferioribus longiores, internodiis ceteris demum multo breviores, striatae, inferiores inter strias plerumque puberulae, nodis pubescentes, ceterum glabrae, laeves ; ligulae ad seriem densam ciliorum redactae ; laminae lanceolato-lineares, basin versus angustatae, in apicem tenuem setaceum attenuatae, usque 60 cm. longae et 2 cm. latae, planae, firmae, glabrae vel nonnunquam puberulae, nervosae, nervis retrorse et antrorse scaberrimae, marginibus albidis cartilagineis scabris, uno margine crispo. *Paniculae* laxae, ovatae, usque 55 cm. longae ; rhachis glabra, Iacyis ; rami solitarii vel 2-3-nati, laxe divisi, tenues, flexuosi, demum horizontaliter patentes, scabridi, inferiores usque 27 cm. longi; pedicelli inaequales, laterales 1-6 mm. longi. *Spiculae* binae vel ternae, Janceolatac, acuminatae, demum hiantes, 14-20 mm. longae, pallide stramineae et purpureo-variegatae, vel omnino pallidae, nervis viridibus. *Glumae* siccitate tenuiter chartaceae ; inferior anguste ovata, ovata vel ^liptico-ovata, acuta, acuminata vel setaceo-acuminata, plerumque breviter aristata, apice hyalina, 5-10 mm. longa, apicem versus minute pubescens, vel glabra, 3-5 nervis, nervis scaberula, plerumque purpurea; superior lanceolata vel anguste ovata, rostrato-acuminata, apice obtusa vel acuta vel mucronata, spiculae aequilonga, 5-nervis, glabra vel supra jnedium prope margines minute pubescens. *Anthoecium inferum $* : lemma lanceolatum vel anguste ovatum, acuto- vel setaceo-acuminatum, glumam superiorem subaequans, 7-nerve, glabrum vel supra medium prope margines minute pubescens; palea lanceolato-oblonga vel anguste elliptico-oblonga, 8-10 mm. longa, margines apicem versus ciliolata ; antherae 6-7 mm. longae. *Anthoecium superum* anguste oblongum : callus rotundato-truncatus, 1-1-5 mm. longus, pilis usque 5 ƒ ?' lon S is .(iense barbatus ; lemma 5-6 mm. longum (parte integra), bi..l..m, lobis acutissimis mucronatis vel breviter aristatis 4-6 mm. lon gia, coriaceum, 9-nerve, infra medium laxe pilosum, supra sed prope tedium pilorum alborum usque 2 mm. longorum fasciculus 6-8 in unam seriem transversam dispositis barbatum; arista **2-4** cm. longa,

e lemmate demum disarticulans, columna siccitate laxe torta 10-13 mm. longa intus brevissime puberula brunnea extra asperula, subula pallide viridi scaberula ; palea apice bidentata- vel bifida, 7-9 mm. longa, carinis alatis, alis rigidis induratis, prope apicem alarum appendiculam circiter 0-8 mm. longam ellipsoideam vacuam gerens, inter carinas papillis minutis clavatis praedita; antherae 3*5-6 mm. longae. *Caryopsis* elliptico-oblonga, 4-5 mm. longa, atrobrunnea.

ANGOLA. Mossamedes : near Km. 108*5 on the Mossamedes Railway, edge of dry stream bed in open forest, *Pearson* 2869.

SOUTH WEST AFRICA. Damaraland : Kunene River, also Kawale and Otjimbombe, stony kopjes, *Barnard* 40; Tsumeb, *Barnard in Herb. S. Afr. Mus.* 16525 ; Gaub, Heisib-Omo, on rocks, *Dinter* 2438 (type) ; Bobos, dolomitic mountain wood, *Dinter* 7562.

TRANSVAAL. Zoutpansberg District: Messina, *Turner* 29 ; ibid., *Rogers* 24776 ; lower slopes of Zoutpansberg, in rock crevices, *Schweickerdt & Verdoorn* 522.

The nine species of *Danthoniopsis* Stapf are confined to tropical Africa, with the exception of *D. barbata* (Nees) C. B. Hubbard which extends into tropical Arabia (Yemen), and *D. Stochsii* (Boiss.) C. E. Hubbard which is restricted to Baluchistan and Sind. They may be arranged in three groups, each group differing slightly in structure and considerably in its area of distribution. In two groups, one comprising the species *D. barbata* and *D. Stochsii* of north-east tropical Africa and the adjacent parts of tropical Asia, and the other, *D. Chevalieri* A. Camus and C. E. Hubbard of French Guinea and Sierra Leone, the upper lemma is provided with a continuous transverse beard of long hairs below each lobe. In the species of the third group (including *D. Dinteri)* from southern tropical Africa, however, the upper lemma is transversely bearded on the back with six to eight distinct tufts of hairs, a type of hair-arrangement of frequent occurrence in the genus *Danthonia* DC. *Danthoniopsis* is obviously very closely related to *Loudetia* Hochst. It may be distinguished mainly by the transversely bearded and deeply bifid upper lemmas. The spikelets of *Danthoniopsis* are, moreover, usually green or purplish and have thinner scarious or chartaceous glumes, whereas in *Loudetia* the spikelets are of various shades of brown and the glumes coriaceous.

Danthoniopsis Dinteri is the largest species and the only annual known at present in the southern group of the genus. Like other members of this group, it is well provided with means to secure widespread dispersal of its seeds, and, judging from the few collections from widely scattered localities, it has been more successful than the perennial species. At or before maturity the bearded callus of the fertile floret readily disarticulates from the rhachilla and by means of the long geniculate and twisted awn the floret may become attached to the fur of passing animals. An interesting feature of this awn is that it is provided with an abscission layer at the base, along which when dry it

may disarticulate from the floret. In many grasses the possession of a spirally twisted hygroscopic column to the awn, together with the presence of upwards-directed hairs on the lemma and basal-callus, such as we have in *D. Dinteri,* are characters usually associated with a sharply pointed basal-callus, the whole forming a useful combination for burying and anchoring the "seeds." In *D. Dinteri,* however, the twisted column of the awn—itself so readily deciduous—is accompanied by an almost truncate blunt basal-callus which would not easily penetrate the soil, an association which appears to be purely fortuitous. One possible explanation of this apparently functionless combination of modifications of the floret is that *Danthoniopsis* originated by the hybridization of species of *Loudetia* and *Danthonia,* the former bringing in the deciduous awn, and the latter the transversely bearded and deeply two-lobed lemma.—C. E. HUBBABD.

FIG. 1, habit figure, *one-sixth natural size;* 2, leaf-blade, *natural size;* 3, inflorescence, *two-third* natural size*; 4, junction of sheath and blade to show ligule, *X* 4; 5, spikelet, X 3 ; 6, lower glume, X 4; 7, upper glume, X 4 ; 8, lemma of lower floret, X 4 ; 9, palea of lower floret, X 4 ; 10, upper floret, front view, X 4 ; 10A, upper part of upper floret, front view, x 6; 11, lemma of upper floret, flattened, x 6 ; 12, portion of awn, X 12 ; 13, basal-callus of upper floret, X 6; 14 and 15,- palea of upper floret, back and front views respectively, x 6 ; 16, appendage *on* winged keel of palea, X 12 ; 17, transverse section through palea in region of appendages (a), X 12; 18, papillae from between keels of palea, X 94 (approx); 19, transverse section through palea in region of papillae, X 12 ; 20, lodicules, stamens and pistil from upper floret, X 6 ; 21 and 22, caryopsis, **back** and front views respectively, x 4.

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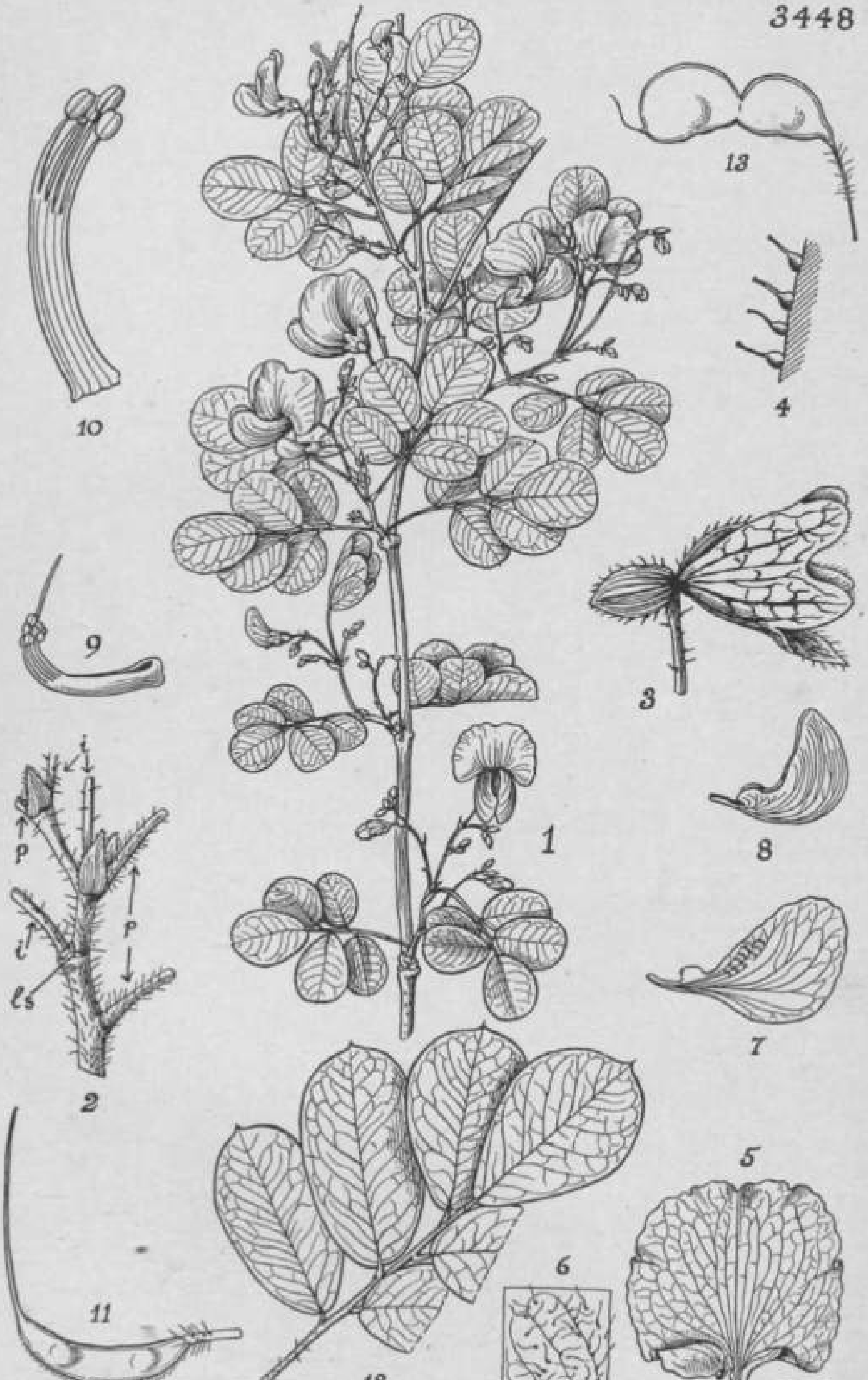

TABULA 3448.

AESCHYNOMENE HINTONI *Sandwith.*

LEGUMINOSAE. Subordo PAPILIONACEAE. Tribus HEDYSAREAE.

Aeschynomene Hintoni *Sandwith*; species nova sect. *Ochopodii* Vogel, *A. Palmeri* Rose affinis, stipulis brevioribus, foliolis paucioribus, corolla majore vexillo extra pilosulo, ovario secus suturam inferiorem tantum pilosulo nonnunquam glabro differt.

Frutex 1-2 m. altus, ramis multis intricatis lignosis glabris teretibus lenticillatis siccitate griseo-brunneis 2*5-4 mm. diametro ; ramuli similes, tenuiores, ultimi hornotini foliiferi abbreviati 1-3 cm. longi pilis aliis brevibus sursum crispatis aliis longioribus inaequalibus rigidioribus patulis apice plerumque glanduliferis basi tumido-tuberculatis induti; ramuli ultimi fruticis in locis umbrosis crescentis valde dissimiles maxime evoluti ac elongati, ad 25 cm. longi, internodiis 1-3 cm. longis, brunnei. *Stipulae* basi deltoideae ad 2 mm. latae, turn lanceolato-subulatae, totae 2-4 mm. longae, basi haud pioductae, longitudinaliter striatae, indumento ramulorum ciliatae. *Folia* ut videtur typica scilicet fruticis in locis apertis crescentis 2-3 cm. longa, imparipinnata ; petiolus ad 7 • 5 mm. longus, indumento ramulorum ; rhachis petiolulique ad 1 mm. longi, glabri; foliola 5 sese imbricantia, lateralia per paria alternatim disposita, obovata vel obovato-elliptica, apice late rotundata saepe fere truncata costa excurrente mucronulata, basi rotundata plus minusve levissime obliqua atque cordata, 0*6-1*5 cm. longa, 0*4-1-3 cm. lata, firme chartacea, glabra, siccitate utrinque viridia opaca, nervatione praesertim subtus reticulata, nervis primariis utroque costae latere circiter 7 ascendentibus longe a margine anastomosantibus. *Folia* fruticis in locis umbrosis evoluti multo majora, aliquantum dissimilia, ad 6 cm. longa, petiolo ad 1 -3 cm. longo, foliolis 4-6 sese imbricantibus apice saepe magis attenuatis obtusis 1-3 cm. longis 0*7-1-9 cm. latis. *Racemi* axillares atquc terminales, ramosi, foliis subtendentibus saepius breviores nonnunquam aequilongi, pilis patulis inaequalibus apice glanduliferis basi tuberculatis copiose induti; bracteae ovatae, 0-5-1 -5 mm. longae, ad 1 mm. latae, longitudinaliter striatae, ciliatae; bracteolae apice pedicelli calycem amplectentes similes sed majores, acutae vel obtusiusculae, 1*5-2 mm. longae, fere ad 1*5 mm. latae; pedicelli 2-3*5 mm. longi. *Flores* adulti circiter 1 cm. longi. *Calycis* tubus campanulatus, 3 mm. longus, 2*5 mm. latus, glaber ; lobi 2 superiores paulo infra medium connati oblongo-ovati rotundato-obtusi 1-1*5 mm. longi 1*5 mm. lati, 3 inferiores liberi quorum laterales triangulari-ovati obtusi 1*5 mm. longi atque lati intermedius longior atque paulo angustior acutissimus 2 mm. longus 1*3 mm. latus, omnes pracsertim inferiores (hi etiam longius) pilis basi tuberculatis plus minusve ciliati. *Corollae* teste lectore albae siccitate albo-purpurascentis vexillum valdc replicatum, late orbiculare,

apice late emarginatuin, basi in unguem brevem rotundatum, fere 1 cm. longum atque latum, dorso haud dense sed obvie patulc pilosuhim ; alae ungue 1 • 75-2 mm. longo kmina obovato-oblonga 7 *5–8 mm. longa 4 mm. lata basi latere superiore auriculata inferiore attenuata ; carinac petala libera, arcuato-cymbiformia, ungue 1*75 mm. longo lamina 6*5-8 mm. longa 3 mm. lata basi latere superiore conspicue auriculata inferiore attenuata. *Staminum* vagina utrinque fissa, 5*5 mm. longa ; filamenta 3 mm. longa. *Ovarium* 3-4 mm. longum, omnino glabrum vel (in typo) secus suturam inferiorem pilis satis copiosis praeditum, stipitc 2 mm. longo inferne glabro dimidio superiore pilis conspicuis flavescentibus basi tumidis vestito; stylus glaber, sursuin provectus, 4'5-5 mm. longus ; ovula 2-3. *Legumen* (plane maturum haud visum) stipite elongato ad 1 • 2 cm. longo dimidio superiore pilis patulo-ascendentibus conspicue induto, inter articulos dorsaliter prof undo ventraliter multo minus obvie sinuatum, articulis 1-2 oblique obovatis glaberrimis tenuiter reticulato-venosis in exemplis visis ad 1-3 cm. longis ad 0*9 cm. latis.

MEXICO. Guerrero : Placeres, district of Coyuca, shrub 1 m. on dry hill, March 6th, 1934, *Hinton* 6104 (typus in Herb. Kew.); Placeres-Cigarillo, district of Mina, 400 m., shrub 2 m. in woods, fls. white, February 9th, 1937, *Hinton* 10644.

This species has been described from two collections taken from shrubs growing under different conditions: the first, from exposed ground on a dry hill, bears reduced young shoots with small leaves and leaflets rising from the, intricately branched old wood; while the second, neater and widely dissimilar in appearance, came from woodland and the young shoots were accordingly drawn up to a considerable height and bear widely spaced leaves with much larger leaflets. The writer is confident that the normal habitat of a shrubby Mexican *Aeschynomene* is dry exposed ground and he has therefore chosen the first of these two collections as the type of the species to be figured in our plate, but the variation presented by the second gathering is indicated in the description and one of its leaves has been drawn. It was fortunate that fruit, in a fairly advanced state of maturity, was present on this second collection from a shady locality.

Aeschynomene Hintoni is evidently related to *A. Palmeri* Rose which is a native of the same state of Guerrero. *A. Palmeri* was given a very inadequate description by its author, possibly because it was noted as " a very distinct species " : no mention was made of the stipules, the width of the leaflets, the size of the flower, the presence or absence of indumentum on the standard or on the stipe of the ovary, or the size of the joints of the fruit. The species was based on Dr. E. Palmer's no. 106a (of 1895) from Acapulco, a gathering which is also cited under *Diphysa occidentalis* Rose. For a long time it was believed that this *Aeschynomene* was unrepresented at Kew, but recently it was discovered that the sheet of *Palmer* 106a in the cover of *Diphysa occi-*

dentalis was a mixture and that more than half of it was filled by material of an *Aeschynomene* which apparently agrees with Rose's description of *A. Palmeri.* These specimens differ from *A. Hintoni* in the longer (up to 7 mm.), more conspicuously subulate stipules ; in the 4-7 pairs of leaflets ; in the glabrous standard of the smaller corolla which does not seem to exceed 8 mm. ; and in both sutures of the ovary being pilosulous (although Rose described the ovary as glabrous). No ripe fruit is present. Apart from these differences the two species are very similar, and they share the character of the swollen-based hairs, exactly resembling those found on the rest of the inflorescence, along the upper half of the long ovary-stipe.

Aeschynomene Palmeri was treated by Standley (" Trees and Shrubs of Mexico," p. 491) as synonymous with the later described *A. paucifoliolata* Micheli, which was found by Langlassé in the same region (El Calabazal, Guerrero). Comparison of material shows that the reduction of *A. paucifoliolata* was quite unjustified. It has the longer subulate stipules, relatively small flowers and glabrous standard of *A. Palmeri* ; but the inflorescences form conspicuous graceful panicles, the bracteoles, calyx and corolla are smaller, the stipe of the ovary is clothed with a soft pubescence of strictly adpressed hairs without swollen bases, and the ovary and fruit are adpressed-pubescent all over the surfaces of the joints. Material of *A. paucifoliolata* agreeing well with Langlessé's specimen has been collected by Mr. Hinton both in the Coyuca district of the state of Guerrero (nos. 6708, 6938) and in the Temascaltepec district of the state of Mexico (nos. 1764, 1997, 4784, 7059).

It will be noticed that the pod of *A. Hintoni* has been drawn in a position that is apparently " upside down " in relation to the axis of the inflorescence and the calyx. This was deliberate, since all the more mature fruits on the dried material had reached that position owing to a twist in the long, delicate stipe. The same phenomenon has been observed less frequently in *A. paucifoliolata.* As the writer is uncertain whether this is an habitual morphological characteristic presumably favouring successful dehiscence, or merely a condition induced by human agency in the press, the pod has been drawn in the position assumed so often on the dried specimen.—N. Y. SANDWITH.

FIG. 1, flowering branch, *natural size* ; 2, base of inflorescence with uppermost stipules, x 3 (i = inflorescence; p = petiole; Is = leaf scar); 3, bracteoles and p[a]lyx, x 6; 4, haira on margin of bracteole, X 24; 5, standard, flattened out, inner surface, x 3 ; 6, portion of outer surface of standard, showing hairs, X 8 ; J, wing petal, outer surface, X 3 ; 8, keel, X 3 ; 9, androecium and pistil, X 3 ; 10. half of staminal sheath, x 6; 11, ovary with stipe, X 6; 12, leaf from specimen growing in woods, *natural size;* 13, immature fruit, showing elongated stipe, *natural size.*


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TABULA 3449.

LYSIMACHIA AN DIN A *Sa>idwith.*

PRIMULACEAE. Tribus LYSIMACHIEAE.

Lysimachia andina *Sandwith* ; species nova ex affinitate *L. chilensis* (Griseb.) Pax, foiiis minoribus, praesertim floribus omnibus axillaribus solitariis, praeterea calyce longiore, corollae lobis multo latius ovatis, capsula calyce breviore primo visu distinguitur.

Herba perennis, nisi basin versus glabra, caulibus e radice longe fibrosa ut videtur ascendentibus arcuatis atque flexuosis usque ad apicem crebre foliosis, 30 cm. vel ultra longis, siccitate brunneis tenuiter striatulis inconspicue angulatis nitidulis, inferne pilis multicellularibus plerumque sparse indutig. ceterum glabris sed glandulis minutis plus minusve copiose notatis, simplicibus vel breviter uniramosis; internodia 0*5-2*8 cm. longa. *Folia* inferiora obovato-cordiformia, apice late truncato-emarginata atque dcltoideo-cuspidatula, basi in petiolum 3-5 mm. longum ad 2 mm. latum cuneatim attenuata, 0*9-2*2 cm. longa, 0 • 8-1 • 5 cm. lata ; superiora lanceolata vel elliptica, apicem versus vel late acuminata vel sensim attenuata acuta, basi in-petiolum latum ad 5 mm. longum sensim attenuata, patula vel patentia, apicem versis sensim decrescentia, 1 • 5-4* 7 cm. longa, 0*5-1*8 cm. lata; omnia tenuiter chartacea, ut videtur plerumque glabra (in exemplo cl. Pearcei costa subtus necnon paginae foliorum inferiorum pilis multicellularibus sunt indutae), marginibus sub lente tenuiter cartilaginosis siccitate saltern irregulariter sinuato-erosulis, viridia, subtus pallidiora siccitate fere grisea, punctis lineolisque aurantiacis siccitate saepius nigrescentibus ubique praesertim secus margines crebre notata, nervis lateralibus utroque costae latere 3-5 ascendentibus subplanis, venulis sub lente Iaxe reticulatis. *Flares* racemosi, scilicet foliorum axillis solitarii, longipedicillati; pedicel!i 3-5 cm. longi, ascendentes vel patuli, graciliter saepe modo S-formi arcuato-flexuosi, glandulis minutis brevissime pedicellatis praediti. *Calyx* fere ad basin partitus, lobis anguste lanceolatis 4-5 mm. lòngis ad 1*5 mm. latis, prope margines glandulis crebre punctatis rarius striolatis, sursum demum incrassatis atque recurvatis. *Corolla* alba, fere usque ad basin partita, expansa ut videtur fere rotata, 1 -5-2*5 cm. diametro ; tubus 0*75 mm. longus ; lobi late ovati, acuti vel breviter late acuminati, 0*8-1-2 cm. longi, 6*5-8 mm. lati, tenuiter venosi, glandulis brevissime pedicellatis copiose marginati. *Stamina* corollae tubo 0*5 mm. supra basin aflixa neque tubo suo proprio praedita sed basi membrana annulari elevata connexa; filamenta gracilia, 5*5 mm. longa; antherae brevissimae, oblongo-subglobosae, 0*75-1 mm. longae. *Ovarium* globosum, 1 mm. altum et paulo latius diametro; stylus 5-6 mm. longus. *Capsula* tenuissime costato-striatula, valvis 5 dehiscens, 3-4 mm. longa, post

dehiscentiam 4-5 mm. diametro, lobis calycinis brevior. *Semina* numerosa, circiter 1 mm. longa, trialata, alis brunneis, corpore saturatius colorato.

ECUADOR. Prov. Loja: Eio de Uarunamaca, Dec. 18th 1876, *André* 4590 (typus); " fleur blanche. Plante délicieuse." Prope Lima [lapsu calami pro Loja ?], July 1876, *André* sine no. Prov. Azuay: district of Sigsig, on the upper eastern slopes of the Eastern Cordillera around Churrucos, 3000-3200 m., amongst scrub on wet rubbly slopes, fl. Oct., betw. 1876 and 1894, *Lehmann* 5148 ; " perennial herb with thin, switch-like, rarely branched stems up to 1 m. long. Leaves dark green, slightly shining. Flowers white." " Equador, 10-11,000 ft.", ann. 1861-2, *Pearce* : this sheet consists of three short stems with small leaves and short pedicels, and evidently represents a reduced form due to some factor of ecology or exposure; the multicellular hairs are plentiful and conspicuous on the stems, and extend to the midrib of the lower surface of most of the leaves and even to both surfaces of the lowermost of them.

The existence in South America of a second species of this well-known, widely-distributed and delightful genus comes as a surprise, particularly as all the specimens from which our figure and description have been drawn were collected very many years ago, and have been lying unidentified in the Kew Herbarium. But it must be remembered that the Eastern Cordillera of the Andes of Ecuador is a remote region which has been little explored for plants: Dr. Ludwig Diels has emphasised this in his recent paper on the vegetation and flora of this Republic, in Bibliotheca Botanica, Heft 116 (1937); and examination of his list of collectors shows that very few botanists of note, with the exception of Humboldt, Hartweg, Jameson, André, Lehmann, and apparently Richard Pearce, have gone far off the beaten track in the southern provinces of Azuay and Loja, towards the Peruvian frontier.

The home of our plant thus lies between those of *L. chilensis* (Griseb.) Pax, which occurs in damp shady places down to at least 600 ft. on the lower Cordilleras of Central Chile (see Reiche, Flora de Chile, V, 97 ; 1910), and *L. mexicana* R. Knuth, an obscure plant collected on a single occasion by Galeotti on the Cordillera of Oaxaca, in Southern Mexico. Now these two species, so distant in their distribution, yet so closely allied that Knuth himself has suggested that his *L. mexicana* is perhaps only a variety of *L. chilensis,* together constitute the small section *Theopyxis* which has been characterised by its white flowers borne in pedunculate, axillary and terminal umbels, and its winged seeds. *Theopyxis chilensis* was the name given in 1854 to the Chilean species by Grisebach, who described it as a new genus of *Primulaceae* from fruiting material collected in Valdivia by Lechler, the name being chosen for the purpose of indicating an affinity with *Dodecatheon.* Flowering material was later (1859-60, in Linnaea, xxx. 195) described by Philippi as a new species, *Lysimachia umbellata,* the author commenting, with

greater penetration than some later students, that his plant constituted a special section on account of the combination of alternate leaves and white corollas, whereby it approached the section *Ephemerum* (Reichb.) Endl., with the membranous ring connecting the stamens, a character which allied it more closely to the section *Lysimastrum* Endl. A few years later a backward step was taken when the plant was described and figured under Philippi's name in a monograph of *Lysimachim* in Abh. Nat. Ver. Hamburg, iv. 4, p. 21, t. 10 (1866), in which the author, Klatt, placed it in the section *Lysimastrum,* the species of which bear yellow flowers and, normally, opposite or verticillate leaves. In 1876, in the " Genera Plantarum," Bentham and Hooker reduced Grisebach's genus *Theopyxis* to *Lysimachia,* remarking that it differed only in the winged seeds. When Pax wrote the account of the *Primulaceae* for Englcr and Prantl's Pflanzenfamilien in 1890, he formally transferred Grisebach's species to *Lysimachia,* and treated it as the basis of a section *Theopyxis,* on account of the winged seeds. In 1905, in the monograph of *Primulaceae* in Engler's Pflanzenreich, vol. iv. 237, pp. 305-308, R. Knuth extended the section *Theopyxis* to include *L. chilensis* (to which he reduced *L. umbellata* Phil.), the now species *L. mexicana, L. Brittenii* R. Knuth of China and *L. grandifolia* Hemsl. of Siam, the sectional criterion being no longer the winged seeds but the umbellate inflorescence. This author admitted that the section thus had no defined area of distribution and that the species perhaps had no common line of descent; and the latter seemed only too obvious to the late Dr. Handel-Mazzetti who, in his Enumeration of all the species of *Lysimachia* (in Notes Roy. Bot. Gard. Edinb. xvi. 81: 1928), rejected the two Asiatic species and limited the section *Theopyxis* of his subgenus *Eulysimachia,* without assigning a diagnostic character to it, to *L. chilensis* and *L. mexicana.*

The interest of the new plant from the Andes of Ecuador lies in its close relationship with *L. chilensis* (and presumably with *L. mexicana,* of which no specimen has been seen) in all important characters such as habit, alternate leaves, leaf-form, indumentum where present, calyx, white corolla, stamens similarly inserted and basally connected and with long slender filaments bearing very short anthers, capsule, and winged seeds; above all, in the reduction of its inflorescence to the simply racemose type, so different from the stalked, axillary, or terminal and bracteate umbels which are typical of *L. chilensis* and which give the effect of a long terminal spray since the upper subtending leaves are reduced to mere leafy bracts. Knuth, who provided an original figure (no. 62) for *L. chilensis,* noted *(loc. cit.,* p. 308) that there usually *[saepius]* occur some solitary flowers in the axils of the lower leaves: this phenomenon cannot be observed on the Kew material, but there is a specimen with a poorly-developed inflorescence collected in 1902 by H. J. Elwes in the Renaico Valley on which, below the terminal umbel, there arises a solitary pedicel from each of three alternating axils of the upper, very reduced, bract-like leaves, while of the axils between these the two higher support stalked umbels and the lowest is empty.

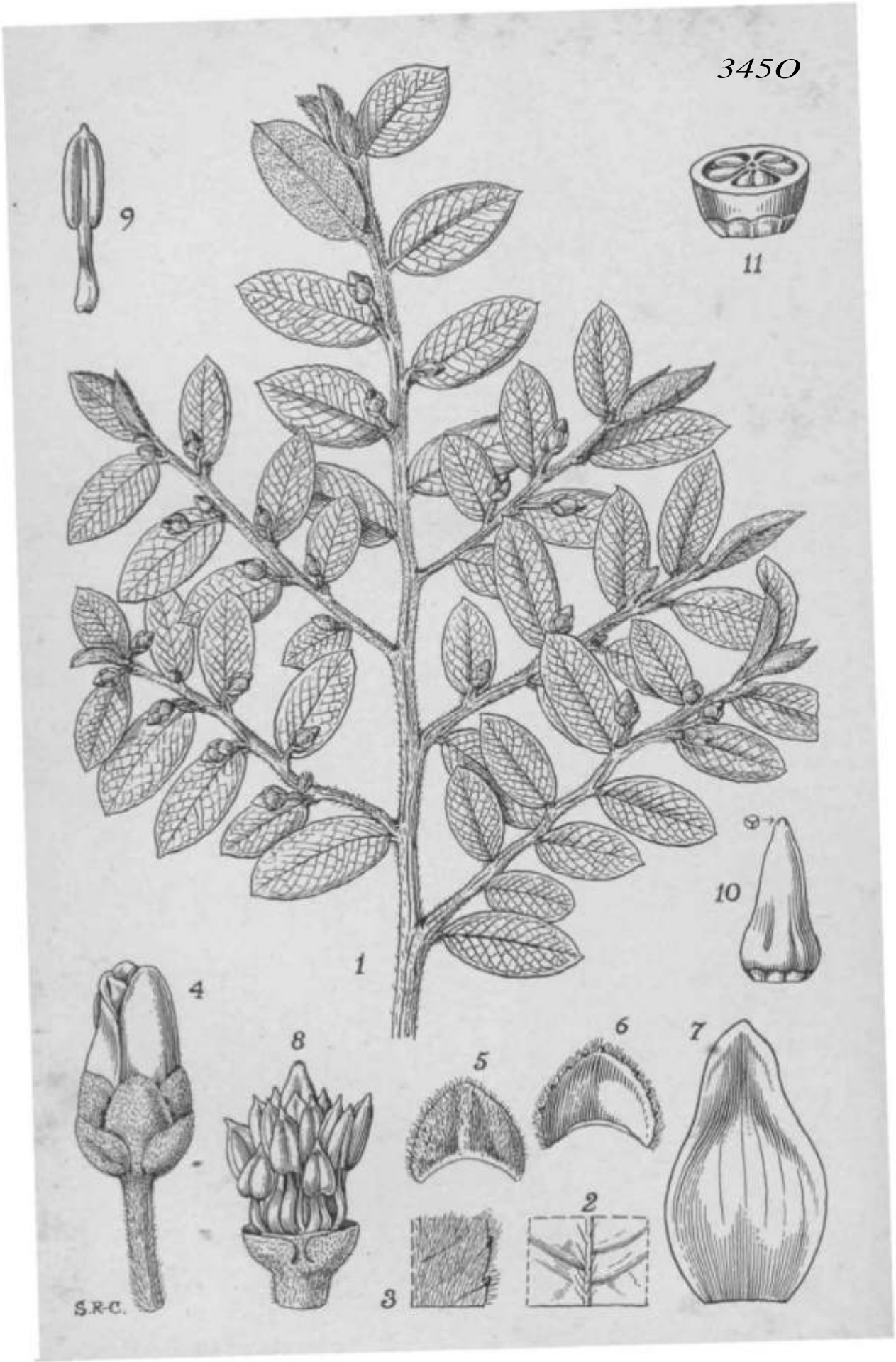
Presumably, this is an interesting progressive tendency appearing in a species whose inflorescence is more " primitive " than that of its ally on the far higher Andes of Ecuador. It is noteworthy that another species, far away on the mountains of Mexico—which nevertheless, may be regarded as a northward extension of the Andes—should retain the inflorescence at a similar stage of evolutionary development. *L. mexicaya* is described as completely glabrous, with lanceolate and long-acuminate leaves, unequal pedicels, longer bracts than *L. chilensis,* and a large corolla; otherwise, as matching it exactly, and perhaps a variety of it. We must hope that it will be re-collected, so that the possibility of a misplaced or erroneous label may be rejected, and the species studied in relation to the two South American plants.

In the light of the above remarks, the discovery, just in time for reference here, of the description by Dr. P. C. Standley of a new species of *Lysimachia* from the mountains of the rich Occidente of Guatemala, is of extreme interest (see Field Museum Publ., Bot. Ser., xxii. 369 : 1940). *Lysimachia Steyermarkii* was collected by Mr. Julian A. Steyermark in January 1940 in the Department of Quezaltenango, on moist steep banks at the base of rocky cliffs on the Volc&n de Zunil, at an altitude of 2500-3800 metres. The specimens were in fruit, so that the characters of the corolla and stamens are unknown. At the end of his description—which includes no reference to the seeds—Dr. Standley remarks that the species is related to *L. mexicana* and its ally *L. chilensis,* " but differs from both in its sessile rather than long-pedunculate fascicles of flowers. Its leaves, too, are relatively much broader than those of *L. ?nexicana."* Points to notice in the description are the long (4-15 mm.) petioles; the alternate leaves, sparsely villous or almost glabrous on both surfaces, 3-6 cm. long, 1-5-2-5 cm. broad; the flowers fasciculate in the leaf-axils above the middle of the stems, on pedicels only 1-5-2 cm. long; and the fruiting sepals 5 mm. long, equalling the capsule. It is probable that we have here a development in the evolution of the inflorescence directly intermediate between the two stages which we have already compared ; but examination of the corolla, stamens and seeds must first establish the position of *L. Steyermarkii* in the section *Theopyxis.*

Meanwhile, apart from the obvious character of the reduced inflorescence, and the much higher elevation at which it grows, *L. andina* differs from *L. chilensis* in its smaller leaves, and in details of the flower and fruit, especially in the broader, more ovate lobes of the corolla which give it a more rotate facies. The four plants which we have been discussing are not related to any of the North American species of *Lysimachia,* which all have yellow flowers, opposite or verticillate leaves, and either stouter filaments or longer anthers. The section *Theopyxis* was admitted by Handel-Mazzetti (I.e. p. 55) to be somewhat isolated, its nearest relationship not very clear. It has been separated, as we have seen, on the grounds of the umbellate inflorescence—a character which is finally broken down by our new species—and the winged seeds. Bentham and Hooker, in the " Genera Plantarum,"

described the seeds of *Lysimachia* as " oblonga orbiculata v. angulata, interdum alata," and these words were transcribed by Knuth for his generic description in the Pflanzenreich. But the latter author very rarely describes the shape of the seeds of any given species (the exceptions are *L. chilensis* and *L. insignis* Hemsl., the seeds of which are also figured; and *L. Remyi* Hillebr.), while Dr. Handel-Mazzetti never mentions them at all, even in his long preliminary discussion of diagnostic characters. Future monographers, when considering the origin and affinities of the section *Theopyxis,* will doubtless concentrate on the white corolla, the very unusual stamens with their connecting membranous ring, and the numerous winged seeds, paying less attention to the habit, the alternate leaves and the inflorescence.—N. Y. SANDWITH.

FIG. 1, lower part of plant, *natural size*; 2, one of the larger leaves, *natural size* ; 3, inflorescence, *natural size*; 4, part of lower surface of leaf, X 6 ; 5, calyx and gynoecium, X 4; 6, corolla, flattened out, X 2; 7, part of corolla, with stamen and connecting ring, x 4 ; 8, gynoecium, x 4 ; 9, capsule, X 4 ; 10 and 11, seeds, X 16; 12, transverse section of seed, X 16.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TABULA 3450.

FREZIERA MICROPHYLLA *Sandwith.*

THE ACE AE. Tribus TERNSTROEMIEAE.

Freziera microphylla *Sandwith*; species nova, ob folia pro genere minima notabilis, qua de causa *F. suberosam* Tul. speciem colombianam simulans, sed inter alia foliis basi haud inaequilateris floribus parvis pedicellis brevibus statim distincta ; *F. parvae* Kobuski speciei peruvianae forsan affinis, sed petiolis brevibus, foliis minoribus basi rotundatis subtus sericeo-tomentosis, sepalis extra sericeo-tomentosis difFert.

Frutex, ut videtur, vel arbor parva ; rami costati, sulcati, siccitate cinereo-nigrescentes, pilis ascendentibus nigrescentibus dense villosi; ramuli crebri breves distichi paralleli ascendentes, dense foliati, cetcrum ramis similes, angulati, indumento simili; internodia 5-10 mm. longa. *Folia* pro genera minima, clliptico-oblonga, apice acuta vel obtusa atque brcvissime cuspidatula, basi rotundata lateribus acqualibus, 1*2-2 *5 cm. longa, 0* 65-1* 2 cm. lata, coriacca, leviter satis obscure crenato-serrulata, marginibus vix vel basin versus tantum revolutis, supra nitida glabra nisi costa dimidio infcriore atque praesertim prope basin pubcscente, subtus pilis pallidis flavescentibus dense subsericeo-tomentosa, costa supra prominula subtus prominente, nervis omnibus supra prominulo-reticulatis subtus sub indumento obscuris, primariis utroque costae latere circiter 12 ascendentibus atque marginem versus anastomosantibus ; petiolus latus, brevissimus, circiter 1*5 mm. longus, indumento ramulorum. *Flores* axillares, 1-2-fasciculati, ascendentes vel nonnunquam (sub pressione tantum ?) cernui, masculi tantum visi; pedicelli ad 4*5 mm. longi, dense villosulo-pubescentes; bracteolae late ovatae, obtusae, circiter 2 mm. longae, 2-5-3 mm. latae, extra flavescenti-pubescentes, intus glabrae, secus margines glandulis nigrescentibus compluribus denticulatae. *Sepala* ovata, rotundato-obtusa, 3-3*2 mm. longa, 2-5-3 mm. lata, integra vel prope basin tantum glanduloso-denticulata, concava, coriacea, marginibus membranaceis, extra pilis flavescentibus dense pubescentia vel subsericeo-tomentosa, intus glabra. *Petala* libera, ovato-elliptica vel lanceolato-elliptica, obtusa, 6-3-7 mm. longa, 3-5-4-5 mm. lata, glabra, concava, coriacea, marginibus •membranaceis. *Stamina* 18, disco affixa, glabra, inaequalia ; filamenta 1-2 mm. longa, antheris subaequilonga vel breviora ; antherae oblongae vel ellipticae, 1*2-1*75 mm. longae, apiculo minuto terminatae. *Ovaiium* triloculare, stylo addito ovoideo-conicum, 4 mm. longum, basi circiter 2 mm. diametro, glabrum, stigmate apicali trilobulato obscuro lobulis cohaerentibus. *Fructus* non visus.

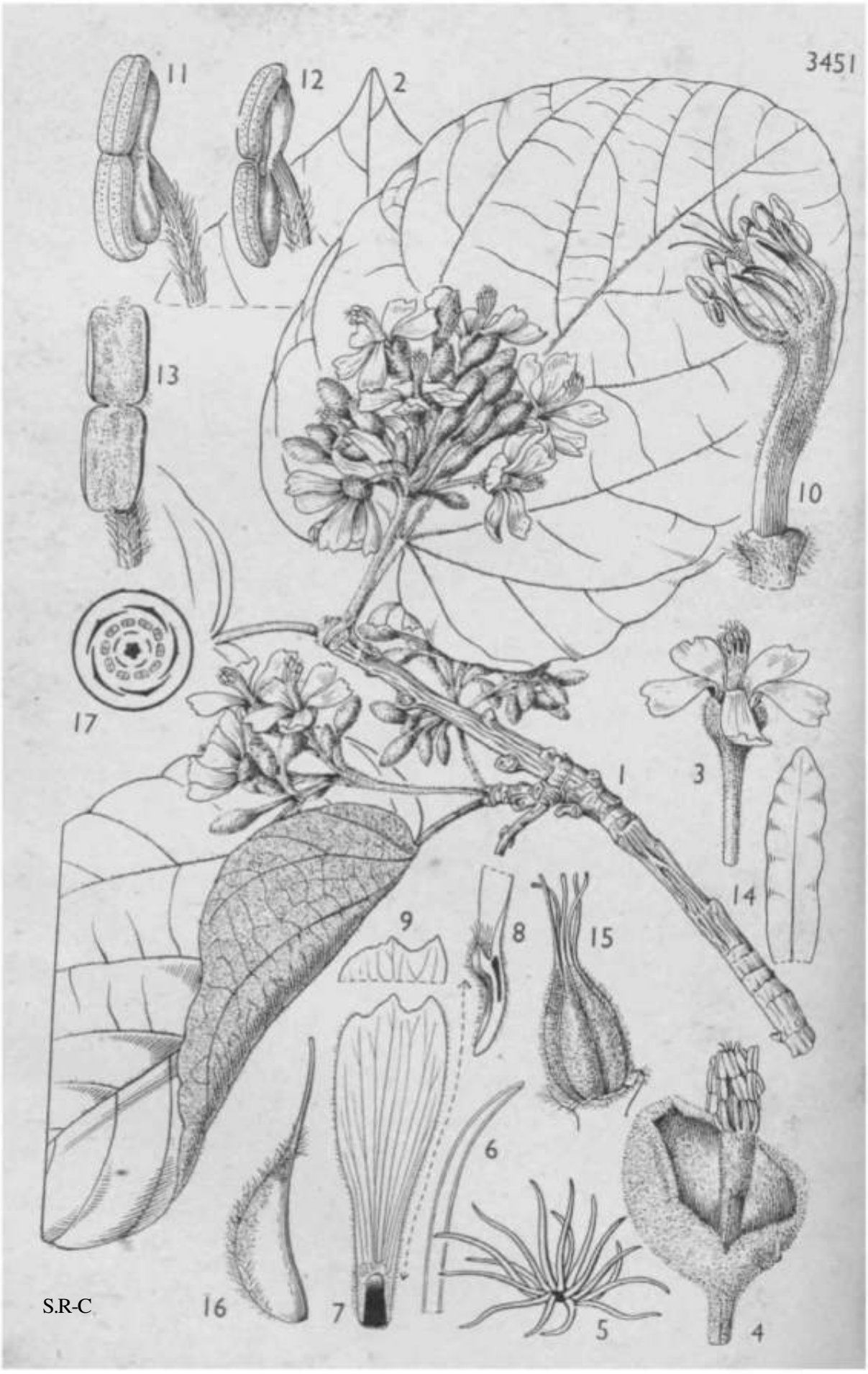
PERU. Dept. Amazonas: Chachapoyas, 1835, *A. Mathews* 1567 (typus in Herb. Kew.).

The two sheets of this outstanding species which were formerly in the herbaria of Bentham and Hooker came to light when the writer was re-arranging the Kew material of the genus *Freziera* by Mr. Clarence E. Kobuski's recent Synopsis (see *Journal of the Arnold Arboretum,* xxii. 457-496 : 1941). The specimens had been studied long ago, for Bentham had made a diswsection of one of the flowers on his sheet, while Planchon had pencilled a manuscript name of a new species of *Eurya* on Hooker's. The only other species of *Freziera* with comparably small leaves and short petioles is *F. suberosa* Tul., a rare plant which seems to have been collected on a single occasion by Goudot near Tolima, on the Cordillera Central of Colombia. No material of this has been seen, and only a photograph and a fragment were examined by Kobuski. Although similar to *F. microphyUa* in its very small, box-like leaves with short petioles and a sericeous lower surface, it evidently differs from it in the corky bark of the branchlets, the more strongly revolute leaves with unequal sides at the base, the keeled dorsal surface of the bracteoles, and especially in the much larger flowers with sepals 7-8 mm. long and 5-7 mm. broad. *F. parva* Kobuski, which Dr. Wcberbaucr collected in Peru in the same department of Amazonas, may well be a closer relative of Ma thews' species : it differs, according to Kobuski's description, in the larger leaves which have conspicuous (5-8 mm.) petioles, a cuneate base, both surfaces glabrous except for the midrib, and more numerous lateral nerves, as well as in the glabrous bracteoles and sepals.

In the introduction to his Synopsis Mr. Kobuski discusses the morphology of the flowers of *Freziera* when examining the relationship between this genus and *Eurya.* He maintains the presence of constant dioecism or " gynodioecism " in *Freziera,* admitting that " In the staminate flowers occurs a seemingly well developed ovary with distinct loculi and from gross appearance well developed ovules. Only a functioning stigma seems to be lacking." So far as they go, these words give a good description of the staminate flowers of *F. microphyUa* in which there are large ovaries with healthy-looking ovules in the three loculi, and poorly developed stigmatic lobes; but it seems that a more intimate study of flowers at different ages might yield a more convincing discussion of the question of the presence or absence of hermaphroditism.

The stamens in dissected flowers of *F. microphylh* are attached to the disk and not to the base of the petals. Mr. Kobuski allows either position to the staminodes of the pistillate flowers of *Freziera,* but describes the filaments of the staminate flowers as adnate to the base of the petals. Here again we may note a point deserving further investigation from both fresh and dried material.—N. Y. SANDWITH.

fto. 1, a flowering branch, *natural size;* 2, part of leaf, upper surface, "x 6; 3, same, lower surface, X 6; 4, staminate flower, x 4; 5 and 6, bracteole, outer and inner surfaces, X 6; 7, petal, X 6; 8, androecium and ovary, X 6; 9, stamen, X 8; 10, ovary and disc, x 6; 11, transverse section of ovary, X 8.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TABULA 3451.

MANS ONI A DIATOMANTHERA *Breiian.*

STERCULIACEAE. Tribus MANSONIEAE.

M. diatomanthera *Brenan*; species nova perinsignis, androgynoecio secundo, androecio leviter zygomorpho, antheris dithecalibus valde diversa ; praeterea a *M. altissima* (A. Chev.) A. Chev., cui facie similis, foliis et inflorescentiis minoribus, petiolis brevioribus, calyce intus dense sericeo, petalis angustioribus, androgynophoro breviore et superne densius piloso, staminum filamentis pilosis differt; a *M. nymphaeifolia* Mildbr. (mihi e descriptione tantum cogpita) ramulis pubescentibus, foliis minoribus subtus dense pubescentibus vel subtomentosis sinu basali lato distat; a *M. gagei* J. R. Drumm. ex Prain foliis majoribus et pro rata latioribus subtus dense pilosis, floribus majoribus, calyce extra dense tomentoso intus dense sericeo, petalis basi pubescentibus unguiculatis nectario praeditis apice oblique bidentatis, androgynophoro longiore densius piloso, carpellis tomentosis nee tantum tomentellis facile distinguenda.

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De *habitu* non certiores facti sumus. *Ramuli* validiusculi, 3-6 mm. diametro, juventute pilis stellatis fuscis densiuscule pubescentes, mox glabrescentes, vetustiores saepe nodosi, glabri, mox cortice plumbeo conspicue longitudinaliter sulcato atque rimis subtilibus transversis hie illic notato obtecti. *Folia* ut videtur decidua, ad apices ramulorum principalium atque lateralium plus minusve abbreviatorum conferta, petiolata, late et oblique ovato-elliptica vel subobovata, chartacea, apice acuminata vel cuspidata vel nonnunquam rotundata, basi cordata sinu lato aperto 5-8 mm. alto, 7-5-12-5 cm. longa, 6-8-9-8 cm. lata (vel majora ?), margine crenis minimis remotis pubescentibus praedita, supra pilis sparsis stellatis vel fasciculatis vel raro simplicibus praesertim ad costam nervosque conspersis exceptis glabra, subtus pilis majusculis plerumque stellatis dense pubescentia vel subtomentosa, praeterea utrinque sed praesertim subtus glandulis microscopicis sessilibus subsphaericis usque breviter clavatis sucinaciis satis crebre gemmata; costa et nervi laterales utroque costae latere 8-10 (nervis basalibus utrinque 3 inclusis) supra prominuli subtus prominentes, nervis lateralibus in crenas marginales exeuntibus, rete venularum intricato supra prominulo sed inconspicuo subtus pulchre prominente; petioli leviter compressi, supra subtusque rotundati, 1-1-9 cm. longi, siccitate nigri, subtiliter et longitudinaliter striati, pilis stellatis plus minusve crebris et glandulis more laminae induti; stipulae caducissimae, subulatae, circiter 5 mm. longae, tomentellae. *Inflorescentiae* multiflorae, cymoso-corymbosae, plus minusve congestae, circiter 2-3 cm. longae, 2-5-4 cm. latae (pedunculo excluso), plerumque 2 pro ramulo, ex axillis foliorum delapsorum apice ramulorum saepius abbreviatorum exorientes; pedunculi 0-8-2 cm. longi, siccitate nigri, more petiolorum vestiti,

apice subumbellatim pluriramosi; pedicelli circiter 5-10 mm. longi, more pedunculorum vestiti sed densius stellato-pilosi hinc tomentosi; bracteolae caducae. *Flores* circiter 1*5-1-8 cm. diametro ; alabastra paulo ante anthesin anguste ellipsoidea, apice obtusa, 8-9 mm. longa, 3*5-4*5 mm. lata. *Calyx* extra pilis stellatis ferrugineo-brunneis dense tomentosus etiam glandulis microscopicis sessilibus crebris sub pilis stellatis plus minusve occultis, intus pilis stellatis vel fasciculatis griseis strigosis appressis dense sericeus, sub anthesi more generis unilateraliter fissus hinc spathaceus, apicem subacutum versus abrupte angustatus, medio plica transversa atque irregulari notatus. *Petala* 5, contorta, 13 mm. longa, 4 mm. lata, ut videtur patentia; lamina oblongo-oblanceolata, rigidiuscule chartacea, glabra sed in marginibus praesertim basim versus sparse ciliata, apice oblique subtruncata et ibi latere inferiore (aestivatione succubo) rotundata vel unidentata, latere superiore (aestivatione incubo) breviter bidentata, basim versus gradatim angustata et turn in unguem brevem contracta; unguis incrassatus, leviter complanatus, 2 mm. longus, 1 mm. latus, marginibus atque extrinsecus pilis griseis deflexis dense villoso-pubescens ; nectarium intus apice unguis positum, parvum, elevatum, squamiforme, incrassatum, brevissime oblongum, apice rotundatum, superne dense griseo-villoso-pubescens. *Androgynophorum* circiter 5*5 mm. longum, leviter curvatum; pars basalis 2 mm. longa, 1 mm. diametro, glabra, conspicue costata ; pars superior inferne in costis griseo-villosa, superne ubique dense griseo-villosa et leviter ampliata, apice 1*5 mm. diametro ; androgynoecium secundum vel subsecundum, angulum cum androgynophoro efformans. *Stamina* 10; filamenta in medio dorsi antherae affixa, subulata, praesertim basim versus plus minusve pilosa, pilis simplicibus vel rarissime fasciculatis, 2-3 mm. longa, ea partis dorsalis androecii quam ventralia longiora ; androecium hinc leviter zygomorphum; antherae 2-5 mm. longae, circiter 0-6 mm. latae; thecae 2, inaequales, divaricatissimae et hinc superpositae, extrorse et longitudinaliter dehiscentes, theca superiore 1 mm. longa, inferiore 1-5 mm. longa ; connectivum dorsaliter incrassatum et prominens ; staminodia 5, intra stamina fertilia posita, Iineari-oblonga, quidpiam undulata, glabra, apice obtusa, 3 mm. longa, circiter 0-75 mm. lata. *Carpella* 5, fusiformia, circiter 2 mm. longa, 0*75 mm. lata, extra pilis stellatis facilibus detersu dense tomentosa, apice in stylum filiforme flexuosum 2-2*5 mm. longum superne glabrum inferne sparse stellato-pilosum attenuata, stigmatibus minimis capitatis; ovula 8 pro carpello, biseriata. *Fructus* non visus.

TANGANYIKA TERRITORY. Handeni District: Eideleko, 9 Nov. 1941, *Yussif bin Mohamedi* 8626. Vernacular name (Eizigua) " Mbenta mpunda."

According to a subsequent letter from Mr. P. J. Greenway, the collector says that the *Mansonia* grew in deciduous thickets composed *of Acacia nigrescms, A. pennata* and *Commiphora pilosa,* with *Euphorbia*

nyikae, E. quadrialata and *E. tirucalli* scattered amongst it, and with *Tribulus terrestris* as a common ground-cover.

The discovery of a species of this remarkable genus in Tanganyika Territory is of great phytogeographical interest. Hitherto three species have been described in the genus; of these *M. altissima* (A. Chev.) A. Chev. extends from the Ivory Coast to Nigeria, *M. nymphaeifolia* Mildbr. occurs in the Cameroons, and *M. gagei* J. R. Drumm. ex Prain in southern Burma, near the border of Siam. The area occupied by the new species is thus intermediate in position between West Africa and Burma, being more than 2400 km. from the nearest known point of th6 West African area of the genus, and between two and three times as far from Burma. The material that is the basis of the present account was kindly sent by Mr. P. J. Greenway, of the East African Agricultural Research Station, Amani, with the suggestion that it might represent a new genus of *Sterculiaceae*; in spite of the absence of fruit, the numerous and striking characters that it shares with the already known species of *Mansonia* leave no doubt of its correct taxonomic position.

Before a clear idea of the relationship of *M. diatomanthera* to its congeners can be given, it is necessary to give some description of and to comment upon the previous work that has been done on the genus.

The genus *Mansonia* was first described by Prain in Journ. Linn. Soc. Bot. xxxvii. 260 (1905), who referred it to a new tribe of *Sterculiaceae,* the *Mansonieae* Prain, comprising *Mansonia* and *Triplochiton* K. Schum. The only species then known, and hence the type-species of the genus, was *M. gagei*; Prain attributed both this binomial and the generic name *Mansonia* to J. R. Drummond. In this excellent account there is little that requires criticism, except that in the plate accompanying the paper the insertion of the filaments is shown as being on the outer side of the anthers, the thecae dehiscing introrsely; in fact, the insertion is on the inside and the dehiscence extrorse, these characters being common to all the species of the genus. The representation of the floral indumentum on the plate is not a very happy one ; the hairs on the outside of the calyx are actually rather sparse, minute, and stellate with many arms, and the outer side of each carpel is shortly, but very densely and continuously tomentellous.

We must next deal with the work of A. Chevalier. His first paper that concerns us here was published in Bull. Mus. Nat. Hist. Nat. Paris, xv. 545-549 (1910 ? *) on the *Mansonieae* of Tropical Africa. He here made a new genus, *Achantia,* based on a single species, *A. altissima,* from the Ivory Coast. No comparison was made between *Achantia* and *Mansonia,* but detailed French descriptions, both generic and specific, were given for *Achantia,* whose staminode number was described as ten. Shortly afterwards Chevalier published again on this

* The number in which this paper occurs contains a description of a function held on 21 December 1909, and I suspect that it could scarcely have been published before 1910. The volume is dated 1909, but I have not seen the number in its original wrapper.

group; he had in the meantime examined *Mansonia gagei* and had come to the conclusion that *Achantia* was not sufficiently distinct from *Mansonia* to be maintained as a separate genus. He made the necessary reduction and new combination in Bull. Soc. Bot. France, Mém. viii. d. 138 (1912, but dated 1911), at the same time redescribing *Mansonia altissima* in Latin. The sinking of *Achantia* as a genus was, I think, unquestionably justified. Although Chevalier was not prepared to retain *Achantia* and *Mansonia* as genera, he considered them subgenerically distinct and accordingly placed *M. gagei* in a new subgenus *Eu-Mansonia* A. Chev., and *M. altissima* in another new subgenus *Achantia* (A. Chev.) A. Chev.; the subgenera were separated by the single character of the number of staminodes—five in *Eu-Mansonia* and ten in *Achantia.*

Now it became evident that both the descriptions of *M. altissima* published subsequently to Chevalier's work and the specimens so named showed various important discrepancies with his original accounts, and I was at first in some doubt therefore whether the current interpretation of *M. altissima* was correct, and whether more than one species might not be confused under that name. Chevalier mentioned no specimens in his first paper, but in his second publication (1912) he cited as types two gatherings: *Chevalier* B. 22345 (fruiting type) and *Chevalier* 22281 (flowering type); fortunately there are in the Kew Herbarium excellent specimens of both these numbers, which are in my opinion clearly conspecific and agree with the recent interpretation of the species. It therefore becomes necessary to rectify Chevalier's description. The most outstanding point is that the number of staminodes in *M. altissima* is not ten but five, as it is throughout the genus, and the sole character assigned by Chevalier to the subgenus *Achantia* is thus shown to be illusory.

In the original French description the upper surface of the leaves was described as densely pubescent and the lower as glabrous when mature, whereas in fact the converse is true; this was recognised by Chevalier and the necessary correction made in the Latin description of *M. altissima* that he published in his 1912 paper. The calyx was also described as glandular-pubescent outside; now there are indeed minute, sessile glands on the calyx of *M. altissima,* similar to those seen in *M. diatomanthera,* but they are not visible without the compound microscope, and not even then unless the tomentum that conceals them is rubbed off or unusually lax, and they certainly do not justify Chevalier's description ; the indumentum of the calyx of *M. altissima* is in fact closely similar to that of *M. diatomanthera.* Chevalier further describes the petals as " arrondis au sommet", thus suggesting that they are similar in shape to those of *M. gagei*, but here again the similarity is rather to *M. diatomanthera,* since they show the same curious obliquely bi- or tri-dentate shape here figured for that species. Finally, it is desirable to point out that " 5 mm.", given as the length of the nectaries, is presumably a typographical error for 0-5 mm. Aubréville, Fl. Forest. Côte d'Ivoire, ii. 261-2, t. 230 (1936), figures and describes

M. altissima; in this admirable work the number of staminodes is correctly given, but the anthers can hardly be described as subsessile and, at least in the dried condition, the styles are not all agglutinated.

In Notizbl. Bot. Gart. u. Mus. Berlin, vii. 489 (1921), Mildbraed described a further species from the South Cameroons, *M. nymphaeifolia,* and referred it to the subgenus *Achantia,* presumably on the evidence of the similarity of facies, since the flowers of *M. nymphaeifolia* were unknown ; I have seen no authentic material of this plant. There are two gatherings from the British Cameroons in the herbarium of the Imperial Forestry Institute, Oxford—*J. Smith* Cam. 129/41 (flowering) and *J. Smith* Cam. 129/36 (fruiting)—which approach *M. nymphaeifolia* in having almost glabrous leaves (except for sparse, minute, stellate hairs on the principal nerves and veins, and a very few on the leaf surface); they disagree, however, in the wide basal sinus of the leaves and in the scurfy-tomentellous branchlets, and indeed, except for the striking difference in indumentum, they are extremely close to *M. allissima,* of which they are probably no more than a well-marked variety. However, in view of their possible identity with *M. nymphaeifolia,* I consider it wiser to leave them for the present unnamed, to await further and better material of the genus from this rather poorly-collected region.

Although the character used by Chevalier to separate subgenerically the West African from the Burmese species is shown to be erroneous, yet a careful investigation reveals other important differences which may justify such separation, and of which perhaps the most striking are to be seen in the morphology of the petals. Both groups agree in possessing anthers which, at least in appearance, are monothecal and androgynoecia which are erect or almost so.

Now *M. diatomanthera* decidedly resembles in facies *M. altissima* rather than *M. gagei,* but has two important characters, the position of the androgynoecium and especially the remarkable and anomalous anther structure, that set it apart from the remainder of the genus and in my opinion justify subgeneric separation.

The following revised and amplified classification of the genus *Mansonia* is therefore proposed, the three subgenera corresponding to the three disjunct parts of its geographical area :—

Subgenus **Diatomanthera** *Brenan*; subgenus novum. Petala basi breviter unguiculata et ibi nectario conspicuo squamiformi praedita, apice oblique bi- vel tridentata. Androgynoecium secundum vel subsecundum, angulum cum androgynophoro efformans; androecium leviter zygomorphum. Antherae filamentis aequilongae, dithecales, thecis superpositis.

Only species :—1. *M. diatomanthera* Brenan.

Subgenus **Achantia** *(A. Chev.) A. Chev.,* mutatis charact. *Brenan.* Petala basi brevissime unguiculata et ibi nectario conspicuo squamiformi praedita, apice oblique bidentata. Androgynoecium rectum vel subrectum ; androecium actinomorphum. Antherae filamentis aequilongae, monothecales.

Included species:—2. *M. altissima* (A. Chev.) A. Chev. 3. *M. nymphaeifolia* Mildbr. (no material seen, and hence status and position doubtful).

Subgenus **Eu-Mansonia** *A. Chev.,* mutatis charact. *Brenan.* Petala basi incrassata sed non vel vix unguiculata, apice rotundata, nectario nullo. Androgynoecium rectum vel subrectum; androecium actinomorphum. Antherae quam filamenta duplo longiores, monothecales.

Only species :—4. *M. gagei* J. R. Drumm. ex Prain.

It is possible that a further character to separate *Eu-Mansonia* from *Achantia* may be found in the embryo. The cotyledons of *M. altissima* are large, rather thin and very contortuplicate. In some drawings of *M. gagei* made by K. P. Dass, now in the Kew Herbarium, the cotyledons appear to be represented as thick, flat and straight. I have seen no fruits of *M. gagei* sufficiently ripe to confirm this, and have therefore refrained from mentioning this point in the diagnoses, but it is very desirable that ripe fruits should be collected.

It may be held that the characters separating *Achantia* from *Eu-Mansonia* are of no more than sectional value. However, in view of the difference of facies, of the possible additional character just mentioned, which if confirmed should be a very important one, and of the undesirability of perhaps prematurely manufacturing additional names, I have retained the rank given by Chevalier, although not without misgivings.

Prain, when founding the genus *Mansonia,* discussed the anomaly of monothecal anthers in the *Sterculiaceae,* but the finding of a species of *Mansonia* with dithecal anthers makes a reconsideration of this problem profitable. Whatever view is otherwise taken, the condition where two distinct thecae are present must surely be relatively more primitive than the monothecal condition. There *seem* then to be two ways in which the monothecal anther may be phylogenetically interpreted: either (i) it is truly monothecal, derived from a dithecal anther by complete loss of one of the thecae, or (ii) it is only apparently monothecal, derived from a dithecal anther by fusion of the thecae. Now what evidence there is inclines me towards the second interpretation. Firstly, the shape of the *anther* is remarkably uniform in all the species, whether monothecal or dithecal, suggesting that if fusion took place, it was of the adjoining parts of two thecae in a superposed or very divaricate position *(cf.* the condition in *Monarda).* Secondly, the insertion of the filament is always about midway up the back of the anther and is thus in the same position relative to the whole anther, independently of the number of thecae. Thirdly, in the monothecal species there is very commonly a slight constriction (although no discontinuity) about half-way up the anther, corresponding in position to the fissure between the two thecae in *M. diatomanthera;* this constriction has been observed repeatedly in all the monothecal species examined, and is obvious even in a young bud. It is clear that this evidence is not conclusive, but it at least seems suggestive. If this theory of thecal fusion is adopted, it greatly lessens an apparent

morphological anomaly, and strengthens the case for including the *Mansonieae* in *Sterculiaceae,* rather than retaining them as a separate family as was proposed by K. Schumann.—J. P. M. BRENAN.

FIG. 1, flowering branch, *natural size*; 2, apex of another leaf, *natural size*; 3, flower, x 1-5; 4, calyx and androgynophore, X 4 ; 5, stellate hair from calyx, X 60 *(approx.)*; 6, one ray of stellate hair, X 120 *(approx.)*; 7, petal, inner surface, x 4; 8, base of petal in longitudinal section showing nectary, x 8; 9, apex of another petal, X 4; 10, androgynophore, X 6 ; 11 and 12, stamen in three-quarter front view and side view respectively, X 12 ; 13, anther, dehiscing, X 12; 14, staminode, X 12; 15, carpels, X 8; 16, single carpel, x 12; 17, floral diagram.


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S. Ross-Craig

TABULA 3452.

ELLIPANTHUS HEMANDBADEMTOIDES *Brenan.*

CONNARACEAE. TrfbuS CASTANOLEAE.

E. hemandradenioides *Brenan*; species nova, ab *E. hdferi* Hook, f. et *E. sarawakensi* Schellenb. reticulo venarum confertiore supra magis elevato, ab hoc praeterea petiolis saepe brevioribus, foliis basi saepe angustioribus apice acumine latiore et obtusiore saepe minus abrupto costa subtus minus pubescente nervis lateralibus paucioribus atque inter sese distantioribus, ab illo foliis minoribus, inflorescentiis saepe elongatis atque laxioribus indumento breviore atque densiore obtectis recedit; ab *E. unifoliolato* (Thwaites) Thwaites foliis majoribus venis confertioribus, ab *E. luzoniensi* Vidal foliis minoribus subcoriaceis subtus in nervis lateralibus paucioribus subglabris, fructibus minoribus brevius stipitatis, stylo longiore stigmate minore capitato distat.

Arbor parva, usque 10 m. alta, ut videtur decidua. *Ramuli* graciles, hornotini pilis minutis appressis simplicibus griseis vel subfulvis nitidis densiuscule puberuli, subteretes vel leviter angulati, annotini plus minusve glabrescentes, cortice atropurpureo longitudinaliter striolato lenticellis crebris minimis rotundatis circiter 0-2-0-5 mm. diametro stramineis vel pallide brunneis prominentibus hie illic notato obtecti; ramuli vetustiores saepe rimis transversalibus prominulis et aliis longitudinalibus atque subtilibus notati, etiam saepe reliquiis cinerascentibus epidermidis super corticem atropurpureum vestiti, hinc plus minusve maculatim pruinosi. *Folia* unifoliolata, hinc ut videtur simplicia ; petioli 6-11 mm. longi, subteretes, more ramulorum vestiti, basi et apice cylindratim pulvinato-incrassati et ibi dense et transverse rugulosi, inter pulvinos longitudinaliter striolati, supra medium (basi pulvini superioris) articulati, articulo saepe praefracti hinc partibus inferioribus 4-6 mm. longis petiolorum in ramulis relictis sed haud diu persistentibus; lamina anguste ovata vel ovata-oblonga, basi late cuneata, apice in acumen angustum obtusum producta, (4*3-) 6-10*2 cm. Ionga, (2-) 2*5-4 cm. lata, tenuiter coriacea, utrinque nitidula, supra pilis minimis perpaucis praesertim ad basim costae exceptis glabra vel serius omnino glabra, subtus in costa et nervis lateralibus sparse atque inconspicue puberula aliter fere glabra, margine angustissime cartilagineo-incrassato integerrimo et siccitate plus minusve undulato; costa supra paululum impressa, subtus prominens; nervi laterales utroque costae latere 4-6, supra prominuli sed inconspicui, subtus prominentes, sub marginem arcuatim anastomosantes; rete venularum arctissime areolatum, utrinque prominulum. *Inflorescentiae* axillares, nonnunquam pseudo-terminales, solitariae vel geminatae, anguste paniculatae, ubique dense griseo-puberulae; rhachis 0-4-2 cm. Ionga, ramulos laterales brevissimos paucifloros usque ad 3 mm. longos saepe sicut glomeruliformes edens; bracteae parvae, usque ad 1 *5 mm. longae, inconspicuae, dense puberulae, apicem versus

cupreae vel brunneae; bracteolae minimae, obscurae; pedicelli brevissimi sed distincti, circiter 1 mm. longi, dense griseo-puberuli, basi articulati. *Sepala* 5, albo-viridia, ovata, subacuta, 2 mm. longa, 1-1*25 mm. lata, extra more pedicellorum induta, intus glabra. *Petala* 5, alba, lineari-oblonga, basi ac apice obtusa, 4 • 5-7* 5 mm. longa, 1-1 • 25 mm. lata, extra dense griseo- vel albido-tomentella, intus puberula. *Stamina antherifera* 5, staminodiis totidem alternantia; filamenta illorum 3*25 mm. longa, subulata ; antherae ellipsoideae vel oblongae, 1-25-1* 5 mm. longae, 0*8-1 mm. latae, introrse dehiscentes ; staminodia 2 - 25 mm. longa, subulata, in corpusculum breve oblongum saturate pigmentatum circiter 0 • 25 mm. longum desinentia; filamenta staminum fertilium et staminodia basi in tubum costatum glabrum 1-1 -5 mm. longum connata, supra tubum usque ad 1-1-5 mm. dense villoso-pubescentia. *Carpellum* solitarium, pilis pallide stramineis suberectis dense villosum, angustum, circiter 2 mm. longum et 1 '5 mm. diametro (pilis inclusis), apice in stylum circiter 3 mm. longum et 0-5 mm. diametro pilis appressis sparsis pubescentem attenuatum; stigma minimum, quam apex styli vix latius, paululum complanatum et muriculatum; ovula bina, collateralia. *Fructus* cymbiformis, apice angustatus et obscure rostratus, basi in stipitem circiter 3-7 mm. longum 1 -5-3 mm. crassum cum corpore fructus angulum efformantem attenuatus, 1*6-2-5 cm. longus (stipite incluso), medio 0-8-1-1 cm. latus, extra dense atque breviter ferrugineo-velutinus. *Semen* unicum, oblongo-ellipsoideum, castaneum, 1-1-1-3 cm. longum, 6-6*5 mm. latum ; arillus basalis, obliquus, pallidus, cerebriformis, circiter 4*5 mm. longus; endospermium exiguum, stratum tenue formans; embryo radicula brevi cotyledonibus ovatis tenuiusculis apice obtusis basi subcordatis 6*5 mm. longis 4-5 mm. latis.

KENYA COLONY. Malindi District: Mida, Oct. 1936, /. *R. Dale* 3573 (with flowers, in Herb. Kew. and Herb. Imp. For. Inst., Oxford):—small forest tree up to 7*5 m., in under-storey ; bark smooth and grey ; calyx green-white ; corolla white, petals strap-shaped; vernacular name " Mnofu wa kuku ? ". Same locality, Apr. 1938, /. JR. *Dale* 3876 (type, with fruits, in Herb. Kew.):—straggly tree to 10*5 m. in *Ajzelia* and *Trachylobium* forest.

The fruits of this outstanding plant are quite characteristic of the *Connaraceae,* and when they are present it is not difficult to place it in the correct family; not so, however, in other stages, for the flowering material cited here has been erroneously put in *Anacardiaceae* and has perhaps been confused with other families.

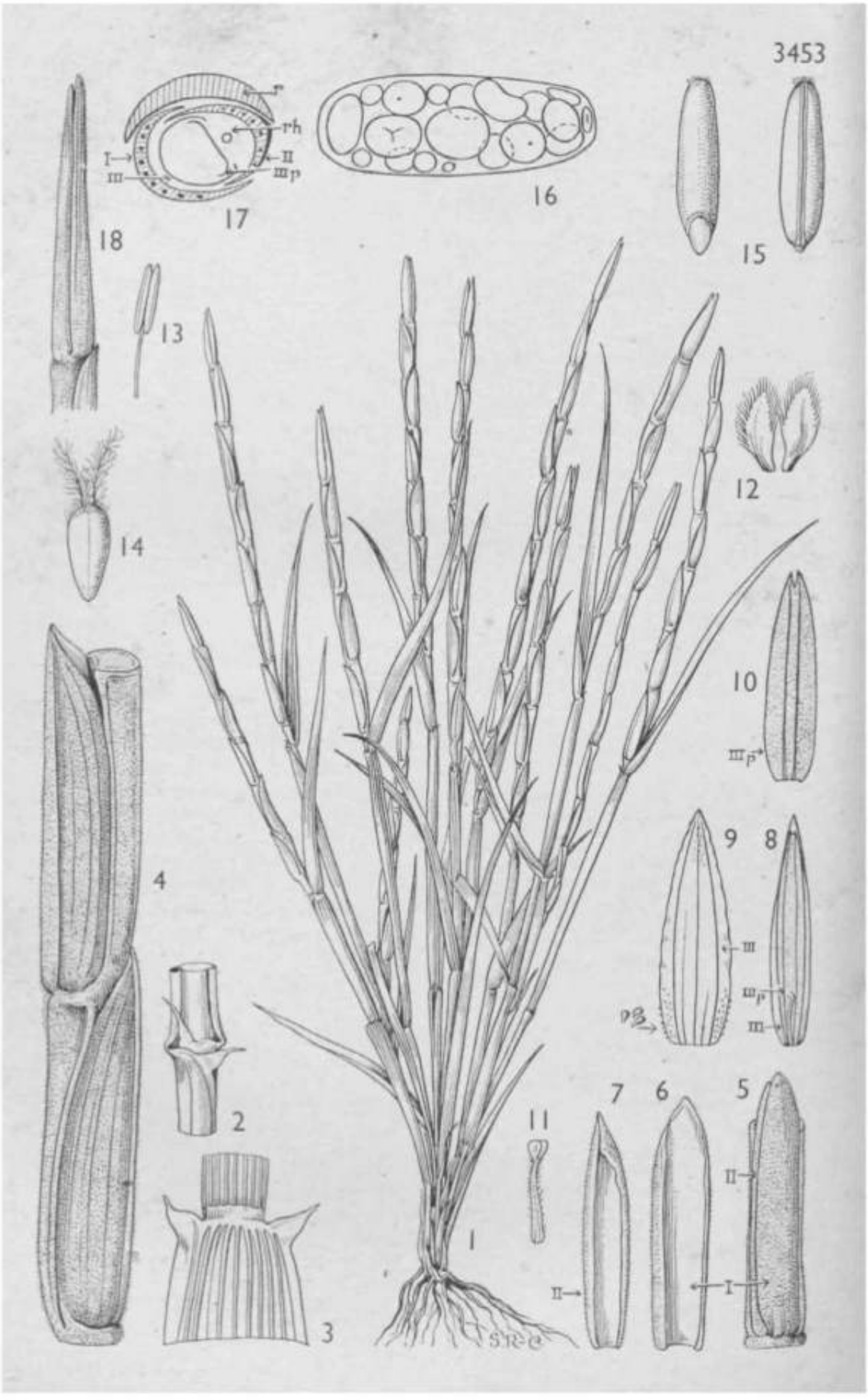
To refer this plant to its correct taxonomic position within the *Connaraceae* is not altogether free from difficulty. From its facies and its occurrence in continental Africa it might reasonably be expected to be referable to the genus *Heniandradenia* Stapf, and in flowering material alone there is no evidence against this. Examination of the fruiting material compelled me, somewhat reluctantly, to abandon this view and to describe it under the genus *Ellipanthus* Hook. f. It may therefore be useful briefly to mention those characters which seem to

support its inclusion in *Ellipanthus* rather than *Hemandradenia*:—firstly, the fruits are distinctly stipitate and not sessile ; secondly, the aril is basal and extends for only about a third of the length of the seed, and does not completely invest it so as to form a so-called " pseudo-baccate testa " ; and thirdly, the endosperm is very scanty, forming a very thin, soft layer, and is not copious and hard as in *Hemandradenia.* A possible fourth factor, which, however, is not certain at present, is the dehiscence of the fruit; most of the fruits on the material available have not dehisced, but two have split down the suture so as partially to expose the seed ; it is possible that this may be caused merely by the mechanical pressure of drying, but the ease with which unopened fruits may be slit down the suture suggests that a genuine dehiscence does take place at a stage of late maturity. Against the placing of this plant in *Ellipanthus* there are two points:—firstly, Schellenberg, in Engler, Pflanzenreich, iv. 127. 181 (1938), describes the endosperm and cotyledons of *Ellipanthus* as " amylum gerentes ", but I have failed to obtain a starch reaction from the Kenya plant; and secondly, the cotyledons are not thick but rather thin. In facies there is little difference between the two genera and, in spite of the discrepancies with *Ellipanthus,* the balance of characters seems clearly in favour of its being placed in that genus. It is to be hoped that further fruiting material, showing the most advanced stage of maturity, will be collected in Kenya.

The plant here described adds a third simple-leaved genus of *Connaraceae* to the two *(Burttia, Vismianthus)* already known from east tropical Africa. The plant mentioned as " Hermandradenia *[sic]* sp." by Dale, " Additions and Corrections to the ' Trees and Shrubs of Kenya Colony (1936)' ", 24 (1939) (published as an appendix to " The Woody Vegetation of the Coast Province of Kenya ", Imp. For. Inst. Paper, xviii) is doubtless *Ellipanthus hemandradenioides.* The discovery in east tropical Africa of *Ellipanthus,* a genus previously known only from Asia, makes still more uncertain the generic position of *Hemandradenia madagascariensis* Schellenb., recently described in Engler, Pflanzenreich, iv. 127. 65 (1938), whose fruits are unknown, and more material of this plant from Madagascar is most desirable. Our plant differs from *H. madagascariensis* in the leaves being broadly cuneate, not rounded, at base, the lateral nerves finer, less prominent beneath and not impressed above, and in the less lax inflorescences with narrower buds which are grey-puberulous outside.

I must thank sincerely Mr. E. Milne-Redhead, who had provisionally annotated the fruiting material of *Ellipanthus hemandradenioides* at Kew as a new species of *Connaraceae,* for generously placing it at my disposal in preparing this account.—J. P. M. BRENAN.

FIG. 1, flowering branch, *natural size*; 2, leaf, upper surface, X 3; 3, flower-bud, x 8; 4, flower, X 8; 5, petal, inner surface, x 8; 6, androecium, X 12; 7, gynoecium, X 8 ; 8, fruiting branch, *natural size ;* 9, fruit, opened longitudinally showing seed, *natural size;* 10, seed, x 2; 11, seed in transverse section, x 2. Note.—As the seed was somewhat shrivelled and would not regain its natural shape on boiling, figs. 10 and 11 are therefore somewhat reconstructed.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TABULA 3453.

HENRARDIA PERSICA (Boiss.) *C. E. Hubbard.*

GRAMINEAE. Tribus HORDEEAE.

Henrardia *C. E. Hubbard* **in Blumea, Suppl. III. 15 (1946). Genus a generibus ceteris tribus** *Hordeearum* **spiculis 1-2-floris, glumis et lemmatibus fere aequilongis, lemmatibus membranaceis tenuiter 3-5-nervibus distinguendum.**

Spiculae **lanceolato-oblongae vel oblongae, muticae, solitariae, distichae, alternae, sessiles, rhachi articulatae spicarum solitariarum arete appressae, glumarum latere rhachin spectante; rhacheos internodia dorso convexa, facie leviter concava vel applanata, superne gradatim incrassata, maturitate transverse disarticulantia; rhachilla inter glumas et anthoecia continua, supra anthoecium terminale fertile producta et anthoecium vestigiale gerens, minute pilosa vel glabra.** ***Anthoecia*** **1-2, ♂?, dorso compressa, glumis paullo breviora.** ***Glumae*** **aequales vel fere aequales, obtusae vel acutae, marginibus membranaceis angustis exceptis induratae et incrassatae; eae spicularum lateralium fere oppositae, plus minusve asymmetricae; inferior dorso applanata vel leviter convexa, superiore latior, lanceolata vel oblonga, 5-9-nervis ; superior dorso convexa vel carinata, subulata vel anguste oblonga, 3-7-nervis; eae spicularum terminalium oppositae et symmetricae.** ***Lemmata*** **glumis fere aequilonga, a dorso visa lanceolata vel lanceolato-oblonga, explanata lanceolato-oblonga, acuta vel obtusa, dorso applanata vel leviter convexa, marginibus inflexis, membranacea, 3-5-nervia, basi prope margines pilis minutissimis clavatis praedita.** ***Paleae*** **lemmatibus aequilongae vel fere aequilongae, anguste lanceolatae, explanatae lanceolato-oblongae, bicarinatae, membranaceae.** ***Lodiculae*** **2, oblique lanceolatae vel ovatae, ciliolatae.** ***Stamina*** **3; antherae oblongae.** ***Ovarium*** **apice dense et minute pilosum; styli distinct], breves ; stigmata plumosa.** ***Caryopsis*** **oblonga, dorso compressa, facie anguste canaliculata, apice dense et minute pilosa, inter lemma et paleam arete inclusa ; scutellum usque tertiam partem caryopseos aequans; hilum lineare, elongatum, caryopsi aequilongum. —*Gramina*** **annua ; culmi graciles, paucinodes ; foliorum vaginae ore auriculis angustis patentibus plerumque auriculatae; ligulae membranaceae, breves, glabrae; laminae angustae, planae vel siccitate convolutae ; spicae graciliusculae, plus minusve cyfindricae, maturitate fragiles et basi disarticulantes, glabrae vel pilosae.**

Species duae, regionis Mediterraneae Asiae occidentalis scilicet ab Asia Minore usque Turkestaniam incolae. Typus : ***Henrardia persica*** **(Boiss.) C. E. Hubbard.**

Spicae pilis brevissimis appressis retrorse et dense pubescentes, vel glabrae; gluma inferior oblonga, obscure nervis; antherae 1*5-2-2 mm. longae. . . . . .\. ***H. persica,***

Spicae pilis brevibus patentibus hispidulae; gluma inferior subulato-lanceolata vel lanceolata, prominenter nervis ; antherae usque 0*7 mm. longae . . . . . 2. *H. pubescens.*

1. **Henrardia persica** *(Boiss.) C. E. Hubbard* in Blumea, Suppl. III. 17 (1946). *Lepturus persicus* Boiss. Diagn. PL Or. Nov., ser. 1, No. 13, 71 (1853).

Gramen annum, confertim vel laxe caespitosum, 10-28 cm. altum. *Culmi* erecti, curvato- vel geniculato-adscendentes, graciles, teretes, simplices vel basi ramosi, 2-4-nodes, internodiis inferioribus brevibus minute et retrorse pubescentibus, internodio supremo (pedunculo) elongato spicam versus pubescente, vel omnino glabri. *Foliorum vaginae* internodiis plerumque longiores, pilis brevissimis dense et retrorse pubescentes, vel glabrae, ore auriculis patentibus brevibus angustis acutis plerumque auriculatae; ligulae truncatae, circiter 0-5 mm. longae; laminae lineares vel anguste lanceolatae, acutae, 2-8 cm. longae, 1 -5-4 mm. latae, planae vel siccitate convolutae, subtus pilis brevissimis dense et retrorse pubescentes, vel glabrae, supra arete nervatae, nervis scabridulis vel breviter pubescentibus, marginibus cartilagineis scabridis. *Spicae* erectae, strictae vel leviter incurvae, 6-16 cm. longae, 1 "5-2 -5 mm. diametro ; rhacheos internodia 6-10 mm. longa, dorso convexa ecarinata, pilis brevissimis appressis densissime et retrorse pubescentia, vel glabra et laevia. *Spiculae* 7-10 mm. longae, rhacheos internodiis paullo longiores. *Glumae* rigidae, ut rhachis pubescentes, vel glabrae; inferior oblonga, obtusa, superiore latior, obscure 7-9-nervis; superior anguste oblonga vel lanceolato-oblonga, acuta, obscure 5-7-nervis. *Anthoecia* 1-2. *Lemmata* 7-8 mm. longa, explanata lanceolato-oblonga, apicem versus minute pubescentia, vel glabra, tenuiter 3-5-nervia. *Paleae* minute pubescentes. *Lodiculae* 1-3-1-8 mm. longae. *Antherae* 1-5-2-2 mm. longae. *Caryopsis* 6-7 mm. longa, pallide brunnea. *Rhachilla* tenuis, minute pubescens, usque 2 mm. producta.

Spicae pilis brevissimis dense pubescentes . . . . . i. var. **erecta.**
Spicae glabrae . . . . . ii. var. **glaberrima.**

i. Var. **erecta** *(Griseb.) C. E. Hubbard* in Blumea, I.e. 18. *Lepturus incurvatus* (L.) Trin. var. *erectus* Griseb. in Ledeb. Fl. Ross. iv. 325 (1852). *L. persicus* Boiss. Diagn. PL Or. Nov., Ser. 1, no. 13, 71 (1853) ; Boiss. Fl. Orient, v. 685 (1884), partim ; Hackel ex Stapf in Denkschr. Math.-Nat. Cl. K. Akad. Wiss. Wien. vol. 50 (Bot. Ergebn. Polak. Exped. Pers. i. 11 : 1885); Aitchison in Trans. Linn. Soc, Bot., ser. 2, iii. 127 (1888), partim ; Roshevitz in Fedchenko et Popov, Fl. Turkmen, i. fasc. 2, 181 : 1932 (Akad. Nauk SSSR., Ser. Turkm. v.); Grossheim, Fl. JCavkaza, i. 324 (1939). *L. hirtulus* Regel in Act. Hort. Petrop. vii. 576: 1881 (Descr. PL Nov., fasc. 8, 36) et in Bull. Imp. Soc. Nat. Hist. St. Petersb. xxxiv. II. 83: 1882 (Descr. PL Nov. Rar. Fedtschenko in Turkest.); Trautv. in Act. Hort. Petrop. ix. 312 (1884);

Fedchenko, Rastitel' Nost Turkestana, 145 (1915); Popov, Descr. PL Envir. Tashkent, i. 39, fig. 71 (1923); Roshevitz in Act. Hort. Petrop. xxxviii. fasc. 1, 139 (1924). *L. pubescens* (Bertol.) Boiss. var. *persicus* (Boiss.) Bernowicz ex Bornmüller in Verh. K.K. Zool.-Bot. Gesellsch. Wien. lx. 191 (1910); Bornmiiller in Beih. Bot. Centralbl. xxviii. Abt. 2, 521 (1911). *Pholiurus persicus* (Boiss.) A. Camus in Ann. Soc. Linn. Lyon, lxix. 90 (1922); Nevski in Act. Univ. Asiae Med., Ser. VHIb, Bot., fasc. 17, 34 (1934), et in Komarov, Fl. URSS. ii. 589, tab. 44, fig. 14 (1934) et in Act. Inst. Bot. Acad. Sci. URSS. ser. 1, fasc. 2, 42 (1936), fasc. 4, 335 (1937); Bornmüller et Gauba in Fedde, Repert. xlvii. 135 (1939); Drobov in Schreder, Fl. Uzbekistan, i. 277 (1941). *Lepturus erectus* (Griseb.) Szovitz ex Roshevitz, Consp. Gram. Turkest. 81 : 1923 (in Act. Hort. Petrop. xxxviii. fasc. 1, 139 : 1924. *L. persicus* Boiss. var. *genuinus* Grossheim, Fl. Kavkaza, i. 324, tab. 25, fig. 3 (1939).

TURKEY. Anatolia : between Sultan Han and Kaisariya, 1200 m., 14-6-1890, *Bornmüller PL Anatol. Or.* 1642 (partim). Turkish Armenia : Egin, Kota, 1-7-1890, *Sintenis It. Or.* 2830.

TRANSCAUCASIA. Armenia : near Erivan, 20-7-1928, *Grossheim in Grossheim & Schischkin, PL Or. Exsicc.* 252. Azerbaijan: near Seidzhadzhi, *Fischer* (? *Szovitz).*

RUSSIAN CENTRAL ASIA. Western Tian Shan: near Kabul-saj, 22-5-1926, *Mokeeva in Herb. Fl. As. Med.* 527.

PERSIA. Twelve miles east of Urmia, 1500 m., 16-5-1929, *Cowan & Darlington* 920; between Dauletabad and Tchitchian, 31-5-1882, *Pichler*; South Persia, without precise locality, *Aucher-Eloy Herb. Or.* 2914 (partim, type-number of *Lepturus persicus* Boiss.), 5440.

AFGHANISTAN. Hari Rud valley, 9/10-5-1885, *Aitchison* 409 (partim); " Chokey," " Killa Pootoollah," south-west of Kandahar, *Griffith* 514 (partim).

BALUCHISTAN. Without precise locality, 1851, *Stocks* 1138.

Specimens of this variety were referred to " *Lepturus incurvatus* L." by Burkill in his List PI. PL Baluchistan, 84 (1909).

ii. Var. glaberrima *(Hausskn.) C. E. Hubbard* in Blumea, I.e. 19. *Lepturus persicus* Boiss. var. *glaberrimus Hausskn.* ex Bornmiiller in Mitteil. Thiiring. Bot. Ver. n.f. xx. 51 (1904-5). *L. pubescens* (Bertol.) Boiss. var. *glaberrimus* (Hausskn.) Bornmüller in Verh. K.K. Zool.-Bot. Gesellsch. Wien, lx. 191 (1910). *L. erectus* Szovitz var. *glabratus* Westberg ex Roshevitz, Consp. Gram. Turkest. 81: 1923 (in Act. Hort. Petrop. xxxviii. fasc. 1, 139: 1924), nomen. *Pholiurus glabriglumis* Nevski in Act. Univ. Asiae Med., Ser. VHIb, Bot., fasc. 17, 35 (1934), in clavi, et in Komarov, Fl. URSS. ii, 589 (1934), et in Act. Inst. Bot. Acad. Sci. URSS. ser. 1, fasc. 2, 42 (1936), descr.; fasc. 4, 335 (1937); Drobov in Schreder, Fl. Uzbekistan, i. 277 (1941). *Lepturus persicus* Boiss. var. *glabratus* (Westb.) Grossheim, Fl. Kavkaza, i. 324, 397 (1939). *L. persicus* Boiss. var. *armeniacus* Hack, ex Grossheim, I.e. 324, in syn.

TURKEY. **Anatolia : between Sultan Han and Kaisariya, 1200 m., 14-6-1890,** ***Bornmüller PI. Anatol. Or.*** **1642 (partim).**

TRANSCAUCASIA. **Nakhichevan : by the river Diza-tshaj, 7-6-1934,** ***Prilipko.***

SOUTH PERSIA. **Without precise locality,** ***Aucher-Eloy Herb. Or.*** **2914 (partim).**

AFGHANISTAN. **Hari Rud valley, 9/10-5-1885,** ***Aitchison*** **409 (partim); " Chokey," " Killa Pootoollah," south-west of Kandahar,** ***Griffith*** **514 (partim).**

Additional evidence of the rather wide range of var. ***erecta,*** **gleaned from the various publications cited above, indicates that it extends from Asiatic Turkey (Anatolia) eastwards through Transcaucasia to Uzbekistan, Turkmenistan, Tadjikistan and Western Tian Shan in Russian Central Asia, and southwards to Persia, Afghanistan and Baluchistan. In this region, it grows in sandy or stony soils on dry slopes and foothills amongst the natural vegetation, or occasionally as a weed in cultivated fields. Var.** ***glaberrima*** **probably occurs throughout the area of the type variety (var.** ***erecta),*** **with which it has been mixed in collections from Turkey, Persia and Afghanistan. Grossheim (Fl. Kavkaza, i. 397 : 1939), for example, remarks that these glabrous and hairy variants grow together and that neither has a distinct geographical area. Apart from its glabrous inflorescences, var.** ***glaberrima*** **does not differ from var.** ***erecta*** **and there seems no justification, therefore, for its separation as a distinct species such as has been proposed by Nevski under the name** ***Pholiurus glabriglumis.*** **The presence of hairy and glabrous varieties in** ***Henrardia persica*** **is paralleled by their occurrence in other genera of the** ***Hordeeae,*** **particularly in species of** ***Agropyron*** **Gaertn.,** ***Triticum*** **L.,** ***Aegihps*** **L., and** ***Amblyopyrum*** **Eig.**

2. Henrardia pubescens ***(Bertol.) C. E. Hubbard*** **in Blumea, I.e. 19,** ***Rottboellia pubescens*** **Bertol. Miscell. Bot. i. 10, tab. 1, figs. 3 & 4 (1842).** ***Lepturus pubescens*** **(Bertol.) Boiss. Fl. Orient, v. 685 (1884); Handel-Mazzetti in Ann. K.K. Naturhist. Hofmus. Wien, xxviii. 32 (1914) ?** ***Pholiurus pubescens*** **(Bertol.) A. Camus in Ann. Soc. Linn. Lyon, lxix. 90 (1922).**

Gramen **annuum caespitosum, circiter 15 cm. altum.** ***Culmi*** **erecti vel adscendentes, graciles, basi ramosi, paucinodes, minute asperuli.** ***Foliorum vaginae*** **internodiis longiores, teretes, laxae, striatae, marginibus membranaceis, basales minute et retrorse pubescentes, ceterae glabrae et laeves, ore auriculis brevibus angustis patentibus praeditae; ligulae truncatae, usque 1 mm. longae; laminae lineares, tenuiter acutae, usque 5 cm. longae et 2-5 mm. latae, planae vel siccitate convolutae, virides, subtus minutissime pubescentes, supra secus nervos minute hispidulae.** ***Sjricae*** **strictae vel leviter incurvae, usque 8 cm. longae et 2 mm. latae, virides; rhacheos internodia 7-8 mm. longa, 1-1-5 mm. lata, dorso carinata minute et antrorse hispidula, marginibus**

ecabrida. *Spiculae* 8-9 mm. longae. *Glumae* acutae, dorso pilis patentibus hispidulae; inferior subulato-lanceolata vel lanceolata, prominenter 5-7-nervis; superior subulata vel anguste oblonga, 3-5-nervis. *Anthoecium* 1. *Lemma* glumis fere aequilongum, anguste lanceolatum, acutum, explanatum lanceolato-oblongum, 5-nerve, apicem versus nervis scabridum. *Palea* lemmate paullo brevior, anguste lanceolata, minute pubescens. *Lodiculae* 1 mm. longae. *Antherae* usque 0*7 mm. longae.

IRAQ. " Expedition to the Euphrates," *Chesney* 197 (Type-number).

The specimens of this rare species, gathered during Col. Chesney's expedition for the survey of the rivers Euphrates and Tigris in the years 1835-37, were probably collected in northern Iraq rather than at the mouth of the Euphrates (" ex oris Euphratis ") as recorded by Bertoloni. Handel-Mazzetti (I.e.) lists *Lepturus pubescens* var. *glaberrimus* (Hausskn.) Bornm. from several localities in Iraq, but as the specimens cited have not been examined, it is not known whether they belong to a glabrous variety of *Henrardia pubescens,* or should be referred to *H. persica* var. *glaberrima.* The very short antrorsely spreading and relatively stiff hairs on the inflorescences of *H. pubescens,* contrasting with the minute retrorsely appressed soft hairs on the spikes of *H. persica* var. *erecta,* or the glabrous spikes of var. *glaberrima,* afford an excellent means of distinguishing the two species so far as the present known variants are concerned. If, however, there should prove to be a glabrous variety of *H. pubescens,* then the differences in the shape and nervation of the lower glumes and in the length of the anthers should provide a satisfactory basis for its separation from *H. persica* var. *glaberrima.* The distinction of *H. pubescens* from *H. persica* by the number of fertile florets in each spikelet, one in the former and two in the latter, suggested by A. Camus (in Ann. Soc. Linn. Lyon, lxix. 89: 1922), is now known to be unreliable, since one-flowered spikelets are of frequent occurrence in *H. persica.*

The grass spike, so economical in its demands on space and material, has undoubtedly contributed in no small degree to the success of those genera possessing this kind of inflorescence, particularly when competing with other grasses growing in comparatively unfavourable types of habitat, such as in arid regions or in saline soils. It was only natural that such a prominent feature should be selected as a basic distinguishing character; consequently, in almost all systems of classification from that of Kunth (1815) down to the more elaborate schemes of the present day, genera with spicate inflorescences have usually been segregated from the others in which the spikelets are differently arranged. That too much importance has been attached to the type of inflorescence and not enough to similarities in floral structure, has become increasingly apparent from recent detailed morphological, anatomical and cytological investigations. There seems little doubt that the spicate inflorescence has arisen independently in various genera at one time

grouped together on account of this particular characteristic, but now referred to such diverse tribes as the *Andropogoneae, Paniceae, Chlorideae, Leptureae, Agrosteae, Festuceae* or *Hordeeae.* When this form of inflorescence is associated with a reduced type of spikelet, it may lead to very unnatural groupings, in which superficial resemblances mask fundamental differences in the plant's more intimate structure. This appears to have been the case with the complex of species generally referred to *Lepturus* R. Br. or to *Pholiurus* Trin., in which our new genus *Henrardia* has remained unrecognised for more than a century.

In a review (Blumea, Suppl. III. 10-15: 1946) of the species included under *Lepturus* R. Br. by Bentham (Benth. et Hook. f. Gen. PL iii. 1204-5: 1883) and others, reasons have been given for their regrouping into the following five genera :—

1. *Lepturus* R. Br., restricted to the type—*L. repens* (G. Forst.) R. Br., and about 12 other perennial species ranging through the tropics of the Old World from East Africa to Polynesia.
2. *Monerma* Beauv., with one annual species, *M. cylindrica* (Willd.) Coss., widespread in the Mediterranean Region.
3. *Parapholis* C. E. Hubbard, with four annual species, including *P. incurvus* (L.) C. E. Hubbard and *P.fdiformis* (Roth) C. E. Hubbard ; natives of the coasts of Western Europe and widespread in the Mediterranean Region.
4. *Pholiurus* Trin., with a single annual species, *P. pannonicus* (Host) Trin., in Spain, Central and South-east Europe.
5. *Henrardia* C. E. Hubbard, with two annual species in Central and S.W. Asia.

It seems strange that *Henrardia,* which possesses typical Hordeaceous caryopses with simple starch grains, should have been included with the other four genera since, except for their spicate inflorescences, they have so little in common with the true genera of the *Hordeeae. Henrardia* may be distinguished from all these genera by its usually auriculate leaf-sheaths, 3-5-nerved lemmas, hairy lodicules, hairy-tipped ovary, and by the longitudinally grooved caryopsis resembling a wheat-grain, with its narrowly linear hilum extending the whole length of the groove. In addition, it may be separated from *Monerma, Parapholis,* and *Pholiurus* by its simple starch grains. Recent examination of the starch grains of *Lepturus repens* (G. Forst.) R. Br. and *L. radicans* Steud. has revealed that these species, typical of *Lepturus,* have simple —not compound—starch grains, thus not only providing another distinction between *Lepturus* and the superficially very similar genus *Monerma* Beauv., but at the same time an unexpected agreement between *Lepturus* and *Henrardia. Lepturus* differs from *Henrardia,* however, in so many respects, particularly in its anatomy, the suppression or extreme reduction of the lower glume, the orientation of the spikelet and in the form of the caryopsis and hilum, that there should be no further risk of the two genera being confused. Whilst

Henrardia is a somewhat aberrant member of the *Hordeeae, Leplurus* is the type-genus of the *Leptureae,* a tribe proposed for its reception by Holmberg (Bot. Not., Lund, 1926, 71-80). This author's conception of *Lepturus* was like that of Bentham's, and although he pointed out some hitherto unobserved differences in the orientation of the spikelets, glumes and florets, he concluded that the division of *Lepturus* into at least four separate genera was not practicable. Had he paid as much attention to the structure of the florets and caryopses, and in particular to the type of starch grain, there is little doubt that he would have arrived at a very different conclusion.

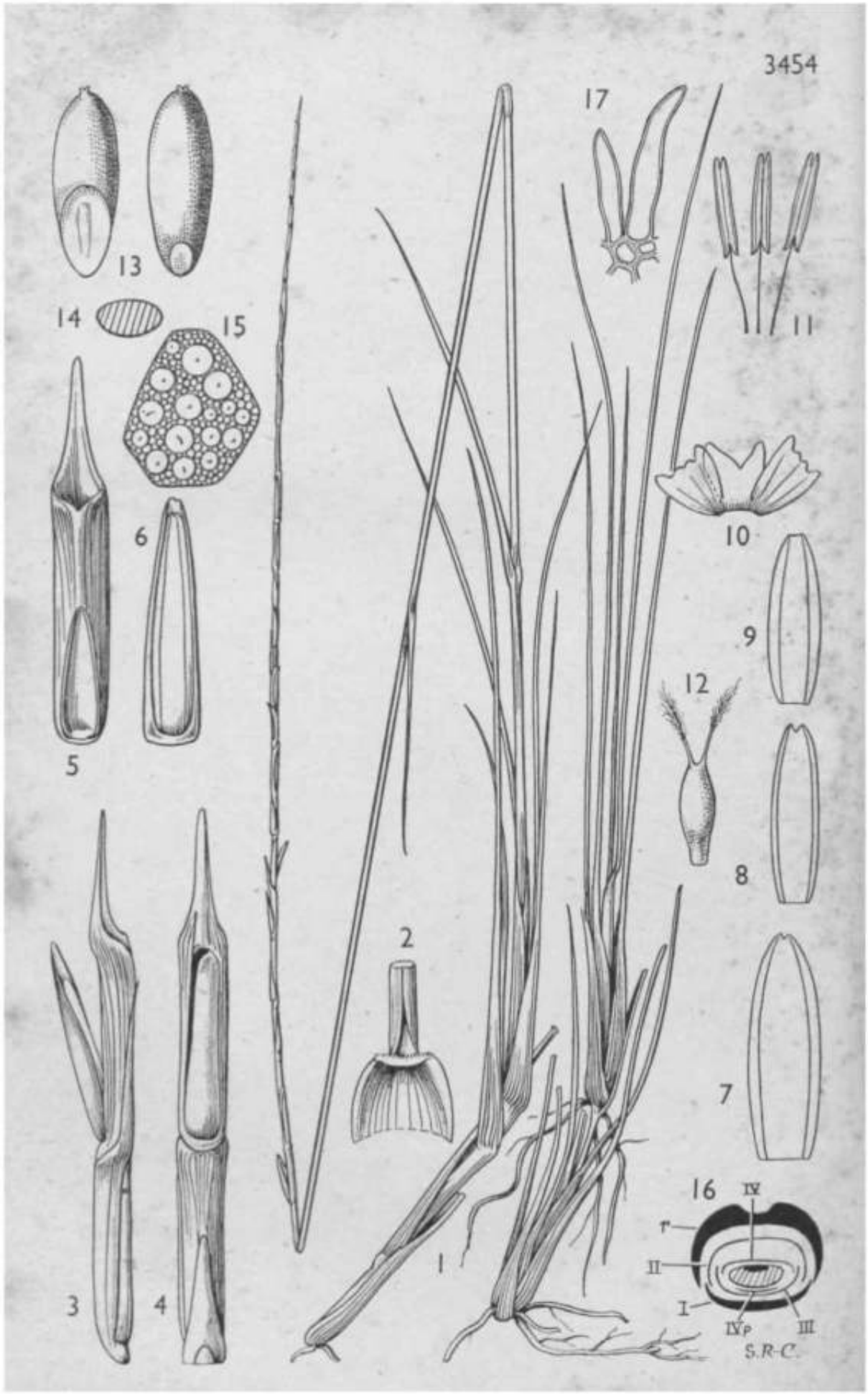
So far as one can judge from the structure of its spikelets, *Henrardia* is not very closely related to any of the present genera of the *Hordeeae.* It represents a very reduced type, not only in its spicate inflorescence and 2-1 -flowered spikelets, but also in the thin membranous 5-3-nerved enclosed lemmas, compared with the thicker herbaceous or coriaceous 5-9-nerved exserted lemmas of all hitherto known members of the tribe. *Henrardia* cannot be included either in the subtribe *Triticinae* Holmb. (Bot. Not., Lund, 1926, 80), or, following Nevski's arrangement of the *Hordeeae* (Act. Inst. Bot. Acad. Sci. URSS., ser. 1, fasc. 1, 26-27 : 1933 ; fasc. 2, 33-90 : 1936), in his subtribe *Aegilopinae,* or in fact in any other subtribe of the *Hordeeae,* without affecting the homogeneity of these groups. A new subtribe, described below, is accordingly proposed for its reception.

Hordeeae subtrib. **Henrardiinae** *C. E. Hubbard,* subtrib. nov. Spicae graciliusculae, plus minusve cylindricae, articulatae, maturitate fragiles et basi disarticulantes; spiculae ad nodos rhacheos solitariae, homomorphae, sessiles, 1-2-florae, muticae; glumae binae, aequales vel fere aequales, obtusae vel acutae, plus minusve asymmetricae ; gluma inferior latior, dorso applanata vel leviter convexa; gluma superior dorso convexa vel carinata; lemmata glumis paullo breviora, acuta vel obtusa, membranacea, 5-3-nervia; plantae annuae; vaginae ore auriculatae.

I am deeply indebted to my colleague, Mr. H. K. Airy Shaw, **for** translating from the Russian numerous extracts regarding the distribution of *Henrardia* in the territories of the USSR.

C. B. HUBBARD.

FIG. 1, plant, *natural size* ; 2, auricles, X 6 ; 3, ligule and auricles, X 6 ; 4, part of spike, x 6; 5, lateral spikelet, X 4; 6, lower glume, X 4 ; 7, upper glume, X 4; 8, front view of floret, X 4 ; 9, lemma, X 4; 10, palea, X 4; 11, prolongation of rhachilla, X 12; 12, lodicules, X 8 ; 13, stamen, X 6; 14, ovary, X 6 ; 15, caryopsis, X 4 ; 16, starch grains in cell, *much enlarged ;* 17, diagram of lateral spikelet; 18, terminal spikelet, X 4 (I = lower glume, II = upper glume, III = lemma, Hip = palea, r = rhachis, rh = rhachilla).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TABULA 3454.

OZYBHACHIS GRACILLIMA *(Baker) C. E. Hubbard.*

GRAMINEAE. Tribus ANDROPOGONEAE.

Oxyrhachis *Pilger* in Notizbl. Bot. Gart. Berlin, xi. 655 (1932), descriptio hie emendata.

Spiculae solitariae, sessiles, abaxiales, biseriatae, alternae, homomorphae, dorso compressae, muticae, in excavationibus rhacheos articulatae spicarum solitariarum gracilium cylindricarum immersae; rhachilla haud producta; callus crassus, glaber, rotundato-obtusus. *Anthoecia* duo, inter glumas inclusa; inferum ad lemma redactum; superum $. *Glumae* dissimiles ; inferior spiculae aequilonga, lanceolato-oblonga, obtusa, cavitatem in rhachi tegens, dorso inferne leviter convexa, superne applanata, marginibus angustissime inflexis, 6-7-nervis, nervis 6 lateralibus, mediano absente vel superne parum notato, coriacea ; superior inferiori fere aequilonga, oblonga vel oblongo-elliptica, apice minute bifida vel integra, dorso leviter convexa, margines versus tenuissime 2-nervis, secundum nervos anguste inflexa, tenuiter membranacea, hyalina. *Anthoecium inferum*: lemma glumae superiori simile sed paullo angustius et brevius, nonnunquam enerve; palea nulla. *Anthoecium superum:* lemma ei anthoecii inferi simile sed paullo brevius et truncatum; palea brevissima, truncata vel fissa, hyalina, basi lodiculae adnata, enervis, vel nonnunquam nulla. *Lodiculae* duae, late obcuneatae, truncatae. *Stamina* 3 ; antherae anguste oblongae. *Ovarium* glabrum; styli breves; stigmata plumosa. *Caryopsis* elliptico-oblonga, dorso compressa ; scutellum late ellipticum, circiter dimidiam partem caryopseos aequans; hilum basale, late ellipticum.—*Gramen* perenne, caespitosum ; culmi paucinodes; foliorum laminae tenues; ligulae brevissimae, membranaceae, minute ciliolatae ; apiece fragiles, glabrae ; rhacheos internodia dorso convexa, facie concava, maturitate vel siccitate valde oblique disarticulantia, apice unilateraliter supra spiculam in rostrum lanceolatum obtusum applanatum vel paullo concavum longius producta.

Species unica, Madagascariae et Tanganyikae Territorii incola.

Oxyrhachis gracillima *(Baker) C. E. Hubbard,* comb. nov. *Rotlboellia gradllima* Baker in Journ. Linn. Soc, Bot. xxii. 533 (1887). *Oxyrhachis mildbraediana* Pilger in Notizbl. Bot. Gart. Berlin, xi. 655 (1932).

Gramen perenne, e rhizomate brevi ortum, caespites confertos efformans, usque 60 cm. altum ; innovationes intravaginales. *Culmi* erecti, gracilliini, teretes, 1-2-nodes, glabri, laeves. *Folia* plerumque basalia; vaginae striatae, glabrae, laeves, basales breves, ore truncatae ; ligulae brevissimae, truncatae; laminae filiformes, acutae vel obtusae, conduplicato-involutae, erectae, rigidulae, virides, subtus glabrae et

laeves, supra pilis minutissimis praeditae, circiter 0*8 mm. latae, inferiores usque 22 cm. longae, eis culmorum multo breviores. *Spicae* erectae, superne valde gradatim attenuatae, purpureae, glabrae, usque 16 cm. longae, circiter 1 mm. diametro ; rhacheos internodia 5-10 (plerumque 6-7) mm. longa, supra spiculam in rostrum 1-5-4 cm. longum producta. *Spiculae* lanceolato-oblongae, obtusae, 4-6 mm. longae; callus 0 * 5-1 mm. longus. Gluma superior et lemmata glabra. *Lemma inferum* 2-8-3-8 mm. longum. *Lemma superum* 2-3-3 mm. longum. *Anthoecii superi palea* 0-5 mm. longa. *Antherae* 1 -5-2-5 mm. longae. *Caryopsis* circiter 2-5 mm. longa.

TANGANYIKA TERRITORY. Iringa Province; Njombe, vlei grass, 1800 m., 1931, *Emson* 84; Lupembe, swampy places by the Ruhudje River, 1-4-1931, *Schlieben* 693 (type of *Oxyrhachis mildbraediana,* not examined).

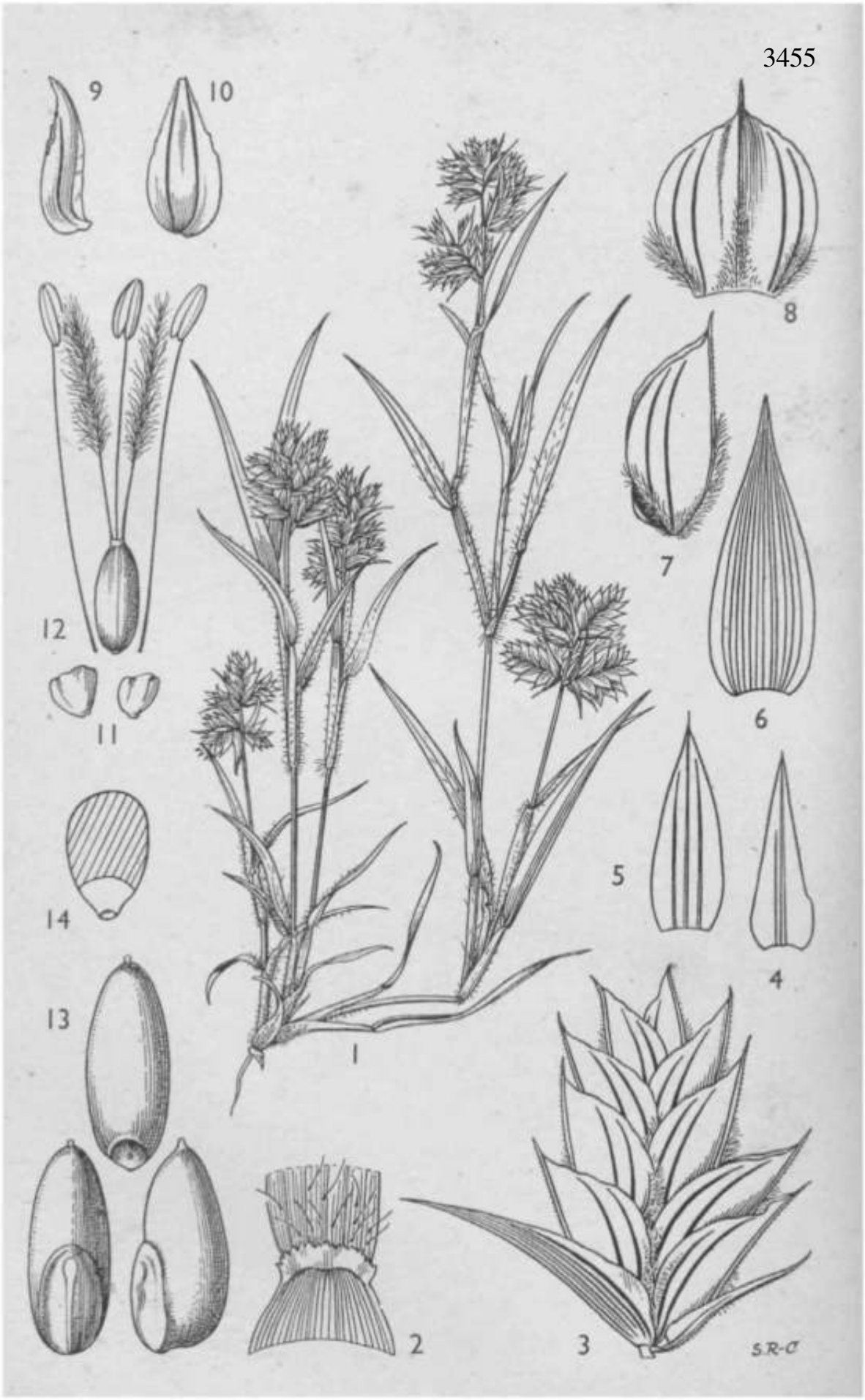
MADAGASCAR. Without precise locality, " frequently giving quite a red shading to marshes," *Baron* 3210, 4457 (type of *Rottboellia gracillima).*

In some tribes, particularly the *Andropogoneae,* in which the floral scales are delicate and often considerably reduced in size and even in some cases suppressed, one scale may be easily mistaken for another, leading to an erroneous conception of the structure of the spikelet. Such a misidentiiication of these scales has occurred in the description of *Oxyrhachis,* causing Pilger to suggest a relationship between his new genus and *Lepturus* R. Br., rather than with its true allies in the *Andropogoneae.* Thus the palea of the upper floret, so very small and obscure or sometimes suppressed in *Oxyrhachis,* was overlooked by Pilger and the lemma treated as a palea. This incorrect interpretation naturally led to the lemma of the barren and palea-less lower floret being regarded as the lemma of the upper floret, the upper glume as the lemma of a barren lower floret, and the indurated lower (outer) glume as the upper glume, whilst the lower glume *(sensu* Pilger) was considered abortive. Even if the spikelet possessed such a structure it would not resemble that of *Lepturus,* since in that genus the lower floret is always complete and hermaphrodite. When the palea of a floret is suppressed or is so small that it is not readily observed, then a misinterpretation of the spikelet's structure may be avoided by ascertaining the positions of the lodicules and caryopsis in relation to the floral scales embracing them, in the manner recommended by Stapf (Hook. Ic. Plant, xxxii. sub t. 3125 : 1927). In mature spikelets of *Oxyrhachis,* if the glumes and lower lemma are carefully removed leaving the upper floret complete, its delicate palea when present may be seen at the base of the caryopsis. This scale is slightly wider than but otherwise very similar to the two lodicules, to which it adheres laterally. The lodicules are situated in their correct position to the right and left of the palea, so that they converge round the dorsal side of the caryopsis where they are adjacent to the upper lemma. Additional evidence that the small scale is the

palea, and the larger scale the lemma and not a palea, is provided by their positions relative to the hilum and embryo of the caryopsis, the palea facing the hilum and the lemma the embryo, as comparable scales do in the florets of other grasses.

Following this emended version of the identity of its parts, it will be observed that the spikelet possesses an indurated lower glume, a membranous upper glume, a membranous barren lower lemma, and a membranous fertile upper lemma and palea, and therefore conforms in structure to the Andropogonous spikelet. *Oxyrhachis* is accordingly treated as a member of the tribe *Andropogoneae.* Its affinity lies with the genera of the subtribe *Rottboelliinae,* particularly those grouped together by Stapf (Prain, Fl. Trop. Afr. ix. 9 : 1917) as the *Rottboelliastrae,* and by Pilger (Engl. u. Prantl, Nat. Pflanzenfam. 2 Aufl., xive. 133 : 1940) as the *Rottboelliininae.* From all the genera included in these groups, *Oxyrhachis* may be distinguished at once by the oblique articulation of the rhachis, the beak-like apical outgrowth of each internode, and by the complete suppression, not only of the pedicelled spikelet, but apparently also of its pedicel. In its densely tufted habit and preference for moist situations, *Oxyrhachis* resembles certain species of *Rhytachne* Desv., especially *R. rottboellioides* Desv. This species of *Rhytachne* also possesses very similar epidermal siliceous cells above the vascular bundles in the leaves, each cell more or less square in surface view or with its sides slightly incurved, and in both genera accompanied by a very narrow cork cell. Among other genera of the *Rottboelliinae, Ophiuros* Gaertn., and *Thaumastochloa* C. E. Hubbard most closely approach *Oxyrhachis* in the complete or almost complete suppression of their pedicelled spikelets, but the pedicels are present, although fused to the internodes of the rhachis.—C. E. HUBBARD.

FIG. 1, part of plant, *natural size ;* 2, ligule, X 8 ; 3 and 4, part of spike, side and front views respectively, X 8; 5, internode of rhachis, X 8 ,* 6, spikelet showing upper glume and margins of lower glume, X 8 ; 7, upper glume, x 8; 8, lemma of lower floret, x 8; 9, lemma of upper floret, X 8 ; 10, palea and lodicules, x 20; 11, stamens, X 8; 12, pistil, X 20; 13, caryopses, X 12; 14, transverse section of caryopsis, x 12 ; 15, cell with starch grains, *much enlarged;* 16, diagram of spikelet (I = lower glume, II = upper glume, III = lower floret, IV = lemma of upper floret, IVp = palea of same, r = rnachis); 17, hairs on upper surface of leaf-blade, *much enlarged.*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TABULA 3455.

DEAKE-BROCKMANIA SOMALENSIS *Stapf.*

GRAMINEAE. Tribus ERAGROSTEAE (sensu lato).

Diake-Brockmania *Stapf in* Kew Bull. 1912,197, et in Prain, Fl. Trop. Afr. ix. 23 (1917); Bews, The World's Grasses, 155 (1929); Roshevitz, Grass, 277 (1937); genus *Heterocarphae* Stapf et C. E. Hubbard affine, sed habitu annuo, spicis in infiorescentiam capitatim compactam dispositis, gluma superiore explanata lanceolata vel anguste ovata spiculae aequilonga vel paullo superante, lemmatibus 5-sub7-nervibus, palearum carinis late alatis differt.

Spiculae latae, lateraliter valde compressae, arete imbricatae, biseriatae, in rhachi continua gracili spicarum brevium secundarum subsessiles ; rhachilla supra glumam superiorem et inter anthoecia demum facile disarticulans, internodiis glabris brevissimis validiusculis. *Anthoecia* 5-10, summo redacto excepto omnia $; callus nullus. *Glumae* persistentes, patentes, carinatae, acute acuminatae, mucronatae, glabrae, prominenter et arete nerves, nervis viridibus, marginibus niembranaceis exceptis rigidae ; eae spicularum lateralium dissimiles ; gluma inferior superiore brevior, lanceolata, leviter asymmetrica, infra medium uno latere nonnunquam auriculata, 1-5-nervis ; gluma inferior spiculae terminalis et glumae superiores spicularum omnium similes, spiculam aequantes vel paullo superantes, lanceolatae vel anguste ovatae, 9-13-nerves. *Lemmata* imbricata, carinata, complicata, a latere visa late et oblique ovata, acuta vel acute acuminata, apice mucrouata vel breviter aristata, integra, scariosa vel tenuiter coriacea, 5-sub7-nervia, nervis Iateralibus viridibus a carina remotis, carina infra medium et marginibus prope basin pilis brevibus molliter et dense pubescentia. *Paleae* lemmatibus breviores, complicatae, dorso infra medium gibbosae, glabrae, bicarinatae, carinis viridibus late alatis, ala circa medium nonnunquam in dentem producta. *Lodiculae* duae, obcuneatae, truncatae, minutae. *Stamina* tria; antherae oblongae. *Ovarium* glabrum; styli longiusculi, distincti vel basi connati; stigmata breviter plumosa, prope apicem anthoecii breviter exserta. *Caryopsis* elliptico-oblonga, subtriquetra, inter lemma paleamque inclusa et cum iis decidua; pericarpium tenuissimum siccitate adnaerens; scutellum circiter dimidiam partem caryopseos aequans; nilum basale, punctiforme.—*Gramen* annuum, a basi ramosum ; culmi gracillimi, paucinodes, ramosi; ligulae membranaceae; laminae lineares vel anguste lanceolatae, planae; spicae paucae, patentes vel renexae, in inflorescentiam capitatim contractam saepissime dispositae.

Species unica, Africae tropicae boreali-orientalis incola.

Drake-Brockmania somalensis *Stapf* in Kew Bull. 1912, 197. *Meusine somalensis* Hack, in Mem. Herb. Boiss. no. 20, 6 (1900).

Culmi laxe fasciculati, plerumque e basi prostrata geniculato-adscendentes, ad nodos infimos interdum radicantes, 5-12 cm. alti, teretes, gracillimi, 2-3-nodes, e nodis ramosi, glabri, laeves. *Folia* mollia, viridia ; vaginae internodiis demum breviores, laxae, nodis pilis tenuissimis patentibus laxe barbatae, ceterum pilis similibus e tuberculis minutis ortis laxissime hirsutae, vel glabrae; ligulae truncatae, 0-5-1 mm. longae, glabrae; laminae sursum longe attenuatae, acutae, 2-8 cm. longae, 2-4 mm. latae, multinervosae, tenues, inferne pilis albis tenuissimis laxissime hirsutae, vel glabrae, marginibus minute scaberulae. *Inflorescentia* e spicis 2-3 composita, 1*2-2-5 cm. longa, capituliformis; spicae usque 1-2 cm. longae, 4-7-spiculatae, sessiles vel infima brevissime pedunculata; rhachis tenuis, 0-5 mm. lata, glabra, dorso minute scaberula. *Spiculae* ambitu late ovato-oblongae vel late oblongae, 6-10 mm. longae, 5-8 mm. latae, nervis viridibus exceptis pallidae, 5-10-florae. *Glumae* glabrae, carinis minute scaberulae; inferior spicularum lateralium 4-5*5 mm. longa; inferior spicularum terminalium et superior spicularum omnium 5-8-5 mm. longa. *Lemmata* 3-5 mm. longa, mucrone (vel arista) rigido duro leviter scaberulo usque 0*7 mm. longo terminata. *Antherae* 0-4-0*7 mm. longae. *Caryopsis* 1-1 - 2 mm. longa, siccitate olivaceo-grisea.

BRITISH SOMALILAND. Bulhar, west of Berbera, *Drake-Brockman* 616, 617, 643, 647, 924, 925 ; Webi Habir, 1891, *Keller* 132.
ANGLO-EGYPTIAN SUDAN. Darfur Province, *Massey.*

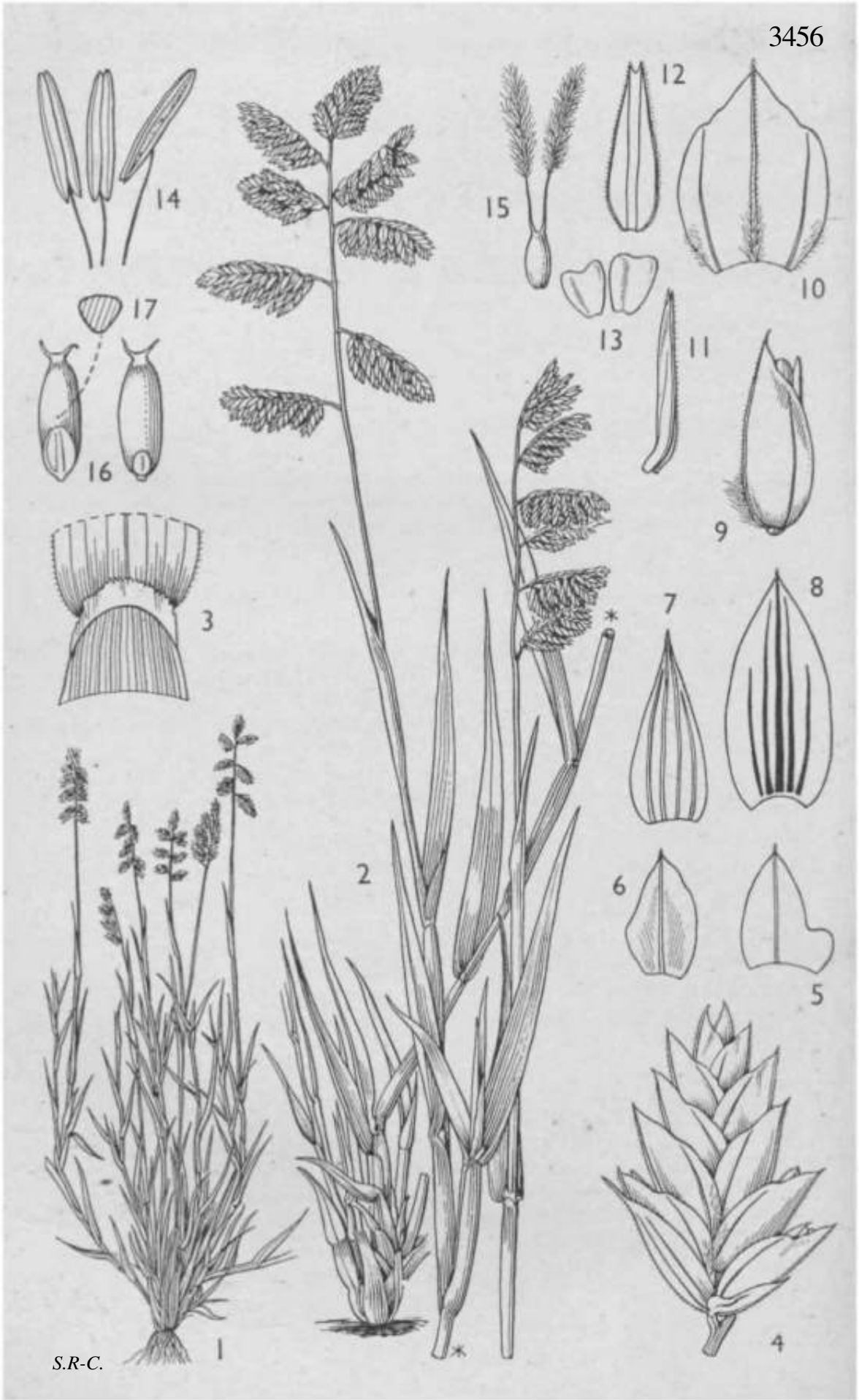
The paucity of material in European herbaria of this very distinctive and fruitful annual grass is due no doubt to its short span of life in areas rarely visited by botanical collectors, rather than to its rarity as the present collections from such widely separated regions as British Somaliland and the Darfur Province of the Anglo-Egyptian Sudan would seem to imply. Our knowledge of its structure has been obtained largely from an excellent series of specimens gathered in the vicinity of Bulhar, British Somaliland, by Drake-Brockman, since Keller's specimens, which formed the basis of *Eleusine somalensis* Hack., are incomplete and in poor condition.

There seems little doubt that *Drake- Brockmania* was referred to the tribe *Festuceae* by Stapf primarily on account of its 5-(7)-nerved lemmas. In many respects, however, particularly in the general structure of the spikelet, the texture of the lemmas, and in certain anatomical characters, it bears a close resemblance to *Heterocarpka* Stapf et C. E. Hubbard (tab. 3456), a genus which has been treated as a member of the *Eragrosteae,* where the lemmas are normally 3-nerved. There are good reasons for supposing that if living material were available, a study of the leaf-anatomy and of the chromosomes would yield sufficient evidence to warrant the separation of *Drake-Brockmania* from the *Festuceae (sensu sTricto).* It is a tropical genus, whereas the *Festuceae* are grasses of temperate climates, and in this restricted sense the tribe is much more homogeneous especially with regard to anatomical and cytological details.

Sections prepared from the dried leaves of *Drake-Brockmania* are far from satisfactory. They do illustrate, however, some of the anatomical and histological characters which have proved of considerable value as indicators of relationships not obvious from purely morphological studies. For example, in both *Drake-Brockmania* and *Heterocarpha,* the siliceous cells of the epidermis are very similar to the dumb-bell and knot types described by Grob (Biblioth. Bot. vii. 38-41 : 1896), and considered by H. Prat (Ann. Sci. Nat., Bot., sér. 10, xviii. 176-180: 1936) to be characteristic of the Panicoid group of tribes. In those grasses which have been cytologically examined and possess siliceous cells of these types, it has been noted that the chromosomes are relatively small, with the basic number $x = 9$ or 10, compared with grasses of the Pestucoid tribes in which the larger kind of chromosomes, with the basic number usually $x = 7$, is associated with siliceous cells of a different type.

Reverting to the spikelets, the lemmas and grains of *Drake-Brockmania* and *Heterocarpha* present several characters foreign to the *Festuceae.* In texture, the lemmas are scarious or thinly coriaceous between the markedly green nerves, whereas in the *Festuceae* they are normally herbaceous. Their grains possess a thin pericarp, which, although not appearing free in the dry state, becomes readily removable after soaking in water, as it does in some genera referred to the *Eragrosteae.* It is possible that the genera of the *Eragrosteae* may have to be regrouped in view of differences in their anatomy, such as the presence or absence of an inner bundle-sheath, the arrangement of the chlorenchyma and the type of siliceous cell, but meanwhile it seems advisable to extend our conception of the tribe to include *Drake-Brockmania,* rather than leave this genus in an unnatural position in the *Festuceae.*—C. E. HUBBARD.

FIG. 1, plant, *natural size;* 2,ligule, X 8; 3, apikelet, x 6; 4 and 5, lower glumes of lateral spikelets, X 6 ; 6, upper glume, X 6 ; 7, floret, X 6 ; 8, lemma, X 6 ; 9and *10,* palea, side and flattened (dorsal) views respectively, x 6 ; 11, lodicules, X 16; 12, stamens and pistil, x 16; 13, caryopses, X 24; 14, transverse section of caryopsis, x 24.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TABULA 3456.

HETEBOCABPHA HAABEBI *Stapfet C. E. Hubbard.*

GRAMINEAE. Tribus ERAGROSTEAE *(sensu lato).*

Heterocarpha *Stapfet C. E. Hubbard* in Eew Bull. 1929, 263; Roshevitz, Grass, 408 (1937); genus cum *Eragrosti* Beauv. et *Eleusini* Gaertn. comparandum, ab ilia spiculis secundum rhachin racemorum secundorum spiciformium dispositis, glumis spicularum lateralium heteromorphis, gluma inferiore spicularum terminalium et gluma superiore spicularum omnium rigida coriacea 5-9-nervi, gluma inferiore spicularum lateralium membranacea 1-3-nervi uno latere auriculata auriculo rotundato, lemmatibus breviter mucronatis secundum carinam infra medium et prope margines basin versus brevissime villosis, ab hac inflorescentia e racemis brevibus pedunculatis demum horizontaliter patentibus composita, spiculis 6-16-floris, gluma superiore 5-9-nervi, lemmatibus breviter mucronatis, pericarpio caryopseos semini siccitate adnato differt.

Sjriculae oblongae, ovato-oblongae vel late ovatae, lateraliter valde compressae, alternatae, biseriatae, dense imbricatae, demum horizontaliter patentes, in rhachi triquetra continua racemorum secundorum spiciformium brevissime pedicellatae ; rhachilla glabra, supra glumam inferiorem et inter anthoecia demum disarticulans, internodiis brevissimis. *Anthoecia* numerosa, summo plus minusve redacto excepto omnia $; callus nullus. *Glumae* plerumque mucronatae, carinatae, eae spicularum terminalium subaequales et similes, spicularum ceterarum inaequales et dissimiles; gluma inferior spicularum lateralium triangulari-ovata vel late oblonga, acuta vel obtusa, 1-3-nervis, membranacea, asymmetrica, uno latere plerumque auriculata, auriculo rotundato rhachin versus spectante ; glumae ambae spicularum terminalium et gluma superior spicularum lateralium a latere visae oblique lanceolatae acuminatae, explanatae elliptico-ovatae vel late ellipticae, arete prominenter 5-9-nerves, marginibus membranaceis exceptis ngidae. *Lemmata* dense imbricata, complicata, acute carinata, a latere visa oblique ovata vel elliptico-ovata et acuta vel obtusa, explanata late ovato-elliptica, integra, apice breviter mucronata, scariosa vel tenuiter chartacea, 3-nervia, carina infra medium et inter nervos laterales et margines basin versus brevissime villosa, nervis lateralibus supra medium evanescentibus. *Paleae* lemmatibus aequilongae vel paullo breviores, infra medium leviter gibbosae, a dorso visae lanceolatae, obtusae, bicarinatae, inter carinas anguste alatas profunde concavae, scariosae. *Lodiculae* duae, minutae, obcuneatae, carnosae. *Stamina* tria; antherae anguste oblongae. *Ovarium* glabrum ; styli distincti; stigmata plumosa, ex anthoeciis lateraliter exserta. *Caryopsis* oblonga, trigona, lemmate paleaque laxe inclusa; pericarpium tenuissime membranaceum, siccitate adhaerens; scutellum usque

dimidiam partem caryopseos aequans ; hilum basale.—*Gramen* perenne stoloniferum; ligulae truncatae, breves, membranaceae; laminae lineares vel anguste lanceolatae, planae; inflorescentia e racemis breviter pedunculatis approximatis vel laxe dispositis composita ; spiculae congestae.

Species unica, Tanganyikae Territorii incola.

Heterocarpha haareri *Stapf et C. E. Hubbard,* I.e. 263, fig. p. 264. *Eleusine conghmerata* Peter in Fedde, Repert. Beih. xl. 1.270,272 (1931), tab. xliia (1936), Anhang, 78 (1930); forma *littoralis* Peter, I.e. Anhang, 79 (1930), tab. xliib (1936); var. *littoralis* Peter, I.e. xl. I. 270 (1931).

***Gramen* perenne, stolones emittens; stolones e nodis radicantes et ibi culmos solitarios vel innovationum et culmorum caespites efformentes. *Culmi* geniculato-adscendentes vel erecti, 10-90 cm. alti, graciles vel modice validi, teretes, supra basin leviter ramosi, ramis nonnumquam fastigiatis, usque 8-nodes, glabri, laeves, internodiis inferioribus brevibus summo (pedunculo) elongato. *Folia* viridia vel glauca; vaginae firmae, teretes, tenuiter striatae, internodiis demum breviores, glabrae, laeves, raro pilis e tuberculis ortis laxe pilosae; ligulae usque 2 mm. longae, minute laceratae; laminae basi abrupte contractae, in apicem duriusculum acutum attenuatae, 1-20 cm. longae, 3-9 mm. latae, planae vel siccitate marginibus involutis, rigidae vel flaccidae, glabrae vel supra sparse pilosae, supra et marginibus scaberulae. *Inflorescentia* secunda, oblonga vel lanceolata, 1-5-15 cm. longa, 1-5-5 cm. lata; axis primarius laevis vel fere laevis, striatus. *Racemi* 3-14, 0-8-3-8 cm. longi, solitarii, conspicue secundi, primo oblique erecti, demum horizontaliter patentes, infimus nonnunquam bractea squamiformi subulato-lanceolata usque 2 mm. longa suffultus; rhachis glabra, 0-5 mm. lata; pedunculi secundarii 1-5-8 mm. longi; pedicelli brevissimi. *Spiculae* 5-14 mm. longae, 3-5-6-5 mm. latae, 6-16-florae, pallide virides vel stramineae et purpureo-variegatae. *Glumae* carinis scaberulae ; inferior spicularum lateralium 2-3-5 mm. longa; glumae ceterae 3-6-5 mm. longae. *Lemmata* 3-4-5 mm. longa, carinis scaberula, mucrone usque 0*4 mm. longo. *Paleae* carinarum alis ciliolatae. *Antherae* 2-2-5 mm. longae. *Caryopsis* 1 mm. longa.**

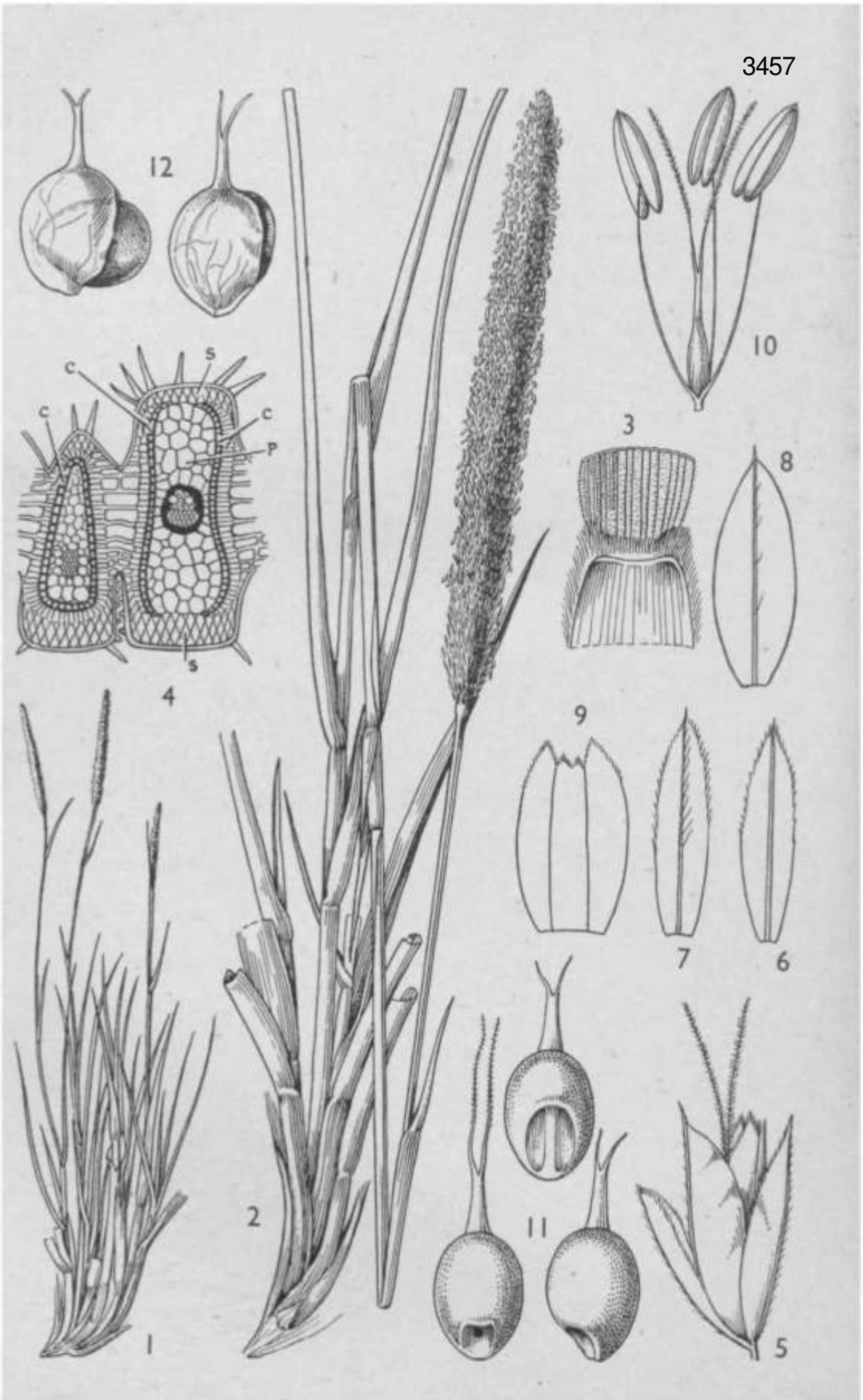
TANGANYIKA TERRITORY. **Usambara District: steppe north of Lake Jipe, 710 m., *Peter* 14128; Kihurio, 720 m., Aug. 1928, *Haarer* 1470 ; Mkomazi, 780 m., Jan. 1929, *Haarer* 1714 ; Mkomazi, in Acacia-Desert Grass formation, black soil, not at all common, very local and forming small patches, 450 m., 23-4-1934, *Greenway* 3974,3982; towards Lake Manga, near Mkomazi, 400 m., *Peter* 10877, 12394; west of Makania towards Lasitti Mtn., 700 m., *Peter* 12277 ; between Bwiko and Lake Manga, 400 m., *Peter*; between Mkomazi and Bwiko, 450-530 m., 7-6-1926, *Peter* 40975; between Bwiko and Hedaru, 600 m., 13-6-1915, *Peter* 11041; Masai-bush near Bwiko, 30-5-1911, *Eichinger***

3376; grass-steppe near Bwiko, 560 m., *Peter* **10342**; **near** lake by **Makuyuni,** 420 m., *Peter* 15442.

It is very probable that the grass listed without description by Schweinfurth as " *Eleusine sp. dactyloides* " (in Höhnel, Zum Rudolph-See und Stephanie-See, reprint p. 2: 1892), from west of the Pare Mountains (200-700 m.), should be referred to *Heterocarpha haareri.* Of the material collected by Peter and enumerated above, only two gatherings (nos. 11041 and 40975) have been examined and these were listed by Peter as authentic specimens of his *Eleusine conglomerate}.* The forma (or variety) *littoralis* Peter, judging from the description and illustration, appears to be a depauperate state of the species, rather like some of Haarer's original specimens of *Heterocarpha,* and is not considered worthy of separation.

Heterocarpha was referred in the first place to the tribe *Eragrosteae* on account of the close resemblance of its spikelets to those of *Eragrostis* and allied genera. It now seems possible, however, that this similarity in morphological structure does not necessarily signify close affinity, for whilst *Eragrostis* has saddle-shaped siliceous cells in the leaf-epidermis, the siliceous cells of *Heterocarpha* closely approximate to the dumb-bell type, as is also the case in the genus *Drake-Brockmania* (tab. 3455). In his paper " La Systématique des Graminées " (Ann. Sci. Nat., Bot., sér. 10, xviii. 167-258 : 1936), H. Prat has ably demonstrated the great importance of these cells in preparing schemes of classification.—C. E. HUBBARD.

FIG. 1, habit figure, *one-fourth natural size;* 2, part of plant, *natural size;* 3, ligule, X 4 ; 4, lateral spikelet, x 6 ; 5 and 6, lower glumes from lateral spikelets, X 8; 7, lower glume from terminal spikelet, X 8; 8, upper glume, X 8; 9, floret, X 8; 10, lemma, X 8; 11 and 12, palea, side and flattened views respectively, X 8; 13, lodicules, x 16; 14, stamens, X 8; 15, pistil, X 16 ; 16, caryopses, X 16; 17, transverse section of same, X 16.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TABULA 3457.

TJROCHONDRA SETULOSA *(Trin.) C. E. Hubbard.*

GRAMINEAE. Tribus SPOROBOLEAE.

Urochondra * *C. E. Hubbard.* Genus novum, *Crypsi* Ait. et *Sporoboh* R. Br. affine, ab ilia habitu perenni dense caespitoso, culmis erectis vel leviter geniculatis pauci-nodibus simpb'cibus, foliorum vaginis elongatis, fructu rostrato, ab hoc glumis et lemmatibus lateraliter valde compressis carinatis ciliolatis, lemmatibus mucronatis vel brevissime aristatis, fructo rostrato differt.

***Spiculae* oblongae vel obovato-oblongae, lateraliter valde compressae, dense imbricatae, in ramis brevissimis paniculae spiciformis subsessiles; rhachilla inter glumam superiorem et anthoecium disarticulans, haud (vel rarissime) supra anthoecium producta. *Anthoecium* 1, $, glumae superiori aequilongum vel ea paullo longius. *Glumae* plus minusve persistentes, angustae, carinatae, tenuiter membranaceae vel hyalinae, 1-nerves, inaequales vel fere aequales, spicula paullo breviores vel superior spiculae aequilonga. *Lemma* gluma superiore latius, obtusum, apice mucronatum vel brevissime aristatum, complicatum, carinatum, ceterum glumae superiori simile. *Palea* lata, lemmate brevior vel lemmati aequilonga, complicata, hyalina, tenuiter 2-nervis, inter nervos facile fissa. *Lodiculae* nullae. *Stamina* 3; filamenta basi dilatata. *Ovarium* gracile, glabrum ; styli terminales, basi connati (?); stigmata brevissime plumosa, ex apice anthoecii exserta. *Fructus* late ellipsoideus, subteres, apice rotundatus et rostrum breve induratum strictum vel leviter curvatum gerens (stylorum bases induratae connatae ?); pericarpium liberum, membranaceum, tenue; scutellum late ellipticum, usque duas trientes caryopseos aequans; hilum punctiforme, subbasale.—*Gramen* perenne, caespitosum ; culmi rigidi, paucinodes ; ligulae ad seriem ciliorum redactae ; foliorum laminae lineares, elongatae, convolutae vel planae; paniculae densissimae, elongatae, anguste cylindricae ; rami ad rhachin connati.**

Species unica, litorum marium Arabicae et Rubrae a Somalia, Eritrea, Sudania et Arabia usque Indiam septentrionali-occidentalem incola.

Urochondra setulosa *(Trin.) C. E. Hubbard,* comb. nov.—*Vilfa setuhsa* Trin. in Mém. Acad. Imp. Sci. Pétersb. sér. 6, vi. part 2, Sci. Nat. 55 : 1840 (p. 33 of reprint); Steud. Syn. PI. Glum. i. 154 (1854); Penzig in Atti Congr. Bot. Genova, 1892, 367 (1893). *Agrostis ekitior* Ehrenb. et Hempr. ex Trin. I.e., in syn. *Crypsis dura* Boiss. Diagn. PI. Or. Nov., Ser. 2, no. 4, 125 (1859). *Heleochloa dura* (Boiss.) Boiss. Fl. Orient, v. 477 (1884); Lisboa, Bombay Grasses, 93 (1896); Hook. f. Fl. Brit. Ind. vii. 236 (1896); Woodrow in Journ. Bomb. Nat. Hist! Soc. xiii. 439 (1901); Cooke, Fl. Bomb. ii. 1011 (1908); Burkill, List Fl. PI. Baluch. 81 (1909); Blatter in Rec. Bot. Survey India, viii.

* *ovpd,* tail; *x$'$pos** grain.

498 (1936); Schwartz in Mitteil. Inst. Allg. Bot. Hamburg, x. 323 (1939). *Sporobolus setulosus* (Trin.) Terrace, in Ann. Istit. Bot. Roma, v. 95 (1893); Schweinf. in Bull. Herb. Boiss. ii. App. 2, 28 (1894) ; Chiov. in Ann. Istit. Bot. Roma, viii. 49 (1903), 337 (1908), et in Nuovo Giorn. Bot. Ital. n.s. xix. 420 (1912); Chiov. Result. Sci. Miss. Stefanini-Paoli, 185 (1916), et Fl. Somala, 333 (1929); Schwartz in Mitteil. Inst. Allg. Bot. Hamburg, x. 325 (1939). *Heleochloa dura* Boiss. subsp. *kuriensis* Vierhapper in Oesterr. Bot. Zeitschr. liii. 481 (1903) et in Denkschr. Akad. Wiss. Wien, Math.-Nat. Cl. lxxi. 328, t. 1, fig. 2 : 1907 (p. 8 of reprint). *Heterochloa dura* (Boiss.) I. B. Balf. in Forbes, Nat. Hist. Sokotra, 531 (1903). *Crypsis setulosa* (Trin.) Mez in Fedde, Repert. xvii. 292 (1921). *Heleochloa setulosa* (Trin.) Blatter et McCann, Bombay Grasses, 205, t. 134 : 1935 (India Counc. Agric. Res., Sci. Monogr. no. 5).

Gramen perenne, dense caespitosum, 15-90 cm. altum, e rhizomate brevi ortum. *Culmi* erecti vel basi leviter geniculati vel curvati, graciles vel modice validi, rigidi, 1-3-nodes, simplices, inflorescentiam versus dense pubescentes. *Foliorum vaginae* internodiis paullo breviores vel paullo longiores, arete appressae, dense et minute pubescentes, vel glabrae et laeves et plus minusve pruinosae, basales persistentes, coriaceae, demum stramineae et nitentes ; laminae lineares, pungentes, usque 30 cm. longae et 8 mm. latae, convolutae vel basin versus explanatae, rigidae et tenaces, subtus tenuiter obscure striatae, in striis vel omnino minute pilosae, supra crasse costatae, costis dense et brevissime pilosae. *Panicula* e vagina superiore demum exserta, dense spiciformis, cylindrica, 4-5-16 cm. longa, 4-8 mm. diametro, straminea vel purpureo-tincta; rhachis minute pubescens; rami brevissimi. *Spiculae* 2-3 mm. longae. *Glumae* lineari-oblongae, anguste oblongae vel anguste oblongo-lanceolatae, acutae vel obtusae, carinis et marginibus laxe ciliolatae vel ciliatae ; inferior 1 • 5-2 • 5 mm. longa ; superior 2 • 6-3 mm. longa. *Lemma* explanatum lanceolato-oblongum, oblongum vel elliptico-oblongum, carina laxe ciliolatum, lateribus et marginibus nonnunquam minute pilosum. *Palea* late oblonga, plus minusve truncata, glabra vel carinis et marginibus ciliolata. *Antherae* 1-1 • 5 mm. longae. *Fructus* circiter 2 mm. longus, castaneo-brunneus, rostro pallido incrassato usque 0*7 mm. longo praeditus.

ANGLO-EGYPTIAN SUDAN. Red Sea Province : near Tokar, *Massey.*
ERITREA. Dahlak Archipelago; Sarad Is., *Terracciano* 411 ; Racaham Is., *Terracciano* 413 ; Sciumma Is., *Terracciano* 763, *Tellini 11*; Damoeita; Achil Is., *Terracciano* 1543; Crulli Is., *Terracciano* 1545; Midle Is., *Terracciano* 1544; Anfilah, *Terracciano* 1542 ; Samhar; Scek-Said Is., in salty sands of the littoral, *Schweinfurth* 4, 76 ; *Terracciano & Pappi* 2679, *Pappi* 3166, 6166 ; Assaorta ; Ras Amas—R£s Tucul, *Terracciano* 2678. (All Eritrean specimens are cited from the publications of Terracciano, Schweinfurth or Chiovenda, 11. cc, and except for *Pappi* 6166, have not been examined.)

BRITISH SOMALILAND. Saad-ud-Din, *Drake-Brockman* 445, 887, 888 ; Nogal, salt areas and sea-shores, common, 4-12-1938, *McKinnon* S.181.

ITALIAN SOMALILAND. Mijertini coast; Hafun, on dunes, *Chiovenda* 7 ; Obbia Sultanate ; Ballighi Adale, *Chiovenda* 518 ; between Obbia and Magangib, on dunes, *Chiovenda* 366 ; Mogadishu, *Paoli* 13 ; near Gesira, *Paoli* 60 ; Sobanalle, *Paoli* 1016 ; plain of Erbed Delbile, *Stefanini* 354 (all ex Chiovenda, 11. cc).

SOCOTRA. Abd-el-Kuri, *Forbes* 1 (ex I. B. Balfour, I.e.); Wadi Maleima, *Simony* (ex Vierhapper, I.e.).

ARABIA. Yemen ; without precise locality, *Bové, Traill*; " Ga el Ma," *Ehrenberg & Hemprich* (ex Trinius, I.e., type of *Vilfa setulosa* Trin.); South Arabia, El Hami, 1881, *Schweinfurth* 174 ; Dhofar,Hafa, 1895, *Bent* 321.

INDIA. Sind, by sea and salt-water creeks, *Stocks* 455 (type-number of *Crypsis dura* Boiss., cited by error as *Griffith* 455); Gholam, in Indus Delta, *Blatter & McCann* D.688 (ex Blatter & McCann, I.e.); Kathiawar, Dwarka, *Woodrow* (ex Cooke, I.e.).

The grass here considered worthy of distinction as a new genus has been treated by various authors as a species of *Crypsis* Ait., *Heleochloa* Host, or *Sporobolus* R. Br., to each of which, judging from the structure of its spikelets, it bears a close relationship. During the investigation of the affinities of *Urochondra,* it soon became apparent that *Crypsis, Heleochloa,* and the more recently described *Torgesia* Bornm., could not be distinguished satisfactorily from one another by the characters usually employed in defining these three genera. *Heleochloa* and *Torgesia* are regarded, therefore, as synonyms of *Crypsis.*

Urochondra setulosa differs conspicuously in habit from the species of *Crypsis.* It is a densely caespitose more or less erect perennial, with simple few-noded rigid culms, tough elongated leaf-blades and narrowly cylindrical spiciform inflorescences, well adapted in all respects for growth in relatively unfavourable habitats. Specimens have been collected from sand-dunes and the banks of salt-water creeks at various points on or near the shores of the Arabian Sea, in Italian Somaliland, southern Arabia, and Sind and Kathiawar in north-west India. Its area of distribution extends through the Gulf of Aden to the Red Sea, along the coastal regions of British Somaliland, Eritrea and tropical Arabia, to as far north as Tokar and probably Port Sudan in the Anglo-Egyptian Sudan. The species of *Crypsis* appear to be absent from all these areas. There are no records of the collection of *Urochondra* from the Arabian and Persian coasts of the Gulf of Oman, whilst the report by Boissier (Diagn. PI. Or. Nov., ser. 2, no. 4, 125) of its occurrence in Baluchistan (coll. *Griffith* no. 455) is an error both as to locality and collector, since the specimens were gathered in Sind by Stocks (no. 455). It may be mentioned here that the vernacular names for *Urochondra setulosa* in British Somaliland are " Garro " (ex Drake-Brockman) and " Afrus " (ex McKinnon).

The species of *Crypsis (sensu lato)* are all annuals, with usually prostrate or rather low geniculately ascending several- to many-noded branched culms, short spreading leaf-blades and very dense hemispherical, ovoid, or broadly to narrowly cylindrical inflorescences. They favour moist ground, particularly areas subjected to flooding during the winter, margins of pools, rivers, etc., and are of common occurrence on saline soils. This genus of about twelve species has a much wider range than *Urochondra.* It is frequent throughout the Mediterranean Region from Portugal and Morocco to Central Asia and North-West India, with the highest concentration of species in south-western Asia. *Crypsis aculeata* (L.) Ait. extends to northern China (Chihli), and *C. schoenoides* (L.) Lam. down the Nile valley to Eritrea and Abyssinia. The latter is found also in inland localities in Tanganyika Territory and Nyasaland, and on the west coast of Africa in Senegal and Angola, where it may have been introduced. It has become naturalized in Madagascar and the United States. Similarly, *C. aculeata* (L.) Ait. has spread to South Africa and *G. alopecuroides* (Pill, et Mitt.) Schrad. to the United States.

Sporobolus R. Br., the other close relative of *Urochondra,* is very polymorphic and occupies a great variety of habitats throughout the tropics, with several species entering the warm temperate zones. The stoloniferous species, *S. spicatus* (Vahl) Kunth, with cylindrical spiciform inflorescences, occupies somewhat similar habitats to *Urochondra* and occurs in most of its area of distribution.

The most distinctive feature of *Urochondra* is the curious prominent beak at the apex of the grain, which, with the free pericarp, constitutes a combination apparently unique in the *Gramineae.* So far as can be ascertained from the examination of very young dried ovaries, the beak is formed by the connate bases of the styles. This fused portion after pollination, and at an early stage in the development of the grain, increases in thickness and length, then becomes hardened, and finally forms a narrow rigid creamy-yellow apical projection sometimes almost as long as the body of the mature grain. When the grains are immersed in water for a short time, the cells of the thin translucent whitish pericarp, clothing the pale brown seed, rapidly become turgid and gelatinous, and those on the inside, mucilaginous. The pericarp enlarges, setting free the seed within. Gradually the seed moves laterally within the still entire pericarp until a crescent-shaped portion of the latter is visible on the embryo side. As the pericarp-cells continue to absorb water, considerable hydrostatic pressure is apparently developed within, since the pericarp splits longitudinally and the seed gradually emerges. The latter then commences to turn within the pericarp until the entire apical portion is exserted. This movement continues and finally the whole seed is ejected. At this stage it is coated with a somewhat viscous mucilage from the interior of the pericarp, by means of which when dry it adheres to any object. The beak remains attached to the empty pericarp ; its function, if any, is obscure, but it is possible that it plays some part in anchoring the pericarp during the emergence of

the seed. The grains of *Vr'ochondra* are very broadly ellipsoid, not at all compressed, and the embryo is only one-half to two-thirds the length of the seed, whereas the grains of *Crypsis* are oblong to elliptic-oblong in side-view, mostly laterally compressed, rarely terete, and the embryo extends nearly or wholly the length of the seed.

In all the species of *Crypsis (sensu lato),* in which grains have been available for study, it has been found that the seeds are likewise enclosed by a free membranous pericarp, as are of course those of the species of *Sporobolus.* Some authors who have' retained *Heleochloa* Host as a genus distinct from *Crypsis* Ait. mention the free pericarp of the latter, but do not refer to the pericarp of the former, or if they do so, then it is to state that this tissue is adnate to the seed. Bentham (in Benth. et Hook. f. Gen. PL iii. 1139 : 1883) describes the pericarp in *Crypsis* as thinly membranous and loose, whilst Hackel (in Bngl. u. Prantl, Nat. Pflanzenfam. ii. Abt. 2,48: 1887; True Grasses, 105: 1896) states that the fruit of *Crypsis* is a utricle, but neither author refers to the condition of the pericarp in the grain of *Heleochloa.* In his treatise on the genera of the grasses of the United States (U.S. Dept. Agric. Bull. no. 772, 15 : 1920), Hitchcock distinguishes *Crypsis (C. aculeata)* and *Heleochloa (Crypsis schoenoides, C. alopecuroides)* by the following characters. In the former genus, the grain falls at maturity from the lemma and palea, and the seed is loose in the pericarp, whereas in the latter the grain remains enclosed between the lemma and palea, and the pericarp is adnate to the seed. These distinctions are not reliable. For example, when the grains of species referred to *Heleochloa,* such as *H. alopecuroides* (Pill, et Mitt.) Host, *H. alpicola* (Hochst.) Boiss., *H. ambigua* Boiss., *H. borszczowi* (Regel) Roshev., *H. crudanelloides* Boiss., and *H. schoenoides* (L.) Host (type-species of *Heleochloa),* are immersed in water, the pericarp is found to be free from the seed. It is true that the membrane is not always so thick, or so gelatinous in water, as that of *Crypsis aculeata,* and for these reasons it may have been overlooked in some species, although it is very prominent in *H. borszczowi.* Duval-Jouve in his " Etude sur le genre *Crypsis* et sur ses espèces franchises " (Bull. Soc. Bot. France, xiii. 317-326 : 1866) presented some original observations on their grains based on an examination of living plants. He noticed that when *C. aculeata* (by error printed C. *schoenoides)* was collected in mature condition, it was not uncommon for its inflorescences to be found covered with seeds emerging from the florets, to the summits of which they adhered, mimicking the shining eggs of certain insects. He found, too, the seeds of *C. schoenoides* and *C. alopecuroides* behaving in a similar manner, but less frequently. A similar condition of the mature inflorescences has been observed in specimens of the last two species in the Kew Herbarium, e.g. *C. schoenoides* (C. Billot, Flora Galliae et Germaniae exsiccata no. 2758) and *C. alopecuroides* (France: Gap, leg. *E. Reverchon,* 11-9-1872), the two species which Host included under his genus *Heleochloa.* As a result of the discovery that the inflorescences of *Crypsis aculeata* were covered with seeds only after heavy rains,

Duval-Jouve decided to carry out some experiments with the grains of this grass. After soaking some in water, noting the swelling of the pericarp, its rupture along one side, and the escape of the seed, he suggested that this was ejected from the spikelet in the following manner. As the wet spikelet commenced to dry, the slightly gaping lemma and palea enclosing the seed in its ruptured pericarp contracted, forcing the smooth seed now covered with mucilage to glide out of the floret. It is possible that a somewhat similar phenomenon takes place in *Urochondra,* but no naked seeds have been found adhering to the few mature inflorescences available for examination. In several species of *Sporobolus,* such as *S. capensis* (Willd.) Kunth and *S. Poiretii* (Roem. et Schult.) Hitchc, with more or less spiciform panicles, the seeds are often found protruding or exserted from the spikelets, but it is not known if this is due to wetting by rain.

In some inflorescences of *Urochondra,* the flowers appear to be slightly protogynous, since the very shortly hairy stigmas project from the apex of the florets whilst the three anthers remain enclosed. On the other hand, inflorescences have been seen in which the projecting anthers closely envelop the stigmas, suggesting that self-pollination takes place. A slight tendency to protogyny has been observed also in some inflorescences of *Crypsis schoenoides* and *C. alopecuroides,* but in others the anthers and stigmas appear to be exserted simultaneously from the florets. In view of the suppression of the lodicules being associated with protogyny in *Alopecurus, Anthoxanthum, Nardus, Spartina* and *Pennisetum,* definite protogyny might have been expected to occur in *Urochondra* and *Crypsis,* as the flowers of both lack lodicules. In the last two genera, the filaments of the stamens are relatively wide, particularly towards the base. These organs, by becoming turgid at the time for anthesis, may function in a similar fashion to the lodicules in other grasses ; that is, by forcing the lemma and palea apart to permit the exsertion of the anthers and stigmas.

Although *Crypsis alopecuroides* more closely resembles *Urochondra setulosa* in the form of its inflorescence than does any other species of *Crypsis,* the leaves of the two grasses differ considerably, not only in general appearance, but also in certain anatomical details as shown by transverse sections. The upper surface of the blade of *Urochondra setulosa* is very prominently ribbed and grooved. The ribs, which are beset with very thick-walled short unicellular hairs, are of two sizes. The larger are wider, truncate and opposite the primary vascular bundles, whereas the smaller ribs, which alternate with the larger ones and are sunken in depressions between them, are more or less rounded and obtuse and face the secondary bundles. The grooves on each side of the smaller bundles are opposite to very narrow grooves on the flat lower surface. The entrance to these lower grooves is lined with hairs similar to those on the upper surface, whilst the sides of the grooves are dotted with knob-like papillae. The epidermis is covered with a thick cuticle, except in the bases of the grooves, where the stomata are to be found. A broad band of sclerenchyma, several cells in thickness,

occurs above and below each bundle, just beneath the epidermis. This layer is broken beneath each groove by a wedge-shaped zone of large broad cells of colourless parenchyma extending right across the blade to the groove beneath. The chlorenchymatous tissue below the main ribs takes the form of two more or less parallel narrow bands open at the top and bottom where they meet the sclerenchyma bands, but more or less contiguous with the sides of the vascular bundle in the middle. The inner layer of each band is composed of large well-defined deep green cells, whereas the outer layer is formed of smaller indistinct cells which connect with the zone of colourless parenchyma between the grooves. The spaces above and below each bundle up to the bands of sclerenchyma are filled by large rounded colourless parenchymatous cells. The chlorenchymatous tissue of the smaller ribs forms a triangular belt (in transverse section) completely enclosing the secondary vascular bundles. The primary bundles are surrounded by an inner sheath of thick-walled lignified cells, which is absent from the secondary bundles.

The leaf-blade of *Crypsis alopecuroides* differs from that of *Urochondra selulosa* particularly in the absence of prominent ribs and grooves. The two surfaces of its blades are very similar and only slightly depressed between the vascular bundles, thus presenting undulating surfaces when dry. The cells of the chlorenchymatous tissue are radially arranged and form a cylinder round the vascular bundles, which is only broken on the upper side by a strand of sclerenchyma in some of the larger bundles. The chlorenchymatous tissue is connected above and below each bundle to small strands of sclerenchyma, whilst the space between the bundles is occupied by large-celled colourless parenchyma.

The genera *Crypsis, Sporobolus,* and the species now separated as *Urochondra,* were classified in the tribe *Agrosteae (Agrostideae)* by Hackel (in Engl. u. Prantl, Nat. Pflanzenfam. ii. Abt. 2, 48 : 1887), a procedure still adopted in many floras. Bentham (in Journ. Linn. Soc, Bot. xix. 57 : 1881) at first referred *Crypsis* to the *Qryzeae,* but two years later (Gen. PL iii. 1139 : 1883) transferred it to the *Phalarideae,* whilst he treated *Heleochloa* as a member of the *Agrosteae.* None of these arrangements is satisfactory, for even by morphological characters alone the three genera may be readily separated from the above tribes. Amongst the distinguishing features may be mentioned the free pericarp of the grains, the 1-nerved lemmas and the ciliate ligules, contrasting with the adnate pericarp, 3-5-nerved lemmas and membranous ligules of typical genera of the *Agrosteae, Phalarideae* and *Oryzeae.*

A more satisfactory classification is effected by removing *Crypsis* and *Sporobolus* from the *Agrosteae* and *Phalarideae,* and by placing them and *Urochondra* in the *Sporoboleae,* a tribe created for *Sporobolus* by Stapf (in Dyer, Fl. Cap. vii. 315 : 1898). The genera of these tribes differ also in anatomical characters, as has been indicated for *Crypsis* and *Sporobolus* by Duval-Jouve in his classic study " Histotaxie des

feiiilles de Gramimes " (Ann. Sci. Nat., Bot., sér. 6, i. 294-371 : 1875). These and other researches on the leaf-anatomy of grasses enabled Avdulov (Bull. Appl. Bot. Genet. & PL-Breed., Suppl. 44: 1931) to divide the genera into two groups. Those with his type I leaf-anatomy, including several species of *Crypsis* and *Sporobolus,* had the cells of the chlorenchymatous tissue arranged radially around the vascular bundles to form a cylinder. On the other hand, the genera with which *Crypsis* and *Sporobolus* have been generally associated possessed his type II leaf-anatomy with the chlorenchyma occupying the spaces between the bundles. In his anatomical studies of the leaves of the South African species of *Sporobolus,* Goossens (in Trans. Roy. Soc. S. Africa, xxvi. 173-223: 1938) confirmed the radial arrangement of the chlorenchymatous tissue in 24 out of 29 species investigated, but in the remaining five species he found that this tissue was differently disposed. Although the cells of chlorenchyma in *Urochondra* do not always form a continuous ring round the vascular bundles, they are nevertheless very similar to those of *Crypsis* and *Sporobolus,* in that they are restricted to a well-defined zone; in my opinion the genus should be classed, therefore, with those genera possessing type I leaf-anatomy. By his cytological investigations, Avdulov (I.e.) showed that *Crypsis* and *Sporobolus* agreed in the size and basic number *(x* = 9) of their chromosomes. • His illustrations of those of *Crypsis schoenoides* (p. 136, 2w = 36) and of species of *Sporobolus* (p. 144, *2n* = 18 and 36) reveal that they are much smaller than those of true genera of the *Agrosteae* and *Phalarideae.* In a personal communication (25-9-1937), Avdulov gave the chromosome number of *Crypsis aculeata* as *In* = 18. Unfortunately, *Urocho)idra* has not yet been examined cytologically.

Those authors who maintain *Heleochloa* Host as a genus distinct from *Crypsis* Ait. have employed one or more of the following characters for distinguishing them, all of which have proved inadequate.

CRYPSIS.	HELEOCHLOA.
1. Inflorescence hemispherical, capitate, without a central axis.	1. Inflorescence ovoid or cylindrical, with a distinct axis.
2. Inflorescence subtended by two spathe-like leaf-sheaths.	2. Inflorescence subtended by or exserted from the uppermost leaf-sheath.
3. Spikelets disarticulating below the glumes at maturity.	3. Spikelets not articulated below the glumes.
4. Palea 1-nerved ; stamens 2.	4. Palea 2-nerved ; stamens 3.
5. Grain falling from the lemma and palea at maturity.	5. Grain remaining permanently enclosed between the lemma and palea.
6. Seed loose in the pericarp.	6. Seed adnate to the pericarp.

1. In *Crypsis aculeata* (L.) Ait. (the type-species of *Crypsis),* the axis of the inflorescence is extremely short and broadly conical in the most highly developed inflorescences, or almost suppressed in the smaller

ones and then the pedicels are crowded together at the apex of the culm. In depauperate plants of *Crypsis schoenoides* (L.) Lam. (the type-species of *Heleochloa),* from arid regions, the inflorescence possesses a much reduced axis very similar to that found in well developed plants of *Crypsis aculeata,* with which they are often confused. *C. compacta* Steud. from Senegal and *Phalaris vaginiflora* Forsk. from Egypt are examples of these dwarf contracted states of *Crypsis schoenoides.*

2. The presence of one or two dilated upper leaf-sheaths subtending the inflorescence does not appear to be of any value for generic distinction, as two such sheaths are usually found enveloping the base of the inflorescence in depauperate plants of *C. schoenoides.*

3. The spikelets readily disarticulate below the glumes at maturity in C *aculeata.* The same is true for both *C. schoenoides* and *C. alopecuroides* (Pill, et Mitt.) Schrad. *(Heleochloa alopecuroides* Host). Inflorescences showing this articulation are to be seen on mature plants from all parts of the area of each species ; the following exsiccatae are cited as examples:—C. Billot, Flora Galliae et Germaniae exsiccata no. 2758 *(C. schoenoides),* and Reliquae Mailleanae no. 1834 *(C. alopecuroides),* both from France.

4. It should be noted that the 1-nerved palea and diandrous flower of *C. aculeata* occur in very densely congested spikelets which, during their development, must be subjected to very considerable compression. The suppression of one of the two adaxial stamens was no doubt brought about in the first place by this pressure, whilst the median nerve in place of two lateral ones in the palea may be due to the same cause. Amongst the large number of specimens of *C. aculeata* examined, a single plant on a sheet of otherwise typical material of the species (F. Sennen, Plantes D'Espagne, no. 3814, from the Balearic Islands) has been found with two- and one-nerved paleas in the same inflorescence. Similarly, Chinese material of C. *aculeata* (Chihli Province, *Cowdry* 2176, etc.) possesses one- or two-nerved paleas and two- or three-stamened flowers. A connecting link between *C. aculeata* and *C. schoenoides* is provided by *C. Factorovskyi* Eig, from Cyprus, Asia Minor, Syria and Palestine. In this species the inflorescences are of the same type as those of *C. aculeata,* but each floret has three stamens and a two-nerved palea. Another intermediate species, *C. turkestanica* Eig, from Central Asia, has an inflorescence resembling that of *C. schoenoides,* but only two (rarely three) stamens are developed in each floret. Hitchcock's description (in U.S. Dept. Agric. Bull. no. 772, 153 : 1920) of the palea of *Crypsis* as being two-nerved may have been based on a study of a species related to *C. schoenoides,* which was distributed in Amer. Gr. Nat. Herb. no. 838 (California: Blavo, 30-5-1921, *C. V. Piper),* as C. *aculeata.*

5. Whilst naked grains are apparently seen more frequently on inflorescences of *C. aculeata,* they are to be found also on those of *C. schoenoides* and *C. alopecuroides.*

6. In those species referred to *Heleochloa* where mature grains have been available for study, the pericarp is free from the seed.

I agree with Duval-Jouve's conclusions (I.e. 325), that the differences between *Crypsis aculeata* and *C. schoenoides* have no generic significance. It is also extremely doubtful whether these distinctions have even sufficient value for subdividing *Crypsis* into two subgenera or sections.

Torgesia Bornm. (in Mitteil. Thiiring. Bot. Ver. n.f. xxx. 83 : 1913), with a single species *T. minuartioides* Bornm. from Palestine, is a species of *Crypsis (C. minuartioides* Mez), in which the inflorescences are reduced to about seven spikelets, borne on a very short axis and tightly enclosed between the uppermost two leaf-sheaths.

The generic name *Heleochloa* Host (Ic. Gram. Austr. i. 23: 1801) was not effectively published as it was unaccompanied by a generic description. In a review of Host's work, Roemer (Collect. 233: 1809), however, validated the name by publishing a short generic description. A few years later, Beauvois (Agrost. 23: 1812) adopted a different conception of the genus, based on *H. juncea* (Michx.) Beauv. and *H. phalaroides* (Koel.) Beauv., the former a synonym of *Sporobolus gracilis* (Trin.) Merr. and the latter of *Phleum phleoides* (L.) Karst. At the same time Beauvois referred Host's two species of *Heleochloa* to *Crypsis.*

The following emended description of *Crypsis* covers the genera *Torgesia* and *Heleochloa,* but excludes *Rhizocephalus* Boiss., which is sometimes treated as a synonym of the latter.

Crypsis *Ait.* Hort. Kew. ed. 1, i. 48 (1789), *nomen conservandum.*—Descriptio hie emendata.—*Pallasia* Scop. Introd. 72 (1777); *Antitragus* Gaertn. Fruct. ii. 7, t. 80 (1791); *Heleochloa* Host, Ic. Gram. Austr. i. 23, tt. 29-30 (1801), Roemer, Collect. 233 (1809); *Pechea* Pourr. ex Lapeyr. Suppl. PI. Pyr. 8 (1818), in syn.; *Raddia* Mazziari in Ionios Anthol. ii. 448 (1834). *Pachea* Pourr. ex Steud. Nomencl. Bot., ed. 2, i. 449 (1840), in syn.; *Torgesia* Bornm. in Mitteil. Thiiring. Bot. Ver. n.f. xxx. 83, t. 1, fig. 3 (1913).

Spiculae oblongae vel obovato-oblongae, lateraliter valde compressae, dense imbricatae, in inflorescentiis capitatis vel spiciformibus brevissime pedicellatae vel subsessiles ; rhachilla inter glumam superiorem et anthoecium tarde vel facile disarticulans vel continua, supra anthoecium haud producta. *Anthoecium* 1, $, glumam superiorem aequans, vel apice e glumis plerumque exsertum. *Glumae* persistentes vel cum reliqua spicula deciduae, obtusae, acutae vel cuspidatae, complicatae, acute carinatae, carina plerumque angustissime alata scabrida vel ciliata, prominenter 1-nerves, membranaceae, aequales vel paullo inaequales, inferior superiore tune brevior ; gluma inferior a latere visa linearis vel lineari-lanceolata vel anguste oblonga; superior inferiore latior, a latere visa lanceolata vel anguste oblonga. *Lemma* a latere visum lanceolato- vel elliptico-oblongum vel oblongum, obtusum, acutum vel euspidatum, complicatum, acute carinatum, carina angustissime alata scabrida vel ciliata, prominenter 1-nerve, membranaceum. *Palea* lemmati aequilonga vel eo paullo brevior, complicata, oblonga vel

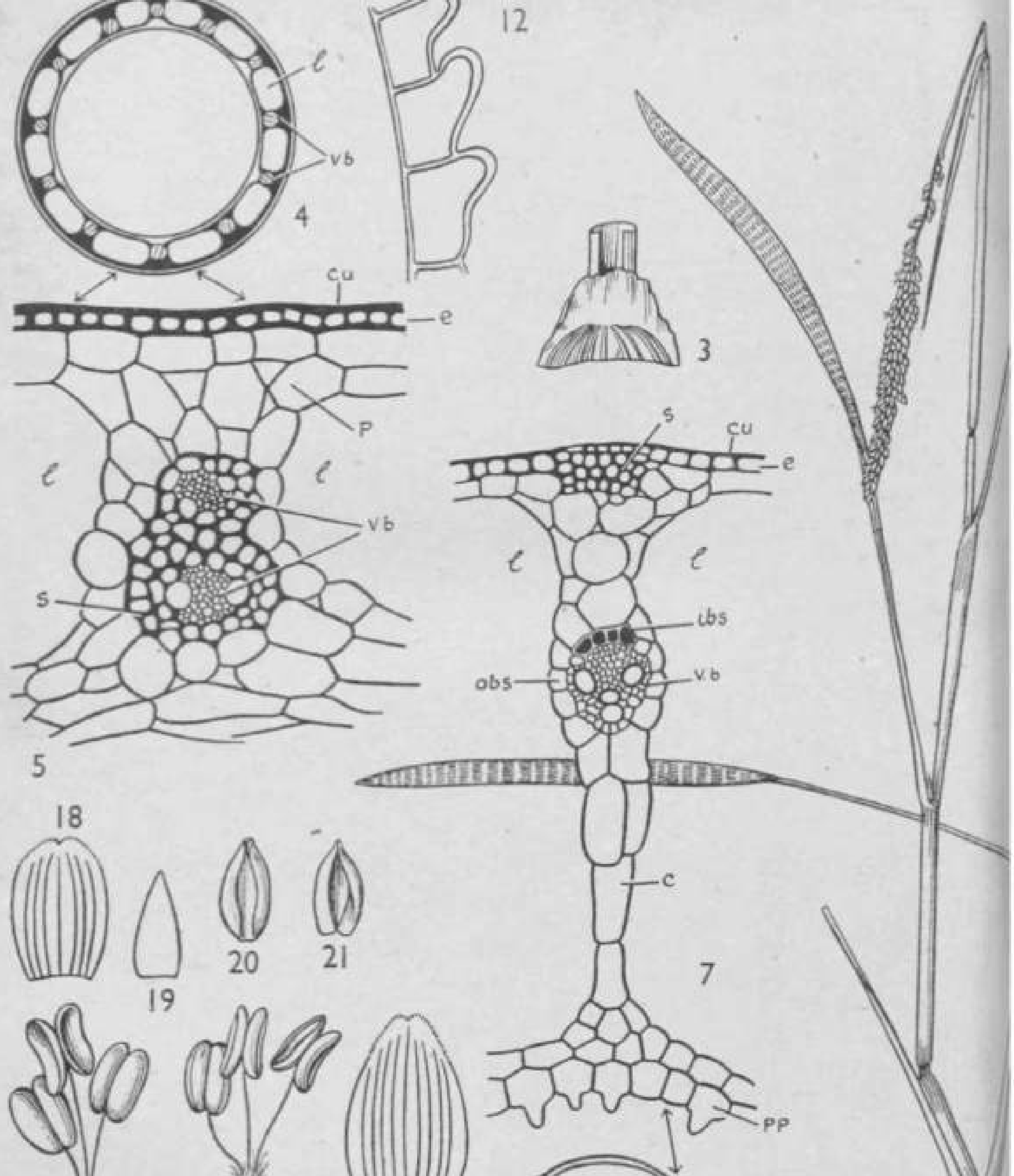
late elliptico-oblonga, truncata, emarginata vel biloba, tenuiter membranacea, hyalina, 1-nervis vel plerumque tenuiter 2-nervis et inter nervos tune facile fissa, rarissime 3-nervis. *Lodiculae* nullae. *Stamina* 2-3; antherae oblongae; filamenta comparate lata. *Ovarium* glabrum; styli distincti, terminates; stigmata breviter plumosa, ex apice anthoecii exserta. *Fructus* a latere visus oblongus vel elliptico-oblongus, lateraliter compressus vel fere teres, inter lemma paleamque liber; pericarpium membranaceum, liberum; scutellum fructui aequilongum vel fere aequilongum; hilum basale, punctiforme.—*Gramina* annua humilia; culmi prostrati vel geniculato-adscendentes vel erecti, graciles, plerumque ramosi; ligulae ad seriem ciliorum redactae; laminae plerumque breves, lineares vel anguste lanceolatae, planae vel siccitate involutae; inflorescentia densissima, semi-globosa, subglobosa, ovoidea, anguste vel late cylindrica, sessilis vel pedunculata, praecipue basi inter vaginas summas latas concavas bractearum vel foliorum floralium nonnunquam plus minusve immersa.

Species 12, Mediterranean Region, from Portugal and Morocco eastwards to Central Asia and North West India, one extending to northern China and another to Senegal, Angola and tropical East Africa. Introduced into North America and southern Africa.

Type :—*Crypsis aculeata* (L.) Ait. *(Schoenus acukatus* L).

C. E. HUBBARD.

FIG. 1, habit figure, *one-fourlh natural size*; 2, part of plant, *natural size*; 3, ligule, x 4; 4, transverse section of part of leaf-blade, diagrammatic, *much enlarged* (c = chlorenchyma, p = parenchyma, s = sclerenchyma); 5, spikelet, X 16; 6, lower glume, X 16; 7, upper glume, x 16; 8, lemma, X 16; 9, palea, X 16; 10, flower, x 16; 11, grains, x 24; 12, two views of grains showing liberation of seed from pericarp, X 24.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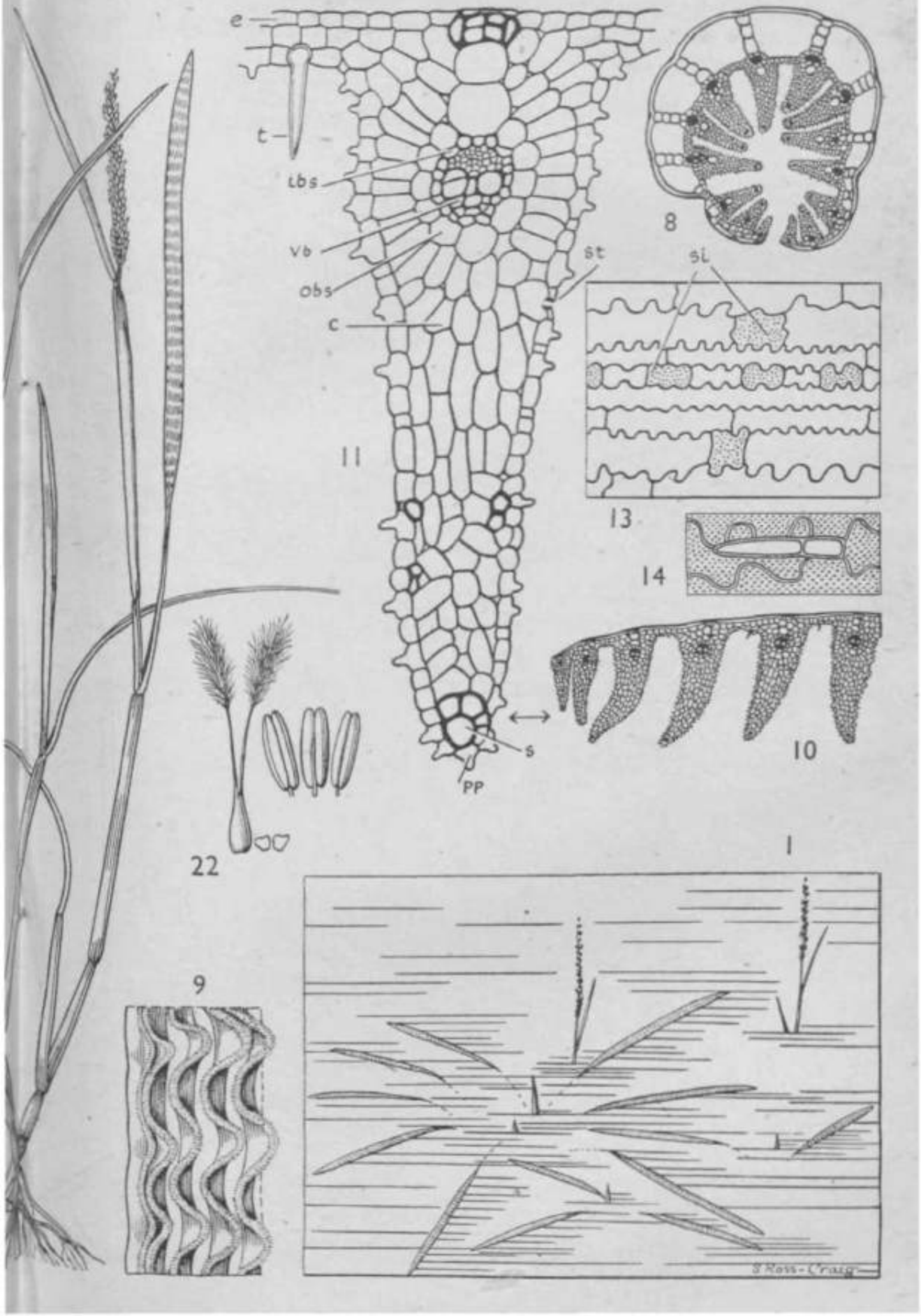
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TABULA 3458.

HYDROTHAUfliA MANICATUM *C. E. Hubbard.*

GRAMINEAE. Tribus PANIOEAE.

Hydrothauma * *C. E. Hubbard.* Genus novum, a *Sacciolepidi* Nash foliis inferioribus longe pseudo-pctiolatis, laminis supra secus nervos lamellis tenuibus erectis undulatis praeditis, spiculis dorso compressis plano-convexis, gluma inferiore latissima oblata rotundato-truncata enervi basin spiculae laxe amplectente distinguendum.

Spiculae a dorso visae anguste ovatae, a latere visae semi-ovatae, muticae, dorso compressae, piano-convexae, in ramis brevibus paniculae spiciformis pedicellatae, demum totae a jiedicellis persistentibus disarticulantes. *Anthoecia* duo ; inferum <$ vel sterile ; superum £, infero brevius. *Glumae* dissimiles ; inferior circiter dimidiam partem spiculae aequans, latissima, oblata, rotundato-truncata, basin spiculae laxe amplectens, tenuissime membranacea, hyalina, enervis; superior spiculae aequilonga, dorso convcxa, tenuiter membranacea, apice hyalina, 7-9-nervis. *Anthoecium inferum:* lemma glumae superiori simile et fere aequilongum, sed dorso planum, 7-nerve ; palea lanccolata, hyalina, enervis. *Anthoecium superum* oblongo-ellipticum vel ellipticum : lemma tenuiter coriaceum, demum crustaceum, obscure nerve, dorso convexum, marginibus firmis involutis; palea lemmati subaequilonga, dorso plana, tenuiter coriacea. *Lodiculae* duae, minutae. *Stamina* tria; antherae oblongae. *Ovarium* glabrum; styli liberi, terminates; stigmata plumosa, ex apice anthoecii exserta.—*Gramen* annuum, aquaticum ; culmi ramosi; ligulae mcmbranaceae ; laminae lineares, planae, fluitantes, supra secus nervos lamellis parallelis erectis tenuibus praeditae, inferiores et intermediae pseudo-petiolatae, superiores sessiles ; panicula spiciformis ; spiculae parvae.

Species unica, Africac tropicae australis incola.

Hydrothauma manicatum *C. E. Hubbard,* species nova.

Gramen usque 20 cm. altum. *Culmi* e basi geniculata vel prostrata adscendentes, basi ramosi, e nodis inferioribus nonnunquam radicantes, usque 8-nodes, superne gracillimi, glabri, laeves, internodiis basin versus succosis siccitate striatis. *Folia* glabra, laevia, viridia ; vaginae laxae, tenuiter herbaceae, rubidae, obscure transverse nerves, apice auriculatae, auriculis erectis, superiores internodiis demum breviores; ligulae auriculis adnatae, truncatae, usque 1 mm. longae; pscudo-petioli gracillimi, filiformes, supra angustissime sulcati, flexuosi vel curvati, usque 9 cm. longi; laminae in pseudo-petiolum attenuatae (inferiores et intermediae), apice obtusae, usque 10 cm. longae et 3 mm, latae, flaccidae, supra prominenter 9-14-Iamellatae, lamellis undulatis,

• *v̈Swp,* **water ;** *Od̈vpa,* **wonder.**

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inter lamellas tenuissimae, subtus indistincte nervosae. *Panicula* linearis, erecta, dense spiciformis, usque 6 cm. longa et 3 mm. lata, pallide viridis, basi e vagina superiore demum exserta ; axis primarius gracillimus, laevis; rami erecti, solitarii, usque 8 mm. longi, simplices, laeves; pedicelli flexuosi, 1-2 mm. longi, apice discoidei. *Spiculae* acutae, 1-8-2 mm. longae, glabrae, pallide virides. *Gluma inferior* 0-8-1 mm. longa, albida ; gluma superior elliptico-ovata et obtusissima vel emarginata (explanata). *Lemma inferum* late ellipticum vel oblongo-ellipticum et emarginatum (explanatum); palea circiter 1 mm. longa. *Lemma superum* 1-1 • 2 mm. longum, demum pallide brunneum. *Antherae* 0*8 mm. longae.

NORTHERN EHODESIA. Mwinilunga District: between R. Kamakonde and R. Kamulende, about 4 miles S.W. of Matonchi Farm, in 6 in. of water, flooding exposed " laterite," Feb. 17, 1938, *Milne-Redhead* 4625.

Among the many noteworthy grasses discovered by E. Milne-Redhead in the Mwinilunga District of Northern Rhodesia, *Hydrothauma manicatum* is undoubtedly the most remarkable. Milne-Redhead informs me that it is one of several endemic species inhabiting the shallow pans of concretionary ironstone (locally known as " laterite ") during the wet months from the end of September to April. These pans, many square yards in extent, are seasonally flooded by the rains to a maximum depth of about six inches. *Hydrothauma* was only observed in one such pan where it formed almost pure stands in the deepest parts. It was surrounded, in the shallow water and on the drying margin of the pan, by other annuals, particularly members of the *Cyperaceae,* and by herbaceous bulbous and tuberous plants able to withstand the long period of drought between the rains.

After the first rains at the end of September, the small seeds of *Hydrothauma* preserved in cracks and crevices begin to germinate, and the plants grow up as the depth of water rises in the pan. The lower leaves are provided with very slender pseudo-petioles, the length of which naturally depends on the depth of the water and their position on the plant, since they permit the expanded portion of the blade to reach and float on the surface of the water. Buds formed in the axils of the lower leaf-sheaths develop into solitary branches, all of which ultimately produce erect aerial inflorescences.

The outstanding feature of *Hydrothauma* is the extraordinary ribbon-like development of the ribs on the upper surface of the leaf-blades. These erect thin flanges or lamellae are closely and regularly sinuate, giving a transverse banding effect to the blade as seen by the naked eye. In the central portion of the blade the lamellae are up to 0^4 mm. high, but become gradually shorter towards the margins and at the base and apex.

It has been possible to supplement our knowledge of *Hydrothauma,* derived so far mainly from an examination of dried specimens, by an

anatomical investigation of spirit material of the culms and leaves collected by Milne-Redhead from the type-locality. Transverse sections through one of the lower internodes of the culm show that not only is there a large cylindrical cavity between the nodes as in most grasses, but that in addition the thin culm-walls themselves contain a ring of about twelve more or less elliptical lacunae (air channels), characteristic of other aquatic grasses. Each lacuna is separated from the next by usually paired vascular bundles which are together embedded in a mass of sclerenchyma or connected by a layer of parenchymatous cells. The vascular bundles and sclerenchyma are surrounded by a sheath of parenchymatous tissue, one cell thick, connecting on the inner side with a double layer of cells of similar tissue encircling the central cylinder, and on the outer side with another such layer lining the epidermis. All these thin-walled parenchymatous cells are usually closely packed with grains of food material, mainly starch, since the majority give the characteristic bluish coloration with iodine solution. The epidermal cells are relatively thick-walled and covered with a thick cuticle.

The leaf-sheath possesses very large lacunae similar to those described below in the pseudo-petiole, but its inner epidermis, which is normally closely appressed to the culm, lacks the lining of parenchymatous cells. Transverse sections through the pseudo-petiole indicate that in the fresh condition it is rounded on the back and longitudinally grooved above. The greater part of the pseudo-petiole consists of large lacunae, separated by thin walls of parenchymatous tissue enclosing the vascular bundles. There are about ten vascular bundles, of varying degrees of development, situated in the abaxial region about one-third to half-way between the lower and upper epidermis. Each of these relatively small bundles is surrounded by a parenchymatous sheath, connecting on the abaxial side with a double layer of similar thin-walled cells to a small strand of sclerenchyma just beneath the epidermis. On the adaxial side, the bundle sheath is joined to a wall one to two cells in thickness which extends to a buttress of similar parenchymatous tissue attached to the upper epidermis. Between these partitions the cells of the lower and upper epidermis enclosing the lacunae are covered with a single layer of parenchymatous cells. The lower epidermis is somewhat similar to that described below in the blades, whilst the upper epidermal cells are usually papillate.

The upper and lower surfaces of the partly or wholly expanded portions of the leaf-blade are very dissimilar, the lower being perfectly smooth, and the upper provided with remarkable vertical outgrowths (or lamellae) of the ribs above the vascular tissue. Transverse sections through the lower part of the blade just above the pseudo-petiole show that in this region the blade is more or less rounded beneath, with the incurved margins almost meeting above. The lacunae which constitute such a prominent feature in the pseudo-petiole are still present, although considerably reduced in size, the larger ones occupying the central portion of the blade, those towards each margin being

progressively smaller. They are now somewhat rounded or angular in transverse section and occupy the abaxial half of the blade, whilst the adaxial (upper) portion bears up to fourteen lamellae, here narrowly wedge-shaped, and each with a vascular bundle at its base. Each lacuna is separated from the next by a single layer of oblong thin-walled parenrhymatous cells, connecting on the abaxial side with a slender strand of sclerenchyma just beneath the lower epidermis, and there joining laterally with a single layer of similar parenchymatous cells lining the lower part of the lacuna and extending to the next partition wall. On the inner side this wall of cells unites with the parenchymatous outer sheath encircling the vascular bundle. The vascular system is rather weakly developed, with bundles of two orders, the five to seven primary ones alternating with others less highly differentiated. The inner bundle sheath is prominently developed only around the lower half of the primary bundles where its cells possess strongly thickened inner and side walls. The parenchymatous cells of the outer sheath are relatively large and provided with chloroplasts, as in many other genera of the *Paniceae.* On the adaxial side of each bundle, the tissue forming the lamella is, except for a few subepidermal strands of sclerenchyma, composed of thin-walled parenchymatous cells, all with chloroplasts. The lamellae are strengthened by two to three very slender strands of sclerenchyma on their flanks and by a thicker apical strand just beneath the epidermis.

The ordinary cells of the upper epidermis, as in several other aquatic grasses, are generally each provided with a prominent papilla at one end, the apical wall of which is strongly thickened. Above the lateral strands of sclerenchyma these papillate cells are interrupted by a single row of short cells, some of which are siliceous and similar to those found in the lower epidermis. Stomata occur on the sides of the lamellae and towards the base of the groove. In this groove between the lamellae, rigid thick-walled unicellular trichomes, resembling spear-heads, appear at intervals ; they have not been found in any other part of the plant. The lower epidermis, in close contact with the water, presents a more varied assemblage of cells. Above each strand of sclerenchyma, there is a single row of short cells, in which "dumb-bell-" or "knot-" shaped siliceous cells alternate with cork cells. They are flanked on each side by one or two rows of narrow elongated cells with very sinuous walls. There is sometimes a longitudinal row of more or less distant stomata near each bundle, but they are more abundant and better developed near the margins of the blade, particularly between the last two bundles, a region which may not be covered always by water. The epidermis above the lacunae is composed mainly of large elongated cells with very irregularly sinuate walls, sometimes connected by solitary siliceous cells. Slender two-celled trichomes, appressed to the surface of the epidermis, have also been observed in this zone.

Transverse sections through the middle portion of the blade show an even greater vertical development of the lamellae, here up to 0-4 mm. high, contrasting with the very thin translucent tissue between them. The large lacunae typical of the basal portion of the blade are absent and

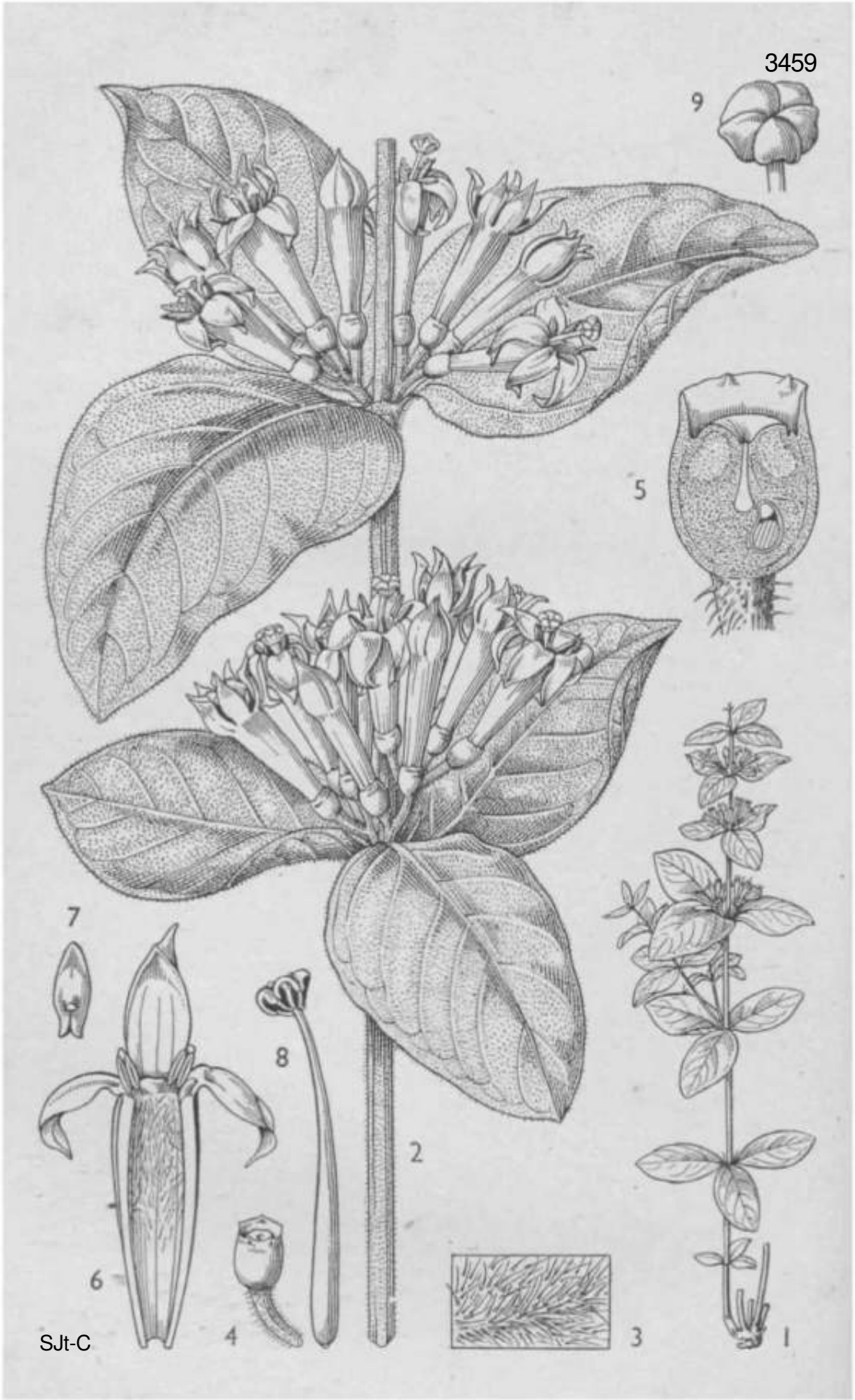
their position is occupied by one or two layers of parenchymatous cells between the lower and upper epidermis. The cells of the chlorenchymatous tissue adjacent to the outer bundle sheath are radially arranged, whilst those of the upper part of the lamellae are looser and have small air-spaces between them. The outer bundle sheath is still well developed, but the cells of the inner sheath lack the prominent thickenings present in the basal portion of the blade. Transverse sections through the apical region of the blade are more or less crescent-shaped, with the lamellae gradually decreasing in size and number towards the tip.

The lamellae, besides providing additional photosynthetic tissue, are enabled by their sinuosity and covering of papillate epidermal cells to trap pockets or bubbles of air and thus contribute to the buoyancy of the blade, and to prevent flooding of the stomata during the frequent storms.

Anatomically the leaf-blade presents a combination of panicoid characteristics, in the well developed outer bundle sheath, radial arrangement of the chlorenchyma, dumb-bell- or knot-like siliceous cells, and the slender two-celled hairs of the epidermis. The spikelets, in their general structure, are very similar to those of *Panicum* L. and *Sacciolepis* Nash, of the tribe *Paniceae.* In addition to its very different leaves, *Hydrothauma* may be distinguished from the former genus by its spicate inflorescence and from the latter by its slightly dorsally compressed spikelets, those of *Sacciolepis* being more or less laterally compressed and frequently asymmetrical, or almost terete.

C. E. HUBBARD.

FIG. 1, habit figure, *one-third natural size ;* 2, part of plant, *natural size;* 3, ligule, x 6; 4, transverse section of lower internode of culm, diagrammatic; 5, t.s. of part of same ; 6, t.s. of pseudo-petiole ; 7, t.s. of part of same ; 8, t.s. of base of leaf-blade, X 36 ; 9, part of upper surface of leaf-blade, showing lamellae, X 24 ; 10, t.s. of middle part of leaf-blade, showing 6 out of 14 lamellae, X 36 ; 11, t.s. of single lamella; 12, longitudinal section of papillate epidermal cells; 13, surface view of lower epidermis of leaf-blade; 14, bi-cellular trichome from lower epidermis ; 15, spikelet, back and side views, X 20 ; 16, lower glume, X 12 ; 17, upper glume, X 12; 18, lemma of lower floret, X 12; 19, palcaof same, X 12; 20, lemma of upper floret, X 12 ; 21, palea of same, x 12; 22, lodicules, stamens and pistil, X 16. Nos. 4-7, 11-14, *much enlarged* (c = chlorenchyma, cu = cuticle, e = epidermis, i b s = inner bundle sheath, 1 = lacuna, o b s = outer bundle sheath, p = parenchyma, pp == papillate epidermal cells, s — sclerenchyma, si = siliceous cells, st = stoma, t = trichome, vb = vascular bundle).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TABULA 3459.

FADOGIA SFECTABILIS *Milne-Redhead.*

RUBIACEAE. Tribus VANGUERIEAE.

F. spectabilis *Milne-Redhead*; species nova, affinis *F. fuchsiaidi* Welw. ex Oliv. a qua caulibus et foliis pubescentibus basin versus minus attenuatis, inflorescentibus brevioribus, tubo corollae longiore distincta.

Herba erecta, usque 50 dm. alta. *Caules* e basi lignosi, simplices, obscure triangulati, pilis brevibus crispis dense induti; internodia 4-10 cm. longa. *Folia* 3-verticillata, subsessilia vel breviter petiolata; laminae ovatae vel ellipticae, usque 8 cm. longae et 5 cm. latae, apice acutae, basi rotundatae vel obscure cuneatae, superne sparse inferne densius crispe hirsutae, superne virides inferne pallidiores reticulataeque; costa et nervi laterales vivo pellucidi; stipulae persistentes, subulatae, basin versus latiores, usque 5 mm. longae, hirsutae. *Cymae* 4-6-florae sessiles vel breviter pedunculatae, ebracteatae; pedicelli usque 6 mm. longi, hirsuti. *Calyx* truncato-ellipsoideus, limbo ad dentes minutissimos redacto vel obsoleto, 4 mm. longus, medium versus 4 mm. diametro, glaber. *Corolla* primulina; tubus angustissime obconicus, usque 2*3 cm. longus, basi 3 mm., apice usque 6 mm. diametro, extra glaber, intus superne pilosus, inferne glaber; lobi 5 vel 6, reflexi, late lanceolati, 8 mm. longi, 4 mm. lati, apiculo crasso valde acuto 3 mm. longo instructi, minutissime papillosi. *Antherae* leviter exsertae, 3 mm. longae, filamentis brevibus instructae. *Stylus* subulato-filiformis, circiter 24 mm. longus, glaber; stigma late turbinatum, superne 5-lobatum, inferne valde et irregulariter sulcatum. *Discus* depressus, glaber, circiter 2 mm. diametro. *Ovarium* 5-loculare. *Fructus* ignotus.

ANGOLA. Moxico District, E. of R. Zambezi and just N. of R. Ysenga in *Brachystegia-Isoberlinia-woodla,nd* on sand, 15 Jan. 1938, *Milne-Redhead* 4135 : stems erect from woody base ; leaves deep green with pellucid veins, pale and reticulate below; calyx yellow-green; corolla primrose-yellow; lobes tinged greenish; anthers brown; style and stigma yellowish.

Robyns in his *Tentamen Monographiae Vangueriae* 317 (1928) established the genus *Temnocalyx* including five species from tropical Africa. This genus is separated from *Fadogia* Schweinf. on account of its larger and more elongate arcuate corolla tube (I.e. 23), that of *Fadogia* being always straight, and usually no longer than the corolla lobes. Both these genera contain species with similar habit, verticillate leaves and cymose few-flowered inflorescences.

Examination of the five species of *Temnocalyx* reveals that four have the habit of *Fadogia* spp., the fifth, *T. noduhsus,* being a shrub of considerable size. Of these four species, three have the arcuate corolla tube and cylindric stigma typical of *Temnocalyx* whilst the fourth, *T.fuchsioides* (Welw. ex Oliv.) Robyns, is anomalous in having a straight corolla tube and a turbinate (often described as coroniform) stigma, both characters of *Fadogia* Schweinf. sensu Robyns, the genus into which this very species was placed by Oliver. *T. fuchsioides* has a truncate calyx and when placed in *Fadogia* consequently falls into Robyns' section *Truncatae,* where it is distinguished by the greater size of its corolla and the relatively greater length of the corolla tube compared with that of the lobes. The writer does not consider that the larger size of the corolla and its different proportions are characters of sufficient importance to exclude this species from *Fadogia* Schweinf.

Fadogia spectabilis Milne-Redhead agrees with *F. fuchsioides* Welw. ex Oliv. in having a truncate calyx and a large corolla with a straight tube considerably longer than the lobes, and likewise falls into section *Truncatae.* It is readily distinguished from *F. fuchsioides* by its pubescence and the other characters given in the diagnosis above.

It might here be opportune to call attention to the fact that Oliver (Trans. Linn. Soc. Bot. xxix. 86 : 1873) had a mixture before him when he described *Fadogia fuchsioides.* The description of the flowers was taken from *Welwitsch* 2567 in the Kew Herbarium, whilst that of the fruit was based on a specimen collected by Grant at Karague (Tanganyika) which we now know to belong to the species subsequently described by N. E. Brown as *Fadogia obovata,* and correctly placed by Robyns in *Temnocalyx.* As Oliver's description and illustration of the flowers were taken from the Welwitsch gathering, it is clear that this specimen must be the type of *F. fuchsioides* Welw. ex Oliv. rather than the Grant specimen so cited by Robyns. Hiern (Fl. Trop. Afr. iii. 155 : 1877) failed to detect Oliver's mixture.

Fadogia fuchsioides is rather widely spread from Huilla in Angola to Broken Hill in Northern Rhodesia and is frequent in the southern part of the Katanga district of the Belgian Congo, but it is unknown from Tanganyika, whilst *F. spectabilis* is at present known only from a single gathering near the head-waters of the Zambezi in Angola.

E. MILNE-REDHEAD.

FIG. 1, habit of plant, *one-sixth natural size;* 2, part of flowering shoot, *natural size;* 3, lower surface of leaf, X 6; 4, calyx showing disc, *x 2;* 5, gynoeeium in longitudinal section, X 6; 6, corolla in longitudinal section, X 2; **7, stamen, dorsal** view, X **4**; 8, style with stigma, X 2; 9, stigma, top view, X 4.


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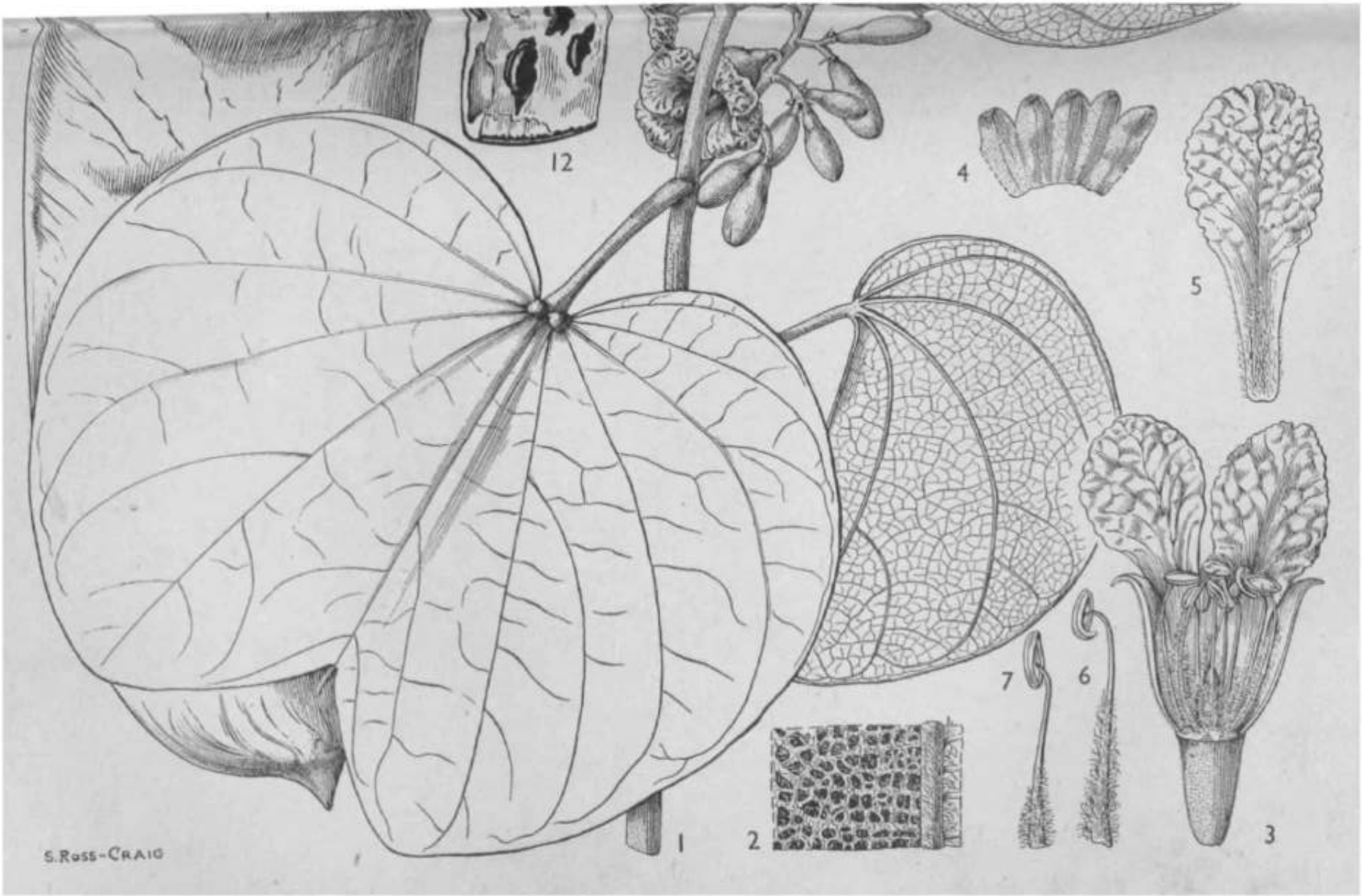
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S. Ross-Craig

TABULA 3460.

PILIOSTIGMA THONNINGII *(Hochst.) Milne-Redhead.*

LEGUMINOSAE. Tribus BAUHINIEAE.

Piliostigma *Hochst.* in Flora xxix, 598 (1846); Walp. Ann. Bot. Syst. i, 258 (1849); genus a *Bauhinia* L. floribus dioicis, calycis tubo turbinato limbo 4-5-fido, stigmate pileiformi, stylo brevissimo, legumine indehiscente, seminibus multiseriatis intra pulpam nidulantibus differt. *Bauhinia* Linn. sect. *Pauletia* Cav., DC, Mém. Lég. 480 (1825) et Prodr. ii, 513 (1825), quoad *B. reticulatam* DC. *Piliostigma* Hochst., Benth. in Miq., PL Jungh. 261 (1852) pro parte, quoad sect. 1. *Locellaria* Welw., Apont. 588, n. 52 (1858). *Bauhinia* Linn. sect. *Pileostigma* (Hochst.) Benth. in Benth. et Hook, f., Gen. PL i, 576 (1865), pro parte. *Bauhinia* Linn. sect. *Piliostigma* (Hochst.) Benth., Taub. in Engl. et Prantl, Nat. Pflanzenfam. Ill, iii, 149 (1892), pro parte. *Bauhinia* Linn., Lemée, Diet. Gen. PL Phan. i, 529 (1929), pro parte, quoad synon. *LoceUaria* Welw. et *Piliostigma* Hochst.

Arbores parvae deciduae. *Folia* biloba. *Stipulae* parvae vel minutae, caducae. *Flores* dioici, racemosi vel paniculati, racemis vel paniculis terminalibus vel axillaribus. *Flores* <$:—*Calyx* tubo terbinato, limbo 4--5-fido, lobis brevibus acutis. *Petala* 5, unguiculata, obtusa, subaequalia, leviter bullata, calycis fauce inserta. *Stamina* 10, cum petalis inserta, omnia fertilia, filamenta inferne villosa. *PistiUodium angustissime* cylindricum, dense villosum. *Flores* ?:—*Calyx* ei floris (J similis. *Petala* 5, iis floris $ similia sed breviora. *Staminodia* minutissima, villosa. *Ovarium* stipitatum, subcylindricum, crassum, multiovulatum ; stigma pelviforme vel potius pileiforme, crassissimum, in ovario plus minusve sessile. *Legumen* coriaceum vel lignosum, lineare vel oblongum, stipitatum, compressum, bivalve, polyspermum, indehiscens. *Sernina* numerosa, bi- vel multiseriata, intra pulpam farinaceum nidulantia.

Species 3, Africae, Asiae et Australiae tropicae incolae.

KEY TO THE SPECIES.

Leaves with rounded lobes, pruinose below, with or without pubescence; pedicels very slender, about twice the length of the calyx ; mature legume narrow, up to 2-5 cm. wide and 32 cm. long, glabrous
1. *malabaricum.*

Leaves with rounded or angular lobes, not pruinose below, with or without pubescence ; pedicels not slender, considerably shorter than the calyx ; mature legume up to 6 cm. wide, usually not more than 25 cm. long, if long and slender, then not less than 3 cm. broad, shortly pubescent or glabrous.

Leaves glabrous below; inflorescence with racemose branches or racemose; mature legume glabrous, pruinose . . . . 2. *reticulatum.*
Leaves finely pubescent below; inflorescence narrowly paniculate; mature legume shortly ferrugineous pubescent . . . . 3. *thonningii.*

ENUMERATION OP THE SPECIES.

1. Piliostigma malabaricum *(Roxb.) Benth.* in Miq., PI. Jungh. 261 (1852). *Bauhinia malabarica* Roxb., Fl. Ind.,ed. 2,321 (1832). *Bauhinia acida* Reinw. apud Korth., Verhand. Nat. Gesch. Kruidk. 86 (1839-42). *Bauhinia castrata* Hassk. in Flora, xxv (2), beibl. 96 (1842). *Casparea castrata* (Hassk.) Hassk., PI. Jav. Rar. 412 (1848). *Piliostigma acidum* (Reinw.) Benth. in Miq., PI. Jungh. 261 (1852). *Bauhinia hawkesiana* F. M. Bail, in Queensl. Agric. Journ. xv, 897 (1905).

India, Burma, Indo-China, Philippine Islands, Java, Timor and Queensland.

2. **P. reticulatum** *{DC.) HochsL* in Flora xxix, 599 (1846). *Bauhinia reticulata* DC, Mém. Lég. 484 (1825). *Bauhinia tamarindacea* Del., Voy. à Méroé, 34 (1826). *Bauhinia benzoin* Kotschy ex Schweinf., Reliq. Kotsch. 12, t. 11 (1868). *Bauhinia glabra* A. Chev., Expl. Bot. 226 (1920), nomen nudum. *Bauhinia glauca* A. Chev., Expl. Bot. 226 (1920), nomen nudum.

Senegal to the Anglo-Egyptian Sudan.

3. P. thonningii *(Schumach.) Milne-Redhead,* comb. nov. *Bauhinia thonningii* Schumach. in Schumach. et Thonning, Beskr. Guin. PI. 203 (1827); Hook. f. in Hook., Niger Fl. 328 (1849); Hutch, et Dalz., Fl. W. Trop. Afr. i, 330 (1928); Bak. f., Leg. Trop. Afr. 657 (1930), pro parte, excl. syn. *B. tamarindacea* Del.; Irvine, PL Gold Coast 50 (1930); Burtt Davy, Fl. Transv. i, 322 (1932); Steedm., Trees, Shrubs and Lianes S. Rhod. 18 (1933); Eggel., Indig. Trees Uganda 30, fig. 11 (1940). *Bauhinia reticulata* (non DC).—Guill. et Perr., Fl. Seneg. 266, t. 60 (1832), pro minore parte, quoad syn. *B. thonningii* Schumach.; Engl., Pflanzenw. Ost-Afr. C, 200 (1895); Hiern, Cat. Afr. PI. Welw. i, 296 {1896); A. Chev., Expl. Bot. 227 (1920), pro parte. *Bauhinia pyrrhocarpa* Hochst. in Flora xxvii, 99 (1844), nomen nudum. *Piliostigma pyrrhocarpum* Hochst. in Flora xxix, 598 (1846); Walp., Ann. Bot. Syst. i, 259 (1849); Benth. in Miq., PI. Jungh. 262 (1852). *Bauhinia abyssinica* A. Rich., Tent. Fl. Abyss, i, 253 (1847). *Locellaria bauhinioides* Welw., Apont. Phyto-geogr. 588 (1858). *Bauhinia articulata* [err. typ. *reticulatae* DC] (non DC).—Oliv., Fl. Trop. Afr. ii, 290 (1871), pro parte, quoad syn. *B. thonningii* Schumach.

* *Arbor* usque 9 m. alta, plerumque minor, interdum plus minusve fruticosa; rami patentes. *Ramuli* ferrugineo-velutini. *Stipulae* minutae, subulatae, velutinae, mox deciduae. *Folia* petiolata; lamina biloba,

lobis subacutis vel rotundatis, basi valde cordata, usque 16 cm. longa et 18 cm. lata, costa usque 13 cm. longa in apiculum usque 4 mm. longum producta, supra glabra, subtus dense reticulata et pilis minutis crispulis ferrugineis densiuscule induta; nervi laterales e basi ortae, quoque latere 5, cum costa inferne ferrugineo-velutini; petioli 3-6 cm. longi, supra sulcati, apice in pulvinum usque 5 mm. longum incrassati, ferrugineo-velutini. *Inflorescentia* **anguste paniculata, terminalis, saepe foliis opposita, dense ferrugineo-velutina, mascula floribus paucioribus quam feminea, $ 8-15 cm. longa, $ 5-7 cm. longa ; pedicelli 3-7 mm. longi, ferrugineo-tomentosi; bracteae et bracteolae minutae.** *Flores* **(J:—***Calyx* **turbinato-cylindricus, inferne valde angustatus, apice 5-dentatus, dentibus late triangularibus, acutis, utrinque ferrugineo-tomentosis, 23 mm. longus, apice tubi 10 mm. diametro.** *Petala* **obovata, ungue lato instructa, in toto 2-6 cm. longa; lamina glabra, valde rugosa vel bullata, margine irregulariter crenata circiter 1 cm. lata; unguis basi circiter 3 mm. latus, utrinque hirsutus.** *Stamina* **10, biseriata; 5 petalis opposita filamentis liberis circiter 8 mm. longis, 5 lobis calycis opposita filamentis liberis 1 - 2 mm. longis; filamenta filiformia, inferne densiuscule pilosa; antherae circiter 3 mm. longae.** *Pistillodium* **anguste cylindricum, circiter 1 • 3 cm. longum, tomentosum.** *Flores* **$:—***Calyx* **ei floris** *$* **similis.** *Petala* **iis floris (J similia sed ungue breviore instructa.** *Staminodia* **10, minutissima, filiformia, dense pilosa.** *Ovarium* **subcylindricum, stipitatum, stipite 7 mm. longo tomentoso, circiter]0 mm. longum et 3 mm. diametro, ferrugineo-tomentosum, multi-ovulatum; stigma sessile, 3*5 mm. diametro.** *Legumen* **pericarpio lignoso, oblongum, stipitatum, plerumque usque 25 cm. longum et 6 cm. latum, stipite 3 cm. longo, raro usque 32 cm. longum et 3*7 cm. latum, stipite 8 cm. longo, ferrugineo-pubescens.** *Semina* **numerosa, multiseriata, ovoidea, leviter compressa, saturate brunnea, nitidula, circiter 9 mm. longa, 6 mm. lata, et 4 mm. crassa.**

GAMBIA. **Without locality,** *Daioe* **61.**

FRENCH GUINEA. **Sabodongou near Touba, among 3 m. high grass in savannah country, 510 m., 11 July 1926,** *Collenette* **62 :—tree 9 m.; growth fairly dense ; flowers white, sweet scented.**

SIERRA LEONE. **Scarcies, not uncommon on grassy lateritic hills, in bush near Senneya, 23 Jan. 1892,** *Scott Elliot* **4658 :—tree about 6 m. high; fruits unripe.**

GOLD COAST. **Ashanti, N. Agogo, Dukwesein, 23 Dec. 1913,** *Chipp* **613:—savannah tree in fruit. Aquapim,** *Thonning* **(type in Herb. Copenhagen).**

TOGOLAND. **Kpedsu, common, 20 Dec. 1925,** *Howes* **1071:—small tree, 4-5 m., with conspicuous brown pods.**

NIGERIA. **Bauchi Plateau, May 1930,** *Lely* **P. 303 :—shrub or small tree up to 7-5 m. with white flowers and large brown flat pods.**

BRITISH CAMEROONS. **Bamenda District, Lokka, in grassland adjoining fringing forest, 1200 m., June 1931,** *Maitland* **1570:—shrub or small tree in flower.**

FRENCH CAMEROONS. Kongola, 750-800 m., 25 Apr. 1914, *Mildbraed* 8996.

UBANGI. Plateau of the Ungourras, in bush, 550 m., 13 Nov. 1902, *Chevalier* 6105.

ANGLO-EGYPTIAN SUDAN. Imatong Mts., Thallanga Forest, common in Katire scrub, 900 m., 16 Dec. 1935, *Thomas* 1602 :—small spreading tree, 6 m., in fruit.

ABYSSINIA. Pibor River, 6 June 1929, *Simpson* 7073. Near Djeladjeranne, 31 July 1840, *Schimper* 1658 (type of *Piliostigma])yrrhocarpum* Hochst.). Near Ferrokobo, 6 Nov. 1839, *Schimper* 712 (type of *Bauhinia abyssinica* A. Rich.).

UGANDA. Serere, Teso, general among uncleared bush land, 1080 m., June 1932, *Chandler* 699 :—shrub or small tree up to 4-5 m.; flowers rather dull white, appearing to open early in the morning and falling off at the least touch.

KENYA. Kipkarren District, very common, 1650 m., Mar. 1932, *Brodhursl Hill* 718 :—a spreading, never tall, tree ; flowers pure white, scented.

TANGANYIKA. E. Usambaras, Tengeni, one of the most dominant plants in the secondary bush association in the area of native cultivation, 210 m., 7 Dec. 1929, *Greenway* 1955 :—a much branched shrub 4-5 m. tall, often taller.

PORTUGUESE EAST AFRICA. Massangulo, frequent on clayey ground in dry forest, 1100 m., Mar. 1933, *Gomes e Sousa* 1312 :—small tree, 8 m.; corolla white.

NYASALAND. Likoma Island, Lake Nyasa, *Johnson* 52.

S. RHODESIA. Salisbury, 1470 m., Jan. 1918, *Eyles* 910 :—common spreading tree, 3-6 m.; flowers white ; petals crinkled.

N. RHODESIA. Solwezi District, above Lower Solwezi Falls at edge of *Brachystegia-woodlsiiid* and grassland, 7 June 1930, *Milne-Redhead* 438 :—tree 4 • 5-6 m. high with spreading branches and large hanging fruits.

BELGIAN CONGO. Katanga, Inumbashi Valley, common tree at edge of vleis, 24 Jan. 1926, *von Hirchberg* 302 :—tree 1 -5-7-5 m. high ; flowers white with brown sepals.

ANGOLA. Portuguese Congo, in open lands or on outskirts of woods, 1921, *Dawe* 18. Zenza do Golungo, abundant near Calumguembo, Sept. 1857, *Welwitsch* carp. coll. no. 486 in Herb. Mus. Brit, (type of *Locellaria bauhinioides* Welw.):—legumes indehiscent, compact and corky-spongy inside, transversely many (80-100)-loculate; seeds 80-100.

TRANSVAAL. Pietersberg Division, Shiluwane, *Junod* 4147.

During my stay at Matonchi Farm, when I was in Northern Rhodesia in 1937, I noticed that certain individual trees of *Bauhinia thonningii* Schumach. were devoid of fruits whilst others nearby were fruiting freely. When, a few weeks later, *B. thonningii* came into flower, the absence of fruits on certain trees was found to be due to dioecism, a

discovery which was to me surprising, for I could not remember ever having seen a mention of the occurrence of this phenomenon in the genus *Bauhinia.*

It would not be an exaggeration to say that *B. thonningii* is one of the commonest and most widely-spread trees in the savannah regions of Africa ; in fact it is so common and so easily recognized by its foliage and fruit, that the dioecious character of its relatively inconspicuous flowers had escaped the attention of most collectors in the field and taxonomists working with dried specimens. I, personally, must have identified material of this species a dozen or more times, yet I had never realized that the flowers were not hermaphrodite !

On looking through the specimens of the species in the herbarium on returning to Kew and examining the flowers, it was at once clear that *B. thonningii* is strictly dioecious throughout its entire range. A good drawing of the gynoecium taken from a flower of *Schimper* 1658 in Herb. Hooker has " $? " below it in Daniel Oliver's handwriting. Welwitsch (I.e.) in his field notes accompanying his no. 547 gives a detailed description of the flowers, but fails to note that they are unisexual. Chevalier, however, says of his gathering no. 14078 from Alokomedji, Lagos, " a dioecious form with female flowers," but apparently he did not realize this to be characteristic of the species.

In literature the character has been with very few exceptions consistently overlooked or ignored. Oliver in the Flora of Tropical Africa (I.e.) includes *B. thonningii* under the closely allied and similarly dioecious *B. reticulata* DC. but describes the flowers as if they were hermaphrodite. Hutchinson and Dalziel in the Flora of West Tropical Africa (I.e.) figure male flowers of the species with the rudimentary ovaries unusually large and with a slender style but still lacking the cushion-like stigma so characteristic of the functional pistil. Eggeling (I.e.) figures male flowers only and makes no reference to the female ones. And so the dismal story goes on. It is, therefore, refreshing to find that G. C. Steedman, in her " Trees, Shrubs and Lianes of Southern Rhodesia " (I.e.), states that the species is dioecious, and describes accurately both the male and female flowers.

The outstanding work on our plant is that of Hochstetter in 1846 (I.e.), who, examining a gathering of Schimper from Abyssinia, not only records the dioecious character and describes the unisexual flowers, but correlates this character with those of the thick sessile stigma, the tubular 4-5-fid calyx and the indehiscent legume with biseriate seeds embedded in floury pith, characters which are anomalous in the genus *Bauhinia* L. Accordingly Hochstetter describes the genus *Piliostigma* and places in it both *Bauhinia pyrrhocarpa* Hochst. (an unpublished name which he had earlier applied to the Schimper gathering mentioned above and which we now know to be synonymous with *B. thonningii* Schumach.) and *Bauhinia reticulata* DC.

Bentham in 1852 (I.e.) accepts Hochstetter's genus, and places in it four further species of *Bauhinia.*

Two of these, *B. malabarica* Roxb. and *B. acida* Benth., are now

recognized as conspecific under Roxburgh's epithet. Examination of the specific descriptions of this species shows it to agree with Hochstetter's diagnosis in every character except dioecism ; in *B. malabarica* the flowers are said to be polygamous. I am not satisfied that this statement is correct, for I have yet to see a hermaphrodite flower of *B. malabarica.* Unfortunately, owing to the stamens and pistil being shorter in relation to the petals than in *P. reticulatum* and *P. thonningii,* it is usually not possible to determine the sex of dried and pressed flowers by superficial examination alone, as in the case of the other two species. Every flower which I have dissected has been unisexual, and I have not found flowers of different sexes on the same plant. There is also a good deal of circumstantial evidence in support of *B. malabarica* being dioecious. Roxburgh (I.e.) describes male flowers only. Pierre (Fl. For. Cochinch. v, t. 400: 1899) figures male flowers only, whilst Koorders and Valeton (Atlas Baumarten Java, t. 13 : 1913) show only female ones and in the text quote the description of the male flowers from Miquel. Baker (Hook, f., Fl. Brit. Ind. ii. 277 : 1878) observes " style produced," the meaning of which is not very clear as the style, for all intents and purposes, is absent, whilst he fails even to mention the stamens. Brandis (Indian Trees, 256 : 1912), however, states " Fl. white, small, often unisexual, £ and $ fl. on different trees in North Kanara (Talbot), . . ." Here we have the observation of a field worker in support of the theory that *B. malabarica,* in spite of statements that it is polygamous, is strictly dioecious. It is, therefore, clear that further field observation on *B. malabarica* is required in order definitely to settle this point, but I consider there is ample justification for following Bentham in including it in *Piliostigma* as recognized by Hochstetter.

The other two species included by Bentham in *Piliostigma* as a second section, *B. racemosa* Lam. and *B. rufescens* Lam., do not conform to Hochstetter's diagnosis, differing in the nature of the calyx, stigma and fruit, in having hermaphrodite flowers, as well as in the general appearance of the flowers and leaves.

The genus *Piliostigma,* as recognized by Bentham, was later reduced by him in the Genera Plantarum (I.e.) to a section of *Bauhinia,* where it has remained to this day in the unnatural state into which Bentham extended it.

Welwitsch (I.e.), on fruit characters alone, considered the genus distinct from *Bauhinia* and, overlooking Hochstetter's paper, described an Angola gathering of *B. thonningii* as *Locellaria bauhinioides* Welw.

I consider that *Piliostigma* Hochst. is a genus distinct from *Bauhinia* L. and that it should be restored to its original limits as defined by Hochstetter. It will then include the Indo-Malayan *Bauhinia malabarica* Roxb. in addition to the two African species upon which it was founded.

Thejgenus consists of small deciduous trees characteristic of the drier monsoon regions of the Old World. *P. reticulatum* DC. is common in the savannah region running east from Senegal to the Anglo-Egyptian Sudan.. It is not known from British East Africa. *P. rnalabaricum*

Roxb. is distributed from India and Burma through Indo-China to the Philippines, and from Java through Timor to Queensland in Australia. It is not known to occur in the Malay Peninsula, and is confined to monsoon regions.

Piliostigma thonningii not only occurs throughout the region occupied by P. *reticulatum,* but extends into Abyssinia and through British East Africa and the Zambezi basin into the Transvaal in the south and Angola in the west. At Zaria in Nigeria in the dry season I came across a mixed population of P. *reticulatum* and *P. thonningii* with strong indications of hybridity. Unfortunately I was not in a position to collect representative material of the population, neither was I able to visit it during the wet season to examine the constituents when in flower. In general it seems that *P. thonningii* occurs in less arid habitats than P. *reticulatum,* and consequently they do not often meet.

P. *thonningii* has in the past been much confused with P. *reticulatum.* J. D. Hooker in the Niger Flora (I.e.) states :—" *B. thonningii* Schum. appears to be a variety of the latter *[B. reticulata* DC], distinguished by the leaves slightly downy underneath, and the pods densely covered with rusty down." On the other hand A. Richard (I.e.) with reference to our plant says that it is certainly not *Bauhivia reticulata* DC, but he fails to identify it with Schumacher's species and describes it as a new species, *B. abyssinica,* based on *Schimper* 712 which is a fruiting specimen. Oliver (I.e.) appears thoroughly confused. He sinks both *B. thonningii* and *B. abyssinica* A. Rich, under *B. articulata* DC [an error for *B. reticulata'],* whilst he makes no mention whatsoever of Hochstetter's account of *Piliostigma,* which was published 25 years earlier. A note serves to show the state of confusion in which Oliver found himself. " Specimens, in fruit only, collected near Kouka in North Central Africa by E. Vogel, differing from the usual form of *B. reticulata* in being glabrous, the twigs and pods more or less glaucous or plumose, probably belong to a marked variety of this species, and may be the *B. benzoin* of Kotschy, described from fruiting specimens only." He did not appear to realize that the " usual form " of *B. reticulata* is glabrous in leaf and fruit, and that *B. benzoin* Kotschy is conspecific with it. The Flora of Tropical Africa appears to have been followed by all botanists until Hutchinson and I)alziel (I.e.) showed *B. thonningii* to be quite distinct from *B. reticulata,* a view now recognized by all workers on the Tropical African flora. The key given above should serve to distinguish the species.*

In general the species is remarkably constant considering its large range, the only variation apart from leaf-shape worth mentioning being that of the shape and size of the legume. Oliver (I.e.) mentions this character in a note which I quote:—" The Nile Land plant differs in a proportionately narrower legume, varying from 1-1J in. in breadth,

* There is a definite difference in the nature of the ultimate reticulations of the undersides of the leaves of *P. thonningii* and *P. reticulatum,* but I have found it impossible adequately to describe it in words and consequently it is not given in the key.

and from a few inches to 1 ft. in length ; but from an examination of the suite of specimens in the Kew Herbarium, I can hardly suppose this to indicate specific distinction." In 1930 in Northern Rhodesia I came across a single tree *(Milne-Redhead* 649) in fruit which at first sight looked remarkably distinct from P. *thonningii,* a species with which in the fruiting state I was thoroughly familiar. The fruits of this tree compared with the fruit of the typical form (in brackets) were about 32 cm. (25 cm.) long with a stipe up to 8 cm. (3 cm.), whilst their maximum width was 3-7 cm. (6 cm.). The fact that only one individual with these long narrow fruits was observed among many normal trees makes me consider it to be a casual mutation unworthy of varietal rank. There is, however, a distinct tendency towards narrow fruits around the N.E. limits of the range of the species.

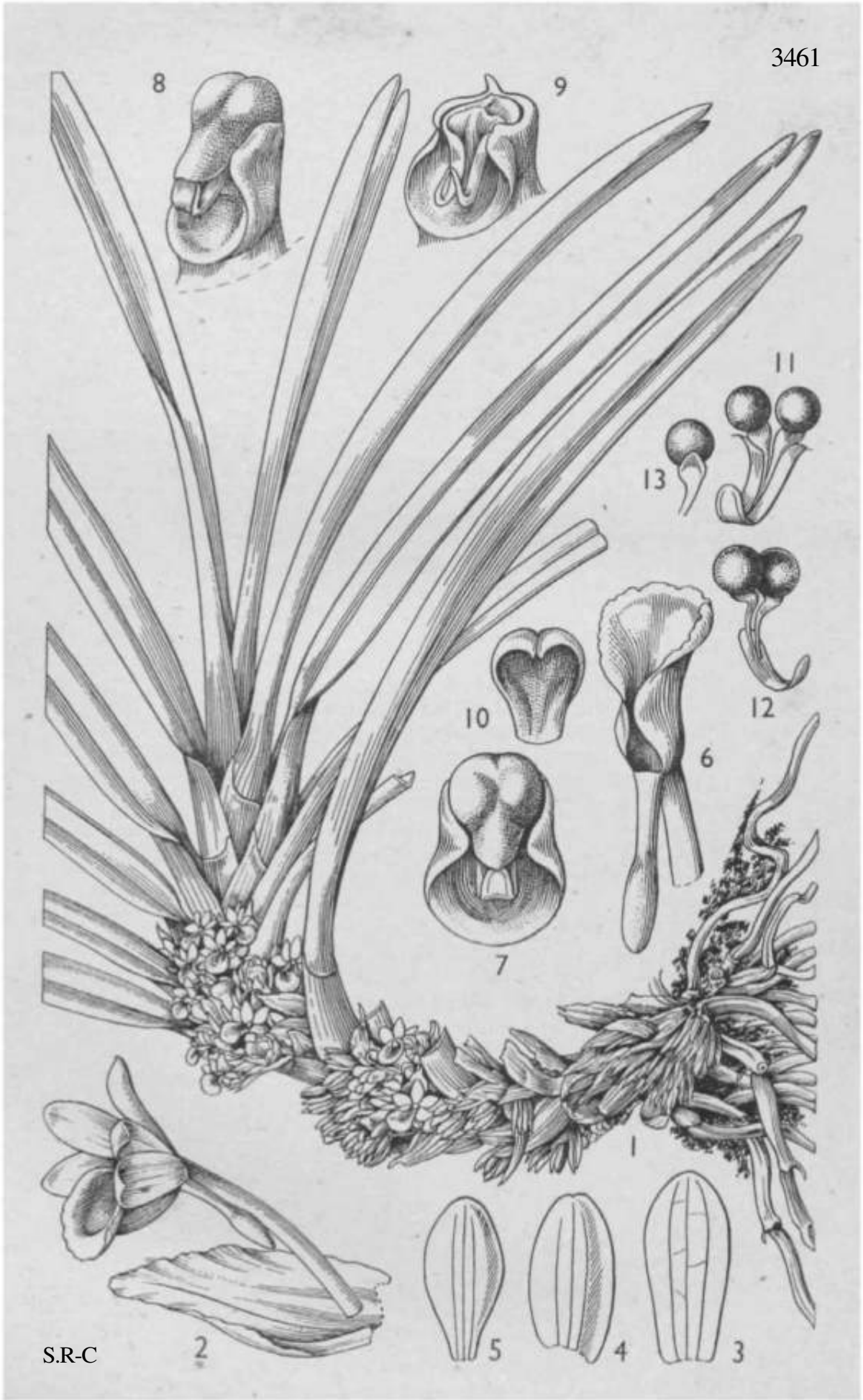
Little is known as to the means of dispersal of the seeds. The pods are indehiscent and remain on the trees for long periods, it being not uncommon to see simultaneously the fruits of two consecutive seasons. Eventually they break off and, lying on the ground, would be subject to attack by termites. The seeds thus liberated might be washed away during heavy rain-storms. Alternatively it may well be that the fruits are eaten and dispersed by game. Dalziel (Usef. PL W. Trop. Afr. 175 : 1937) states that Fulani cattle eat the pods, and Mr. W. J. Eggeling informs me that in Uganda trees are stripped of their leaves and fruits by elephants.

The economic uses are dealt with fully by Dalziel (I.e.). Mr. Eggeling informs me that an effusion from the bark has been extensively used during the war years to coagulate *Funtumia* latex in Uganda, it being by far the best medium for the purpose. Dudgeon has reported a similar use for the tree in French Guinea.

I am indebted to Dr. Fr. Pellegrin who, through the kindness of Prof. H. Humbert, has examined the type of *Bauhinia tamarindacea* Del. and informs me that it is conspecific with *P. reticulatum* (DC.) Hochst. As DelriVs description was published one year later than that of De Candolle, a change of epithet is thus happily avoided. I would also convey my thanks to the Director of the University Botanical Museum, Copenhagen, for sending on loan to Kew the type specimen of *Bauhinia thonningii* Schumach., and to the Director of the Botanic Garden, Geneva, for sending photographs of the type specimens of *Bauhinia reticulata* in the Prodromus Herbarium.

A new combination is necessary for *Bauhinia thonningii* Schumach. when placed in *Piliostigma,* as Hochstetter used the epithet *pyrrhocarpum* for the species.—E. MILNE-REDHEAD.

FIG. 1, female flowering branch, *natural size*; 2, lower surface of leaf, X 8; 3, male flower with part of calyx and corolla removed, X 2; 4, calyx of male flower, opened out, outside view, *natural size;* 5, petal of male flower, upper surface, x 2 ; 6, 7, stamens, x 3 ; 8, female flower with part of calyx and corolla removed, showing staminodes, x 2; 9, petal of female flower, upper surface, X 2; 10, section of pistil and base of calyx, X 2 ; 11, fruit, *natural size*; 12, part of fruit cut open to show seeds, *natural size*; 13, 14, seeds, side and front view, X 2.



S.R-C

TABULA 3461.

ANCISTBORHYNCHTJS OVATUS *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

A. ovatus *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xi. 210 (1944).—Affinis *A.glomerato* (Ridl.) Summerh. et *A. metteniae* (Kraenzl.) Summerh., ab hoc calcari quam labello usque ad fere duplo longiore, ab utroque labello ovato integro basi columnam haud involvente distinguitur.

***Herba* epiphytica; caulis usque ad 20 cm. longus, fere 5 mm. diametro, saepius arcuatus, apicem versus adscendens, superne foliatus, inferne vaginis foliorum delapsorum ± obtectus, radices ramosas flexuosas squamuloso-rugulosas 1-2 mm. diametro emittens. *Folia* basi imbricata, suberecta, patentia vel rarius recurvata, lineari-ligulata, supra articulum 7-19 cm. longa, 5-14 mm. lata, basi vix angustata, apice inaequaliter bilobata, lobis rotundatis vel rotundato-acutis interdum brevissime bilobulatis vel retusis lobo longiore usque ad 1 cm. longo, superne plana, basi ± conduplicata, costa supra impressa subtus leviter carinata. *Inflorescentiae* ex axillis foliorum inferiorum exortae, sessiles, globoso- vel ovoideo-capitatae, 1-2 cm. longae et diametro, multiflorae; bracteae flores aequantes, ligulatae, oblanceolatae vel ovato-lanceolatae, acutae, 6-12 mm. longae, usque ad 5 mm. latae, scariosae. *Flores* albi; pedicellus cum ovario 6-8 mm. longus. *Sepalum* intermedium oblongo-ellipticum vel obovato-ellipticum, apice rotundatum, 3-3-4-4 mm. longum, 1 -3-2 mm. latum ; sepala lateralia elliptico-oblonga, leviter obliqua, apice rotundata, 3-5-4*75 mm. longa, 1*3-2*1 mm. lata; sepala omnia trinervia. *Petala* late elliptico-oblanceolata, apice rotundata, 3*25-4*5 mm. longa, 1-3-2*1 mm. lata, trinervia, nervis lateralibus breviter ramosis. *Labellum* ± concavum, late ovatum vel ovato-orbiculare, apice rotundatum," 3-4*8 mm. longum, 2-4-4-25 mm. latum, marginibus leviter flexuosis et undulatis; calcar ex ore lato sensim angustatum, triente apicali inflatum, apice ipso rotundatum, totum 4-6-5*8 mm. longum. *Columna* crassa, semiteres, 0*8-1*4 mm. alta, truncata, androclinio leviter excavato; anthera subhemisphaerica, antice breviter producta, truncata vel rotundata ; pollinia fere globosa, stipitibus 2 apice recurvatis spathulato-dilatatis 0*5-0*7 mm. longis, viscidio medio implicato elliptico-ligulato 0-8-1*2 mm. longo; rostellum inferne descendens, deinde hamato-implicatum, apice subacutum, in toto circiter 1 mm. longum, viscidio amoto ferc ad basin bipartitum; fovea stigmatica transverse quadrato-elliptica.**

BELGIAN CONGO. **Prov. of Uele, R. Wamba, 1911, *Claessens* 1047.**
UGANDA. **Budongo Forest, *Eggeling* 3053; Budongo, June 1937,**

Eggeling 3360; Budongo, Bunyoro, June 1935, *Eggeling* 2048 (type); same locality, collected in fruit, Dec. 1942, cult, and flowered in Busingiro, May & June 1943 and May 1944, *Eggeling* 5184.

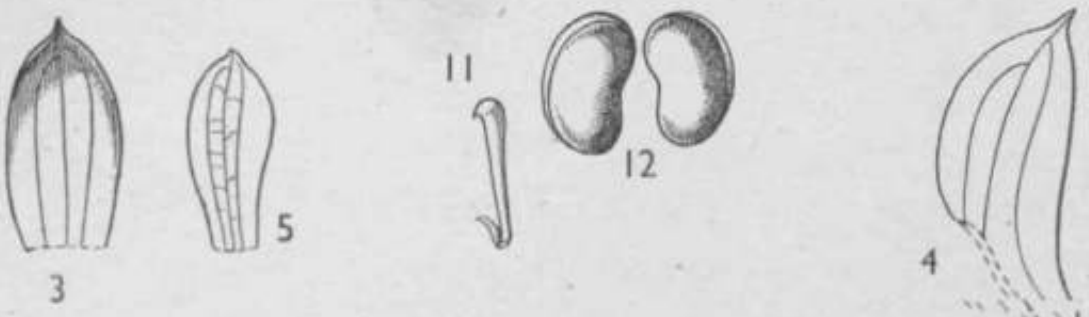
This species is evidently closely allied to *A. glomeratus* (Ridl.) Summerh. and *A. metteniae* (Kraenzl.) Summerh. with which it agrees closely in habit and leaf characters. The combination of ovate lip without the least sign of the rounded side lobes so characteristic of the other two species and the moderately long slender spur distinguishes it from both of them. According to Mr. Eggeling *A. ovatus* is one of the commonest orchids in the Budongo and Bugoma Forests, but it is found only high up on big trees, which may explain why it has not been discovered until quite recently.

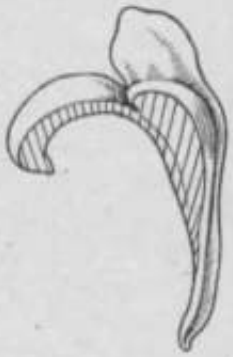
An interesting feature, shown in the picture, is the curved stem ascending towards the apex. This is apparently due to the fact that roots are produced normally only at the base, and the weight of the numerous leaves and dense persistent inflorescences and infructescences causes the stem to bend over. The curvation of the stem therefore represents an equilibrium between the pulling down effect of this weight and the continued upward growth of the apex. There is one specimen in the Kew Herbarium in which apparently the stem has finally fallen over on to the branch, taken root all along and produced several new lateral shoots from the axils of the fallen leaves.

The drawing was prepared from Eggeling's two gatherings nos. 2048 (type specimen) and 5184, the latter being in liquid.

V. S. SUMMERHAYES.

Fio. 1, flowering plant, *natural size;* 2, bract and flower, X 4; 3, dorsal sepal, X 6; 4, lateral sepal, X 6 ; 5, petal, X 6; 6, lip, from above, X 6; 7, column, from above, X 16; 8, column, three-quarter profile, x 16; 9, apex of column, anther and pollinarium removed, X 16; 10, anther, from below, X 16; 11, rostellum, with pollinarium in position, X 16; 12, pollinarium, X 16; 13, apex of one stipes, with pollinium, x 16.





S.R-C.

TABULA 3462.

POLYSTACHYA PABVA *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

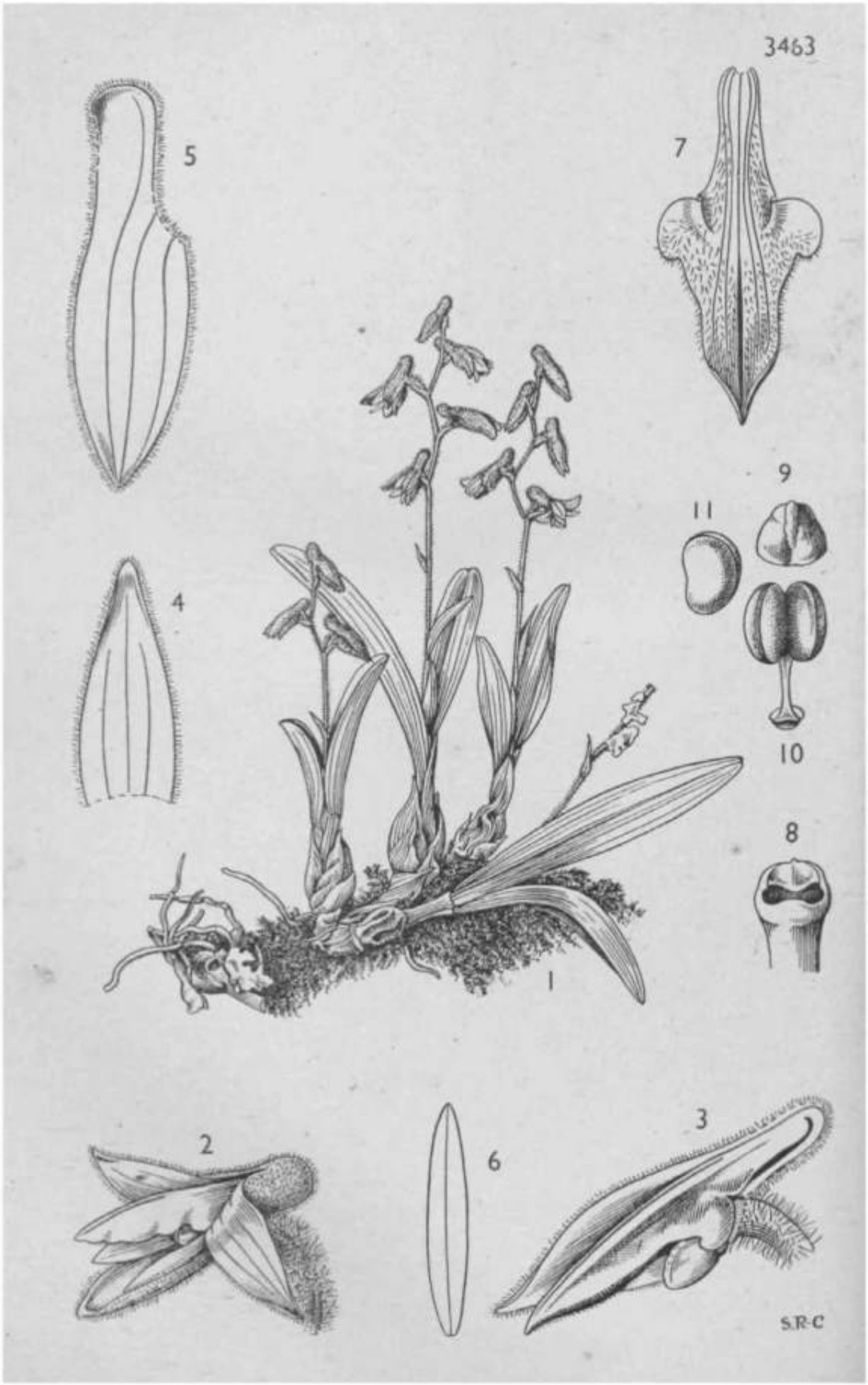
P. (§ Humiles) **parva** *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. x. 285 (1942).—Inter species sectionis floribus parvis, labelli lobo intermedio latissime ovato, lobis lateralibus antice in intermedium breviter decurrentibus lamellas altas formantibus distincta.

Planta epiphytica, parva, usque ad 3 • 5 cm. alta. *Caules* approximate basi pseudobulbosi, ad 1 cm. alti, superne 2-3-(rarius 4-) foliati, basi radices flexuosas emittentes; pseudobulbi ovoidei, leviter compressi, usque ad 7 mm. longi et 5 mm. diametro, cataphyllis obtecti. *Folia* ± patentia vel recurvata, ligulata vel lanceolato-ligulata, apice obtusa, breviter aequaliter vel leviter inaequaliter bilobulata, usque ad 3*5 cm. longa, 2-5-7 mm. lata, inferiora valde minora interdum fere ad vaginas redacta. *Infiorescentia* erecta, folia aequans vel superans, simplex, 1-4-flora ; pedunculus 7-13 mm. longus, basi vagina singula (vel rarius 2) circiter 5 mm. longa instructus, ut rhachis breviter pubescens; bracteae lanceolatae, acuminatae, 1-5-3 mm. longae. *Fhres* patentes ; pedicellus cum ovario 2-3 mm. longus, pubescens. *Sepalum* intermedium incurvatum, lanceolato-ellipticum vel anguste ellipticum, breviter acuminatum, 4 mm. longum, 1-8-2 mm. latum, concavum; sepala lateralia superne patentia, curvatim ovato-triangularia, margine postica prope basin dilatata, breviter acuminata, tota 5*5 mm. longa, basi 3-5 mm. lata, mentum apice breviter cylindricum rotundatum leviter retusum 3-5 mm. longum formantia; omnia sepala sparse pubescentia, ut petala pallide viridescenti-alba. *Petala* incurvata, oblanceolata, apiculato-acuminata, leviter obliqua, circiter 3-5 mm. longa et 1-5 mm. lata, glabra. *Labellum* superne valde recurvatum, e dimidio inferiore cuneato distincte trflobatum, totum 5-5 mm. longum ; lobus intermedius latissime ovatus, apice recurvatus acutus leviter canaliculatus, fere 3 mm. longus, circiter 3-25 mm. latus, subcarnosus ; lobi laterales basibus parallelis vel antice convergentibus, versus margines subpatentes, parte libera triangulari obtusa vel acuta circiter 1 mm. longa, antice in intermedium breviter decurrentes lamellas altas formantes; discus anguste canaliculatus, callo proprio nullo; labellum pallide flavido-viride. *Columna* semi-teres, 1-5 mm. alta, ut anthera purpureo-brunnea ; anthera hemisphaerica, antice breviter producta ; pollinarii stipes linearis, 1 mm. longus, viscidium fere orbiculare, 0-2 mm. diametro; rostellum sursum et deorsum productum, viscidio amoto inferne bifidum ; fovea stigmatica transverse elliptica.

NORTHERN RHODESIA. Mwinilunga District, Matonchi Farm, on *Brachystegia* trees, Jan. 1938, *Milne-Redhead* 4369 ; also in evergreen vegetation, River Luao.

This species possesses the dwarf habit and marked development of pseudobulbs characteristic of sect. *Humiles* but the flowers are smaller than usual in that group. The drawing was made from whole plants in liquid preservative. The decurrence of the prominent lateral lobes of the lip on to the middle-lobe is a striking feature not observed elsewhere in sect. *Humiles*.—*Y.* S. SUMMERHAYES.

FIO. 1, flowering plant, *natural size*; 2, apex of inflorescence, X 3; 3, dorsal sepal, X 6; 4, lateral sepal, X 6; 5, petal, X 6; 6 and 7, lip and column, front and side views respectively, X 8; 8, lip in vertical section, X 8; 9, apex of column, anther and pollinarium removed, X 8; 10, anther, from inside, X 3; 11, stipes and viscidium, X 16; 12, pollinia, X 16.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TABULA 3463.

POLYSTACHYA PRAECIPITIS *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

P. (§ **Affines) praecipitis** *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xJ. 286 (1942).—Inter species sectionis sepalis lateralibus valde obliquis, mento anguste cylindiico, labello longiuscule unguiculato distinguenda.

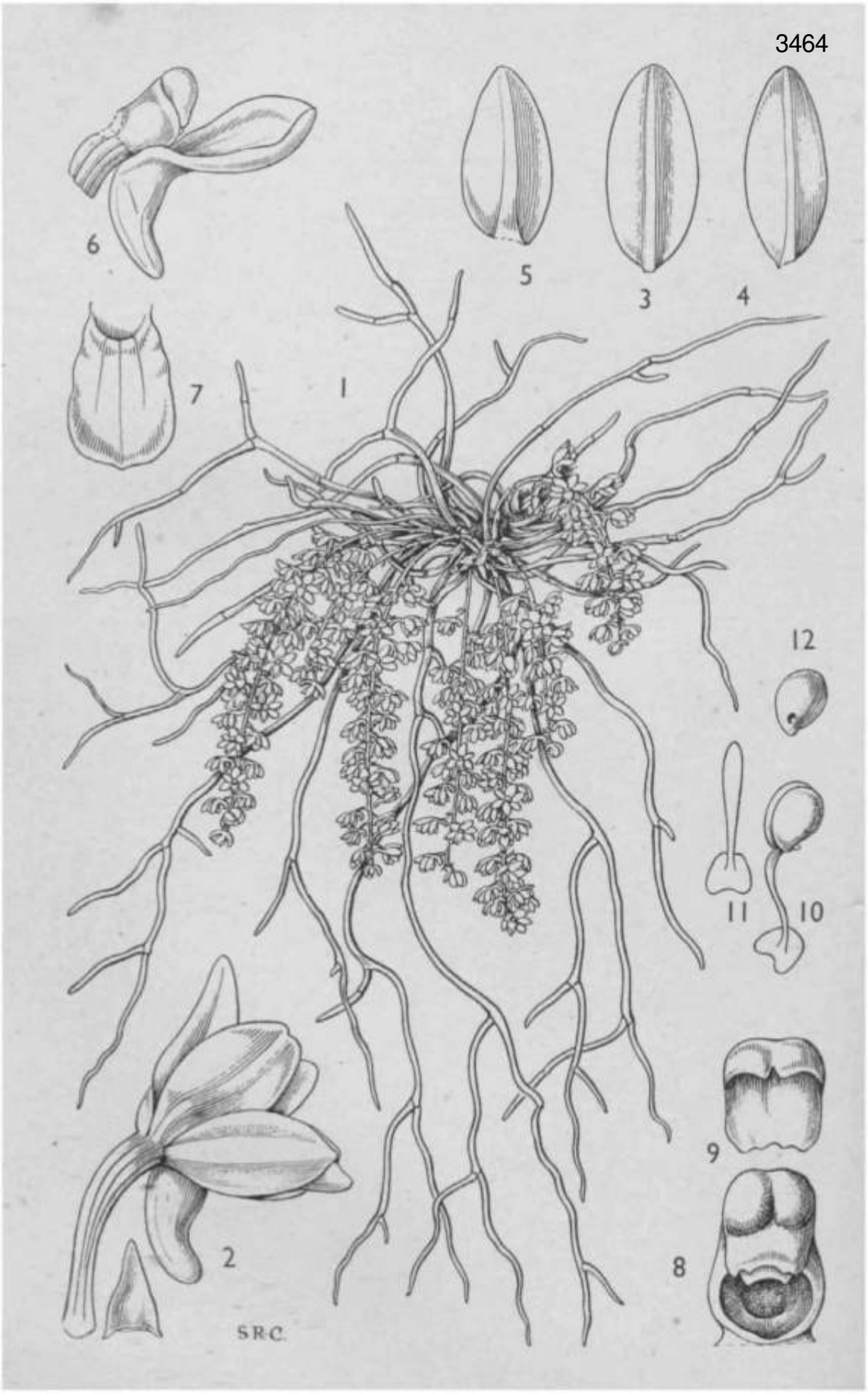
Uerba epiphytica, parva, usque ad 8 cm. alta ; pseudobulbi contigui, basi angustati, superne ovoidei vel ellipsoidei, 1-2 cm. longi, 0-5-1 cm. diametro, vaginis membranaceis obtecti, apice 2-3-phylli, radices flexuosas glabras emittentes. *Folia* anguste oblonga <vel elliptico-oblonga, apice breviter bilobulata, inferne articulata, supra articulum 1-5-5 cm. longa, 5-10 mm. lata, dorso humiliter carinata. *Infiorescentia* erecta, simpliciter racemosa, usque ad 7 cm. alta, saepius folia superans; pedunculus usque ad 4-5 cm. longus, ut rhachis subdense pubescens, cataphyllis 3-4 scariosis ± vaginantibus instructus; racemus 1-3 cm. longus, laxe 3-5-florus; bracteae ovatae, acuminatae, subscariosae, usque ad 4 mm. longae, floribus multo breviores. *Fbres* cremei, deflexi, fragrantes; pedicellus brevissimus, ovario 2-4 mm. longo dense patentim albido-piloso. *Sepalum* intermedium elliptico-lanceolatum, breviter acuminatum, 5-5-7 mm. longum, 2-5-3 mm. latum; sepala lateralia valde oblique oblongo-lanceolata, apice subacuta, basi margine postico rotundato-dilatata, tota 8-5-11 mm. longa, 3-4 mm. lata, cum pede columnae mentum angustum cylindricum rotundatum 3-4 mm. longum formantia; sepala omnia extra pubescentia, interdum linea mediana purpurea instructa. *Petala* leviter curvatim lanceolato-oblonga, acuta, 5-6 mm. longa, 1-2-1-5 mm. lata, glabra. *Labellum* ex ungue longiusculo ligulato fere 4 mm. longo subhastatum, totum 8-11 mm. longum, 3-5-4 mm. latum ; lobi laterales breves, obtusi, ab intermedio vix sejuncti; lobus intermedius acutus, 3-5-4 mm. longus, 2-3 mm. latus, prope apicem marginibus ± involutis, pulvino pilorum articulatorum flavidorum fere omnino obtectus ; discus et unguis intus pilis sparsis patentibus praeditus. *Columna* brevis, fere teres, vix 2 mm. alta : androclinium leviter excavatum; anthers hemisphaerica ; fovea stigmatica transverse elliptica.

TANGANYIKA TERRITORY. Handeni District, Nyogi Mt., 1050 m. alt., forest margin on summit of great rocks [precipice], Sept. 1933, *Burtt* 487 (type); South Masailand, Njoro Hill, near Kibaya, on summit, 1800 m. alt., in shade on clump of moss and lichen, coll. H. F. I. Elliott, cult, and flowered Amani, Sept. 1943, *Moreau* 327.

This species, which was growing with P. *isochiloides* Summerh. (see tab. 3443), seems correctly placed in sect. *Affines* with which it agrees in the general habit, simple few-flowered inflorescence and hairy

flowers. The lip is, however, rather aberrant, having a long narrow claw and subhastate lamina. The discovery of this interesting species at two localities in a comparatively restricted area of Tanganyika Territory is an indication of what we may expect to find in this region when it is properly explored botanically.—V. S. SUMMERHAYES.

FIG. 1, flowering plant, *mtural size*; 2, flower, X 4; 3, flower with most of perianth removed to show lip in position, X 6; 4, dorsal sepal, X 6; 5, lateral sepal, X 6; 6, petal, X 6; 7, lip, spread out, X 6; 8, apex of column, anther and pollinarium removed, X 8 (material much damaged so drawing may not be quite accurate); 9, anther, front view, X 8; 10, pollinarium, X 16; 11, one pair of pollinia, side view, X 16.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TABULA 3464.

MICROCOELIA ERICOSMA *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

M. (§ **Eu-microcoelia) ericosma** *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xi. 251 (1945).—Affinis *M. guyonianae* (Reichb. f.) Summerh. a qua radicibus tenuioribus magis ramosis, floribus crebrioribus fragrantibus, tepalis latioribus obtusioribusque differt.

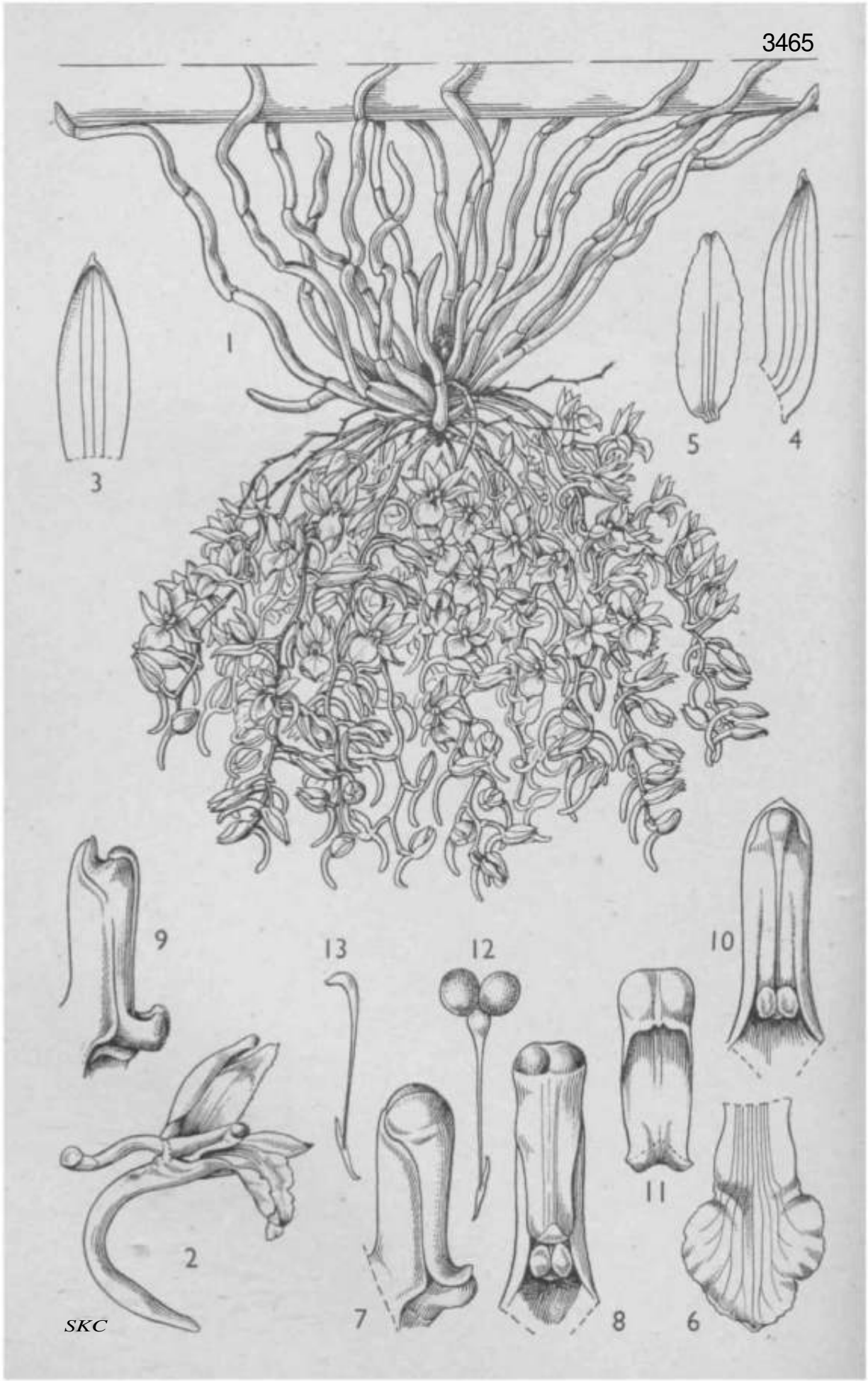
Herba epiphytica, aphylla; caulis brevis vel brevissimus, saepius pendulus, usque ad 4 cm. longus, 2-4 mm. diametro, apice cataphyllis scariosis lanceolatis acuminatis arete imbricatis vestitus, radices numerosas flexuosas multo ramosas 1-2 mm. diametro glabras emittens. *Inflorescentiae* pendulae vel dependentes, simpliciter racemosae, 4-9 cm. longae, densiuscule multiflorae ; pedunculus 1-2-5 cm. longus, vaginis 4-5 obtusis instructus, ut rhachis pluriangulatus vel sulcatus ; bracteae 1-3 mm. distantes, lanceolatae vel triangulari-lanceolatae, acutissimae vel acuminatae, circiter 1 mm. longae. *Fhres* patentes vel erecto-patentes, albi, calcari apice carnoso, suaveolentes; pedicellus cum ovario 2-3 mm. longus. *Bepala* elliptica, rotundata vel brevissime apiculata, basi angustata, lateralia leviter obliqua, 2*4-3*4 mm. longa, 1-3-1-75 mm. lata, uninervia. *Petala* late elliptica vel ovato-elliptica, rotundata, basi angustata, 2-5-3-25 mm. longa, 1-3-1 -85 mm. lata, uninervia. *Labellum* ellipticum, oblongo-ellipticum vel obovato-ellipticum, apice rotundatum vel leviter emarginatum, valde concavum, 2-4-3-3 mm. longum, 1-3-1-6 mm. latum, trinervium ; calcar ex ore latiusculo incurvatim conicum, dimidio apicali cylindricum, obtusum, 2-5-3 mm. longum. *Columna* brevis, crassa, apice truncata, androclinio leviter excavato reclinato ; anthera late subhemisphaerica, antice breviter producta, truncata; pollinia ovoideo-sphaerica vel ovoidea, 0-4 mm. longa, stipite uno ligulato superne subspathulato-dilatato leviter sigmoideo 0-4-0-6 mm. longo, viscidio quadrato antice latiore truncato vel emarginato 0-3-0*4 mm. longo ; rostellum breviter deorsum productum, latum.

TANGANYIKA TERRITORY. Kilimanjaro, Marangu, epiphytic on large tree, Nov. 1941, *Forest Guard*; comm. *W. M. & R. E. Moreau* 105; same locality, Dec. 1932, *Geilinger* 4207 ; Amani, Bomole, 907 m. alt., on tree at edge of rain forest, Dec. 1941, *Moreau* 111 (type); Amani, 750 m. alt., epiphytic on *Parinari* sp., Dec. 1941, *Moreau* 112.

This species is allied to *M. guyoniana* (Reichb. f.) Summerh., *M. smithii* (Rolfe) Summerh., and *M. stolzii* (Schltr.) Summerh. but may be distinguished by its heather-scent, broad and obtuse constantly 1-nerved tepals devoid of coloured or thickened median band and rather slender much branched roots.

As in some other species *oiMicrocoelia* (see *M. pachystemma* Summerh. t. 3465) the stems hang down and the inflorescences are also pendulous, either entirely or with an ascending basal portion.—V. S. SUMMERHAYES.

FIG. 1, flowering plant, *natural size;* 2, bract and side view of flower, X 8; 3, dorsal sepal, X 8; 4, lateral sepal, X 8; 5, petal, x 8; 6, lip and column, side view, X 8; 7, lamina of lip, spread out, X 8; 8, column, front view, X 16; 9, anther, from inside, x 16; 10, pollinarium, X 24; 11, stipes and viscidium, front view, x 24; 12, pollinium, side view, X 24.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TABULA 3465.

MICBOCOELIA KOEHLERI *(Schlechter) Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

M. Koehleri *(Schlechter) Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xi. 158 (1943). *Angraecum Koehleri* Schlechter in Engl. Bot. Jahrb. xxxviii. 162 (1906). *Gussonea Koehleri* Schlechter in Beih. Bot. Centralbl, xxxvi, abt. 2, 93 (1918); et in Fedde, Repert. Spec. Nov. Beih. lxviii. t. 97, no. 387 (1932). *Microcoelia pachystemma* Summerhayes in Orch. Rev. xlvii. 21, fig. p. 23 (1939); et in Bot. Mus. Leafl. Harv. Univ. xi. 158 (1943).—Affinis *M. megalorrhizae* (Rchb. f.) Summerh., a qua radicibus laevibus, labelli lamina latiore, rostelli lobis obtusissimis carnosis, viscidio anguste lineari differt.

Herba epiphytica aphylla, saepius e ramis pendula. *Caulis* brevis vel brevissimus, usque ad 3*5 cm. longus, apice cataphyllis numerosis linearibus acutis scariosis instructus, radices numerosas carnosas teretes flexuosas laeves griseo-virides circiter 3 mm. diametro emittens. *Injlorescentiae* usque ad 40, deorsum ± rigide directae, usque ad 15 cm. longae, subdense multiflorae, floribus 3-7 mm. distantibus; bracteae minutae, triangulares. *Flores* ± patentes, albi, sepalis linea mediana brunnea vel aurantiaca instructis; ovarium cum pedicello 3-^5 mm. longum. *Sepalum* intermedium lanceolato-oblongum vel oblongo-lanceolatum, acutum vel breviter acuminatum, 4-8 mm. longum, 1 -5-2*5 mm. latum; sepala lateralia ± curvatim lanceolato-ligulata, breviter acuminata, basi valde obliqua, 5-8-5 mm. longa, 1-25-2 mm. lata; sepala omnia trinervia. *Petala* oblique oblongo-lanceolata, acuta, 4-5-7*25 mm. longa, 1-5-2-25 mm. lata, uninervia usque trinervia. *Labellum* e basi angusta late ovatum vel orbiculari-ovatum, acutum vel breviter acuminatum, 5-8-5 mm. longum, 3-25-5-75 mm. latum, plurinervium, marginibus antice minute et irregulariter denticulatis ; calcar incurvatum vel leviter sigmoideum, e basi lata sensim angustatum, parte apicali leviter vel vix inflatum, 6-5-11 mm. longum. *Columna* adscendens, antice excavata, 2-5-3-75 mm. alta; androclinium fere verticale, apice excavatum; anthera superne fere hemisphaerica, antice longe decurvatim producta, apice breviter recurvata ; poUinia fere globosa, stipite communi 2-3 mm. longo inferne lineari superne spathulato-dilatato apice decurvato, viscidio lineari 0-6 mm. longo; rostellum prope basin columnae situm, breviter productum, lobis obtusissimis quadratis carnosis, circiter 0-6 mm. longum.

UGANDA. Bunyoro, Budongo Forest, 1110 m. alt., in crown of *Celtis Soyauxii* well within forest, Feb. 1943, *Eggeling* 5234 ; Bunyoro, Butiaba Flats, 600 m. alt., in very dry thicket, on *Strychnos myrcioides,* March 1944, *Eggeling* 5495; Bulimezi, Kangase Forest, on small branches of trees, *Maitland* 121 AB.

KENYA COLONY. Near Lake Victoria, 1080 m. alt., on underside of Calabash trees, March 1938, *Firth*; Kisumu, 1350-1500 m. alt., Aug. 1938, *Gray* 53; same locality, 1040-1200 m. alt., March 1937, *Cunningham-van Someren* 37; Kakamega, 1500 m. alt., in forest, March 1944, *E. W. Carroll in Tweedie* 643.

TANGANYIKA TERBITORY. Usambara, Feb. 1899, *Köhler* (type); West Usambara Mts., cult, and flowered Amani, Jan. 1946, *Moreau* 673.

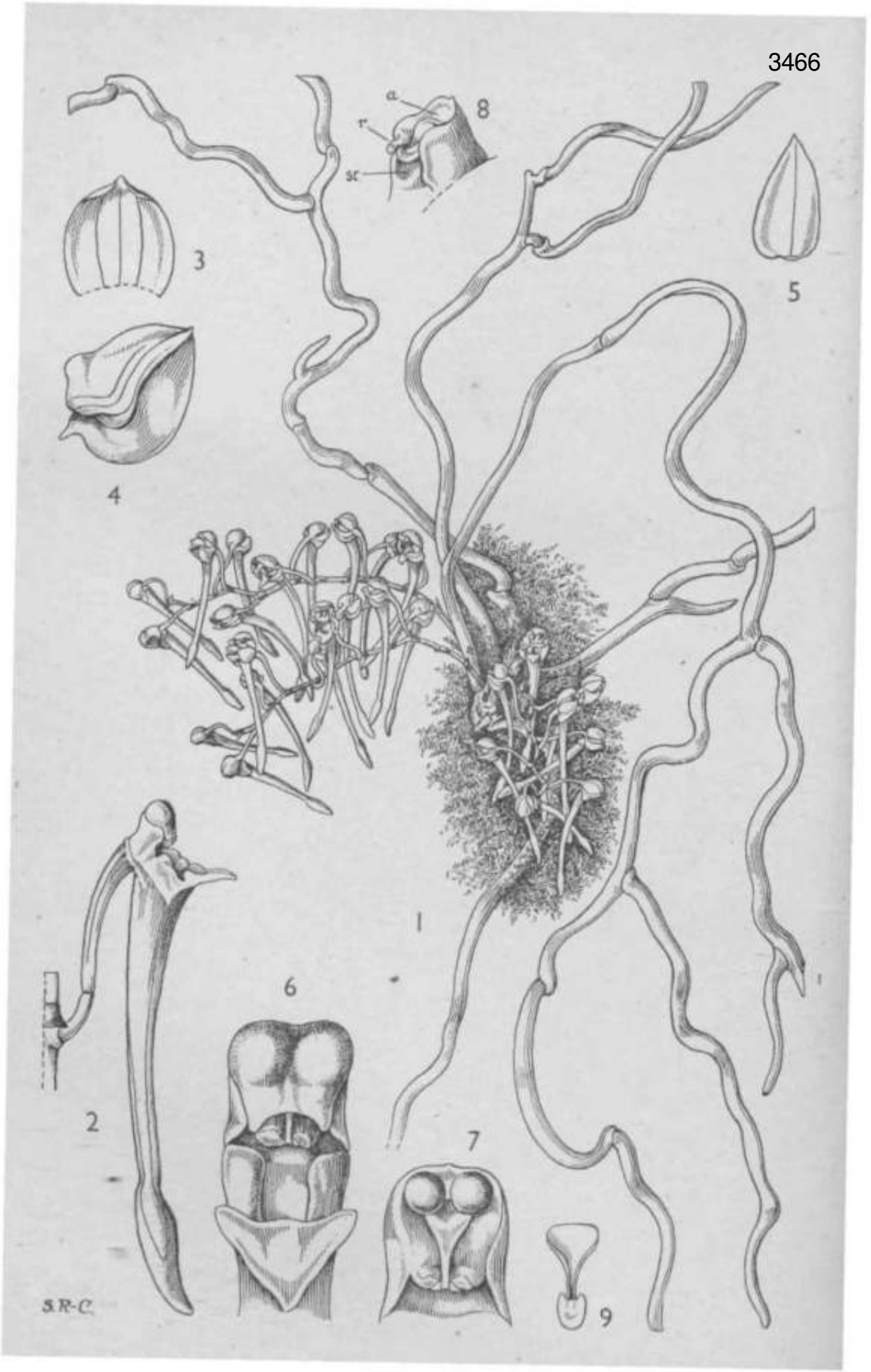
When I originally described *M. packystemma* and later when I dealt with this species and *M. Koehleri* in my revision of the genus (Bot. Mus. Leafl. Harv. Univ. xi. 158 : 1943) I kept the two species distinct on account of the very different rostellum and viscidium described and later figured by Schlechter.

At that time I had seen no material from Tanganyika Territory referable to either species, but recently I received from Mr. and Mrs. R. E. Moreau material in spirit of a *Microcoelia* collected in the West Usambara Mountains which agreed in all general features with *M. Koehleri* but possessed the characteristic rostellum and viscidium of *M. pachystemma.* In the course of examining the column I accidentally partially severed the rostellum and it was then quite evident that Schlechter had done the same when examining the original specimen of *M. Koehleri.* The short acute or subulate lobes of the rostellum described by him are obviously the portions left after breaking off the distal portions, while the large emarginate viscidium which he figures represents the two obtuse fleshy ends of the rostellum lobes together with the true viscidium lying between them. Unfortunately the type specimen has been destroyed with the Berlin Herbarium so that it is impossible to confirm this view of what happened, but in my opinion there is no longer any reason for keeping the two species distinct and the single species concerned must therefore bear the name *M. Koehleri* (Schltr.) Summerh.

The species belongs to sect. *Bicranotaenia* which is characterized by the large lamina to the lip, the relatively long spur and the peculiar column structure. The androclinium is placed vertically and occupies practically the whole front of the column, being covered by the very long beak of the anther.

The curious appearance of the plants is no doubt due to the method of growth. The stem grows slowly at the apex and dies away at the back. The great weight of the flowers and fruit tends to draw the stem away from the host branch, to which, however, it is anchored continuously by new roots arising successively nearer the apex and growing upwards until contact with the branch is made.—V. S. SUMMERHAYES.

FIG. 1, flowering plant, *natural size*; 2, flower in lateral view, one lateral sepal and petal removed, × 4; 3, dorsal sepal, × 6; 4, lateral sepal, × 6; 5, petal, × 6; 6, lip lamina, spread out, × 6; 7 and 8, column, side and front views, × 12; 9 and 10, column, side and front views, anther and pollinia removed, × 12; 11, anther, from inside, × 12; 12, pollinarium, front view, × 12; 13, same, side view, pollinia removed, × 12.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TABULA 3466.

MICBOCOELIA MICEOGLOSSA *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE. ,

H. (§ Eu-microcoelia) microglossa *Summerhayes* in Hutch. & Dalz. Fl. West Trop. Afr. ii. 454 (1936), et in Kew Bull. 1936, p. 231, et in Bot. Mus. Leafl. Harv. Univ. xi. 147 (1943), et I.e. xi. 255 (1945).—*M. caespitosae* (Rolfe) Summerh. similis, sed sepalo intermedio suborbiculari, sepalis lateralibus magis obliquis, calcari longiore sub apice subito dilatato, columna multo breviore, androclinio reclinato, rostello brevissimo, pollinarii viscidio reniformi-elliptico differt.

Herba epiphytica, aphylla. *Caulis* brevissimus, usque ad 1 cm. longus, apice cataphyllis linearibus acutis instructus, radices numerosas ramosas flexuosas glabras 2-2-5 mm. diametro emittens. *Inflorescentiae* patentes, ± horizontales, usque ad 8 cm. longae, usque ad 12-florae; pedunculus 5-12 mm. longus, ut rhachis teres, gracilis ; bracteae vaginiformes, obtusae, 1-1 '5 mm. longae. *Flores* patentes, albi, sepalis linea mediana brunnea instructis; pedicellus cum ovario tenuis, 6-10 mm. longus. *Sepalum* intermedium suborbiculare, apiculatum, 2*25-2*75 mm. longum et latum; sepala lateralia valde oblique triangulari-ovata, acuta vel obtusa, 3-3-5 mm. longa, 2*75-3 mm. lata, extra leviter carinata; sepala omnia trinervia. *Petala* lanceolato-ovata, acuta, leviter curvata, 2*25-2*5 mm. longa, circiter 1*5 mm. lata, uninervia. *Labelli* lamina leviter recurvata, parva, triangulari-ovata, acuta, basi rotundato-hastata, 2-2*25 mm. longa, 1-25—1 -5 mm. lata, trinervia; calcar lamina multo majus, ore fere 2 mm. diametro e basi apicem versus per quadrantes tres inferiores sensim attenuatum, deinde subito subconico-dilatatum, totum 1*5-2 cm. longum. *Columna* brevis, fere 2 mm. alta. *Anthera* semiglobosa, antice breviter producta, truncata; pollinia fere globosa, stipite basi angustissimo sursum valde dilatato rhombiformi marginibus leviter recurvatis fere 1 mm. longo, viscidio anguste reniformi-elliptico antice rotundato stipite triplo breviore. *Rostellum* breviter productum, bilobum, lobis subacutis ; fovea stigmatica orbicularis.

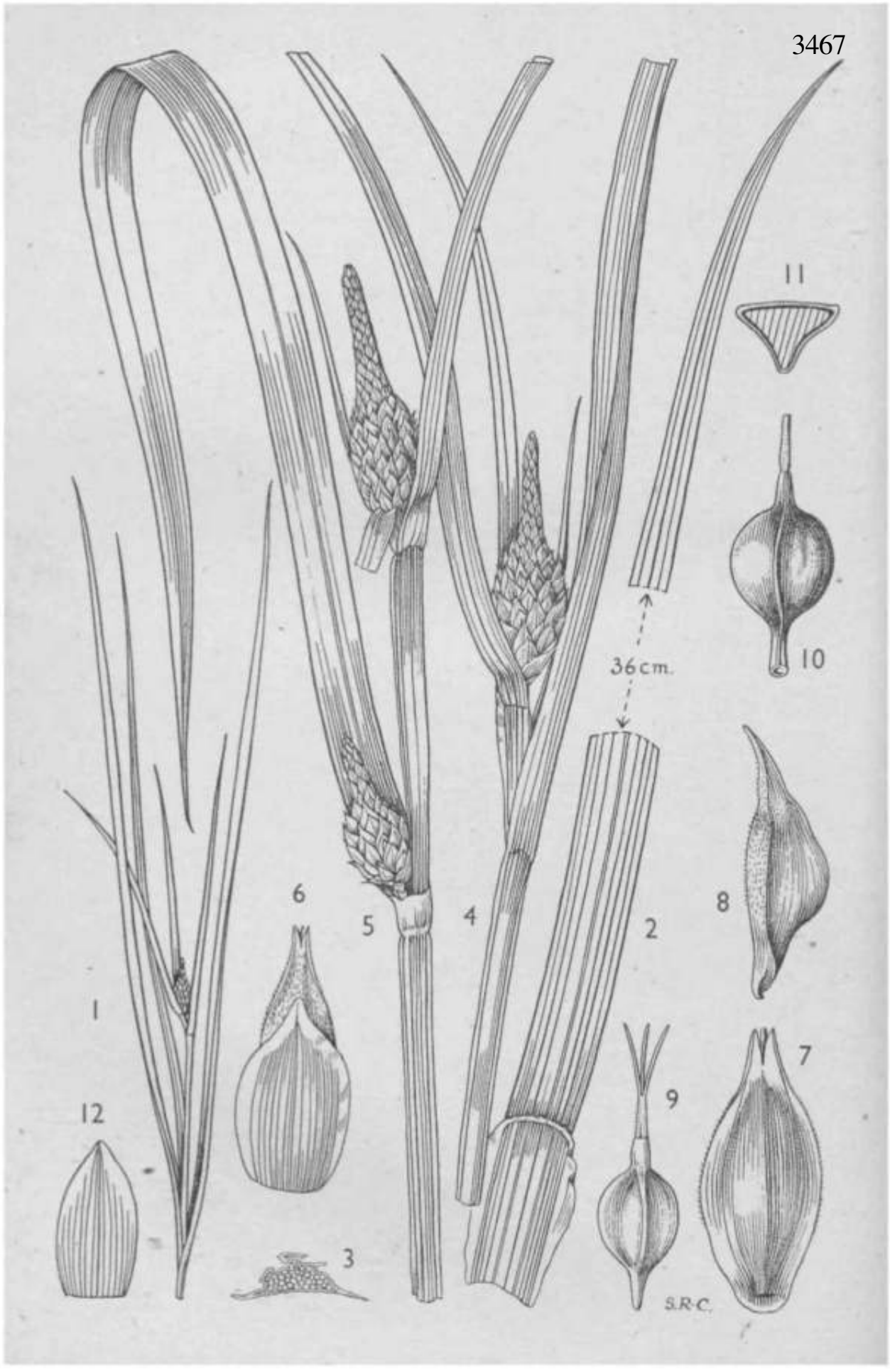
NIGERIA. Oban District, 1911-12, *Talbot* (type).
UGANDA. Bunyoro, Budongo Forest, 1050 m. alt., cult, and flowered at Busingiro, Oct. 1943, *Eggeling* 5450.

This species agrees with many species in sect. *Brachygbssa* in the very small lamina to the lip, but the column, and pollinarium are similar to those in other species of sect. *Eu-microcoelia.* One may speculate as to the exact nature of the insect or insects which pollinate this species in view of the relatively long spur and the extremely small alighting area provided by the lamina. It seems possible that the

visiting insects may be of a type which hovers while extracting the nectar.

The markedly discontinuous distribution so far recorded is probably merely an indication of our general ignorance of the African orchid flora and of the relative inconspicuousness of the species except when flowering. It is probably distributed throughout the Congo forest region.—V. S. SUMMERHAYES.

FIO. 1, flowering plant, *natural size;* 2, flower with sepals and petals removed, X 4; 3, dorsal sepal, X 8; 4, lateral sepal, from outside, X 8; 5, petal, X 8; 6, column and upper part of lip, X 12; 7, column, anther removed, X 12; 8, column, side view, with anther and pollinarium removed, x 8; 9, stipes and viscidium, X 12 (a, androclinium; r, rostellum lobes; st, stigma).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TABULA 3467.

CAREX PTEROCAULOS *Nelmes.*

CYPERACEAE. Tribus CABICEAE.

C. (§ Digitatae) pterocaulos *Nelmes*; species nova, a *Carex delavayi* Franch. culmorum angulis alatis, foliis latioribus, spicis longioribus, bracteis vix vaginantibus, squamarum carina non excurrente distinguenda.

Culmi **erecti vel suberecti, centrales, 3-5-4 mm. crassi angulis alatis inclusis, compresso-triquetri vel obscure tetraquetri, submarcidi, infra angulos laeves vel parce scabri, apicem versus subdense scabri, costati et striati.** ***Folia caulina*** **culmo multo longiora, 9-11*5 mm. lata, plana vel planiuscula, subtenuia, pluricostata, supra saepe septato-nodulosa, infra costa media carinata superne scabrida excepta laevia, supra et marginibus scabrida, apicem versus attenuata.** ***Spicae*** **1-2, plerumque 1 cum bractea sterili alterius evanidae, 2-6 cm. distantes, androgynaeceae, 2*5-4 cm. longae, densiflorae, sessiles, erectae vel suberectae, parte feminea ellipsoideo-cylindrica vel ovoidea plerumque quam pars mascula longiore et 8-11 mm. crassa, parte mascula 3-3-5 mm. crassa.** ***Bractea*** **spicae inferioris foliacea, culmum longe superans, basi ventre auriculata sed vix vaginantia, basi dorso interdum transverse undulata, bracteae spicam superiorem versus 2-3 steriles foliaceae vel setaceae culmum longe superantes, bractea spicae supremae subfoliacca vel setacea spicam suam superans.** ***Squamae femineae*** **4-5 mm. longae, 2*5-3 mm. latae, oblongo-triangulae vel oblongo-ovato-acuminatae, cymbiformes vel subconduplicatae, praesertim inferne interdum superne planiusculae, albido-stramineae, tenues et translucentes sed multinervosae, marginibus demum erosae superne minute ciliolatae, basi gibbae, truncato-incrassatae, vitta mediana trinervi nervis superne coalitis ex apice acuta vel subacuta non excurrente.** ***Utriculi*** **6-7 mm. longi, 2*5-2*75 mm. lati, ellipsoidei vel rhomboideo-ellipsoidei, trigoni, superne leviter incurvi, facie ventrali quam utraque facies dorsalis majore subvalde confertim multinervi, subcoriacei, dorso (facie abaxiali) glabri vel apicem versus parce furfuraceo-hispiduli, ventre (facie adaxiali) superne subdense vel dense albido- et subadpresso-hispiduli, inferne glabri vel parcissime hispiduli, straminei, anguste vel sublate marginati, marginibus inferne parce superne dense ciliolato-hispiduli, demum subpatuli vel patuli, inferne in partem basalem oblongam vel suboblongam 1-5-2 mm. longam subsensim vel subabrupte contracti, basi rotundo-truncati, vix stipitati, superne in rostrum latum compresso-cylindricum marginatum superne glabrum vel glabrescens inferne hispidulo-marginatum bidentatum circiter 1 mm. longum subsensim desinentes ; ore recto ; dentes lanceolati, circiter 0-5 mm. longi, stricti vel substricti.** ***Nux*** **4*5-4*75 mm. longa (stipite et rostro incluso), 2*3-2*5 mm. lata, elliptica sed inferne cuneato-angustata vel orbiculato-obovato-elliptica, trigona, angulis pallidis prominentibus, faciebus**

concavis fusco-brunneis, dense minute puncticulata, basi in stipitem pallidum cylindricum vel trigono-cylindricum 1 mm. longum et 0*3-0*4 mm. crassum subabrupte contracta et apice in rostrum apice crassiusculum vel discoideo-annulatum crassum pallidum trigono-cylindricum inflexum 0*75 mm. longum abrupte contracta. *Stylus* hispidulus, trigonus, basin versus incrassatus, in rostro nucis persistens. *Stigmata* 3.

INDIA. Burma: Tavoy; head waters of Sedi Chaung, 13 September 1920, *P. T. Russell* (Botanical Survey of India Field No. 1845;.

Kiikenthal (Engl. Pflanzenreich, 1909) divided Section *Digitatae* Fries of the *Eucarices* into the small Subsection *Radicales* (5 species) and the larger Subsection *Eu-Digitatae* (20 species). *Carex pterocaulos* clearly belongs to the *Radicales* but is quite distinct from the other members of this group, though sharing characters with several of them. It has the winged stem, but in greater degree, of C *spedosa* Kunth, the broad leaves and large utricles of *C. courtallensis* Nees apud Boott, and the stout spikes of *C. delavayi* Franch. It also follows *C. delavayi* in having its spikes reduced to 1-2, though those of *C. speciosa* and *C. radicalis* Boott are only slightly more numerous. The term " reduced " is well applied to *C. pterocaulos,* the 2-3 empty bracts situated just below the terminal spike plainly showing how much reduced in number of spikes this species has become. In fact, as *C. pterocaulos* is usually unispicate, it has as much right to be included in Kiikenthars Subgenus *Primocarex* as have many of the species originally placed there, yet its proper place is obviously among the *Eucarices.* In other words, this species demonstrates, with other "*Primocarices*" the instability of unispicateness in this subgenus, and points unmistakably to its multispicate origin.

C. pterocaulos is known only from the type locality. Of its allies, *C. speciosa, C. courtallensis,* and *C. radicalis* occur in India (the first-mentioned also extending through Indo-China and Siam into the Malay Islands), *C. cylindrostachys* Franch. and *C. delavayi* are Chinese, while the remaining member of the subsection, *C. phalaroides* Kunth (with 5 varieties), is found in S. America, from Ecuador down into Chile and northern Argentina.—E. NELMES.

FIG. 1, upper part of plant, *one-quarter natural size;* 2, lower and upper part of leaf, upper surface, *natural size;* 3, transverse section of stem, X 4; 4 and 5, flowering stems bearing one and two spikes respectively, *natural size* ; 6, scale and utricle, X 6; 7, utricle, X 6; 8, utricle in side view, x 6; 9, young nut with style and stigmas, X 6; 10, mature nut, X 6; 11, transverse section of nut, X 6; 12, male scale, X 6.


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TABULA 3468.

CABEX HELFEBI *Boech.*

CYPERACEAE. Tribus CARICEAE.

C. (§ **Mapanifoliae) helferi** *BoecL* in Linnaea, xl. 365 (1876).—A *C. majpaniifolia* Ridl. praesertim foliis angustioribus, squamis femineis brevioribus distinguenda.

Herba caespitosa. *Rhizoma* validum, lignosum. *Cidmi* 20-40 cm. alti, inferne 1-2 mm. crassi, superne 0-7-1 mm. crassi, valde costati, subteretes vel trigoni, glabri, laeves vel angulis scabriusculi, interdum setulosi, erecti vel subcurvi, subscapiformes, centrales, pallido-vel subbrunnei, vaginas infundibuliformes subherbaceas 5-10 cm. longas in loco foliorum per totam longitudinem (inferne confertas) gerentes, basi foliis et cataphyllis 2-6 spadiceis vel emarcidis vel integris brunneo- vel subatrato-nervosis brevissimis usque 16 cm. longis circumdatis. *Folia radicalia* culmum floriferum circumdantia (sed ab eo fere libera) et plerumque longe superantia, circiter 40-90 cm. longa, 1 • 6-3* 6 cm. lata, basi vix vel breviter vaginantia, modice usque longe alato-petiolata, sursum in laminam planam late linearem sensim ampliata, apicem firmum acutum vel obtusum versus longe acuminata, sicca tenuia sed rigida, ut videtur arcuata vel obliqua, tenuiter vel valde multinervia, sed nervo medio et nervis 2 lateralibus validioribus, supra dense alveolata, inferne laevia, superne praecipue apicem versus nervis prominentibus et marginibus scabriusculis, interdum supra omnibus parce pallide minute adpresso-setulosis, partim tenuiter sed distincte septato-nodosa. *Inflorescentia* composite interrupte paniculata, circiter 10-25 cm. longa, erecta; *paniculae secundariae* 3-6, singulae, plus minus oblongo-ovoideae, contractae, densissimae, 2-3-5 cm. longae, 1*25-2-25 cm. latae, superiores subapproximatae vel subdistantes, inferiores distantes vel longe distantes, erectae vel patulae, superiores breviter vel sublonge, inferiores longe vel longissime exserto-pedunculatae, ramuli inferiores brevissimi vix pedunculati ut videtur in spicas plures sessiles iterum ramosi, spicae ramulorum superiorum simplices; pedunculi subteretes usque trigoni, angulis laeves usque hispiduli vel scabriusculi, superne saepe minute setulosi, 1-1-3 mm. crassi. *Rhachis* paniculorum secundariarum triquetra, angulis acutis hispidulis. *Bracteae* pallide brunneae usque pallide spadiceae, subherbaceae, dorso basi excepta dense et minute subadpresso-setosae vel paleaceae, laminae breves, paniculam suam subaequantes, acuminatae, apice acutae, conduplicatae usque planiusculae, supremae breviter vaginantes, reliquae longe vaginantes, subvalde nervosae, nervis bractearum inferiorum saepe brunneis usque atratis ; vaginae ampliatae, ore concavae et facile ruptae, nodo saepe pallido. *Spicae* plerumque androgynaeceae, sessiles, dense aggregatae, parte mascula densiflora quam pars feminea plerumque multo longiore et demum graciliore, parte feminea pauciflora, demum 5-8 mm. vel ultra crassa, tota 6-10 mm. longa, plus minus oblonga, demum subovoidea et patula usque patentia. *Bracteolae* squamis femineis simillimae. *Cladoprophylla* spicarum et ramulorum

3 mm. longa, 1*5 mm. lata, inferne utriculiformia, gibba, siiperne squamiformia, planiuscula, apice acuta usque obtusa, dorso parce furfuraceo-hispidula, marginibus enervia translucentia glabra albo-hyalina, medio valde nervosa. *Squamae femineae* 3* 5-7* 5 mm. longae (arista 1-3-75 mm. longa inclusa), 1-5-2 mm. latae, plus minus oblongae vel ovato-oblongae, subcymbiformes, saepe subcurvae, basi truncatae, incrassatae et subincurvae, apice obtusae usque truncato-bilobae, dense et minute alveolatae, pallide brunneae vel albidae, marginibus translucentibus latis tenuibus albo-hyalinis tenuiter nervosis demum erosis, ceterum valde multinervosae, dorso glabrae usque dense furfuraceo-hispidulae, nervo medio et nervis 2 lateralibus sursum subconvergentibus dorso in aristam latam marginibus dense hispidulam excurrentibus; arista 1-3 • 75 mm. longa, interdum curva vel etiam flexuosa. *Utriculi* 6-7 mm. longi, 1-5-1-8 mm. lati, rostro excluso ellipsoidei, primo subinflati et obscure trigoni, demum trigoni et angulis obtusis et prominentibus, faciebus concaviusculi, demum divergentes, faciebus singulis (omnibus) valde circiter 6-8-nervibus, membranacei usque subcoriacei, straminei, demum brunnei, inferne glabri, triente usque dimidio superiore subdense hispiduli vel paleacei, inferne attenuati et in stipitem brevem validum contracti, superne in apicem globosum 0-5 mm. vel ultra diametro abrupte contracti et in rostrum longum (circiter 3-3-5 mm.) albidum demum brunnescentem parce usque subdense hispidulum planiusculum teres vix usque angustissime marginatum curvum et interdum tortum abrupte vel subabrupte contracti; ore valde oblique secto. *Nux* circiter 2 • 75 mm. longa, 1-5-1-75 mm. lata, ellipsoidea usque obovoideo-ellipsoidea, trigona, angulis prominentibus obtusis, faciebus concaviusculis, dense minute puncticulata, straminea, demum atro-brunnea, angulis pallidioribus, inferne attenuata et abrupte vix usque brevissime et valde stipitata, superne attenuata apice rotundata, abrupte vix usque brevissime rostrata. *Stylus* basi pyramidalis, basi discoidea 0-5 mm. diametro in apice nucis subpersistente. *Stigmata* 3, crassiuscula, sublonga.

BURMA. Tenasserim, 7 March 1838, *Heifer* (Kew distrib.) **6111/2**; Mergui, Maran, Maliwun, 60 m., 16 April 1928, *Sukoe* 7743.

Carex helferi Boeck. and *C. mapaniifolia* Ridl. are fully discussed under the description of *C. adrienii* E. G. Camus (tab. 3434), where they are treated as forming the new Section *Mapaniifoliae* Nelmes et Airy-Shaw. *C. helferi* appears to be restricted to a small area in Lower Burma. It is a smaller plant than, but otherwise closely related to, *C. mapaniifolia,* which would have been described and figured here, alongside C *helferi,* but for the fact that the inflorescences of the only known specimens, from peninsular Siam, are immature, with undeveloped utricles and nuts.—E. NELMES.

FIG. 1, plant, *one-sixth natural size*; 2, leaf, *natural size;* 3, inflorescence, *natural size;* 4, part of partial inflorescence, X 3 ; 5, spike, X 4 ; 6, bracteole, X 6; 7, cladoprophyll, x 6; 8, male flower, x 6; 9, female flower, X 6 ; 10, young nut with style and stigmas, x 8; 11, mature utricle, X 8; 12, transverse section of utricle, x 8; 13, nut, x 8 (br = bracteole, c = cladoprophyll, f = female flower, m = male flowers).


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TABULA 3469.

SABCOCOCCA WALLICHII *Stapf.*

BUXACEAE.

S. wallichii *Stapf* in Kew Bull. 1916, p. 37. *S. saligna* a *coriacea* (Hook.) Muell. Arg. in DC. Prodr. XVI. 11 (1864) pro parte et exel. synon.—Cum *S. coriacea* (Hook.) Sweet et *S. saligna* (D. Don) Muell. Arg. confusa, sed pedicellis florum femineorum et fructuum longioribus laxe bracteolatis differt; ab hac foliis latioribus floribus masculis majoribus, ab ilia stigmatibus tribus floribus masculis paucioribus in inflorescentiis subglobosis (haud cylindraceis spiciformibus) dispositis distinguenda.

Frutex sempervirens, 0*6-3 m. altus; ramuli glabri. *Folia* petiolata ; laminae ellipticae ad lanceolatae, longe acuminatae ad caudatae, basi cuneatae, plerumque 6-13 cm. longae et 1 -8-3-3 cm. latae, tenuiter coriaceae, supra saturate virides, subtus pallide virides, in sicco utrinque costa et venis primariis elevatis ; petioli 8-13 mm. raro ad 2 cm. longi. *Inflorescentiae androgynae* circiter 1-1-5 cm. longae, subglobosae, patentes, e floribus masculis 5-6 basi cum floribus femineis duobus compositae ; rhachis puberula ; bracteae ovatae, acuminatae, 1-2 mm. longae, raro subulatae et ad 4 mm. longae, concavae, carinatae, ciliolatae. *Inflorescentiae femineae* (solum in fructu cognitae) e floribus femineis usque 6 in rhachide perbrevi compositae. *Flores masculi* sessiles vel breviter pedicellati; pedicelli usque ad 2 mm. longi, fere ebracteolati sed perraro bracteolis duabus ovatis obtusis circiter 1-5 mm. longis tepalis adpressis ornati; tepala 4, ovata vel oblonga ad late ovata vel orbicularia, acuta ad rotundata vel leviter retusa vel truncata vel cuspidata, 3-4-5 mm. longa, ciliolata; filamenta 6-8-5 mm. longa; antherae circiter 1-5 mm. longae. *Flores feminei* 7-9 mm. longi; pedicelli 5-6 mm. longi bracteolis 4 vel 6 vel 8 oppositis vel suboppositis laxe dispositis instructi; bracteolae ovatae, acutae, 1-2 mm. longae, ciliolatae, erectae, adpressae, duae supremae prope tepala insertae ; tepala 5-6, ovata, acuta vel acuminata vel cuspidata, (1#5)-2-2-5 mm. longa, ciliolata, erecta, valde imbricata; gynoecium 2-5-4 mm. longum, in stigmata tria profunde divisum, ovario triloculari. *Fructus* subglobosi, 9-10 mm. longi, 8-9 mm. lati, primo virides deinde purpurascentes denique nigri *(fide* J. D. Hooker), pedicellis 6-10 mm. longis suffulti. *Semina* plano-convexa leviter carinata, ambitu ovalia, circiter 8 mm. longa et 5 mm. lata, fusco-brunnea.

NEPAL. Sine loc. anno 1821, *Wallich* in Herb. Hook, *(typus)*; N. slopes of Phulloot [Phalut,] 10 Nov. 1848, *J. D. Hooker*; Tambur River, 22 Nov. 1848, *J. D. Hooker.*

SIKKIM. Singalila Range, 6000 ft., Oct. 1891, *H. II. Haines* 261.

CHINA. W. Yunnan: Nmai-hka—Salween divide, 25° 50' N., 7-8000 ft., Sept. 1919, *G. Forrest* 18577 ; Shweli—Salween divide, 25° 40' N., 7000 ft., Sept. 1919, *G. Forrest* 18533; ibid. 25° 20' N., 8000 ft., Sept. 1913, *G. Forrest* 12017 ; Mingkwong valley, 25° 15' N., 6-7000 ft., June 1912, *G. Forrest* 8163 ; hills south of Tengyueh, 25° N., 6000 ft., July 1912, *G. Forrest* 8284.

In 1825 W. J. Hooker figured and described, in his Flora Exotica, ii. t. 148, a plant grown at the Glasgow Botanic Garden which had been received from Kew, where it had been raised from seeds presented by Dr. Wallich in 1823. Hooker recognized the plant as being probably a new genus of *Euphorbiaceae* (sens, lat.), but being unwilling to describe it as such in the absence of fruit, he named it *Pachysandra ? coriacea,* remarking that it was " A native of Nepaul, whence I have received fine dried specimens from my inestimable friend Dr. Wallich." One of the specimens referred to is indeed the same as *Pachysandra ? coriacea,* but the other is not, being, in fact, the plant figured here. Thus from the very first *S. wallichii* was confused with another species, which, though strikingly similar in foliage, is very different in floral characters. This, however, was only the beginning of the confusion. The year following the publication of Hooker's *P. coriacea,* Lindley figured the same species in the Botanical Register, t. 1012, and, having seen fruits, he described it as a new genus, *Sarcococca, naming* it *S. pruniformisy* and identifying with it the herbarium material sent home by Wallich under the MS. name *Tricera ? nepahnsis (Wallich* 7979A). Lindley divided the species into two varieties, a *kUifolia,* the plant figured, with which he correctly identified *Pachysandra ? coriacea* Hook., and p *angustifolia,* which Lindley thought might be the same as *Buxus saligna* D. Don (Prodr. Fl. Nepal. 63 : 1825), as, in fact, it has proved to be. The two varieties, however, are not conspecific, but represent quite distinct species which properly bear the names *S. coriacea* (Hook.) Sweet and *S. saligna* (D. Don) Muell. Arg. respectively. The subsequent history of these species need not concern us, except for the fact that in the Flora of British India, v. 267 (1887), they were included, together with another distinct species, *S. trinervia* Wight, in " *S. pruniformis* proper," which also, of course, includes the as yet unrecognized *S. wallichii.* Three other species were referred to *S. pruniformis* as varieties in the Flora of British India, so that the name *S. pruniformis* there covers all the Indian material of the genus, comprising at least seven distinct species. Subsequent authors followed Hooker, and the name *S. pruniformis* was used for the Chinese and Malayan Sarcococcas as well as for the Indian.

'Some time between 1907 and 1916 the late Dr. O. Stapf thoroughly revised the material of *Sarcococca* in the Kew Herbarium and came to the conclusion that most of the species reduced to *S. pruniformis* should be maintained, and that, in addition, several more species could be

recognized. Most of these new species have been published at one time or another, and one more of them is described later on in the present work (t. 3471). Dr. Stapf referred to his work in an article on *S. ruscifolia* Stapf in the Botanical Magazine (t. 9045), but unfortunately he never found time to complete his investigations and write the comprehensive account of the genus which he had in mind, nor did he publish the key to the species which he had prepared. The difficulties experienced in classifying the plants included in *Sarcococca* are chiefly due to the small size of the flowers, to their general similarity throughout the genus, and to the fact that there is usually a certain amount of variation among the flowers of individual plants. Fortunately, as Dr. Stapf discovered, the differences in floral characters (which *do* become apparent when the material is critically examined) are correlated with differences in vegetative characters, namely whether the twigs are glabrous or puberulous, and the shape and size of the leaves. In addition there are differences in the form of the male or predominantly male inflorescences, some species having the male flowers relatively few (up to 6 or 8) and forming a more or less globose cluster, which is inclined outwards from the leaf-axil, or is slightly cernuous, whilst in other species the male flowers are more numerous (up to 16) and form an erect spike-like raceme. Finally there is one easily observed floral character which proves reliable, namely the number of stigmas, which is either 2 or 3, and indicates the number of carpels forming the gynoecium.

S. wallichii was one of the species detected and described by Dr. Stapf, and it is evident that he had completely straightened out the confusion between it and its allies. It was known originally only from the specimens collected by Wallich and by Hooker in Nepal, but collections received at Kew subsequently have shown that it occurs also in the adjoining part of Sikkim, and, much farther east, in western China.

From *S. coriacea,* with which it was first confused and which it greatly resembles in vegetative features, *S. wallichii* is easily distinguished by the longer pedicels of the female flowers whose bracteoles do not overlap—differences which are very striking in the fruiting condition ; by the gynoecium with 3 (instead of 2) stigmas, and by the fewer male flowers crowded into a subglobose cluster instead of forming erect cylindrical spikes. Like *S. wallichii, S. coriacea* is a native of Nepal, and it is also found farther east, in the Khasia, Naga, and Manipur hills of Assam.

In contrast, *S. saligna* is a species of the western Himalayas, being distributed from extreme eastern Afghanistan eastwards to Kumaon, but not found, so far as is known, farther east. From both *S. wallichii* and *S. coriacea* it differs markedly in its much narrower, linear-lanceolate leaves. It agrees with *S. wallichii* in having 3 stigmas, and relatively few male flowers in a more or less globose cluster, but as in *8. coriacea* the female flowers have a much shorter pedicel with overlapping bracteoles. It also differs from *S. wallichii* by its smaller male flowers

which commonly have two bracteoles (the latter are very rarely present in *S. wallichii)* and by its smaller fruits and seeds, the latter being a bright chestnut colour instead of dark chocolate-brown as in *S. wallichii.*

J. ROBERT SEALY.

FIG. 1, flowering shoot, *natural size;* 2, leaf from strong shoot, *natural size;* 3, inflorescence, X 3 (p = base of petiole, s = stem); 4, male flower, X 4; 5, male flower with tepals opened out and stamens removed, X 4 ; 6, female flower, X 6 ; 7, gynoecium, X 6 ; 8, part of fruiting branch, *natural size ;* 9, pedicel and tepals from fruit, x 3 (br. = uppermost bracteoles); 10, seed, in face-view and transverse section, X 2. Figs. 1-7 from *Wallich* (Nepal, anno 1821) in Herb. Hook.; figs. 8-10 from *J. D. Hooker* (22 Nov. 1848).


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TABULA 3470.

SABCOCOCCA HOOKERIANA *Bailkn.*

BUXACEAE.

S. hookeriana *Baillon,* Monogr. Bux. 53 (1859); Muell. Arg. in DC. Prodr. xvi. 13 (1864); Garden, xxv. 359, cum fig. (1884); Marquand in Journ. Linn. Soc. London, Bot. xlviii. 220 (1929); B. 0. M[ulligan] in Gard. Chron. Ser. 3, lxxxvii. 286 (1930); Bean, Trees & Shrubs, iii. 451 (1933). *S. pruniformis* var. *hookeriana* (Baill.) Hooker f., Fl. Brit. India, v. 267 (1887).—Species *S. salignae* (D. Don) Muell. Arg. affinis, sed ramulis puberulis, foliis ellipticis acutis vel acuminatis (nee lineari-ellipticis vel anguste lanceolatis acuminatis vel caudatis) plerumque brevioribus pro rata latioribus, tepalis florum masculorum majoribus, iloribus femineis longioribus stigma tibus nonnihil exsertis patentibus nee valde recurvis differt.

Frutex sempervirens, 1-1*6 m. altus; ramuli puberuli. *Folia* petiolata; laminae anguste ellipticae vel ellipticae, acutae vel acuminatae, basi cuneatae vel subcuneatae, plerumque 3*5-8 cm. longae et 1*2-2*5 cm. latae, interdum usque ad 10*5 cm. longae, tenuiter coriaceae, supra saturate virides, subtus pallide virides, supra in costa puberulae ceterum glabrae ; petioli plerumque 5-10 mm. longi, puberuli. *Inflorescentiae mascuhe vel pro maxima parte masculae* subglobosae, patentes vel leviter cernuae, e floribus masculis 3-8 basi cum floribus femineis 0-2 compositae ; bracteae ovatae et tenuiter acuminatae vel subulatae, 1 -5-4—(5) mm. longae, ciliolatae. *Inflorescentiae femineae vel pro maxima parte femineae* e floribus femineis 2-4 in rhachide perbrevi compositae, raro floribus masculis 1-2 additis. *Flores masculi* breviter pedicellati; pedicelli usque ad 2-5 mm. longi, ebracteolati vel interdum bracteolis 1-2 instructi; bracteolae ovatae, acuminatae, 2-3 mm. longae, concavae, ciliolatae; tepala 4, late ovata vel late ovalia, cuspidata, 3-4 mm. longa, concava, ciliolata; filamenta 6-5-8 mm. longa ; antherae circiter 2 mm. longae. *Flores feminei* 7-9 mm. longi raro 5*5 mm. longi; pedicelli 4-6 mm. longi, bracteolis 6-10 oppositis vel suboppositis instructi; bracteolae subulatae vel anguste triangulares acuminatae, 1-2-5 mm. longae, duae supremae prope tepala insertae et ab eis vix distinguendae ; tepala 4 vel 5, triangularia, acuminata, 2-2-5 mm. longa, ciliolata; gynoecium 2*5-3 mm. longum, in stigmata tria divisum. *Fruotus* subglobosi, 6-10 mm. longi, 8-10 mm. lati, nigri, pedicellis 5-7 mm. longis suffulti. *Semina* planoconvexa, circiter 5 mm. longa et 4*5 mm. lata, fusco-brunnea.

SIKKIM. Ratong valley, 8-9000 ft., 7 Jan. 1849, *J. D. Hooker;* Yalloong Mts., 7-8000 ft., *J. D. Hooker;* Lachoong, 8000 ft., 27 Oct. 1849, J. *D. Hooker*\ Tumbok, 8000 ft., 11 Oct. 1870, C. *B. Clarke* 12979A ; sine loc. 8000 ft., 15 Oct. 1874, *Treutler* 907.

BHUTAN. Sine loc. *Griffith* 2514 et 2515 (Kew Distrib. no. 4897).

ASSAM. Jablung Hills, March 1853, *Simons* (Kew Distrib. no. 4896); Seinghku valley, 28° 5' N., 97° 30' E., 9000-10000 ft., 24 Oct. 1926, *F. K. Ward* 7613.

TIBET. Tsangpo gorge near Pemakochung, 8000 ft., 18 Nov. 1924, *F. K. Ward* 6277.

As stated in the preceding article, the late Dr. Stapf came to the conclusion many years ago that the Indian material of *Sarcococca,* which had been included in one species by J. D. Hooker, really consisted of a number of distinct species. A critical survey of the specimens in the Kew Herbarium supports Dr. Stapf's view, and leaves no doubt that the plant figured here should retain the specific rank originally given to it.

From its nearest ally, *S. saligna* (D. Don) Muell. Arg., *S. hooheriana* differs by its leaves being elliptic, acute to acuminate, mostly shorter, and relatively broader (3-5-8 cm. long and 1-2-2*5 cm. wide), the leaves of *S. saligna* being narrowly lanceolate or linear-elliptic, acuminate to caudate, 6-5-14 cm. long, and 0-8-2-2 cm. wide. Also *S. hookeriana* has puberulous branchlets, whereas those of *S. saligna* are ordinarily glabrous, very rarely slightly puberulous as in T. *Thomson* 644. Correlated with these vegetative characters there are differences in the flowers. *S. hookeriana* has larger male and female flowers, the bracteoles and tepals of the latter being more finely pointed, whilst the stigmas are spreading and not much exserted from the perianth—contrasting in this with the condition in *S. saligna* where the stigmas are strongly recurved and clearly exceed the perianth. As mentioned in the preceding article, *S. saligna* is a species of the western Himalayas, being distributed from eastern Afghanistan to Kumaon. *S. hookeriana,* on the other hand, is a native of the eastern Himalayas from Sikkim to Assam.

Farther east, in Szechwan and north-western Yunnan, *S. hookeriana* is replaced by plants which resemble it very greatly in vegetative characters and in the general appearance of the flowers, but which differ by the much less finely pointed bracts and female bracteoles, and by the gynoecium being composed of two, instead of three, carpels, and having two, not three, stigmas. As a rule in this genus the number of stigmas (and carpels) is a good specific character, but in this particular case the resemblance between the Chinese plants and *S. hookeriana* is otherwise so great, that I think they must be regarded as conspecific. The Chinese plants may well be regarded as a distinct variety, as was suggested by Franchet when he named them *S. hookeriana* var. *digyna.* In *Sarcococca* the number of carpels is normally constant in each plant, but two exceptions have been found, both in this var. *digyna.* In one specimen *{McLaren's Collector* C. 30), two flowers have three stigmas whilst all the others (27) have two stigmas. In the other specimen, *Farges* 1159, one of the two inflorescences examined had two female flowers, one with two and the other with three stigmas ; in the second inflorescence three flowers were digynous and the fourth trigynous.

One of the digynous flowers had one of its stigmas bifid, broader than the other, and seemingly formed of two connate stigmas, but the ovary proved to be bilocular and showed no indication of the presence of a third carpel. In a genus where some species have two carpels and the other species have three carpels, one might reasonably expect to find anomalous flowers occasionally in some plants, yet close examination of the numerous sheets in the Kew Herbarium, and the dissection of a great many flowers, has so far brought to light only the two examples mentioned.

There is one more plant closely allied to *S. hookeriana* which must be mentioned, namely the one described as *S. humilis* by Stapf and, apparently independently, as *S. hookeriana* var. *humilis* by Rehder & Wilson. It is very similar to *S. hookeriana* and its var. *digyna* in foliage, but differs by its very small size—it does not exceed 50 cm. in height—by its slightly smaller leaves, shorter filaments and smaller female flowers; like var. *digyna,* it differs from typical *S. hookeriana* by its bracts and bracteoles being acute instead of finely acuminate to subulate, and by having two, not three, stigmas. It was originally described as having stigmas either two or three in number, but in typical material from western Hupeh *(A. Henry* 7834 & *Wilson Veitch Exped.* 50) and from Wu Shan in eastern Szechwan *(A. Henry* 7065), as well as in cultivated plants grown from seeds collected by Wilson in the latter locality *(Veitch Exped.* Seed number 900), the stigmas are constantly two. It is markedly rhizomatous in habit, and in this agrees with cultivated plants of var. *digyna.* None of the wild specimens of the variety shows the subterranean part of the plant, nor is there any mention of it in any of the field-notes. The same is true of typical *S. hookeriana,* and it is therefore not possible to say whether or not this too is rhizomatous.

There can be no doubt that *S. hookeriana,* its var. *digyna,* and *S. humilis* are very closely related, and it is not impossible that var. *digyna* may represent the ancestral form of the species .which in the most easterly part of its wide geographical range has given rise to the dwarf *humilis,* whilst in the westernmost part the trigynous *S. hookeriana* has arisen.

The plants with three stigmas hitherto included in *S. humilis* should, I think, be excluded. The material from Yunnan *(A. Henry* 9859, 9859A, *Forrest* 420, *Maire* 2102) should be referred to *S. rusdfolia* var. *chinensis* (Franch.) Rehd. & Wils., whilst a plant often grown in gardens as *S. humilis,* and figured under that name in the Botanical Magazine t. 9449, stands apart from all other Sarcococcas and its position is doubtful. It is, almost certainly, related to *S. humilis,* but it can scarcely be claimed as a member of the *S. hookeriana* group. Nevertheless, since it has been confused with a plant belonging to this group, it is not inappropriate to conclude this article by setting down what is known about it. The earliest record of it at Kew is material received from Glasnevin in 1916. Next comes a good specimen from the late Miss E. Willmott, which was sent in 1919 with the information that it was grown from Wilson's seeds. This was determined as *S. humilis* by

Dr. Stapf, and plants became widely distributed in cultivation under this name. From *S. humilis,* with which it agrees in its black fruits, the plant differs by its caespitose habit, by its shorter and relatively broader leaves which tend to be ovate and which have shorter petioles, by its inflorescences with fewer and slightly smaller flowers, and by its anthers being creamy-yellow instead of pink. It was apparently to this pseudo-iS. *humilis* that B. 0. Mulligan applied the name *S. ruscifolia* var. *chinensis* (Franch.) Rehd. & Wils. (Gard. Chron. Ser. 3, lxxxvii. 286, fig. 113: 1930), but though that variety is similar in habit and in the shape and size of its leaves, the pseudo-& *humilis* differs very considerably by its ebracteolate male flowers, by the female flowers having fewer bracteoles (4-6, against 8-12), and by its black (not red) fruits. The most striking characteristic of the plant, however, is that the number of carpels is quite variable, both digynous and trigynous flowers being normally present on the same shoot, and even in the same inflorescence, a state of affairs unique in the genus. In this the plant contrasts both with *S. humilis,* where the flowers are strictly digynous, and with *S. ruscifolia,* where the flowers are always trigynous. The origin of this pseudo-S. *humilis* of gardens is not known for certain. As already stated, there is a note with the specimen from Miss Willmott's garden to the effect that the plant was grown from seeds sent home by E. H. Wilson, but there is no evidence to show that the seeds were those which Wilson collected for Messrs. Veitch (seed no. 900) and from which the true *S. humilis* was grown. There is no field-specimen at Kew to match it, and we therefore have no record of it as a wild plant. From what has been said it will be evident that the plant combines characters of both *S. humilis* and *S. ruscifolia,* and the question arises : can it be a hybrid between these two species ? Both species are found in western Hupeh, but whereas *S. ruscifolia* is said to be common in the area of Ichang, Patung, and Nan'to, *S. humilis* is recorded by Wilson *{Sarg. PL Wils.* ii. 164 : 1914) as a rare plant, and our one localized Hupeh specimen is from Changyang. Both species were introduced into cultivation in 1901 by seeds collected by Wilson for Messrs. Veitch, and it is possible that one or other of his collectings may have included seeds of hybrid origin. On the other hand, flowering specimens of both species were received at Kew from Messrs. Veitch in 1907, and between that date and 1916, when material of the pseudo-/S. *humilis* was sent from Glasnevin, there was ample time for a hybrid to have arisen. The question is, of course, will the two species hybridize ? The problem of the origin of the pseudo-5. *humilis* awaits further investigation.—-J. ROBERT SEALY.

FIG. 1, flowering shoot, *natural size ;* 2, inflorescence, X 3 ; 3, male flower with subtending bract (sb), X 4 ; 4, tepal from male flower, X 6; 5, female flower witfc subtending bract, X 6 ; 6, gynoecium, x 6; 7, part of fruiting branch, *natural size*; 8, rhachis and two pedicels (with persistent bracteoles and tepals) oi an infructescence, X 3 ; 9, seed, x 4; 10, transverse section of seed, X 4. *igs. 1-6 from *Simons* (Kew Dietrib. no. 4896); figs. 7-10 from *J. D. Hooker* sine *num.* (7 Jan. 1849).


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TABULA 3471.

SARCOCOCCA PHILIPPINENSIS *SfapfexSealy.*

BUXACEAE.

S. philippinensis *Stapf (MS) ex Sealy*; species nova, affinis *S. hookerianae* Baill. var. *digynae* Franch., sed inflorescentiis, florum masculorum tepalis filamentisque minoribus, floribus femineis multibracteolatis valde discrepat.—*S. saligna* (D. Don) Muell. Arg. sec. Merrill, Enum. Philippine PL ii. 465 (1923), *non* (D. Don) Muell. Arg.

Frutex sempervirens; ramuli puberuli. *Folia* petiolata ; laminae lineari-oblongae vel oblongae vel anguste ellipticae, acutae vel longe acutae, basi cuneatae, plerumque 6-9-5 cm. longae et 0-8-1 -8 cm. latae, tenuiter coriaceae, supra saturate virides, subtus pallidiores, supra in costa puberulae ceterum glabrae, costa supra impressa subtus elevata, nervis in sicco utrinque obscure elevaṭis; petioli 4-8 mm. longi, puberuli. *Inflorescentiae* androgynae, cernuae, 1-5-2 cm. longae ; flores masculi et feminei numero variantes, masculi 10-13 et feminei 5 usque masculi 6 et feminei 8-12, vel interdum flores masculi 4-5 et feminei 1-2; in ramulis lateralibus debilibus inflorescentiae e floribus femineis 3-4 masculis nullis vel paucis compositae; pedunculi 2-3 mm. longi, bracteati, ut rhachides puberuli; bracteae ovatae, acuminatae, 1-2 mm. longae, ciliolatae, erectae. *Flores masculi* pedicellis usque ad 2 mm. longis ebracteolatis vel interdum (flos terminalis et flores infimi) bibracteolatis instructi; bracteolae ovatae, acuminatae, 1*5-2 mm. longae, ciliolatae ; tepala 4, ovata et acuminata vel ovalia et cuspidata, 2-5-3-5 mm. longa, ciliolata; stamina e perianthio breviter exserta, fllamentis circiter 3-4 mm. longis et antheris 1-5 mm. longis. *Flores feminei* 6*5-10 mm. longi; pedicelli 4-5-8 mm. longi, puberuli, bracteolis 8-18 imbricatis ornati; bracteolae anguste triangulares, tenuiter acuminatae, 1-1-5 mm. longae, ciliolatae, erecto-patentes; tepala 5 vel 6, triangularia vel ovata, acuminata, circiter 2 mm. longa, valde concava, ciliolata; gynoecium circiter 2 mm. longum, ovario subgloboso circiter 0-5 mm. diametro, stylo circiter 1 mm. longo, stigmatibus duobus patentibus circiter 0-75 mm. longis. *Frvatus* et *semina* haud visa.

PHILIPPINE ISLANDS. Luzon: Benguet prov., Mt. Data, *A. Loher* 4645 (typus); ibid. Sept. 1921, *M. Ramos et G. Edaño* (Bur. Sc. No.) 40224.

This is one of the new species recognized by the late Dr. Stapf when he revised the Kew material of *Sarcococca* many years ago (see sub t. 3469). It is a very distinct species characterized by the inflorescences having up to 8-12 female flowers, and by these flowers being up to 10 mm. long with upwards of 18 bracteoles. As in other species

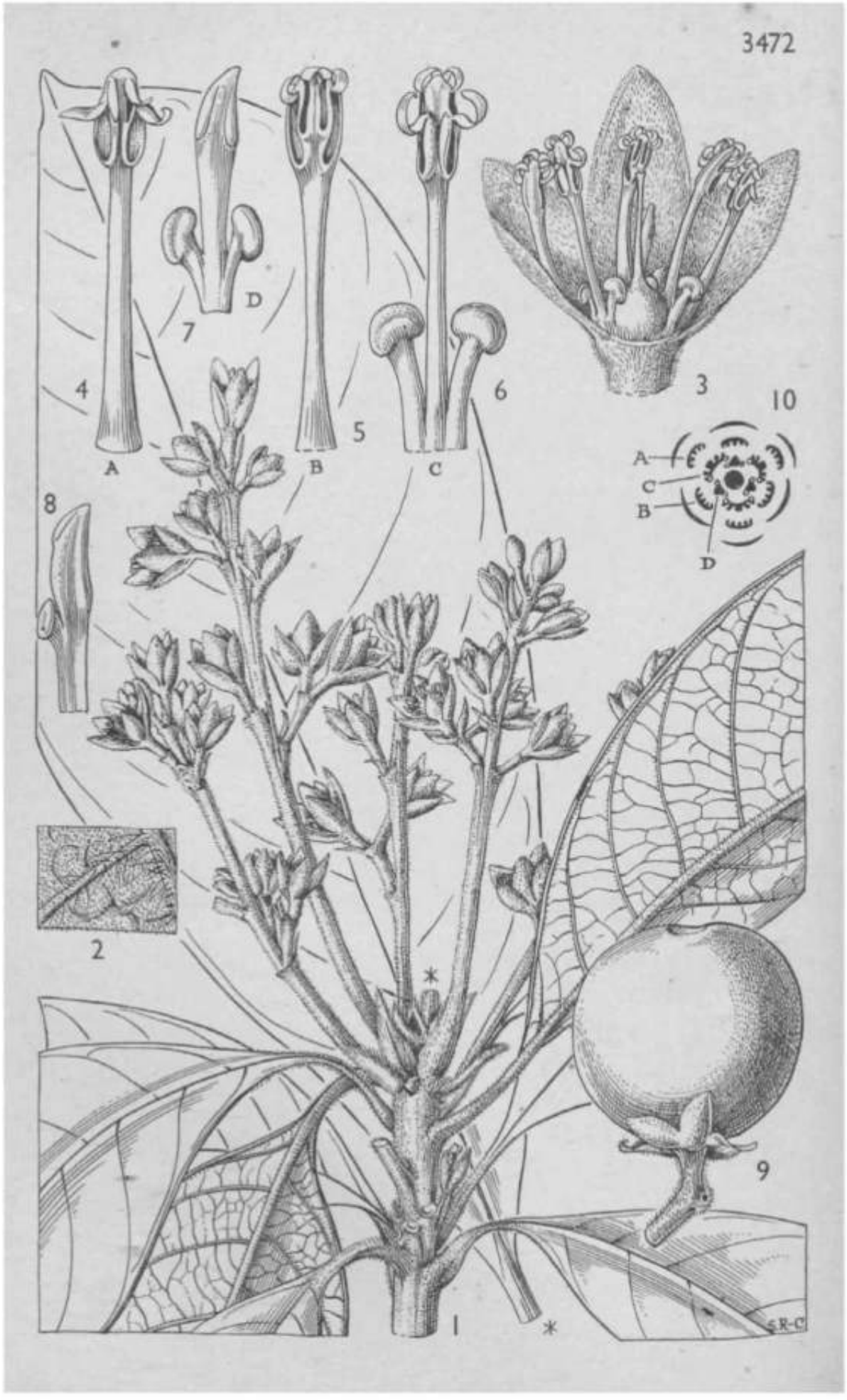
of the genus, the inflorescences show considerable variation in number of flowers, but in no other species are the fully-developed inflorescences like those of *S. philippinensis.* The largest inflorescences vary in composition from those with 10-13 male flowers accompanied by 5 females, to those composed of 6 males with 8-12 females. Comparable inflorescences in other species have 4-16 males with 1-4 females, and where the male flowers exceed 8, the inflorescences are erect and spiciform. Inflorescences with more than 4 female flowers are found in species other than *S. philippinensis,* but the number does not usually exceed 6 (though *S. tonkinensis* Gagnep. has up to 10, *fide* Gagnepain) and there are no male flowers—the inflorescences being wholly female.

The nearest affinity for *S. philippinensis* seems to be *S. hookeriana* var. *digyna* Franch., which agrees with it in having puberulous branchlets, similar leaves (though mostly broader in proportion), and digynous flowers of much the same size. *S. philippinensis* differs, however, by its smaller male flowers (tepals 2-5-3-5 mm. long against 4 mm.) with much shorter stamens (filaments 3—4 mm. long and scarcely exceeding the tepals, against 5-7 mm. and clearly exserted), by its female flowers with more numerous bracteoles (8-18 against 6-8), and finally by its inflorescences.

S. philippinensis has been confused with *S. saligna* (D. Don) Muell. Arg., which sometimes has similar leaves, but differs widely in almost all other respects. It has, for example, glabrous branches, different inflorescences, larger male flowers, much shorter trigynous female flowers with fewer bracteoles, and the leaves are mostly narrowly lanceolate and long-acuminate or caudate.

The male flowers of *S. philippinensis* are mostly ebracteolate, but, as is often the case, flowers with two bracteoles occur sometimes. Thus in the inflorescence shown enlarged on the plate (fig. 3), the terminal and three lowermost flowers were bracteolate, whilst the nine other male flowers were ebracteolate, as shown in fig. 4. The lowermost male flower (fig. 5) appears to have three pairs of bracteoles, for in addition to the uppermost pair inserted close to the tepals (the normal condition in bracteolate male flowers), there are two more pairs lower down on the pedicel. This reminds one of the condition commonly found at the apex of an inflorescence, for very often the part of the rhachis immediately below the terminal flower bears a number of sterile bracts (there were six in the inflorescence shown in fig. 3). The flower shown in fig. 5 may therefore be considered as the terminal flower of an inflorescence branch, the four lower bracteoles being regarded as sterile bracts, and the uppermost pair being—as they undoubtedly are—the normal bracteoles.—J. ROBERT SEALY.

FIG. 1, part of leafy shoot, *natural size*; 2, part of flowering branch, *natural size* 3, inflorescence with 13 male flowers and 5 female flowers, X 3 ; 4, ebracteolate male flower with its subtending bract, X 6; 5, lowermost bracteolate male nower (br. = one of the two normal bracteoles, b = 3 of the 4 supernumerary Dracteoles), x 6; 6, female flower with subtending bract, X 6; 7, tepals and gynoecmm of female flower, x 8. Drawn from *A. Loher* 4645.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TABULA 3472.

PERSEA BALANSAE *Airy Shaw.*

LAUHACEAE. Tribus CINNAMOMEAE.

P. balansae *Airy Shaw* ; species nova, ab altera huius generis specie asiatica, P. *dumicola* (W. W. Sm.) Airy Shaw, foliis subtus sparsius longiusque tomentellis glaucescentibus brevius petiolatis, perianthii segmentis dense adpresse albido-fulvo-tomentellis, staminibus staminodiisque glabris, glandularum stipitibus liberis, ovario glabro abhorrens.—*Phoebe Kunstleri* Gamble, sec. Lecomte in Nouv. Arch. Mus. Hist. Nat. s<5r. 5, v. 104 (1913) et in Lecomte et Gagnep. Fl. Gén. Indo-Chine, v. 125 (1914); Liou Ho, Laur. Chine et Indoch. 65 (1934); *non* Gamble.

Arbor 5-6 m. alta (teste *Balansa)*; ramis usque 7 mm. crassis longitudinaliter ruguloso-sulcatis, cortice pallido densiuscule cinnamomeo-tomentoso serius exfoliante glabrescente. *Folia* cuneato-obovata usque oblanceolata, 12-28 cm. longa [-37-5 cm. sec. Liou Ho], 3-11 cm. lata [-14*5 cm. sec. Liou Ho], basi stride cuneata, apice subacuta usque rotundata, breviter cuspidato-acuminata cuspide 8-13 mm. longa, firme chartacea vel subcoriacea, supra glaberrima (nisi ima basi secus costam), siccitate pallidiuscule olivacea, subtus brevissime tenuiter (secus costam nervosque densius) fulvo-pilosula, rubido-brunnea, valde glaucescentia; costa modice gracilis, subtus modice prominens, striolata, apicem versus magis applanata, supra basin versus anguste sulcato-impressa, apicem versus fere plana; nervi laterales 10-15 (plerumque *c.* 12), graciles, subtus argute prominentes, supra fere plani, procurvi, prope marginem evanescentes, haud distincte anastomosantes; nervi secundarii inter primarios scalariformiter dispositi, gracillimi, manifesti; petioli 1-3 cm. longi, 2-3 mm. crassi, siccitate nigricantes, supra plani, subtus convexi, breviter densiuscule fulvo-tomentelli. *Inflorescentiae* axillares et (plerumque) subterminales, paupere thyrso'ideae vel subracemiformes, 5-10 cm. longae [15-20 cm. sec. Liou Ho], ramulis usque 12 mm. longis, suberectae, rigidiusculae, saepe 2-5 ad apicem ramuli congregatae, bracteis vel perulis majusculis oblongis vel oblanceolatis usque 16 mm. longis dense ferrugineo-tomentosis suffultae vel cinctae; axis teres, 2 mm. crassus, dense fulvo-tomentellus, dimidio inferiore vel duabus partibus inferioribus eramosus. *Flores* majusculi, usque 11 mm. longi, albidi (teste *Balansa),* perianthii segmentis exterioribus quam interiora conspicue brevioribus ; pedicelli 2-4 mm. longi, dense ferrugineo-tomentelli; bracteolae angustae, lineares usque spatulatae, 3-7 mm. longae, dense subsericeo-tomentellae. *Perianthii* segmenta exteriora sub anthesi elliptica usque oblongo-elliptica, 7-8 mm. longa, 2*5 usque vix 3 mm. lata, acutiuscula ; interiora similia sed majora, usque 11 mm. longa et 4 mm. lata ; omnia basi brevissime connata, extra dense, intus minus dense,

adpresse albido-fulvo-tomentella, intus inferne glabrescentia, ante anthesin conspicue breviora sed vix angustiora. *Receptaculum* hirsutum. *Stamina* 9, subaequilonga, 6-7 mm. longa antheris oblongis quadrilocularibus 1*5-2 mm. longis inclusis; filamenta angusta, applanata, rigidula, glabra ; antherae serierum I et II introrsae, seriei III latero-extrorsae, thecis superioribus quam inferiores subduplo minoribus; glandulae staminum seriei III stipitatae, 2*5 mm. longae, capitatae, rotundatae, subpileiformes. *Staminodia* (ser. IV) circiter 3 mm. longa ; filamenta plana, late linearia, 2 mm. longa ; caput triangulari-lanceolatum ; glandulae vel 2, vel nullae, vel in eodem flore staminibus 2 eglandulosis tertio 1-glanduligero (fig. 8). *Ovarium* subglobosum, 2 mm. diametro, glabrum, basi pilis receptacularibus ferrugineis circumdatum, apice in stylum longum glabrum simplicem vel duplicem circiter 4 mm. longum attenuatum, stigmate parvo. *Bacca* magna, globosa, 3 cm. diametro, purpureo-brunnescens, pericarpio ut videtur valde carnoso, endocarpio crustaceo; pedicellus usque 1 cm. longus, vix incrassatus; perianthii segmenta persistentia, patentia vel plus minus reflexa, parum aucta. *Semina* baud scrutata.

TONKIN. Environs de Tu-Phap, dans les bois, (fl.) Nov. 1888, *Balansa* 2423 *(typus)*: " Arbre dioique ? de 5-6 mètres de hauteur. Corolle blanchâtre." Chrétienté de Duc-Phon, au N E de Hong Hoa, (fl.) 25 Nov. 1888, *Balansa* 2424 : " Arbre de 5-6 mètres de hauteur." Village de Tchoun-Tchoi, à la base du Mont Bavi, (fr.) Mai 1887, *Balansa* 2425 : " Arbre de 5-6 mètres de hauteur."

This species is the first indigenous representative of the genus *Persea* Gaertn., *sensu stricto* (i.e. sections *Eupersea, Gnesiopersea* and *Eriodaphne,* of Bentham and Hooker), apart from the Azores-Madeira-Canary Island species *P. indica* (L.) Spreng., and the widely cultivated American species *P. americana* Mill., to be recorded from the Old World.

The genus *Phoebe,* to which Lecomte and Liou Ho have referred the present species, is of course closely related to *Persea* but is readily distinguished by the erect, closely adpressed fruiting calyx, as well as by the smaller flowers and fruit and less copious indumentum. Lecomte's description of the fruit of this plant as " accompagné du périanthe dressé " is quite erroneous. The fruiting calyx is, in fact, spreading, and bears more resemblance to that of *Machilus.*

Balansa's note, " arbre dioïque ? ", may indicate some degree of polygamy in the flowers, but, with Lecomte, I have been unable to confirm this from the examples dissected. The presence of two styles to the ovary was a curious feature of one flower examined, and the inconstancy in the staminodial glands is noteworthy. The fact that in this species and *P. dumicola* the two outer (introrse) rows of stamens have anthers in which the two lower and larger locelli are situated outside the two smaller upper ones, while in the third (extrorse) row the two larger and lower locelli are situated to the inside, suggests the possibility that the locelli in the third row may have " moved round

the comer," in pairs (one small upper and one large lower), to their present position, from a former introrse arrangement, the members of each pair meanwhile preserving their position relative to each other. In P. *balansae* the completely extrorse arrangement has not yet been attained.

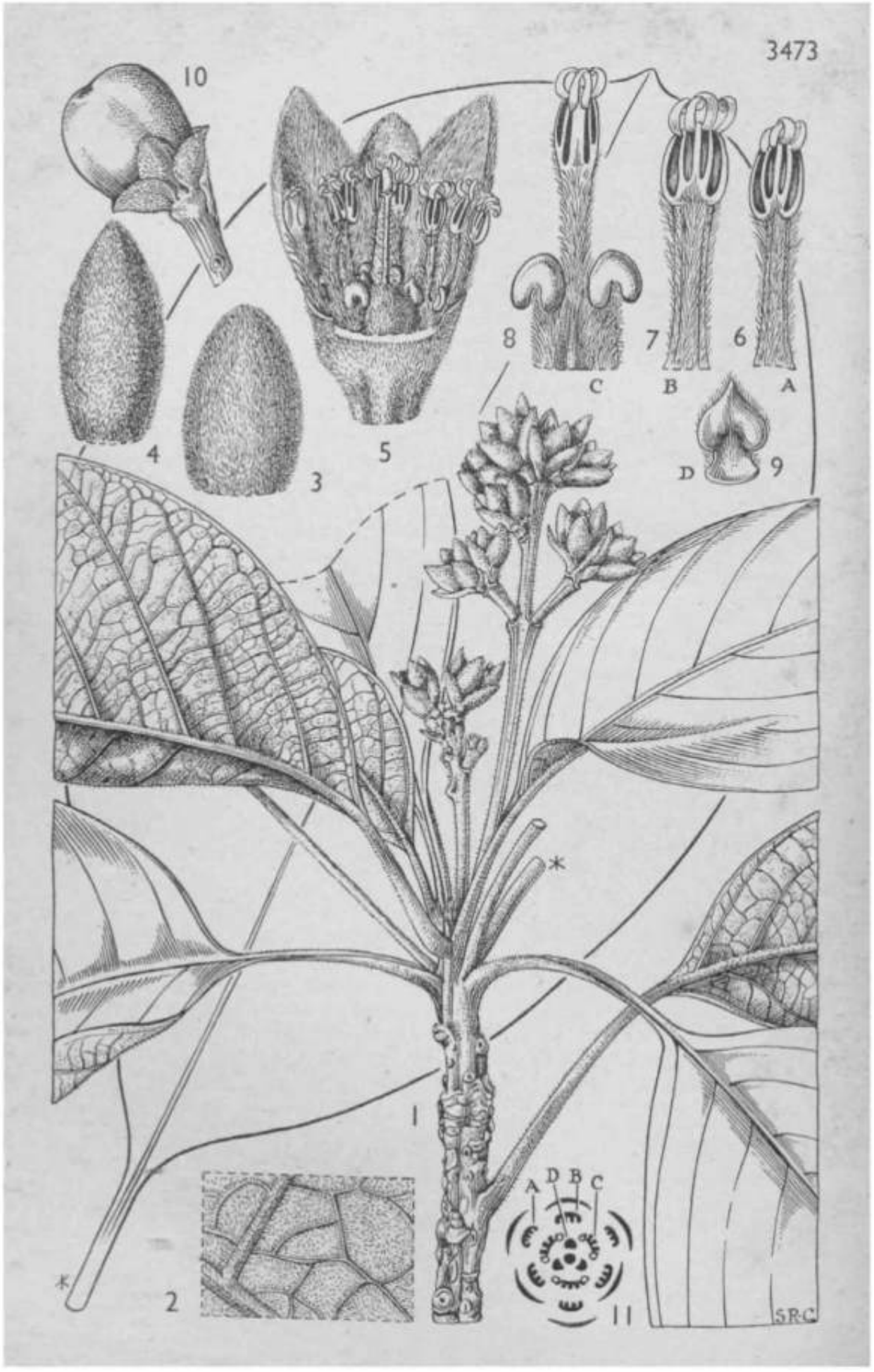
Balansa 2424, from Duc-Phon, differs from the other two specimens in having considerably longer and narrower leaves. Sample measurements are: 22 x 7 cm., 26-5 x 8 cm., as against 19 x 9-5 cm., 20-5 x 10 cm., 24 x 11 cm., for the " typical " form. The difference in the length/breadth proportions is significant: roughly 3:1 as against 2:1. Further collections will be needed in order to show whether this form deserves a varietal name.

In Mez's account of *Per sea* in his " Lauraceae Americanae monographice descriptae " (Jahrb. Kŏnigl. Bot. Gart. Berlin, v. 134 : 1889), P. *balansae* would fall into Subgen. *Eupersea* Mez, in the neighbourhood of P. *hirta* Nees (Peru); but this probably does not represent its closest affinity, since the species in that work are arranged according to the evidently artificial Key. P. *balansae* bears a considerable resemblance, in foliage and inflorescence, to P. *boliviensis* Mez et Rusby *{Bang* 1657 ! 1733 !), a species which, according to its authors, is closely related to P. *peruviana* Nees. The latter *(Poeppig* 1310) is unfortunately not represented at Kew. These two Andine species are placed by Mez in his subgenus *Hexanthera,* distinguished from subgen. *Eupersea* by the third series of stamens having minute sterile anthers, but this is evidently a purely artificial distinction, being uncorrelated with any other distinguishing character. P. *boliviensis* and P. *peruviana* differ from P. *balansae* principally in their shorter inflorescences and very much shorter outer perianth-segments.

It may be added that *Rock* 1901, collected in Siam (Chiengmai province, between Ban Hue Bong and the Burmese border), 20 Jan. 1922, probably represents an undescribed species of *Per sea*; the inflorescences, however, are in an extremely immature stage, rendering description impracticable.

H. K. AIR* SHAW.

FIG. 1, flowering branch, -*natural size.;* 2, lower surface of leaf, X 12 ; 3, flower, with three perianth-segments removed, x 4 ; 4. stamen, series I, X 8 ; 5, stamen, series II, X 8 ; 6, stamen, series III, X 8 ; 7, staminode (series IV), X 8; 8, staminode (series IV), from *Balansa* 2424, X 8; 9, fruit, from *Balansa* 2425, *natural size ;* 10, floral diagram (letters in figs. 4-7 and 10 correspond). All figures drawn from type-specimen, unless otherwise indicated.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TABULA 3473.

PERSEA DUMICOLA *(W. W. Sm.) Airy Shaw.*

LAURACEAE. Tribus CINNAMOMEAE.

P. dumicola *(W. W. Sm.) Airy Sliaw,* comb. *nov.—Alseodaphnc dumicola* W. W. Sm. in Notes Roy. Bot. Gard. Edinb. xiii. 152 **(1921).**— Ab altera huius generis specie asiatica, *P. balansae* Airy Shaw, foliis subtus (in forma typica) densius breviusque tomentellis ferrugineis nee glaucis pro rata longius (usque 4 cm.) petiolatis, perianthii segmentis extra ferrugineo-tomentellis, staminibus staminodiisque pilosis, glandularum stipitibus adnatis, ovario styloque piloso abunde distincta.

Frutex magnus, 6-7-5 m. altus (teste *Forrest)*; ramuli vetustiores usque 1 cm. crassi, rugosi, lenticellis numerosis prominentibus vulviformibus 1-2 mm. longis cicatricibusque foliorum perularumque delapsorum conspicue notati, parce tomentelli; innovationes usque 5 mm. diametro, obtuse angulatae, dense ferrugineo-tomentellae, lenticellis similibus sed multo minoribus notatae. *Folia* (fere omnia apicem innovationum versus congregata) obovata usque obovato-oblonga, rarius suboblonga vel subovata vel subelliptica, 12-20 cm. longa, 6-10 cm. lata, basi cuneata usque subrotundata, apice obtusa vel rotundata, brevissime (2-3 mm.) et obtuse apiculata, chartacea vel tenuiter coriacea, supra glaberrima, siccitate olivaceo-castanea, subtus dense brevissime ferrugineo-tomentella (pilis ipsis sub lente saepe apice albidis); costa modica, supra alte insculpta, subtus modice prominens ; nervi laterales 10-13-jugi, primum subrecti, marginem versus leviter procurvi atque evanescentes, subtus prominentes, dense tomentelli, supra anguste insculpti; nervi secundarii inter primarios plus minus scalariformiter dispositi, subtus distinctissimi, supra inconspicui; petioli 2-5-4 cm. longi, 2-3 mm. crassi, supra leviter canaliculati, subtus rotundati, dense fulvo-tomentelli. *Inflorescentiae* subterminales, ex axillis foliorum hornotinorum ortae, paupere thyrsoideae, usque 8-5 cm. longae, ramulis usque 9 mm. longis, subcrectae, rigidiusculae, perulis parvis inconspicuis ferrugineo-tomentosis; axis distincte applanatus, striolatus, 1-2 (nodis usque 3) mm. crassus, fulvo-tomentellus, duabus partibus inferioribus eramosus. *Fhres* majusculi, usque 10 mm. longi, dense cinnamomeo-tomentelli, extra laete brunnei, intus rubido-brunnei (teste *Forrett),* perianthii segmentis exterioribus quam interiora conspicue brevioribus; pedicelli brevissimi, circiter 2 mm. longi, dense cinnamomeo-tomentelli; bracteolae parvae, ovatae vel delto'ideae, 1-3 mm. longae, dense subsericeo-tomentellae. *Perianthii* segmenta exteriora ovata usque elliptico-ovata, 7-8 mm. longa, 4-4 • 5 mm. lata, obtusiuscula; interiora magis elliptico-Ianceolata, 7*5-9 mm. longa, 3-4 mm. lata, obtusiuscula; omnia basi brevissime connata, apice leviter incurva, extra intusque dense cinnamomeo-tomentella, nervo medio dorsaliter saepe intensius colorato. *Stamina*

perfecta 9, serierum I et II eglandulifera, antheris introrsis, seriei **III** glandulifera, antheris extrorsis : stamina seriei I segmentis exterioribus fere aequilonga iisque basi brevissime adnata, filamentis linearibus valde pilosis basi dilatatis, antheris ovato-oblongis glabris, locellis anguste oblongis subaequalibus interioribus leviter tantum supra exteriores sitis ; seriei II segmentis interioribus manifeste (fere 2 mm.) breviora iisque basi longius adnata, filamentis antherisque similibus, connectivo dorso pilosulo ; seriei III circiter 5 mm. longa, sigmoidea, conniventia, basi intus glabra, glandulis capitato-pileiformibus glabris breviter (2 mm.) stipitatis stipitibus pilosis dorso filamenti lateraliter adnatis (instar filamenti latissimi supra basin biglandulosi praebentibus), antheris angustioribus. *Staminodia* (seriei IV) circiter 2-5 mm. longa, incurva, applanata, late subulata, capite ovato-sagittato cucullato acuto, extra pilosa, intus glabra. *Ovarium* depresso-globosum, circiter 2*5 mm. diametro, superne pilosum, basi glabrum, brevissime stipitatum; stylus 3 mm. longus, dense pilosus, stigmate parvo expanso. *Fructus* ignotus (vide tamen varietatem infra descriptam).

CHINA. Yunnan: Shweli-Salwin divide, lat. 25° 40' N., in dense thickets in side valleys, 2400 m., June 1919, *Forrest* 18071: " Shrub of 20-25 ft. Flowers, exterior light brown, interior ruddy **brown."**

This species is readily distinguished from P. *balansae* by the denser, more tawny indumentum of the leaves and flowers, and by the densely pilose stamens, staminodes, ovary and style, besides other features.

A closely related plant has been collected in the Naga Hills of Assam, which may be distinguished as a variety as follows. Further material may show that it deserves specific rank.

var. **assamica** *Airy Shaw,* var. nov., statura arborea, foliis angustioribus basi magis cuneatis, nervis crebrioribus, inflorescentiis longioribus (usque 12 cm. longis), ramis longioribus (usque 14 mm. longis) apicem axis versus magis approximatis diversa; bacca obovoi'dea, fere 2 cm. longa, 1-5 cm. diametro, carnosa, nigra; perianthium sub fructu persistens, subcupulare, segmentis auctis latissime ovatis vel suborbicularibus glabrescentibus baccam basi laxe amplectentibus *(Phoebes* magis ad instar), pedicello modice incrassato.

ASSAM. Naga Hills : Benroumi, 1800 m., (fl.) 18 May 1935, *N. L. Bor* 2662 *(typus)*: " Very large tree." Baimho, " all over the hill " at 1500 m., (fr.) 13 July 1935, *N. L. Bor* 5082 : " Tall tree ; excellent timber." (Baimho and Benroumi are 70-80 miles apart.)

It would have been interesting to have had some estimate of the actual height of the trees. The superior stature of the Assam plant may possibly be due to the lower altitude and higher rainfall. The fruiting calyx shows a distinct approach to the *Plwebe* type and perhaps indicates how that genus may have arisen from *Persea.*

In Mez's Key (in Jahrb. Königl. Bot. Gart. Berlin, v. 134: 1889),

Persea dumicola **falls into Subgen. *Eupersea,* species 12-16, all from Brazil or Guiana. It differs from all of these in having the leaves shortly ferrugineous-tomentellous, not glabrous or sericeous, below. It is in fact probably more closely related to species such as P. *subcordata* Nees (Peru), artificially separated by Mez in a distinct subgenus, *Heterandra* Mez, on account of the third row of stamens having bilocellate anthers. As I have previously indicated (Kew Bull. 1940,74, 76 ; Hook. Ic. PL xxxv. t. 3436 [pp. 2, 3]: 1943), undue stress must not be laid on anther-structure as a test of affinity in the *Lauraceae,* unless associated with other characters. The venation and pubescence of the lower leaf-surface of P. *dumicola* bears some resemblance to that of P. *pyrifolia* Mez, from Brazil.**

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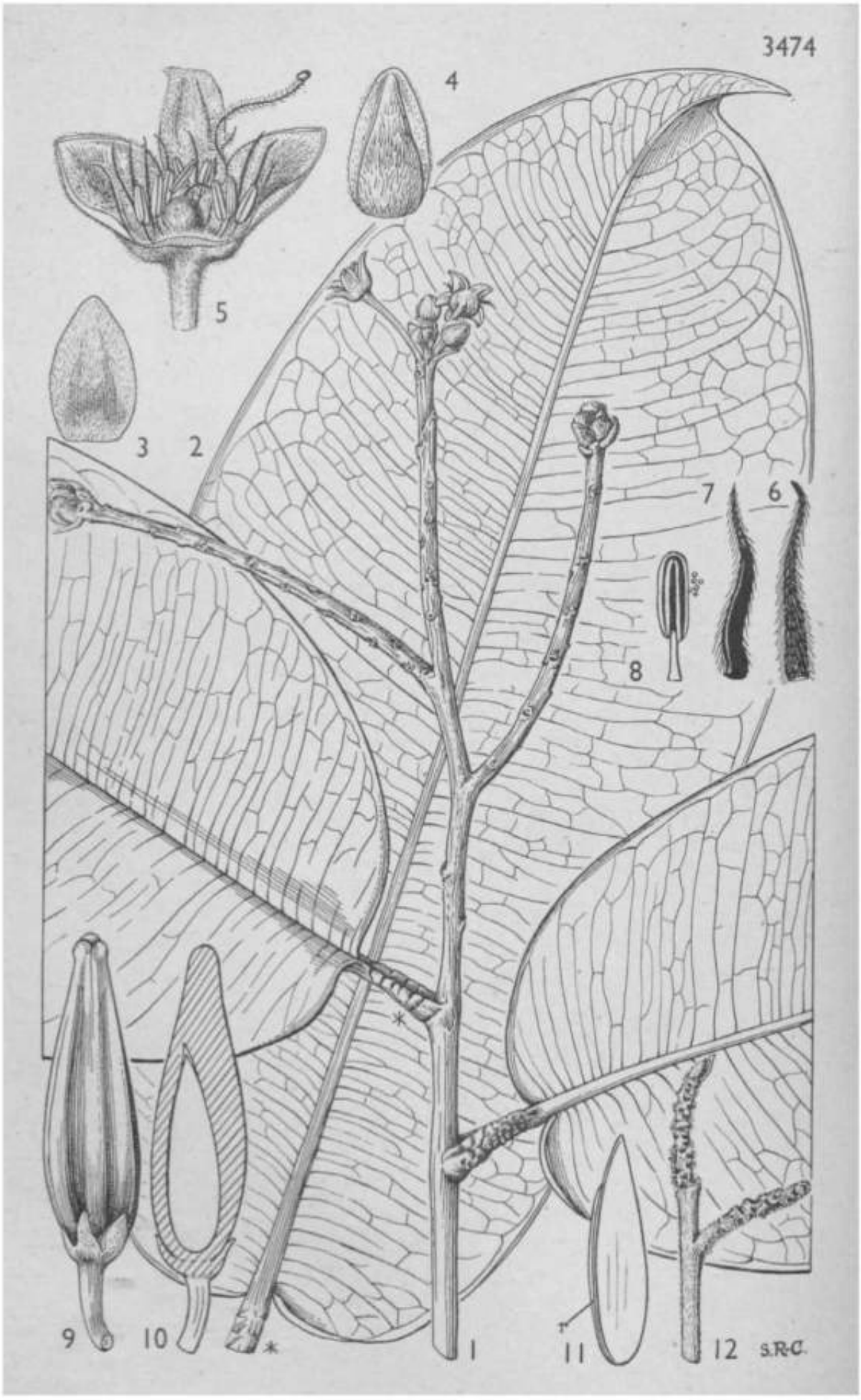
FIO. 1, flowering branch, *natural size*; 2, lower surface of leaf, X 12 ; 3, **outer** perianth-segment, outer surface, X 4; 4, inner perianth-segment, outer surface, X 4; 5, flower, with three perianth-segments removed, X 4; 6, stamen, series I, X 8; 7, stamen, series II, X 8; 8, stamen, series III, X 8; 9, staminode (series IV), X 8; 10, fruit of var. *assatnica, natural size*; 11, floral diagram (the letters A-D in figs. 6-9 and 11 correspond).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TABULA 3474.

GONYSTYLUS AUGESCENS *Ridley.*

THYMELAEACEAE. Subfam. GONYSTYLOIDEAE.

G. augescens *Ridley* in Kew Bull. 1946, 43 (1946).—Species insignis, inflorescentiae ramulis elongatis racemiformib'us (nee valde abbreviatis fasciculiformibus) usque 18 cm. longis cicatricibus florum bractearumque delapsorum regulariter notatis, petalis dense retrorso-setulosis, et capsula immatura anguste lanceolata (? an semper), in genere unica; foliis magnis usque 27 cm. longis et 14 cm. latis supra " chagrinatis."

Arbor parva (teste *Haviland). Ramuli* teretes, 2-5 mm. crassi. teretes, iuniores minute adpresse fulvo-pubescentes, cortice fusco tenuiter striato, lenticellis parvis inconspicuis. *Folia* late elliptico-oblonga, 16-27 cm. longa, 8-14 cm. lata, basi leviter cordata vel rotundata vel rarius latissime cuneata, apice rotundata, abrupte breviter cuspidato-acuminata acumine triangulari 5-15 mm. longO obtuso deflexo, integerrima, margine angustissime reflexo et basi subrevoluto, firme coriacea, siccitate brunnescentia (subtus surde purpurascenti-brunnea, supra interdum subcastanea), utrmque glaberrima, epidermi sub lente (maxime supra) minutissime granulosa vel " chagrinata " ; costa subtus valida, elevata, supra impress^; nervi laterales graciles, late patuli, subrecti, marginem versus leviter procurvi, in nervum submarginalem 1-2 mm. a margine anastomosantes; reticulum valde conspicuum, supra densiusculum, subtus la*xius; petioli robusti, 10-15 cm. longi, 3-4 mm. crassi, valde rugulosi, supra canaliculati, minute fulvo-pubescentes. *Inflorescentiae* paniculiformes, e racemis paucissimis (1-3)-sistentes, terminales; racemi longitudine valde varii, iuniores tantum 1 cm., vetustiores usque 18 cm. longi, 2 mm. crassi; iuniores dense fulvo-pubescentes, cicatricibus florum bractearumque delapsorum subnodosis creberrime notati; vetustiores puberuli, incremento apicali (? et intercalari) valde elongati: itaque cicatrices magis magisque dissitae, valde regulariter spiraliter dispositao, series verticales circiter quattuor efformantes, in quaque serie intervallis usque 8 mm. longis semnctae; racemi flores paucos bracteis suffultos imo apice gerentes. *Bracteae* ovatae vel suboblongae, apice subacutae, usque 5 mm. longae, l'5-2*5 mm. latae, extra fulvo-subsericeo-pubescentes, intus sub-glabrae, cito caducae. *Pedicelli* 8-13 mm. longi, dense fulvo-sericei. *Alabastra* subglobosa, circiter 4 mm. diametro. *Flores* expansi 7-9 mm. diametro. *Sepala* ovata vel deltoideo-ovata, 4-5 mm. longa, 2-2-5 mm. lata, basi subtumida et breviter connata, apice obtusiuscula, extra dense fulvo-sericea, intus dense puberula et medio dense fulvo-setulosa, leviter imbricata vel valvata. *Petala* circiter 16, subulata, 3 mm. longa, intus dense retrorso-setulosa, extra parce setulosa vel fere glabra. *Stamina* circiter 16, filamentis 1 mm^ longis, antheris

anguste oblongis circiter 1-2 mm. longis; receptaculum inter filamenta dense fulvo-setosum. *Ovarium* subglobosum, circiter 1 mm. diametro, triloculare, dense fulvo-pubescens; stylus filiformis, sinuato-geniculatus, 4-5 mm. longus, pubescens, stigmate capitato. *Capsula* e specimine unico valde pecufiari forsan immaturo tantum nota: anguste lanceolata, 4*5 cm. longa, 1 -4 cm. lata, lignosa, grosse sexcostata (costis latioribus locularibus, angustioribus suturalibus), in apicem obtusum inconspicue trigibbum sensim angustata, basi calyce petalisque persistentibus cincta. *Semen* solitarium, valde compressum, subellipticum, 2-25 cm. longum, 0*8 cm. latum.

SARAWAK. TWO miles from Kuching, 1891, *Haviland* 488 (d.c.q.a.) *(lectotypus):* " A small tree." Near Kuching, 3 Jan. 1893, *Lingau* for *Haviland* 2078.

Probably this species, but only leaves present:—

SUMATRA. Simalur, 12 March 1919, *Achmad* 979; **vernacular name:** *pinang bai.*

This interesting species differs so markedly from any hitherto described that it seems desirable to establish a distinct section for it:—

Gonystylus Sect. **Auxanthus** *Airy-Shaw,* sect. nov. Flores secundum ramos inflorescentiae paupere paniculiformis regulariter racemose dispositi; rami valde elongantes. Petala intus dense retrorso-setulosa. Capsula (? an semper) anguste lanceolata, grosse sexcostata.—Typus (species adhuc unica): *6. augescens* Ridley.

The racemose arrangement of the flowers in *G. augescens* seems to indicate a less advanced stage in inflorescence-evolution than that represented by the nodose-fasciculate arrangement characterizing the remainder of the genus. The great majority of the flowers evidently fall very quickly, a circumstance suggesting that fertilisation may be only rarely effected. The curious elongate ribbed capsule described above may possibly be abnormal, but it seems significant that Domke (in Biblioth. Bot. xxvii. Heft 111, 34: 1934) describes a young fruit on a specimen of *Amyxa pluricornis* (Badlk.) Domke in Herb. Bogor. as " ± prismatisch-vierkantig und nicht kugelig " ; it measured 1 cm. in length by about 5 mm. in its widest part. Further collections of *0. augescens,* accompanied by field observations, are very desirable.

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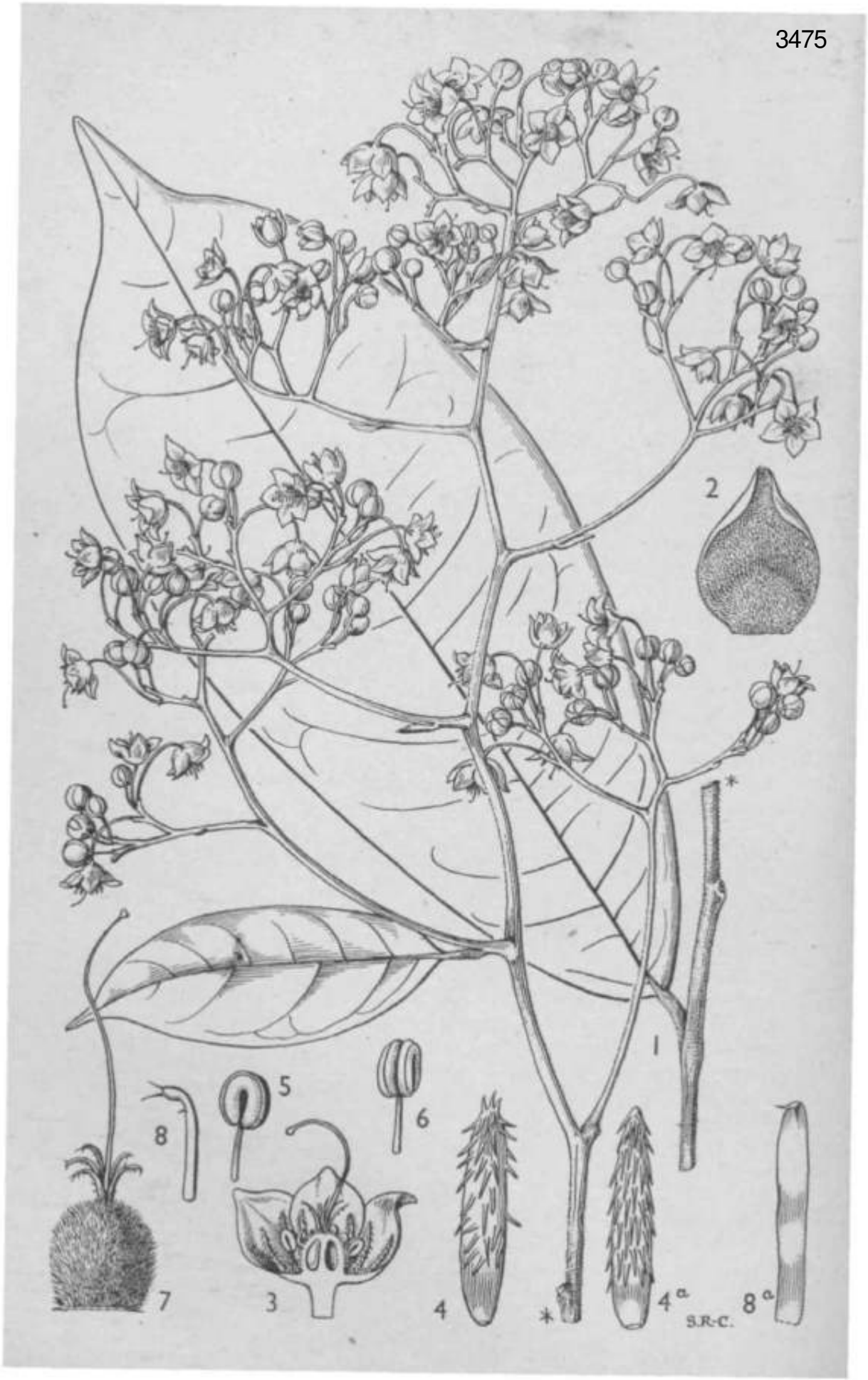
FIG. 1, flowering branch, *natural size*; 2, leaf, lower surface, *natural size*; 3, 4, sepals, outer surface, X 4; 5, flower, with two sepals removed, X 4; 6, 7, petals, inner and outer surfaces respectively, x 8; 8, stamen, X 8; 9, fruit, *natural size;* 10, fruit, longitudinal section, *natural size;* 11, seed, *natural size* (r=raphe); 12, part of young inflorescence, showing pubescence and arrangement of scars, *natural size.* (1-11, from lectotype; 12, from *Haviland* 2078.)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TABULA 3475.

AMYXA PLTJRICOBNIS *(Radlk.) Domke.*

THYMELAEACEAE. Subfam. GONYSTYLOIDEAE.

A. pluricornis *(Radlh.) Domke* in Biblioth. Bot. xxvii. Heft 111, 5, 33,117, etc., 1.1, f. 4, t. IV, f. 35, t. V, f. 38 g (1934); Airy Shaw in Kew Bull. 1940, 261.—*Gonystylus pluricornis* Eadlk. in Sitzungsber. math.-phys. Kl. K. Bayer. Akad. Wissensch. Muench. 1886, xvi. 329 (1887); H. Hallier in Meded. 's Eijks Herb. Leid. xliv. 15 (1922).—*Amyxa kutcinensis* Van Tiegh. in Ann. Sci. Nat. sér. 7, xvii. 248 (1893).— Species unica.

***Arbor* 15 m. alta (teste *Clemens),* trunco circiter 30 cm. crasso (teste *Richards),* ramulis gracilibus teretibus usque 3 mm. diametro cortice brunneo tenuiter striolato minute tomentello vel glabro, innovationibus minute vel conspicue fulvo-tomentellis. *Folia* alterna, oblonga usque leviter oblanceolata, rarius subelliptica, (8) 10-16 cm. longa, 4*5-6-5 cm. Iata, basi abruptiuscule angustata (et margine hie manifeste inflexo), apice abruptiuscule rarius sensim caudato-acuminata, cauda 7-20 mm. longa acuta vel obtusa, tenuiter chartacea, supra glaberrima, subtus etiam praeter nervos glaberrima nisi iuniora prope basin interdum minute sparseque puberula, siccitate pallide olivacea vel varie brunnescentia, supra sub lente crebre minute impresso-punctata ; costa gracilis, supra impressa glabra, subtus patule vel adpresse fulvo-puberula usque glabra; nervi primarii laterales gracillimi, 5-11-jugi, patuli, marginem versus procurvi et anastomosantes ; nervi secundarii graciliores, fere recti vel minus procurvi, saepe (praecipue marginem versus) vix perspicui; petioli graciles, 8-15 mm. longi, fere teretes, rugosuli, dense fulvo-puberuli usque subglabri, vetustiores nigricantes. *Inflorescentiae* laterales et terminates, amplo-thyrsoi'deae, multiflorae, 9-28 cm. longae, gracillimae, axi primario 1-2 mm. diametro, ramis valde divaricatis 3-8 cm. longis usque 1 mm. diametro inferne longe eramosis basi vel longe supra basin bractea vel rarius folio suffultis, ramulis similiter divaricatis usque 2 cm. longis apice iterum breviramosis, axi ramis ramulis conspicue angulatis vel complanatis fulvo-tomentellis vel minute adpresso- (subsericeo-) puberulis; bracteae suffulcientes plerumque longe (usque 15 mm.) supra basin ramuli suffulti sitae, angustissime oblanceolatae vel fere lineares, 2-7 mm. longae, dense longe fulvo-pubescentes vel brevius adpresso- (subsericeo-) puberulae; pedunculi ultimi brevissimi, plus minus fasciculato-conferti, apice, ubi pedicello articulati, saepe conspicue expansi. *Pedicelli* graciles, 5-10 mm. longi, apicem versus leviter ampliati, minute adpresso-puberuli usque longius adpresso-subsericei. *Flores* inter minores, breviter late cupulares, 5-7 mm. lati, virides (teste *Havifand),* vel viridialbi, fragrantes (teste *Richards)*; alabastra depresso-globosa, circiter 3 mm. diametro. *Sepala* 5, imbricata, ovata, 5 mm. longa, 3 mm. Iata,**

basi per 1-5 mm. connata, apicem versus brevissime vel vix acutata, apice rotundata usque subacuta et plus minus reflexa, extra dense adpresso-sericea, intus glabra, medio leviter carinata et basin versus pubescentia, siccitate atro-purpurea. *Petala* 10, per paria sepalis alterna disposita, anguste oblonga vel sublinearia, 2-3 mm. longa, valde retrorso-setosa, setis plus minus adpressis vel petalorum apicem versus patentibus. *Stamina* 10, petalis alterna, filamentis brevissimis, antheris hippocrepidiformibus. *Ovarium* subglobosum, 2 mm. diametro, densissime setulosum setulisque receptacularibus circumdatum, triloculare, loculis uniovulatis. *Stylus* elongate filiformis, valde flexuosus, 5-6 mm. longus, inferne pilis paucissimis hinc inde instructus; stigma capitatum, stylo 2-3-plo crassius, obscurissime 2-3-lobulatum; " parastyli " circa basin styli 5-6, corniformes, applanati, recurvati, 1-2 mm. longi, stylo leviter crassiores, glabri vel apicem versus parce pilosi. *Fructus immaturus* (teste *Domke)* prismatico-tetragonus, circiter 1 cm. longus et 5 mm. crassus; cetera ignota.

SARAWAK. Near Kuching, 1865-8, *Beccari* 1563 *(typus; non vidi).* " Santubong (?) ", 1891, *Haviland* 494 (d.k.d.b.). Near Kuching, 9 May 1893, *Haviland* 3073 : " Perianth green ; ovary superior, 3-celled, with one ovule in each cell." Gat, Upper Rejang River, forest slopes, 1929, *J. <& M. S. Clemens* 21687 : " Tree 50 ft., fl. green-yellow." Near Long Kapa, Mount Dulit (Ulu Tinjar), primary forest on hillside, under 300 m., 3 Sept. 1932, *Richards* 1604 : " Tree, c. 30 cm. diam. Fls. greenish-white, sweet-scented." Vernacular name *(ex* Richards): *soma merah.*

The above-cited specimens are not entirely uniform, but fall into two groups. In the first group, comprising the two Haviland numbers and *(e descriptione)* the Beccari gathering, there is a conspicuous short fulvous tomentum, particularly on the petioles, inflorescence-axes and bracts; the midribs also are puberulous below. In the second group, comprising the Clemens and Richards specimens, the indumentum is extremely sparse and adpressed, almost imperceptible to the naked eye, except on parts of the inflorescence. The calyx is externally adpressed-sericeous in both groups. The inflorescence in group 2 seems on the whole more elongate than in group 1. In the first group the apical setulae of the petals are spreading and the " parastyles " more slender and recurved ; in the second group the setulae are all retrorse-adpressed and the " parastyles " more strap-shaped and erect. But without a wider range of material available, it would perhaps be premature to give names to these groups. Both are covered by the accompanying description.

Domke's description of the stigma of *Amyxa* as " klein,nicht abgesetzt, wenig dicker als der Griffel" (l.e. 117) was apparently based upon Perfect material. In all the flowers which I have examined the stigma is definitely capitate or subclavate, as in *Gonystylus.*

The remarkable " Nebengriffel " or " parastyles " remain a morphological mystery, but, as I have suggested elsewhere (K.B. 1947, *ined.),*

they are probably homologous with the small blunt processes present round the base of the style in certain species of *Gonystylus*—cf. Ridley, Fl. Mai. Penins. i. 322, fig. 30 (1923).

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FIG. 1, flowering branch, with leaf, *natural size;* 2, sepal, outer surface, X 6 ; 3, flower, longitudinal section, X 4; 4,4a, petals from groups 1 and 2 respectively, X 18 ; 5, 6, stamens from bud, in two views, X 8 ; 7, gynoecium, showing parastyles, X 8; 8, 8a, parastyles from groups 1 and 2 respectively, X 18. (1-8, from *Haviland* 494; 4a and 8a from *Richards* 1604.)


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TABULA 3476.

GOMBRETUM ACUTUM *Laws.*

COMBEETACEAE. TribuS COMBRETEAE:

Combretum (§ Acutae) acutum *Laws,* in Oliv., Flor. Trop. Afr. ii, 424 (1871); Engler et Diels, Monogr. Afr. Pflz. iii, 102 (1899); Hutchinson et Dalziel, Flor. W. Trop. Afr. i, 217, 220 (1927); Keay in Kew Bull. 1950, 247 (1950). *Combretum mucronatum* Schumach. et Thonn. forma *acutum* (Laws.) Roberty in Candollea xi, 85 (1947) quoad syn. *C. acutum* Laws., nee quoad syn. *C. afzelii* Engl. et Diels, nee quoad specim. cit. 7. Species sectionis novae admodum descriptae unica.

Frutèx scandens vel arbor parva, usque 3 m. alta. *Ramuli* juveniles compressi, glabri, purpurascentes. *Folia* opposita vel subopposita, brevissime petiolata, petiolis usque 4 mm. longis glabris; lamina oblongo-elliptica vel anguste elliptica, basi late cuneata vel rotundata, apice rotundata raro obtusata, 4-13 cm. longa, 2-6 cm. lata, saepe etiam in eodem ramulo inaequalia, plus minusve coriacea, supra nitidula glabra, subtus glabra minutissime impresso-punctata, margine integra ; costa utrinque leviter prominula ; nervi laterales utroque costae latere 5-7, utrinque prominuli, sub marginem arcuatim anastomosantes; rete venularum utrinque satis obvium. *Injlorescentiae* terminales, solitariae vel aliquando geminatae, spicatae; pedunculi spicarum 1-2 • 5 cm. longi, glabri vel subglabri; rhachides 2-7 cm. longae, dense puberulae ; bracteae oblanceolatae, 3-4 mm. longae, reflexae, mox deciduae. *Receptaculum inferius* 3 mm. longum, fusiforme, dense tomentellum ; *superius* 3-5-4-5 mm. longum, 2-2-5 mm. latum, campanulatum, extra more rhachidis vestitum, intus sparse puberulum ; discus inconspicuus omnino adnatus; segmenta calycis 5, late triangularia, 1 • 5-2 mm. longa, reflexa, extra more rhachidis vestita, intus longius pubescentia. *Petala* 5, alba, orbicularia, circiter 2 mm. diametro, breviter unguiculata, glabra utrinque sed praesertim intus papillosa. *Stamina* 10, biserialia, inclusa, quam receptaculum superius breviora, filamentis brevissimis, antheris anguste cordatis circiter 1 mm. longis. *Stylus* receptaculo superiori aequilongus, haud exsertus, apicem versus incrassatus glaber. *Fructus* lignosus ovoideus, acutus, 5-angulatus, angulis acutis vel angustissime alatis, glaber, 4-5-8 cm. longus, 2-5-3 cm. latus.

GOLD COAST. Northern Territories. Addeko River, Yamalaga, Apr. 1927, *A. Kitson* 931 (with flowers, Herb. Kew). Bugiyenga to

Fio. 1, flowering branch, *natural size* ; 2, flower with petals removed, in longitudinal section, and bract, upper surface, X 4 ; 3, ovary in transverse section, x 8 ; 4, part of upper receptacle with petals and stamens, x 6 ; 5, part of the upper surface of a petal, x 40; 6, stamen, X 12; 7, fruit, *natural size* ; 8, fruit in transverse section, seeds removed, *natural size*; 9, seed, in three-quarter back view, *natural size* ; 10, seed, in transverse section, X 1-5.

Loggada, May 1927, *A. Kitson* 530 (with flowers, Herb. Kew) :— small trees (?) in bed of river, white petals. Western Dagomba District, Pong Tamale, alt. 500 ft., May 1935, C. *Vigne* 3862 (with flowers and fruits, Herb. Kew and Herb. Imp. For. Inst. Oxford): — a small straggling tree or shrub common along banks of rivers, fruits with 5-winged angles, woody. River Volta, near Naga, alt. 500 ft., March 1939, C. *Vigne* 4689 (with flowers and young fruits, Herb. Brit. Mus.): — shrub in river bed, fruit 5-angled, flowers white.

NIGERIA. Confluence of rivers Niger and Benue, *Barter* 453 (leaves only, Herb. Kew):— shrub, 10 ft., flowers white, young shoots purple. Same locality, *Barter* 1671 (type, with flowers and fruits, Herb. Kew):— small shrub, flowers white, young shoots purple. Abinsi, June 1912, *Dalziel* 706 (with flowers, Herb. Kew and Herb. Brit. Mus.): — in ravines, a scrambling shrub.

When Engler and Diels were preparing their monograph on the African species of *Combretum,* the material of *C. acutum* Laws, at their disposal was very inadequate. They were therefore unable to allocate this species to a section, and it was left as a " species incertae sedis," without illustration and with only a latinized version of Lawson's original description.

Two specimens of this species in the Kew Herbarium are labelled as " type/' one of these, *Barter* 1671, has flowers and fruits and I take it as the type specimen, the other, *Barter* 453, is sterile. Several other gatherings have been made more recently in Nigeria and the Gold Coast. Examination of this material at Kew shows that *C. acutum* is a most distinct and remarkable species.

The almost wingless, 5-angled fruit attracts immediate interest, but it is in the flower that this species is really most noteworthy. Unlike those of other African species, the filaments are so short that the stamens are completely included in the upper receptacle. The style, too, is short and does not protrude from the upper receptacle.

The flowers of *C. acutum* are pentamerous and resemble species of § *Lasiopetalae* Engl. et Diels in the campanulate upper receptacle and inconspicuous wholly adnate disc. The bulky 5-angled fruit of C. *acutum* is similar to that of *C. pentagonum* Laws, of § *Lasiopetalae. C. acutum* differs from § *Lasiopetalae* in its orbicular petals and in the remarkable included stamens and style. It appears therefore desirable to accommodate *C. acutum* Laws, in a new section, § *Acutae* Keay, which is described in *Kew Bulletin* 1950, p. 247.

In most species of *Combretum* the fruit has 4 or 5 membranous wings considerably wider than the body, but several species (e.g. *C.cuspidatum* Planch.) have sub-woody fruits with thick narrow wings, a few (e.g. C. *acutum* Laws.) have the wings reduced to angular ridges, an* in a few (e.g. C. *pentagonum* Laws.) the ridges are rounded. Fruit-shape might be regarded as a sectional character of considerable importance. There are, however, several species with narrow-winged bulky Irmts in various sections of the genus, which are evidently closely

related, so far as other characters are concerned, to species with typical fruits. For instance, Engler et Diels placed *C. cuspidatum* Planch, and *C. insulate* Engler et Diels in § *Olivaceae,* and as far as floral characters are concerned it is clear that these two species are closely related, but the fruits of *C. cuspidatum* are of the bulky type while *C. insulate* has typical winged fruits. Again, Exell has pointed out *(Kew Bulletin* 1931 p. 469) that *Combretum cacoucia* Exell (=Cacoucia coccinea Aubl.) of South America must come into § *Caciouca* along with *Combretum mooreanum* Exell. (=Cacoucia velutina *S. Moore), C. bracteatum* (Laws.) Engl. et Diels and *C. platypterum* (Welw.) Hutch, et Dalz., three species of West Africa. In *Combretum cacoucia* the fruit is not winged, in *C. mooreanum* it is ridged but scarcely winged, while in *C. bracteatum* and *C. platypterum* the fruits are of the usual winged type.

It appears therefore that closely related species may show a wide range in fruit shape. A sectional classification based primarily on fruit shape would certainly bring together several species with widely differing floral structure. It should therefore be emphasized that the leading characters of the new § *Acutae* are derived from the flower structure. Although the fruit of the only species known at present is of the bulky type, the possible addition of other species with normal winged fruits must be borne in mind.

Ridley, in *The Dispersal of Plants Throughout the World,* 1930 (pp. 102 and 210), states that several Asiatic species of *Combretum* with bulky, almost wingless, fruits are characteristic of river banks and are dispersed by water. It is therefore interesting to note that the West African *C. acutum* is also a river bank species.

Roberty's taxonomic treatment of *C. acutum* is most unsatisfactory, for he regards this distinct species as a *forma* of *C. smeathmannii* G. Don (=C. mucronatum *Schumach. et Thonn.)* of § *Mucronatae* Engl. et Diels. The latter species has small tetramerous flowers, a well developed four-lobed disc, long exserted stamens and style, and small papery fruits ; it is, in fact, very different from *C. acutum.* Furthermore, neither species shows any close affinity with *C. afzelii* Engl. et Diels *(non* G. Don) which Roberty includes as a synonym. *C. afzelii* Engl. et Diels and the specimen *Lebrun* 883, which Roberty cites as *C. mucronatum* forma *acutum,* are, in fact, *C. cuspidatum* Planch, of § *Combretaslrum* Eichl. (§ Olivaceae *Engl et Diels).—R.* W. J. KEAY.

S.R-C.

TABULA 3477.

LORANTHUS DEPENDENS *Engl.*

LORANTHACEAE. Subfam. LORANTHOIDEAE.

Loranthus (Dentifera) dependens *Engl.* in Engl., Bot. Jahrb. xx. 117 (1894); Hiern in Cat. Afr. PL Welw. i. 933 (1900); Sprague in Dyer, Fl. Trop. Afr. vi, pt. 1. 346 (1910) ; Balle in Fl. Congo Beige et Kuanda-Urundi i. 353 (1948). *Acrostephanus dependens* (Engl.) Van Tiegh. in Bull. Soc. Bot. Fr. xlii, 268 (1895). *Loranthus Homblei* De Wild., Contr. Fl. Kat. 52 (1921). Affinis *L. kisantuensi* De Wild, et Th. Dur. et *L. Poggei* Engl., sed ab utroque foliis lineari-lanceolatis saepe falcatis valde distinctus.

***Frutex* parasiticus, glaber. *Rami* penduli, dense aggregati; ramuli teretes, graciles ; internodia 0 • 6–5 • 2 cm. longa. *Folia* opposita, subopposita vel interdum alterna, dependentia, falcata vel irregulariter recta, lineari-lanceolata, lineari-oblanceolata vel anguste oblonga, apice obtusa vel subacuta, basi in petiolum circiter 1 cm. longum attenuata, coriacea, penninervia ; nervi laterales 3-5-jugi valde obliqui. *Umbellae* axillares, solitares vel ternatae, 3-4-florae ; pedunculus 3-5 mm. longus ; pedicelli 2-3 mm. longi; bractea cupuliformis, 2-3 mm. longa, pedicellum arete complexa. *Calyx* oblique cupuliformis, truncatus, irregulariter fissus, circiter 4 mm. longus, basin inflatam corollae arete complexus. *Corollae* dimorphae, circiter 38 mm. longae; tubus basi inflatus, ellipsoideus, obovoideus vel subglobosus, curvatus, inde valde constrictus et sensim ampliatus ; alius corollae tubus superne 3 • 5 mm. diametro et unilateraliter fissus, lobis plus minusve secundis valde reflexis ; alius corollae tubus superne circiter 2*0 mm. diametro, haud unilateraliter sed demum irregulariter fissus, lobis radiatis haud secundis valde reflexis; tubus ante fissionem circiter 3 • 0 cm. longus ; lobi circiter 8 mm. longi, spathulato-lineares, superne incrassati; alabastra paulo ante anthesin apice depresso-truncata. *Filamenta* infra apices loborum circiter 9 mm. inserta, involuta, angustissime linearia vel sensim leviter attenuata, circiter 5 mm. longa, apice postice dente circiter 5 mm. longa instructa ; antherae anguste oblongae, usque 2 - 2 mm. longae. *Stylus* filiformis, infra stigma capitatum obscure bilobum per 2 mm. angustissimus, deinde per 5 mm. leviter incrassatus. *Fructus* mihi ignotus.**

BELGIAN CONGO. **Haut-Katanga. Valley of the Eapiri, *Homblé* 1246 (type of *L. Homblei* De Wild, in Brussels Herb.)**

NORTHERN RHODESIA. **Ndola District. Mufulira, parasitic on *Brachystegia* tree, 30 Dec. 1947, *Cruse* 136. Mwinilunga District.**

FIG. 1, part of flowering branch, *natural size*; 2, upper part of a flower-bud, X 4; 3, pedicel, calyx, and base of corolla, X 4; 4, anther from narrow-tubed flower, x 8; 5, the same in side view, X 8; 6, stigma and upper part of style from narrow-tubed flower, x 12 ; 7, stigma from wide-tubed flower, x 12.

Slope E. of Matonchi Farm, parasitic on *Brachystegia floribunda* Benth. in *Brachystegia* woodland, 10 Dec. 1937, *Milne-Redhead* 3586 :— shoots hanging down in large masses ; flowers upright; leaves green, leathery ; flowers of two kinds ; the one with corolla pink outside, slit open down one side to show the pink inside with 5 crimson filaments; tips of lobes black, grey in bud ; the other with narrower corolla tube, pink, not slit open down one side ; lobes pale green, spreading radially ; filaments pale pink ; style green.

ANGOLA. Cuanza Norte District. Pungo Andongo, near Mutollo and at Candumba, growing on a species of *Citrus* and on the Leguminosa called " Mucumba," Jan. 1857, *Welmitsch* 4852 (type) : — shrub 1-2-3*0 m. high, hanging down a long way; leaves glossy, deep green; flowers very crowded, deep blood red, very handsome.

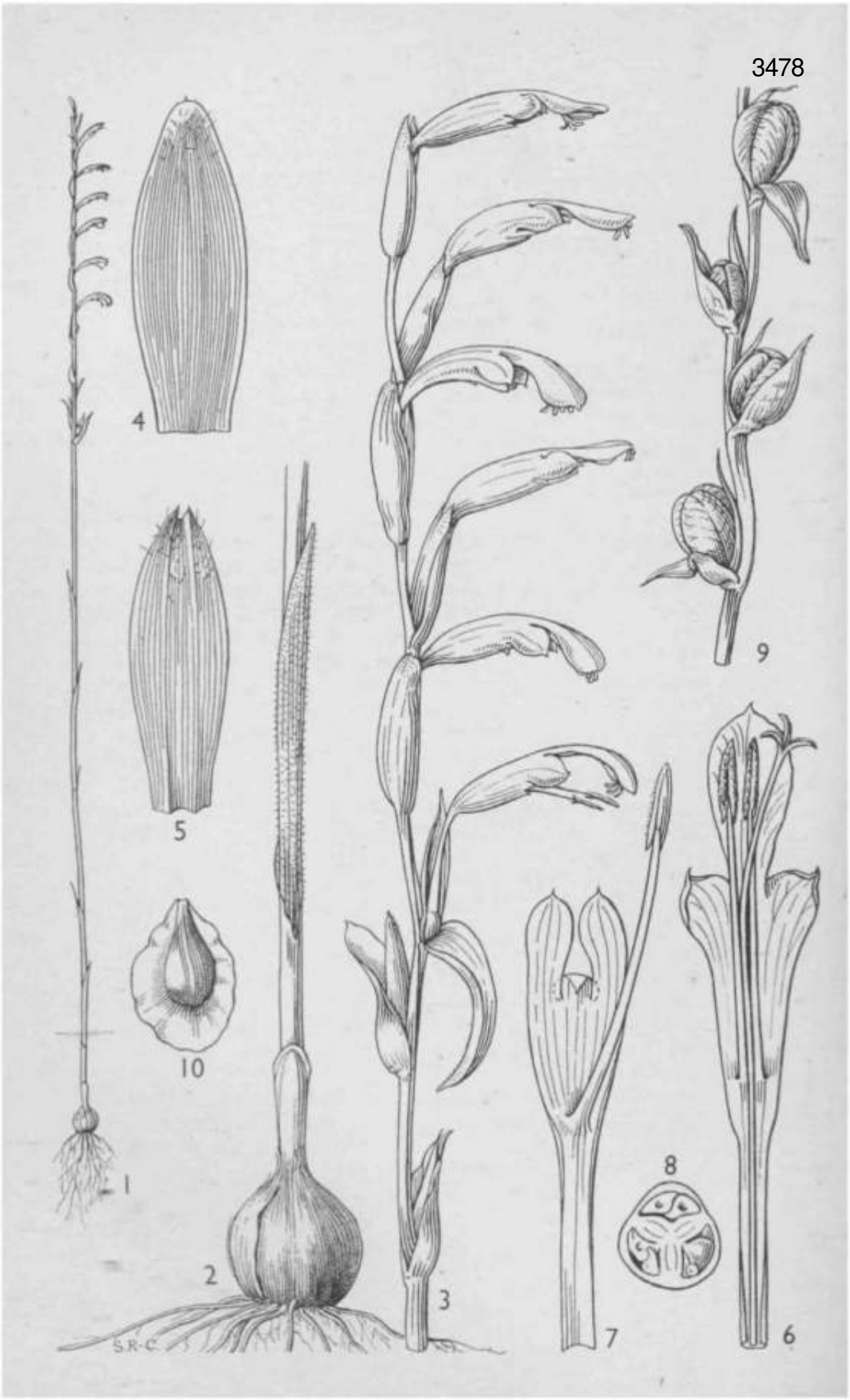
The plant here figured was collected by the writer in the Mwinilunga District of Northern Ehodesia, who refers it with certainty to *Loranthus dependents* Engl. He has, however, been unable to find any reference to the presence of dimorphic flowers in a species of *Loranthus,* nor can he suggest a reason for this strange phenomenon. When he collected material of *L. dependens* Engl. in 1937, he noticed that two kinds of flowers were present, but being unaware that this was unusual in the genus, he did nothing beyond recording the fact. It would be helpful if botanists and others, who may have an opportunity to collect any species of *Loranthus* of the affinity of *L. dependens,* would look out for this character and record whether it is general, or whether it is confined to certain individual plants.

Not only is the corolla of different proportions in the two kinds of flowers, but the method of opening is distinct and a considerable colour difference also exists (see field note quoted above). Even in flowers preserved in alcohol after thirteen years it is possible to see a difference in colour between the two kinds of flowers. The wide-tubed flowers were considerably more numerous than the narrow-tubed flowers on the inflorescences examined.

L. dependens has a somewhat restricted distribution in southern tropical Africa, judging by the specimens here cited. It is however likely to be considerably more frequent than these records suggest, for it is not an easy subject to collect. Not only does it often grow hopelessly out of reach of the pedestrian, but it flowers in the height of the rains, at a time when travel is difficult and few collectors are abroad.

In flower structure *L. dependens* is undoubtedly closely allied to *L. kisantuensis* De Wild, et Th. Dur. (including *L. kimuenzae* De Wild.) and to *L. Poggei* Engl., from both of which it is easily distinguished by its long narrow often falcate leaves. Balle (I.e. 348) recognizes a var. *erectilobus* Balle, of *L. Poggei,* in which the corolla lobes remain straight when in flower. It is interesting to note that in *L. dependens* what is probably a comparable character, may occur on one and the same plant.

E. MILNE-BEDHEAD.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TABULA 3478.

PETAMENES VAGINIFER *Milne-Redhead.*

IRIDACEAE. Tribus IXIEAE.

P. vaginifer *Milne-Redhead*; sp. nov., affinis *P. huillensi* (Welw. ex Bak.) N.E.Br., sed habitu robustiore, foliis in laminas haud productis, bracteis et perianthio longioribus facile distinguenda.

***Cormus* subsphaericus, circiter 2 cm. diametro ; tunicae membranaceae vix fibrosae, brunneae. *Caulis* simplex, erectus, 50-95 cm. altus, basi circiter 3-5 mm. diametro. *Folia* circiter 7 ; folia duo infima vaginiformia, subterranea, albida vel paleacea, glabra; folium tertium vaginiforme, apice oblique truncatum, viride, densiuscule hirsutum; folia superiora 4, vaginiformia, apice vix in laminam ensiformem producta, acuta, usque 15 cm. longa, parce hirsuta vel glabrescentia. *Caulis* supra folium summum per 10-12 cm. nudus. *Mores* 8-12 in spica secunda 18-30 cm. longa dispositi. *Bractea exterior* oblongo-lanceolata, concava, usque 25 mm. longa et 8 • 5 mm. lata, apice obtusiuscula vel acuta, minute apiculata, inferne convoluta, apice extra parce hirsuta, ceterum glabra ; bractea interior similis, usque 21 mm. longa et 7 mm. lata. *Perianthium* 4*5 cm. longum, glabrum. *Tubus perianthii* parte infima anguste cylindricus, rectus, circiter 10 mm. longus et 1-3 mm. diametro, parte media anguste cylindricus valde dorsaliter compressus, curvatus, circiter 6 mm. longus, parte superiore cylindricus, lateraliter compressus, 13 mm. longus, 6 x 4 mm. diametro, leviter curvatus, apice obliquus. *Lobi perianthii* valde inaequales; posticus ovato-triangularis, valde acutus, apiculatus, 3*5 mm. longus, 2*5 mm. latus, superne demum in tubum recurvatus ; postico-laterales oblongo-lanceolati, 7*5 mm. longi, apice acutiusculi, apiculati, margine revoluti; antico-laterales oblique rotundato-ovati, circiter 5 mm. longi et 4 mm. lati, apice acuminati, apiculati; anticus ovatus, unguiculatus, in toto 15 mm. longus, superne 6 mm. latus. *Antherae* circiter 5 mm. longae ; filamentum anticum circiter 25 mm. longum, filamenta postica circiter 20 mm. longa. *Stylus* circiter 4 cm. longus, apice in ramos circiter 2 mm. longos divisus. *Ovarium* cylindricum, circiter 4 mm. longum. *Capsula* ellipsoidea, circiter 16 mm. longa et 8 mm. diametro, perianthio flaccido coronata.**

NORTHERN EHODESIA. **Mwinilunga District. About four miles S.E. of Matonchi Farm, on bare sandy patches among *Pteridium* in *Brachystegia* woodland just E. of Dobka Bridge, 5 Nov. 1937, *Milne-Redhead***

FIG. 1, plant, *one-sixth natural size*; 2, corm and lower part of plant, *natural size;* 3, inflorescence, *natural size* ; 4, 5, outer and inner bracts respectively, showing outer surface, X 2 ; 6, 7, longitudinal section of perianth showing the posterior and anterior halves respectively together with stamens and style, X 2; 8, ovary in transverse section, X 6 ; 9, part of infructescence, *natural size*; 10, seed, X 4.

3111 :— stem erect; sheaths grey-green, pubescent; bracts and stem pink ; perianth tube whitish below, bright red where it widens ; upper part deepest blackish puce ; filaments pinkish ; anthers blackish puce.

In 1932 N. E. Brown published an account of his investigation into the taxonomy of *Antkolyza* L. (Trans. Roy. Soc. S. Afr. xx, 265 etseq. : 1932). In this masterly paper he proposed several new genera for plants which had from time to time been relegated to the *Anlholyza* rubbish-heap for want of a better place to put them. Among these genera was *Petamenes,* a name which Brown took from R. A. Salisbury, who had applied it to the plant figured in Curtis (Bot. Mag. t. 567 : 1802), as *Gladiolus quadrangularis* Ker. without publishing a generic description (Trans. Hort. Soc. Lond. i, 324 : 1812).

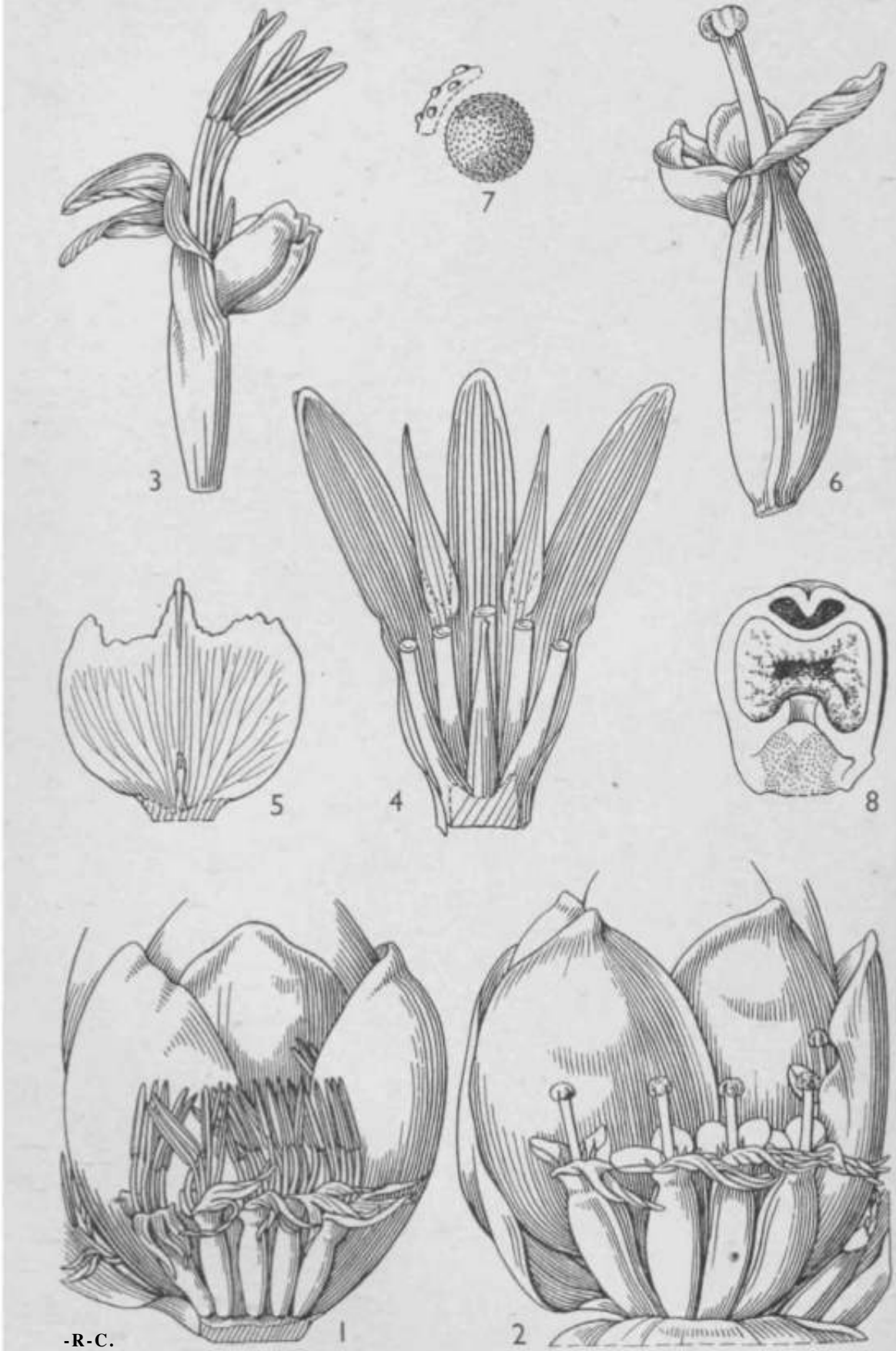
Most closely allied to *Chasmanthe* N.E.Br., *Petamenes* is distinguished from that genus by the bracts being longer than the slender part of the tube, and the capsule being shorter than the bracts. Brown admits eight species, five of which are natives of Tropical Africa, whilst three are South African species.

P. vaginifer is remarkable for its great reduction in leaf, the blades being entirely absent, or represented by a slight prolongation of the sheath on one or two leaves only. It undoubtedly is most closely allied to *P. huillensis* (Welw. ex Bak.) N.E.Br. from Angola, but that species has at least one leaf-blade developed, it being 10 cm. long in the specimen in the Kew Herbarium. The portion of the leaves sheathing the stem is green in both these species and functions as the principal assimilatory organ. The lowest of the sheaths above ground (the two lowest are subterranean cataphylls) is much more strongly hirsute than those above it, but the reason for this is not understood.

P. vaginifer was found to be extremely local in the neighbourhood of Matonchi Farm, the writer having seen it in one small area only. P. *huillensis* is similarly known only from a single gathering. It is probably due to the fact that plants such as these two species of *Petamenes* occur only here and there throughout many hundreds of square miles of suitable country and that they flower at the height of the growing season when grasses and bracken tend to conceal them, that they are so poorly represented in herbaria. Both in habitat and in its restricted occurrence there appears to be a striking parallel between *Petamenes vaginifer* in Northern Rhodesia and *Gladiolus illyricus* in the New Forest, England, a parallel which may not necessarily be due to unrelated causes.

E. MILNE-REDHEAD.

3479 A



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TABULAE 3479 A ET B.

ENSETE HOMBLEI *(Bequaert ex Be Wild.) E. E. Cheesm.*

MUSACEAE. Subfam. MUSOIDEAE.

E. Homblei *(Bequaert ex Be Wild.) E. E. Cheesm.* in Kew Bull. 1947, 103 (1948). *Musa Homblei* Bequaert ex De Wild, in Ann. Mus. Col! Marseille, sér. 2, x. 332 (1912). Species statura parva, habitu deciduo, foliorum nervis lateralibus obliquis, floribus uniseriatis egregia.

Herba **perennis usque 1-2 m. alta, basi bulbiformis, cataphyllis brunneis induta.** ***Caules*** **annui, erecti, apice inflorescentia nutante terminati, foliosi.** ***Folia*** **petiolis convolutis caulem claudentibus et pseudocaulem formantibus, glaucescentibus ; lamina foliorum mediorum usque 17 cm. longa et 7 cm. lata, elliptica, apice acuta vel obtusa, interdum apiculata, basi cuneata, supra viridis, subtus glaucescens ; costa inferne basin versus prominens; nervi laterales numerosi, leviter curvati, medium versus laminae angulum circiter 45° formantes; petioli apicem versus per 2 cm. liberi, circiter 12 mm. diametro, inferne usque ad basin convoluto-vaginati, explanati 3-4 cm. lati, glaucescentes; lamina foliorum inferiorum minor, elliptica vel obovata ; folia superiora reducta, ad bracteas vergentia ; folia plantarum sterilium oblanceolata ; lamina usque 4 dm. longa et 11 -5 cm. lata, apice acuta basi in petiolum usque 15 cm. longum, librum haud convolutum angustata.** ***Inflorescentia*** **ovoidea, densa, compacta, usque 13 cm. longa et 8 cm. lata; bracteae numerosae, ovatae, concavae, apice obtusae, basin versus contractae, usque 7 cm. longae et 5 cm. latae, superiores minores, post anthesin persistentes, haud reflexae ; bracteae 9-10 inferiores flores $ 4-5 subtendentes ; bracteae 1-2 medium versus inflorescentiae flores cj, superiores flores (J subtendentes.** ***Flores*** **lactei.** ***Flores*** **$ in toto circiter 3-5 cm. longi.** ***Tepala*** **exteriora in tubum breviter trilobum dorso longitudinaliter fissum connata, circiter 18 mm. longa et 9 mm. lata ; lobi circiter 8 mm. longi, obtusi; lobus medius venis 9, laterales venis circiter 12 instructi; tepalorum exteriorum tubus sub anthesin valde dorsaliter compressus, apice emarginatus ; tepala exteriora post anthesin dextrorsus horizontaliter reflexa et spiraliter contorta; tepalum interius dorsale valde trilobum, circiter 8 mm. longum et 13 mm. latum ; lobus medius lanceolatus, acutus, circiter 4 mm. longus, uninervatus ; lobi laterales suborbiculares, apice rotundati, circiter**

A. FIG. 1, inflorescence, with some bracts removed to show the male flowers, *natural size* ; 2, inflorescence, with some bracts removed to show the female flowers, *natural size* ; 3, male flower, x 2 ; 4, part perianth (anterior tepals) bases of filaments, and sterile gynoecium, x 3 ; 5, posterior tepal, with the vestigial stamen still attached, x 3 ;"6, female flower, X 2 ; 7, pollen grain, c. x 100, and part of surface *much enlarged* ; 8, seed in longitudinal section, x 4.

B. FIG. 1, plant, *one-sixth natural size* ; 2, leaf, *natural size* ; 3, inflorescence and upper leaves, *natural size ;* 4, part of infructescence, *natural size;* 5, seed, x 3.

6 mm. diametro, haud valde nervati; tepala interiora lateralia obsolescentia, ad tepala exteriora adhaerentia. *Staminodia* 5, circiter 2 mm. longa, antice disposita. *Stylus* anguste subcylindricus, circiter 12 mm. longus et 1 • 5 mm. diametro, basin versus incrassatus: stigma subcapitatum, dorsaliter compressum, sexlobatum ; ovarium subcylindricum, basin versus angustatum, circiter 18 mm. longum, transverse obscure triangulare. *Florum Q* perianthium illi $ simile, sed tepala interiora lateralia superne libera, lamina 0-9 mm. longa, anguste lanceolata. *Stamina* 5, antice disposita et postice leviter arcuata ; filamenta anguste cylindrica, circiter 10 mm. longa et 1 mm. diametro ; antherae circiter 9 mm. longae, apice basique obtusae ; pollinis granula minutissime tuberculata ; staminodium unum vestigiale postice dispositum ; pistalodia circiter 7 mm. longa ; ovarium cylindricum, circiter 10 mm. longum, sterile. *Fruatus* anguste pyriformis, obscure angulatus, usque 4*5 cm. longus et 2*3 cm. diametro, apice flore flaccido coronatus, 20-30-spermus. *Semina* subglobosa, 6-7 mm. diametro, nigra, nitentia, in pulpa alba nidulantia ; hilum rotundatum, circiter 4 mm. diametro, medio depressum.

BELGIAN CONGO. Katanga Province. Near Elisabethville, in savannah woodland, on termite hills, 25 June 1912, *Bequaert* 511 (Herb. Brux.). Elisabethville, on termite hill, May 1912, *Homblé* 671 (Herb. Brux.) : — mature bunch of fruits found in May ; by June only the rootstock remains.

NORTHERN RHODESIA. Mwinilunga District. Kalenda Ridge, W. of Matonchi Farm, on rocky slope and on termite hills in *Brachystegia* woodland, 2 Nov. 1937. *Milne-Redhead* 3062 :— " bulb " with brown scale leaves; stem up to 12 dm. long, grey, glaucous; lowest stem leaves with small blades : middle with blades up to 17 cm. long ; upper merging into bracts; leaves longer on young sterile sucker plants; female flowers lowest, in about 9-10 lots of 4-5 flowers each ; then 1-2 lots of hermaphrodite flowers, and the remaining lots male flowers ; flowers entirely creamy. Same locality, Jan. 1939, *K. R. Paterson* s.n.:— fruits and seeds.

Ensete Homblei is not only the smallest banana known but it is the only completely herbaceous one, 'able to withstand five or six months of drought, during which it is quite leafless. Thick hard rather leathery scale leaves protect the perennial rootstock and the growing point from damage due to grass fires, and these scale leaves are the only visible signs of the plant during the dry season after the withered leaves and the old scape have been burnt off.

J. Bequaert collected the plant at the beginning of the dry season in 1912, when he got it in fruit. A detailed description made in the field by •him was published by De Wilderman (I.e. 332-336). The flowers, however, have not until now been described.

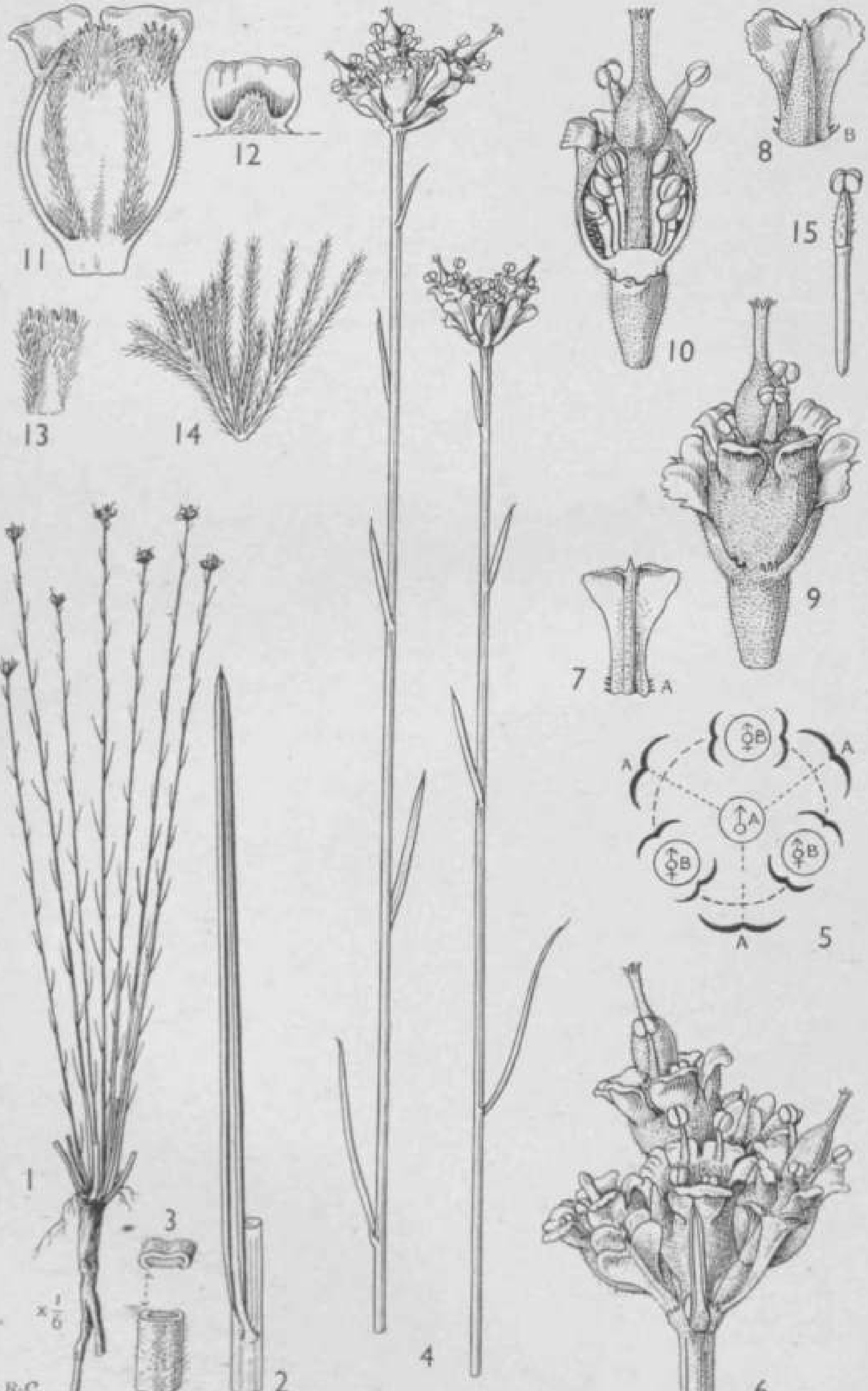
In placing *Musa Homlei* in the genus *Ensete* Horan, I am following Cheesman (Kew Bull. 1947, 97 : 1948) whose knowledge of the taxo-

nomy of *Musa* is unrivalled. Cheesman is, in my opinion, right in removing the genus from *Musa,* but I am not so sure that it would not be better to place *M. Homblei,* a plant which Cheesman knew only imperfectly, in a separate genus. I hope that this account of the species, and the excellent plate which Miss Ross-Craig has prepared of it, may enable someone more competent than myself to find the correct place for this very remarkable plant.

The ample material now available has revealed a number of characters in which *Ensete Homblei* differs from *Ensete* as recognized by Cheesman. The deciduous perennial habit, the presence of suckers are both anomalous characters, no doubt associated with the abnormal (for *Ensete)* conditions of the habitat in which the species thrives. The acute angle which the secondary nerves make with the midrib is, so far as I can tell, unique in *Musa* in the broad sense, and may well be correlated with the dwarf nature of the plant and the very small leaf blades which would offer little resistance to the wind. The wide angle of the nerves of the enormous leaves of most bananas results in the wind tearing the leaf whilst leaving it fully operative as an assimilating organ.

There are anomalies also in the inflorescence and the flowers. In *E. Homblei* the flowers subtended by each bract are arranged in but a single series, as against two in *Ensete.* Whilst this may be just another example of the reduction in size that has produced *E. Homblei,* there is another character which cannot be so explained. K. Schuman (Das Pflanzenreich IV. 45, Musaceae, 6: 1900) mentions that *Musa Ensete* J. F. Gmel and its allies (species now placed in *Ensete* by Cheesman) lack the free blades of the two inner anterior tepals. These are present, however, in *E. Homblei,* conspicuously in the male flowers (fig. 4), whilst in the female flowers they are smaller and remain adhering by their edges to the lobes of the outer perianth.

I am indebted to my late friend, Capt. K. R. Paterson, around whose home, Matonchi Farm, *Ensete Homblei* grew and who first called my attention to the plant, for collecting and sending me ripe seed at the end of the rainy season in 1938. Some of this was sent to the Imperial College of Tropical Agriculture, Trinidad, and some was sown at Kew, but at neither was germination recorded.—E. MILNE-REDHEAD.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TABULA 3480.

EUPHORBIA ERYTHROGEPHALA *Bally et Milne-Redhead.*

EUPHORBIACEAE. TribuS EUPHORBIEAE.

E. erythrocephala *Bally et Milne-Redhead* ; species nova, ab omnibus specibus africanis *Euphorbiae, E. asclepiadea* Milne-Redhead excepta, valde distincta ; ab *E. asclepiadea* habitu stricto, caulibus caespitosis, foliis minoribus, cyathiis in cymam unicam dispositis glandulis 5 ornatis, ovario erecto facile distinguenda.

Herba **perennis, radice lignosa longe cylindrica usque 13 mm. diametro.** ***Caules*** **annui, omnes floriferi, 11-20, erecti, caespitosi, inferne glabri, apicem versus puberuli, usque 68 cm. longi et basi 2 mm. diametro, simplices, teretes, foliosi, internodiis circiter 3 '5-^5' 5 cm. longis.** ***Folia*** **alterna, sessilia, utrinque glabra vel basi minutissime puberula, anguste linearia, margine valde revoluta, inferne usque 5-0 cm. longa, superne minora, infra ipsam inflorescentiam 0-5 cm. tantum longa, costa apice in apiculum 0«6 mm. longum producta; glandulae nigrescentes minutae lineares in axillis foliorum dense glomeratae.** ***Cyathia*** **in cymam unicam terminalem trifurcatam exinvolucratam disposita.** ***Cyathium primarium <$*** **; bracteae 3, spatulatae, valde retusae, costa in apiculum conspicuum producta, 4 mm. longae, apice 2 mm. latae; cyathium urceolatum, 3-5 mm. diametro, 4 mm. altum, puberulum; glandulae 5, erectae, ambitu late obovatae, apice truncatae, margine revolutae, circiter 2 mm. longae et apice 2 mm. latae, basi 1-5 mm. latae, intus triente inferiore labio triangulari irregulariter fimbriato patente lobisque cyathii imposito praeditae, inferne crassae et concavae, facie abaxiali dense pubescente, ceterum glabrae ; lobi 5, anguste oblongi, 2 mm. longi 0*15 mm. lati, costa prominente instructi, densiuscule hirsuti.** ***Flores $*** **numerosi; bracteolae filiformes, simplices vel pinnatifidae, 4*5 mm. longae, breviter plumosae ; pedicelli filiformes, usque 4 mm. longi, glabri; filamentum filiforme, usque 2 mm. longum, glabrum vel parce et minute pubescens; anthera 0*6 mm. longa et 1-0 mm. lata.** ***Cyathia secundaria*** **3, vel abortu pauciora, bisexualia ; bracteae 2, valde bilobatae, 5 mm. longae, apicem versus 4 mm. latae, basin versus angustatae, breviter apiculatae; cyathia, glandulae et flores <J iis cyathiorum primariorum similes.** ***Flos*** **$ singulus ; pedicellus**

FIG. 1, plant, *one-sixth natural size;* 2, lower leaf and part of stem, X 2 ; 3, part of young leaf showing upper surface and cross-section, X 8; 4, flowering stems, *natural size* ; 5, diagram of inflorescence ; 6, inflorescence, X 3 ; 7, 8, involucral bracts of primary and secondary cyathia respectively, x 4; 9, secondary (§) cyathia, X 4; 10, secondary cyathia with part removed to show flowers, X 4 ; 11, part of involucre, from within, X 6 ; 12, gland of involucre, from within, X 6; 13, lobe of involucre, X 8; 14, bract subtending male flower, X 6; 15, mature male flower, x 4.

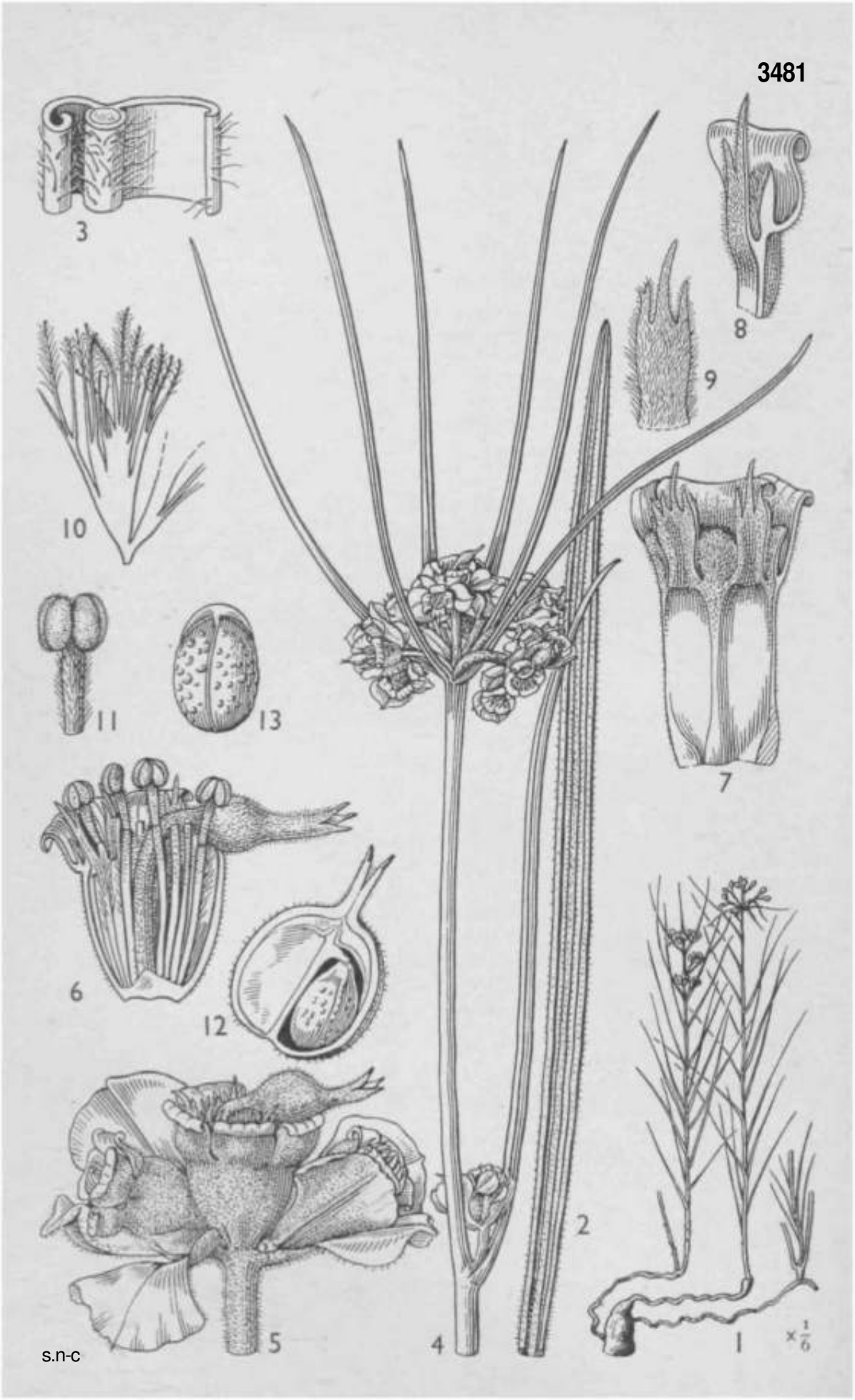
3*5 mm. longus, 1 mm. diametro, erectus, parce adpresse pubescens; calyx obsoletus; ovarium erectum subovoideum, obscure trilobatum, 2 mm. longum, 1*8 mm. diametro, basin versus dense adpresse pubescens, superne parce pubescens ; styli 2•7 mm. longi, in columnam cylindricam 2 mm. longam coaliti, parce hirsuti, parte libera glabra, ramis stigmaticis leviter incrassatis ; ovula 3, ovoidea, circiter 0 * 8 mm. longa. *Cyathia tertiaria* 6 vel abortu pauciora, secundariis similia. *Fructus* nobis ignotus.

NORTHERN RHODESIA. Mwinilunga District, Source-of-Matonchi Dambo, in sandy grassland in open, 16 Feb. 1938, *Milne-Redhead* 4607 :— perennial herb with thick vertical cylindrical woody rootstock full of white latex ; shoots and leaves (except the reduced uppermost ones) dull green ; uppermost leaves and bracts deep crimson ; cyathium red ; filaments red, rest of inflorescence crimson ; plant appearing like a *Rhynckospora.*

This very striking spurge has, so far as we can discover, no close ally in the genus, apart from *E. asclepiadea,* which is figured on the following plate. This is, admittedly, a very unsatisfactory situation. We feel, however, that we do not know enough about the taxonomy of this worldwide and polymorphic genus to suggest the natural affinity of these two species. We feel that the publication of these figures may bring *E. erythrocephala* and *E. asclepiadea* to the notice of students of *Euphorbia* one of whom may be able to throw light on the relationship of these two species to some other members of the genus possibly from outside the African continent.

Whilst the relationship of this species to *E. asclepiadea* is unquestionable, there are some very good specific characters by which it can be separated. In *E. erythrocephala* the reduction and specialization has gone further than in *E. asclepiadea.* The leaves of the former are smaller and more ericoid, the inflorescence is only a single cyme ; the cyathia have five glands each and the primary cyathium is male. Other good specific characters are to be found in the degree of indumentum and in the shapes and sizes of many parts of the inflorescence and in the different nature of the underground parts. It is unfortunate that the fruit of *E. erythrocephala* has not yet been collected.

F. R. 0. BALLY AND E. MILNE-REDHEAD.



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TABULA 3481.

EUPHORBIA ASCLEPIADEA *Milne-Redhead.*

EUPHORBIACEAE. TribuS EUPHORBIEAE.

E. asclepiadea *Milne-Redhead;* species nova, ab *E. erythrocephala* ***Bally et Mihie-Redhead*** **caulibus subterraneis elongatis, foliis longioribus et latioribus, cymis saepe umbellatis, pedunculis et basibus bractearum et cyathiorum dense hirsutis, ovario horizontaliter disposito facile distinguenda.**

Herba **perennis.** ***Radix*** **tuberosa, caules subterraneos elongatos emittens.** ***Caules*** **annui, e caulibus subterraneis orti, erecti vel forsan decumbentes, inferne plus minusve glabri, superne puberuli, siccitate striati, usque 36 cm. longi et basi 3 mm. diametro, simplices, teretes, foliosi, internodiis 7-22 mm. longis.** ***Folia*** **alterna, subsessilia, anguste linearia, margine valde revoluta, superne 7-5-12 cm., inferne 2-5-3-5 cm. longa, supra basin versus et secus costam parce hirsuta, ceterum glabra, subtus parce hirsuta, apice obtusiuscula, haud apiculata; glandulae nigrescentes minutissimae in axillis foliorum glomeratae.** ***Cyathia*** **in cymas bifurcatas usque 8 apice caulis umbellatas et in cymas solitarias in axillis foliorum superiorum disposita ; pedunculi dense breviter hirsuti.** ***Cyathium primarium*** *§* **; bracteae 2, obovato-spatulatae, apice rotundatae, sed costa in apiculum conspicuum producta, 9 mm. longae, 5 mm. latae, extra inferne et ad costam breviter hirsutae, intus glabrae ; cyathium urceolatum, circiter 6 mm. diametro et 7 mm. altum, breviter hirsutum ; glandulae 4, erectae, ambitu late obovatae, apice truncatae, margine valde revolutae, circiter 2-5 mm. longae et apice 3 mm. latae, basi 1-5 mm. latae, intus triente inferiore labio brevi late triangulari integro patente lobisque cyathii imposito praeditae, inferne crassae et concavae, facie abaxiali infra labium dense hirsutae, ceterum puberulae vel glabrae ; lobi 5, oblongi, apice trifurcati, ramis lateralibus quam terminali brevioribus integris vel bifidis, hirsuti.** ***Fhres*** *£* **numerosi; bracteolae multifidae segmentis filiformibus, circiter 5 mm. longae ; pedicelli filiformes, circiter 5 mm. longi, parcissime pubescentes ; filamentum filiforme, circiter 1 mm. longum, parcissime pubescens; anthera circiter 0-8 mm. longa et 1-2 mm. lata, minute pubescens.** ***Flos*** **$ singulus ; pedicellus circiter 5 mm. longus, et 1 mm. diametro, erectus apice curvatus, densiuscule pubescens; calyx obsoletus; ovarium ovoideum, circiter 3 mm. longum, 2 • 5 mm. diametro, pubescens**

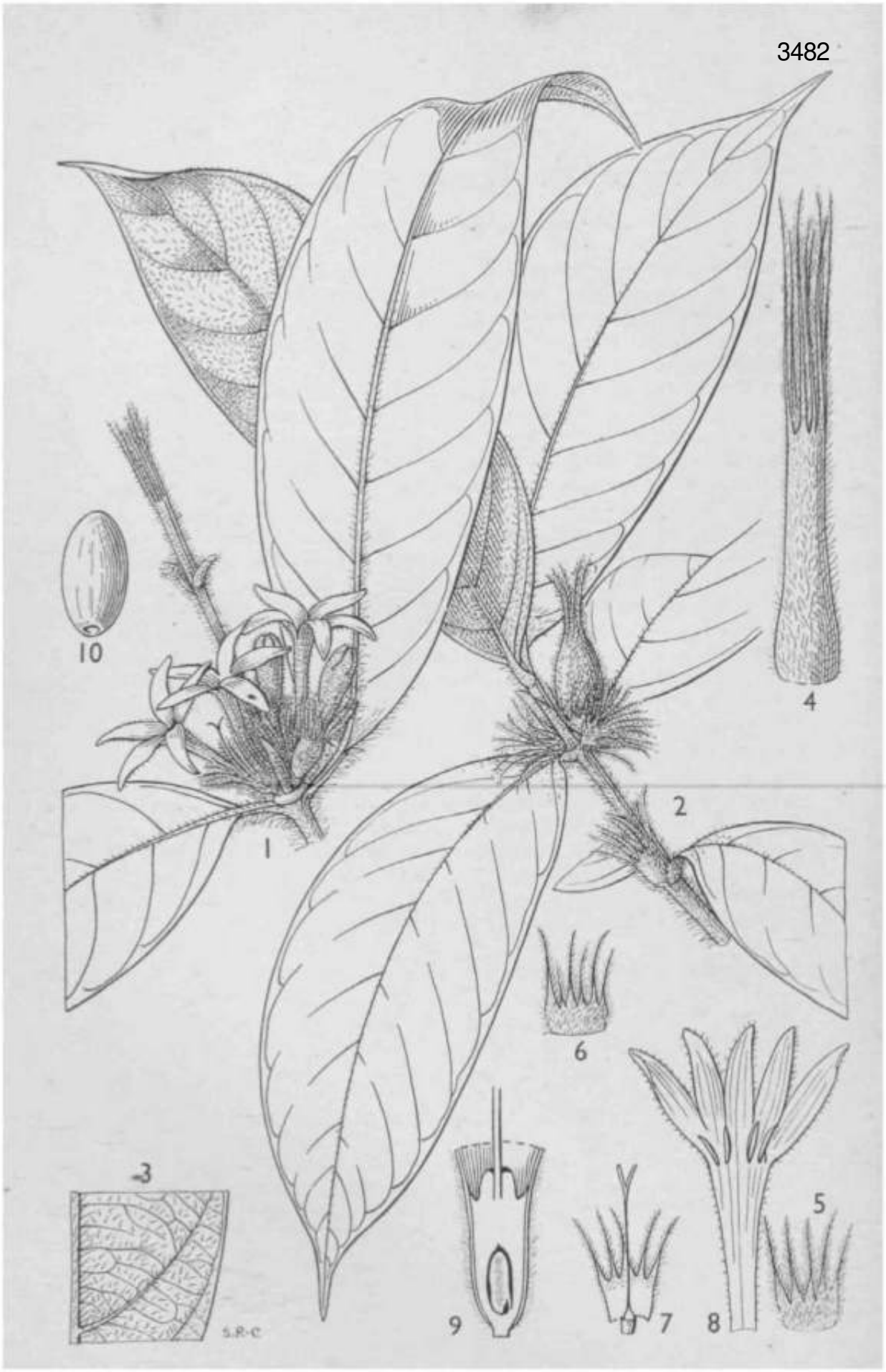
FIG. 1, plant, ***one-sixth natural size*****; 2, one of the shorter leaves somewhat unrolled to show lower surface, X 2 ; 3, part of leaf with one half unrolled to show width of lamina, X 8; 4, flowering stem,** ***natural size*****; 5, inflorescence, x 3; 6, cyathia with part removed to show flowers, X 4; 7, part of involucre, inner surface, X 6 ; 8, gland and part of lobe of involucre, cut longitudinally, X 8 ; 9, lobe of involucre, outer surface, x 8 ; 10, bracts of male flowers, x 6 ; 11, male flower, without pedicel, X 8; 12, fruit in longitudinal section, X 3; 13, seed, x 4.**

horizontaliter dispositum ; styli 3 mm. longi in columnam cylindricam 2 mm. longam et 1 mm. diametro coaliti, pubescentes, parte libera plus minusve glabra, ramis stigmaticis haud incrassatis ; ovula 3, ovoidea, circiter 1-5 mm. longa. *Cyathia secundaria* 2, vel abortu pauciora, primariis similia. *Cyathia tertiaria* 4, vel saepe abortu pauciora. *Fructus* compresse ovoideo-cylindricus, circiter 7 mm. longus et 7 mm. diametro, leviter rugosus et parce tomentosus ; semen subpyriforme, dorsaliter leviter compressum et obscure carinatum, circiter 5 mm. longum et 3 mm. diametro, obscure pustulatum, haud arillatum.

ANGOLA. **Bié District. Without precise locality, 1300 m., 1930, *Gossweiler* 9457 (type in Herb. Brit. Mus., duplicate in Herb. Kew.)**

When looking through the tropical African species of *Euphorbia* with a view to finding an affinity for *E. erythrocephala* Bally & Milne-Redhead, figured on the previous plate, a single specimen of this remarkable species, at first sight looking like a species of *Asclepias,* was found among the unnamed specimens. A sheet of the same gathering, but showing the underground parts which are missing from the Kew sheet, was found in the Herbarium of the British Museum. As this specimen shows fruits, which are also missing from the Kew specimen, it has been made the type of the specific name.

Whilst obviously specifically distinct from *E. erythrocephala,* this specimen showed certain striking resemblances. The linear leaves with unrolled margins, the red or pinkish bracts which retain their colour to some extent in the dried state, and the shape of the glands are characters common to both these species. For notes on the principal differences between these two species, reference should be made to the text of t. 3480.—B. MILNE-REDHEAD.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TABULA 3482.

SCHIZOCOLEA LINDERI *(Hutch, et Dak.) Brem.*

RUBIACEAE. Tribus COUSSAREAE.

Schizocolea *Brem.* Genus novum *Coussarearum,* floribus pentameris et stipulis in vaginam longam et angustam margine fimbriatam connatis a generibus adhuc descriptis longe recedens.

Arbuscula. Folia opposita, quoque pari aequalia, subtus inter nervos laterales venulis approximatis transverse striata, acarodomatiis nullis. *Stipulae* in vaginam longam et angustam in fimbrias plerumque 8 fissam connatae, intus ad basin colleteribus baculiformibus vestitae. *Fhres* in axillis foliorum oppositorum nunc solitarii, nunc in cymas trifloras dispositi; cymae et flores e quibus compositae similiter involucrati; flores solitarii involucro duplo instructi; involucra e stipulis connatis formata in fimbrias 6 fissa, intus ad basin ut stipulae colleteribus baculiformibus instructa. Flores ipsi subsessiles, 5-meri. *Ovarium* biloculare, loculis septo tenui separatis ; uterque loculus ovulo singulo ex angulo interiore ascendente instructus. *Calyx* 5-fidus, lobis e basi triangulari setiformibus, tubo intus ad basin colleteribus baculiformibus instructo. *Corolla* hypocrateriformis, alba, fragrans, tubo calycem longitudine multo excedente, intus glabro, ad os paulum dilatato, lobis lanceolatis alabastro valvatis. *Stamina* parte dilatata tubi inserta, subinclusa; filamenta brevissima; antherae lineares dorsifixae, fissuris longitudinalibus dehiscentes. *Granula pollinis* globosa, parva, punctata, haud fissuris instructa, 4-pora. *Discus* depresse semiglobosus glaber. *Stylus* glaber, in stigmata dua linearia exiens ; stigmata basin antherarum haud attingentia. *Fructus* bacca exsucca, calce coronata, monosperma, endocarpio membranaceo intus nitido, raphidibus albo-punctato. *Semen* avoideum, nigrum, neque costis nee excavationibus ornatum; albumen corneum; embryo rectus, parvus; radicula inferior.

Species unica, Africae occidentalis incola.

Schizocolea linden* *(Hutch, et Dalz.) Brem.,* comb. nov.

Urophyllum linderi Hutch, et Dalz., Fl. West Trop. Afr. ii. 104 (1931); Cooper and Record, Evergreen Forests of Liberia, Bull. 31 of the School of Forestry, Yale University, 115 (1931); Dinklage in Fedde, Rep. Sp. Nov. xli. 268 (1937).

Sabicea ? linderi (Hutch, et Dalz.) Brem. in Engl., Bot. Jahrb. lxxi. 202 et 226 (1940).

FIG. 1,2, flowering and fruiting branches, *natural size*; 3, part of lower surface of leaf, X 2 ; 4, stipule from apex of branch, x 2 ; 5, 6 outer and inner involucres respectively, flattened, showing the outer surface, X 1 • 5 ; 7, calyx and gynoeceum, with the former cut away and spread out, x 1 -5 ; 8, corolla opened out, X 1 - 5 ; 9, ovary in longitudinal section, x 12 ; 10, seed, X 2.

Arbuscula 0-30-3-0 m. alta. *Rami* graciles, novelli fulvo-hirsuti, veteriores cortice griseo vestiti. *Folia* petiolo fulvo-hirsuto 3-5 mm. longo instructa ; lamina oblanceolata, 8-12 cm. longa et 2-5-4-5 cm. lata, apice acuminata et longius mucronata, basi acuta vel subacuta, supra costa sola hirsuta, alibi glabra, subtus costa et nervis lateralibus densius, inter nervos sparse hirsuta, nervis utroque latere costae 8 vel 9, supra prominulis, subtus prominentibus, venulis approximatis subtus transverse striata, raphidibus inconspicuis. *Stipulae* usque ad 2 cm. longae, extra hirsutae, vagina 1-5-2 mm. diametro, fimbriis circiter 8. *Flores* nunc solitarii, nunc in triades dispositi. *Involucra* 5-8 mm. alta, basi campanulata, lobis 6 e basi triangulari setiformibus, margine ciliatis. *Ovarium* turbinatum, dense griseo-villosum, 2 mm. altum. *Calyx* 5-8 mm. altus, maxime ut involucrum sed 5-merus et paulo profundius fissus. *Corolla* 3 cm. longa, extra sparse pubescens, tubo 2 cm. longo et 1 mm. diametro, ore usque ad 3-5 mm. dilatato, lobis lineari-lanceolatis 1 cm. longis et 1*5 mm. latis. *Stamina* filamentis 1 mm., antheris 4-5 mm. longis. *Stylus* glaber, 12 mm. longus, in stigmata 2-5 mm. longa exiens. *Bacca* rubra vel ultimo nigra, sparse hirsuta, 10-12 mm. alta et 6-7 mm. diametro, calyce usque ad 10 mm. elongato coronata. *Semen* unicum 7 mm. altum et 4 mm. diametro.

SIERRA LEONE. Moyamba District. Sierra Leone Peninsula, York Pass, in forest, 6 Dec. 1936, *Deighton* 3311!*:— undershrub, 3-15 dm. high, flowers fragrant, white. Kenema District. Kambui Hill, in dense shade in undergrowth, *Lane-Poole* 469. Pujchun District. Gola Forest, between Zimi and Gorahun, 8 April 1939, *Deighton* 3686! :— undershrub, 15 dm.; fruits red. Gola Forest, 7 Jan. 1949, *Mrs. King* 10.

LIBERIA. Dukwai River, 2 Apr. 1929, *Cooper* 151 !:— shrub under 30 dm. tall with single sessile berries. Dukwai River, from vicinity of Firestone Plantations, Oct./Nov. 1928, *Cooper* 36:— shrub with small white buds in green bracts. Peáhtah [Pehata], in virgin forest, 15 Oct. 1926, *Under* 1072 :— low bush ; flowers white. Within 32 Km. of Kakatown, without precise locality or date, *Whyte* s.n. (type) ! Harbel, on hill near Upper Du River, in primary forest, 26 Dec. 1943, *J. C. Bequaert* 14 :— small bush, 3 dm. high ; flowers white.

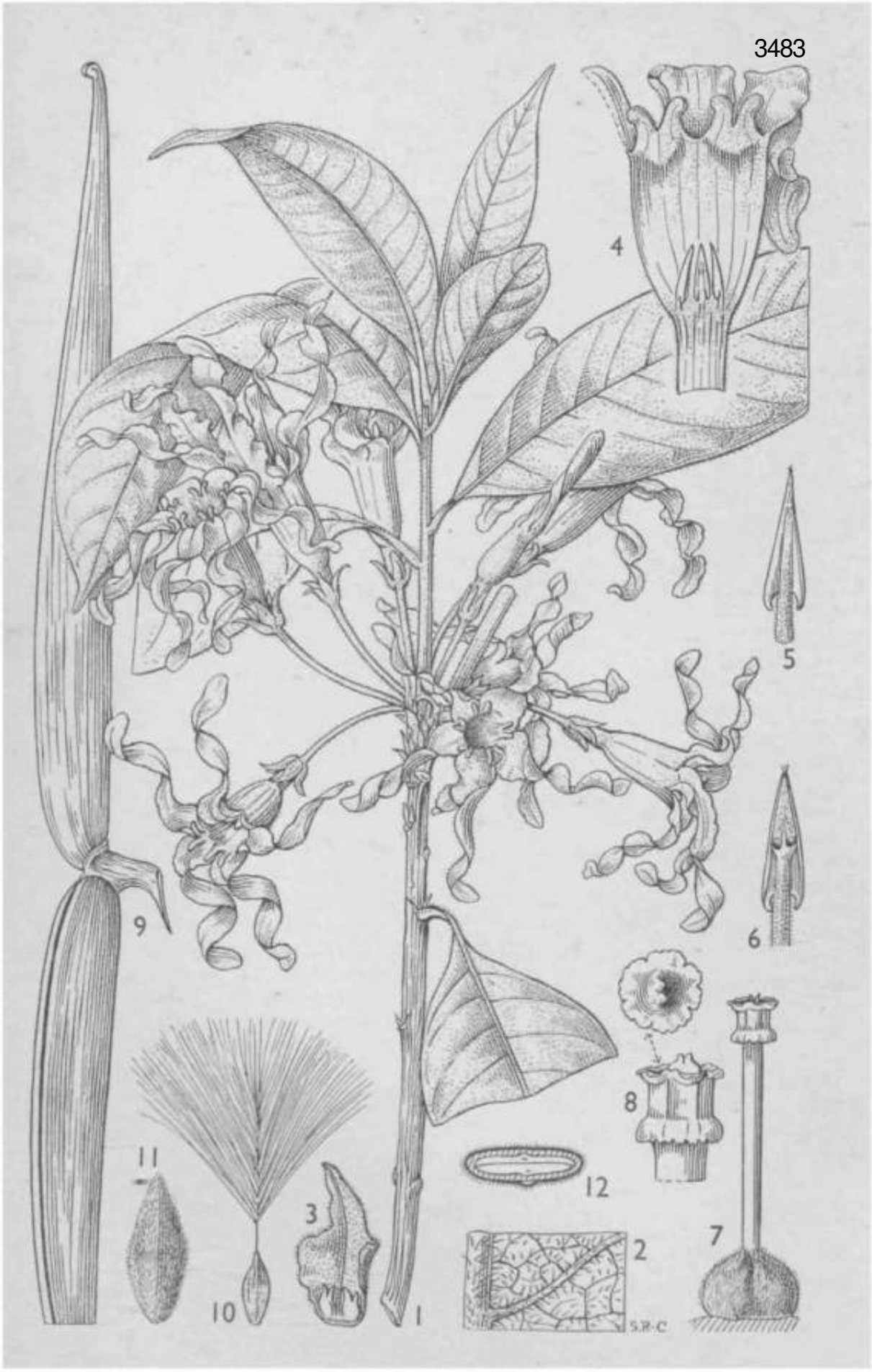
The position of this new genus is somewhat puzzling. The valvate aestivation of the corolla lobes, the bilocular ovary with its thin dissepiment and solitary ascending ovules, and the one-seeded berry assign it a place in the *Coussareae.* It differs, however, from the other genera belonging to this tribe in the 5-merous instead of 4-merous flowers and in the totally different stipules with their long and narrow, fimbriate sheath. The stipules found in the other genera are provided with a sl^prt sheath and end in a single awn. So far the tribe was, moreover, not known outside Tropical America. The presence of raphides in the

* In addition to the four specimens examined by Dr. Brcraekamp, which are marked " ! ", a number of other specimens at Kew have been added, with his permission, to the enumeration.

endocarp is another point of resemblance between the African plant and the American representatives of this tribe, but as raphids are found also in the *Psycliotrieae* and some allied groups, this is a point of secondary importance.

The peculiar venation of the new genus is also met with in some species of *LasianthuSy* a genus belonging to the nearly related *Psychotrieae*. The latter, however, differ conspicuously from our genus in the structure of the fruit, the endocarp being stony. The ovary of *Lasianthus* is, moreover, plurilocular, and its drupe contains several pyrenes.

C. E. B. BREMEKAMP.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TABULA 3483.

STROPHANTHUS BOIVINI *Bailhn.*

APOCYNACEAE. Tribus ECHITOIDEAE.

S. boivini *Bailhn* in Bull. Soc. Linn. Paris, i. 757 (1888); Franch. in Morot, Journ. Bot. vii. 320 (1893) et Nouv. Arch. Mus. Paris, sér. 3, v. 252, t. 7 (1893); Payrau, Strophanthus, 107 (1900); Gilg in Engl. Monograph. Afrik. Pfl.-Fam. vii. 10 (1903); Jumelle et H. Perrier in Ann. Mus. Col. Marseille, sér. 2, viii. 461, t. 10 (1910). *S. arboreus* Boivin ex Franch. in Nouv. Arch. Mus. Paris, I.e., *nomen. S. aurantiacus* Hort. ex Duncan, Cat. PL Roy. Bot. Gard. Mauritius, 88 (1863), *nomen*; Teijsm. et Binnend. Cat. PI. Hort. Bot. Bog. 127 (1866); Murton, Cat. PL Cult. Bot. Gard. Singapore, 20 (1879); Cantley, Cat. PL Roy. Bot. Gard. Mauritius, 69 (1880); Gleeson, Cat. Agri-Hort. Soc. Madras, 71 (1884); R. Blondel, Strophantus du Commerce, 11 (1888); Christy, New Commercial Plants and Drugs, xi. 86 (1889); Gleeson, Cat. Agri-Hort. Soc. Gard. Madras, 23 (1898). *Roupellina boivini* (Baill.) M. Pichon in Mém. Inst. Sci. Madag., sér. B, ii. 62 (1949): Perr. in Rev. Bot. Appl. xxx. 15 (1950). In sectione *Roupellina* Baillon *Strophantho grevei* Baillon affinis, sed floribus paucioribus ramulorum apici insidentibus foliis et corollis necnon ovariis undique minute pubescentibus differt.

Arbor parva, circiter 4 m. alta, ramis patentibus, ramulis teretibus leviter longitudinaliter striatis lenticellatis, cicatricibus foliorum delapsorum conspicuis. *Folia* petiolata, in ramulis junioribus aggregata; lamina 10-14 cm. longa, 3-5 cm. lata, plerumque oblanceolata, interdum plus minusve elliptica, acuta, basi cuneata, integra, subcoriacea, utrinque (praesertim venis) minute puberula, costa supra leviter canaliculata, nervis primariis 14—16-jugis distinctis ad marginem attingentibus, reticulatione plus minusve conspicua; petiolus 5-10 mm. longus, puberulus; stipulae parvae, ovato-lanceolatae, subacuminatae, squamiformes. *Inflorescentiae* terminales, corymbosae, e cymis 8-12-floris compositae, pedicellis 1-5-2 cm. longis tomentosis. *Calyx* alte 5-partitus, lobis 4-5 mm. longis 1 mm. latis anguste ovato-lanceolatis acutis puberulis basi intus glandulis parvis binis praeditis. *Corolla* laete aurantiaca, tubo 13-14 mm. longo late campanulato sed basi anguste cylindrico, extra sparse minute puberulo, intus minute papilloso, venulis circiter 20 parallelis longitudinaliter percurso ; lobis patentibus 2 cm. longis loratis, apice late obtusis, in medio crassioribus, minute

FIG. 1, flowering branch, *natural size*: 2, part of lower surface of leaf, X 8 • 3, inner calyx-segment, with processes at the base, X 4; 4, part of corolla and androecium, X 2 ; 5, stamen, dorsal view, x 6 ; 6, the same, ventral view, x 6 • 7, gynoecium, X 6; 8, stigma in side and top views, x 12 ; 9, fruit, *natural size]* 10, seed, *natural size* ; 11, seed with the coma removed, x 2 ; 12, seed in transverse section, X 4.

puberulis pulchre contortis atque rugosis, basi appendicibus binis parvis obtusis squamiformibus parvis praeditis. *Stamina* 5, prope basin tubi conferta, supra gynoecium hoc modo obtectum arcuata, filamentis brevibus minute puberulis, antheris 3 mm. longis acutis sagittatis. *Carpella* 2, libera, late ovoidea, circiter 2 mm. longa, puberula, stylis 4-5 mm. longis coalitis, stigmate communi breviter cylindrico in medio constricto apice minute bilobato. *Folliculi* anguste elongato-lanceolati, glabri, 11-5-17 cm. longi, 1-2-5 cm. lati, apice complanati ac obtuse bilobi, pericarpio lignoso duro. *Semina* complanata, ovato-elliptica, cinerea, 9-11 mm. longa, circiter 3 mm. lata, coma 3-3-5 cm. longa pallide brunnea praedita.

MADAGASCAR. North Madagascar, bay of Rigny and Diégo-Suarès, Oct. 1848, *Boivin* 2462 (typus in Herb. Mus. Paris.). M. Pichon kindly informed me that on the type sheet another printed label was apparently put later, giving a different locality: " Madagascar, Sainte-Marie; Boivin 1849." This locality, although cited by both Franchet and Gilg, is floristically different and in all probability an error *{fide* Pichon). Madagascar, *Baron* 6830 in Herb. Kew (specimen rather poor and does not agree exactly with the specimen from the cultivated plants.

INDIA : Cultivated in Madras, Agri-Hort. Garden, June 1885, *Gamble* 16302 ; *Lady Bourne* s.n.; Bombay, Victoria Gardens, *D. S. Land* s.n.; 15 July 1947, *D. L Ahmadi* s.n.

Previously cultivated in Mauritius, **Java and** Singapore.

This plant has had an interesting history. Although it was not described until 1888 by Baillon and was referred to again by Franchet in 1893, the plant was in cultivation in Mauritius as early as 1859 under the horticultural *nomen nudum, Strophanthus aurantiacus.* This name was used in that year by James Duncan in a list of plants sent to Kew which is preserved in the manuscript letters of Kew Collectors (vol. ix. 116 in the Library of the Royal Botanic Gardens, Kew). Duncan was the curator of the Royal Botanic Garden, Mauritius, from 1849 to 1865, and it appears that this plant was introduced into Mauritius from Madagascar during his time. Nothing is definitely known about the details of this introduction, neither is it known who gave to it the specific name *aurantiacus.* Duncan published this name in 1863 in his catalogue (I.e.) where the country of origin of the plant is given as Madagascar. It is probable that it was distributed from Mauritius to Java, Singapore and India. In some of the catalogues of these countries the source of the plant is given as Mauritius (which means the immediate source from which the plant had been obtained). Gleeson in his catalogue of 1884 gives its native country as Madagascar, but in his 1898 edition of the same catalogue the native country is changed and ascribed to Mauritius—apparently following Murton's Singapore catalogue (I.e.). Incidentally an English name " Corkscrew flower " is suggested for this plant by Gleeson in 1898. This name also appears on one of the sheets collected from Madras and now in the Kew Herbarium.

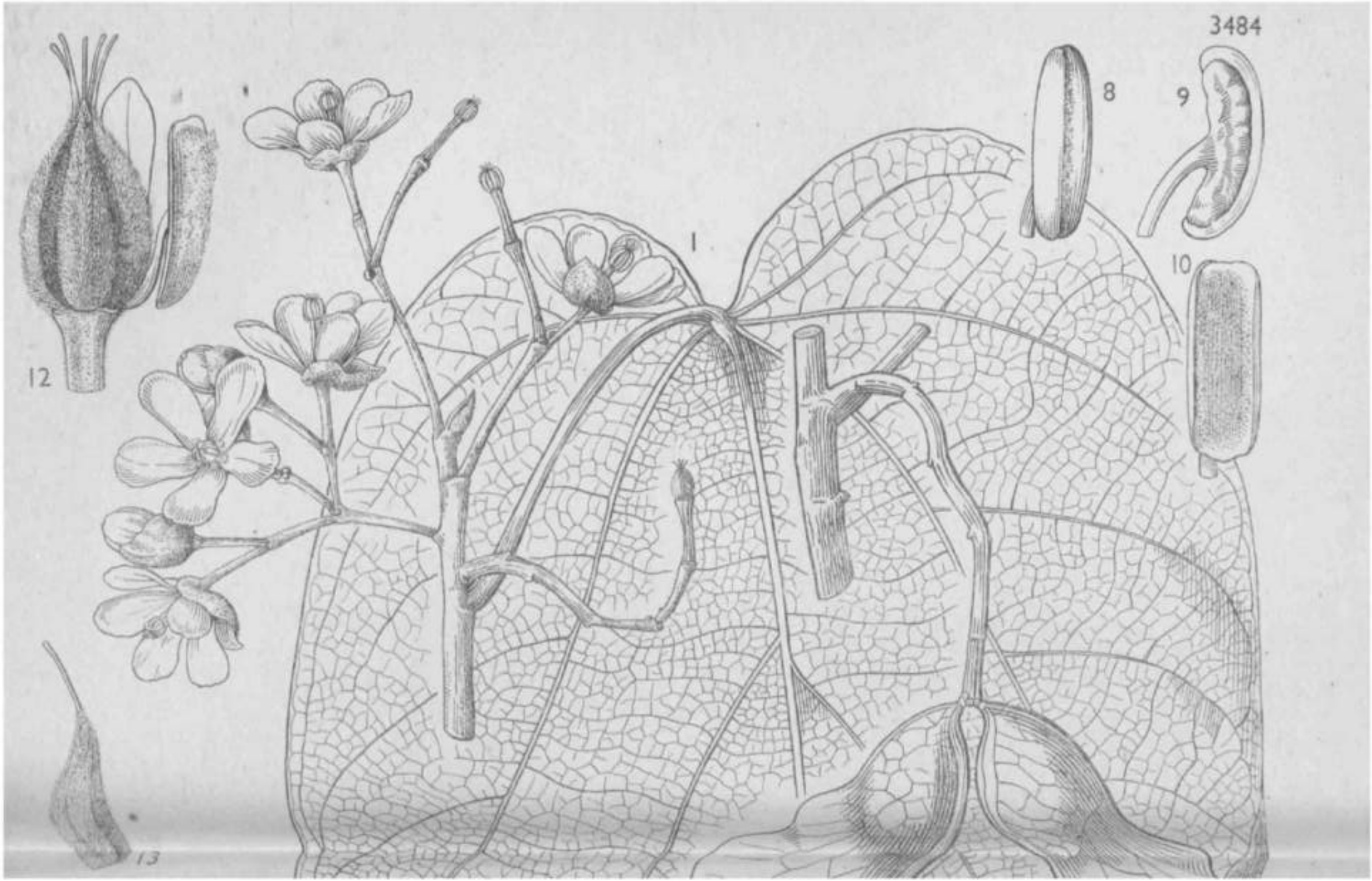
Both Christy and Blondel became interested in the genus *Strophanthus* from the medicinal point of view about the years 1887-S9. Blondel had seen the private herbarium of Christy's which the latter had assembled from various parts of the world (Christy, I.e. 82). There was amon^ them a named specimen of *Strophanthus aurantiacus* which Christy received from Java *via* Holland. This specimen is referred to by Blondel, who was not sure about the exact source of the plant, as " le *Strophanthus aurantiacus* qui parait pousser à Java et à Madagascar " (I.e.). This reference appears in Index Kewensis under the name *S. aurantiacus.*

There is one fragmentary specimen of *Baron* no. 6830 in the Kew Herbarium which was collected in Madagascar prior to 1905. This is the only sheet which agrees fairly well with sheets from India. Baron's plant gave stronger grounds for assuming the native country of the cultivated plant (from India) to be Madagascar. As it was known that an account of the *Apocynaceae* of Madagascar was being prepared at Paris, the cultivated Indian specimen was sent to the Muséum National d'Histoire Naturelle, Paris, in the hope that they might be able to match it with gatherings in their rich collection from Madagascar. I was informed by Monsieur Pichon that the Indian plant agreed exactly with the typical variety of *S. boivini* Baillon.

In the original descriptions of *S. boivini* Baill. neither Baillon nor Franchet made any reference to the plant cultivated in tropical parts of Asia under the name *S. aurantiacus.* It was therefore thought desirable to correlate the two names for the first time here and publish a figure with a fuller description.

This plant belongs to the section *Roupellina* Baillon, a section which is characterized by the absence of caudate or filiform prolongations of the corolla lobes. It is also interesting to note that the section is confined to Madagascar.

I am greatly indebted to Mr. J. R. Sealy for the information concerning the early history of this plant. I am also grateful to Dr. D. I. Ahmadi of the Victoria Gardens, Bombay and to Professor H. Humbert and Monsieur M. Pichon of the Muséum National d'Histoire Naturelle, Paris, for their kind and generous help in connection with the identity of this plant.—D. CHATTERJEE.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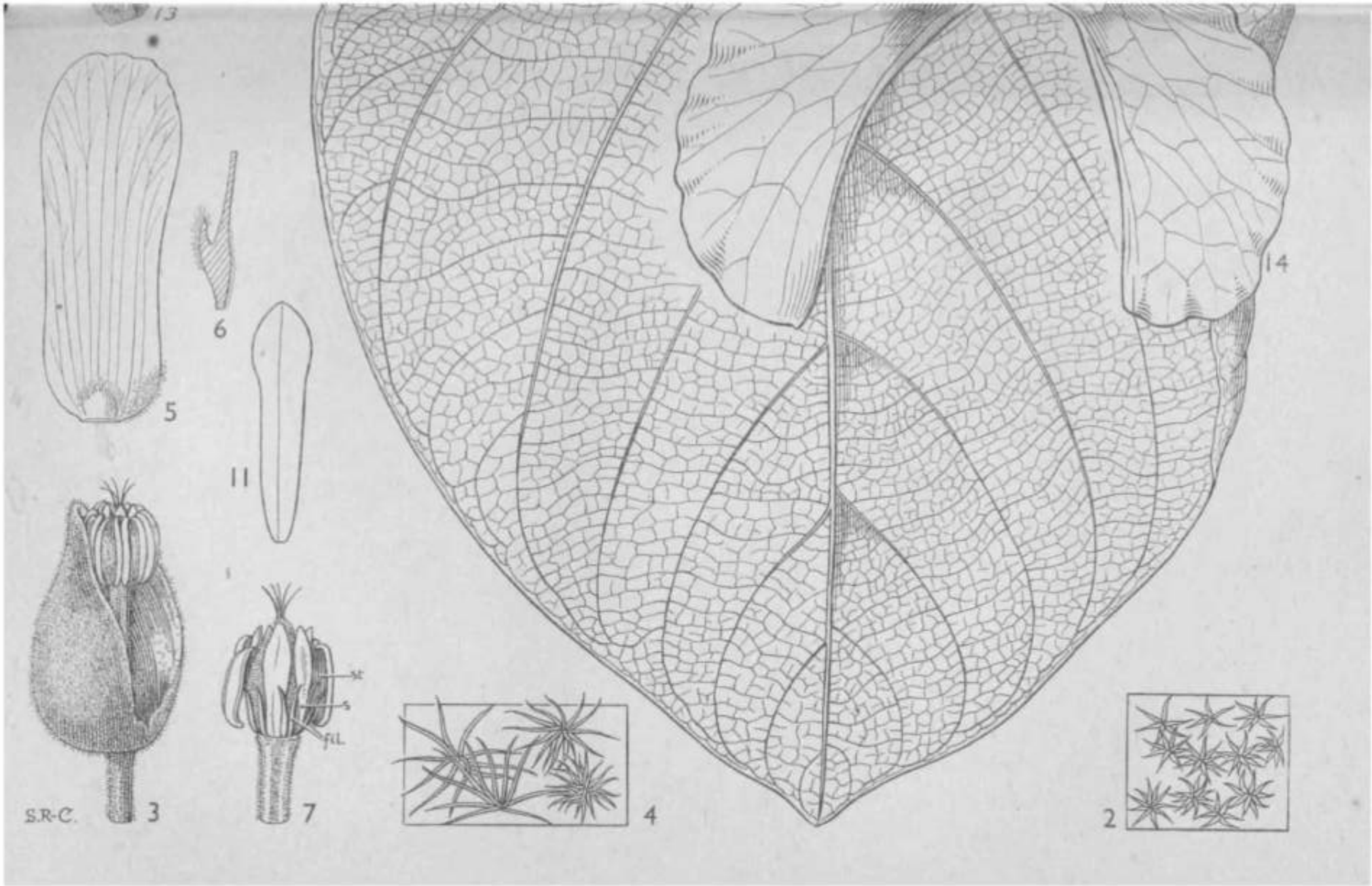
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TABULA 3484.

MANSONIA DIPIKAE *Purkayaslha.*

STERCULIACEAE. Tribus MANSO^IEAE.

M. dipikae *Purkayastha* in Ind. Forester, lxxiii. 14 (1947); species facie *M. altissimae* (A. Chev.) A. Chev. propinqua, foliis paene glabris, ramulis novellis petiolis et axibus inflorescentiarum pulverulento-tomentellis, inflorescentiis laxis, alabastris majoribus, floribus pauciori-bus majoribusque, petalis apice haud bi- vel tridentatis, androgynophoro secundum totam longitudinem in angulis tomentello, corpore samarae majore minute sed dense pulverulento neque subglabro plane differt.

Arbor sempervirens, procera, 25-35 m. alta, trunco circiter 3 m. peripheria; cortex cinereo-albus, fissuris longitudinalibus notatus (teste specici auctore). *Ramuli* obscure brunnei. *Folia* novella sparse stellato-pilosa (radiis pili cuj usque 7-9), mox glabrescentia, crenulata, matura subcoriacea, ovato-oblonga vel elliptico-oblonga, apice subacuta, basi cordata subcordata vel truncata, 15-25 cm. longa, 8-15 cm. lata, margine integra vel subintegra, lamina utrinque paene glabra; nervi primarii plerumque 5, e basi folii palmatim patuli et in margines per-currentes ; petioli 3* 5-6* 5 cm. longi, teretes, pubescentes; stipulae haud visae. *Inflorescentiae* plerumque terminales, subcorymboso-paniculatae ; pedunculi inflorescentiarum partialium 3-5 cm. longi, divaricati; pedicelli 7-15 mm. longi, dense pallide brunneo-tomentelli, basi saepe glandulis sessilibus pulviniformibus siccitate atrobrunneis vel nigris ornati; bracteolae non visae. *Flares* expansi circiter 2 cm. diametro. *Calyx* spathaceus, late ovatus, 10-13 mm. longus, 10 mm. latus, extra more pedicellorum vestitus, intus glaber, venulis multis percursus. *Petala* 5, imbricata, obovata usque elongato-obovata, 10-13 mm. longa, circiter 4 mm. lata, papyracea, fere glabra, prope basin puberula incrassata et nectario squamiformi nisi alabastro haud conspicuo praedita, sed haud unguiculata, apice subintegra, repanda, rotundato-subtruncata. *Androgynophorum* 5-7 mm. longum, rectum, 4-5-costatum, in costis tomentellum. *Stamina* 10; filamenta quam antherae breviora ; antherae monothecales, lineares, 3-4 mm. longae, rima longitudinali dehiscentes; connectivum dorso incrassatum, glabrum ; staminodia 5, intra stamina fertilia posita elongato-spathulata, subacuta, 3-4 mm. longa, 0-5 mm. lata, glabra, venula media percursa. *Carpella* 5, oblique elongato-ovoidea, 2-2-5 mm. longa, extra ubique

Fio. 1, flowering twig with leaf attached, *natural size;* 2, hairs on young leaf (both surfaces alike), X 24; 3, flower with petals removed, x 3 ; 4, hairs on calyx X 24 ; 5, petal, inner surface, X 4; 6, longitudinal section through base of petal, X 8 ; 7, flower with calyx, petals and four anthers removed, X 4 ; 8, 9, 10, stamen, front, side, and front view after dehiscence, respectively, x 8; 11, staminodc, x' 8, 12, gynoecium with one stamen and one staminode, X 8; 13, carpel, x*8; 14, fruit, *natural size;* (fil. = filament, s. = staminode, et. = stamen).

tomentella, apice in stylum filiforme 1-1-5 mm. longum glabrum transeuntia, stigmatibus apicalibus minimis stylo haud crassioribus. *Fructus* e 1-5 samaris patulis 7-8 cm. longis 2*5 cm. latis compositus, samaris praesertim in corpore dense pulverulentis alis conspicue reticulato-venosis. *Semen* unum pro samara, embryone leviter curvato, cotyledonibus plus minusve plicatis.

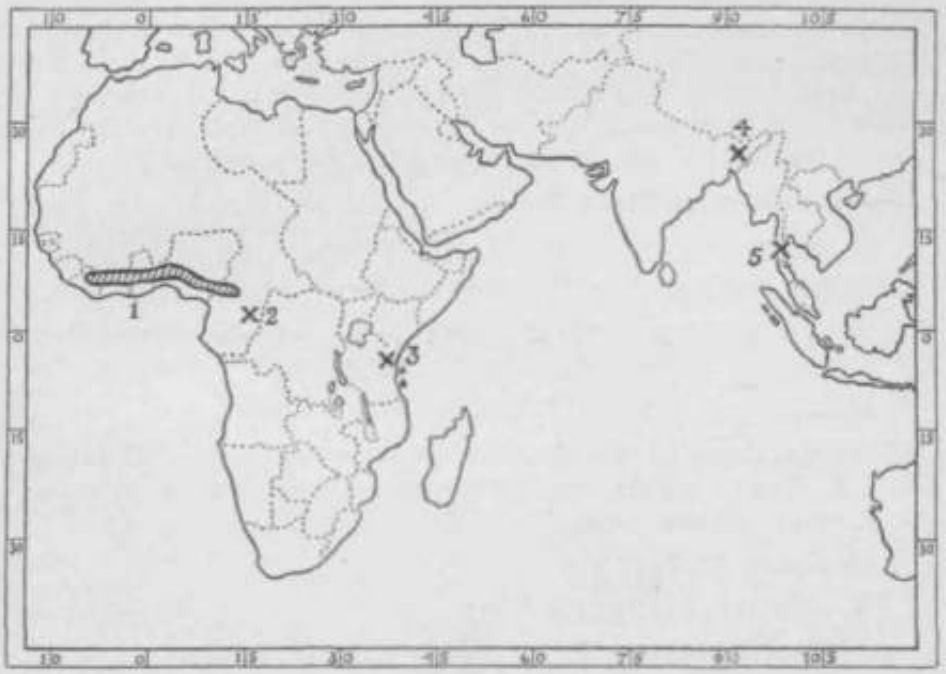
India. Assam, Naga Hills, Bangapahar, Ehapa Nala area, 13 June 1945, *C. S. Purkayastha* 21868 ; Jan. 1945, C. *S. Purkayastha* 21865; June 1947, *C. S. Purkayastha* s.n. (two sheets).

Since the publication of the original account of this species *(I.e.),* Mr. Purkayastha has kindly presented to the Kew Herbarium the above four sheets of this interesting and remarkable species. Unfortunately, it appears to us that the original account, since it contains some serious discrepancies, must have been hurriedly drawn up, and the accompanying illustration is very sketchy and inadequate. In view of the impoitance of *Mansonia* as a genus of timber-trees, and of its remarkable distribution, it seems very desirable to publish an emended and enlarged description of *M. dipikae,* together with a plate. Some of the original discrepancies should be mentioned. Mr. Purkayastha separates *M. dipikae* from *M. altissima* by the presence in the former of the pulviniform glands on the inflorescence; but these glands are not only clearly present in *M. altissima* but in all the other species of the genus. This character, together with that of extrorsely dehiscing anthers which *M. dipikae* shares with its congeners, should be added to the generic description of *Mansonia.* Through a typographical error the calyx of *M. dipikae* was stated to have stellate hairs " 12-13 cm. long " ; in fact the hairs are very minute and scarcely exceed 0*5 mm. in length. In the original illustration of the androgynophore *(I.e.,* fig. 4) the flattened staminodes appear to be external to the fertile stamens and reflexed, whereas they are arranged inside the fertile stamens and are erect. The filaments are shown (fig. 5) as equalling the anther-thecae in length, and the ovary (fig. 7) as thinly hairy ; in fact the filaments are very short, never exceeding half the length of the thecae, and the ovary is densely tomentellous.

Brenan has recently published (Hook. Ic. PL, t. 3451 : 1947) an account of another remarkable new species from East Africa, *M. diatomanthera* Brenan. In connection with this it may be recalled that when the type-species of *Mansonia, M. gagei,* was discovered in South Burma it was at first thought that it belonged to the genus *Triphchiton,* now also placed in the tribe *Mansonieae.* In a letter to Kew dated 6 Jan. 1905, Drummond wrote from Calcutta : "If the Tenasserim plant *[Mansonia gagei* J. R. Drumm. ex Pram] be congeneric with *Triphchiton* of K. Schumann, then the geographical range is about the same as that of some sections of *Sterculia* and, though no intermediate stations are known here, the genus may be represented in East Africa or

the Mascarene **Islands/'** It is remarkable that with the **discovery** of *M. diatomanthera* in 1941 Drummond's conjecture waa **verified.**

The distribution of" tin- **knows** species of *Mansonia* is given in the following map:—



Geographical distribution of the **seam** *Maiimnia,* Area of .)/. *altimimn* repre-wiitfi! !i\ liati-liiiijjt; looalitias **of other spades, ewdiof which baa been toranJonlj** onoe, given by crosses. **1,** *M.* **nBtMtma** {including var, ***kamenmim), 2, if.*** *nympfiarifotia.* 3, il/. *diutouuttillu I>I.* (. .]/. *dipikae.* 5, ^f. *gagei.*

It will be seen from the **above** that the occurrence of **the genus id,** in general, associated with simitar ecological conditions, of which the more or less heavy rainfall allowing the development of rain- or mon>oon-forest is perhaps the **most** significant. Although the locality of *M. diatonmntficru* is now in a drier zone, the **presence** of various species belonging to typically forest-zone genera suggests that the coastal belt of S. Kenya and"Tanganyika Territory had **a** considerably **higher** rainfall ***whsa*** the **genera in question** reached there; ***Gittanthera, DiaMttm,*** *T'l/mra, Hirielhi, Oldfieldia* and *Octolwewt may* **be** mentioned as additional examples **of Bach** genera.

Brenan *(I.e.)* has suggested that all the species of *M(ii<«>!>i>t* may be distribute I umlcr three subgenera. The discovery of *M.* ***dipikae*** makes a reconsideration of this arrangement desirable. In facias *M. dipikae* is, Surprisingly, clearly more related to the African .1/. **ottMMUl** than to its Asia• lie congener *M. gagei : M.* ***dipikae*** has. however, the [iHats round mi at the **apex** and not miguiculate at the base, in these points agreeing with *M.* ***gagei*** ; at the base of the petal there is a small .scale-like nectary **with**

ciliolate margin, a character similar to *M. altissima* ; in bud this nectary appears as a Tittle flap, free on its anticous side, but in the open flower it seems to cohere to the petal, perhaps owing to sticky ooze, and its structure is thus not clear. *M. dipikae* thus partially breaks down the characters of petal morphology used by Brenan *(I.e.)* to separate the subgenera *Eu-Mansonia* and *Achanlia.* Only the differences in facies, the relative length of anthers and filaments and the presence or absence of a nectary are left. The embryos of *M. altissima* and *M. dipikae* are remarkably similar, and though that of *M. gagei* is still unknown, it appears that *Achantia* should not be given higher rank than that of a section, and the following emended classification is proposed :—

Subgenus **Diatomanthera** Brenan

M. diatomanthera Brenan, the only species.

Subgenus **Mansonia** *(Eu-Mansonia* A. Chev.)

(i) Section **Mansonia,** sect. nov.; petala basi sine nectario squamiformi, filamenta quam antherae multo longiora.

M. gagei J. R. Drumm. ex Prain, the only species.

(ii) Section **Achantia** (A. Chev.) Chatterjee, sect, et stat. nov. *(Achantia* A. Chev.) ; petala basi nectario squamiformi praedita ; filamenta - quam antherae multo breviora.

M. dipikae Purkayastha

M. altissima (A. Chev.) A. Chev.

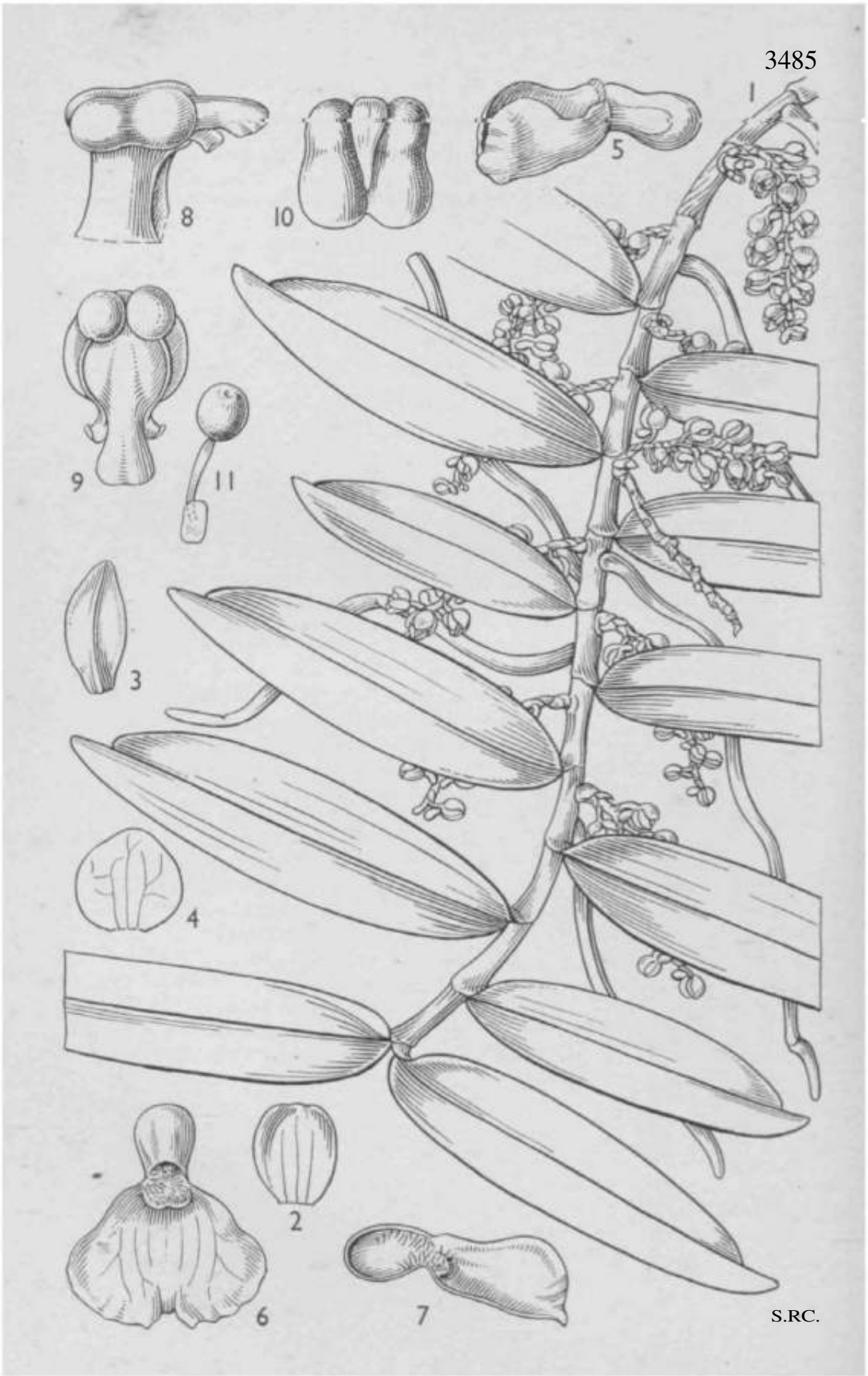
*var. *kamerunica* Jacques-Félix

M. nymphaeifolia Mildbr. (No material seen, hence position doubtful).

In view of the fact that a proposal was passed at the International Botanical Congress in 1950 requiring that subgenera containing the type-species of a genus shall repeat the generic name unaltered, we have brought our nomenclature into conformity with this.

D. CHATTERJEE, J. P. M. BRENAN.

*** *M. aUissima* var. *kamerunica* was described by Jacques-Félix in Rev. Bot. Appliqué, xxv. 236 (1945). We have not seen authentic material, but it is probably the same as the variant of *M. altissima* from the British Cameroons discussed by Brenan in Hook. Ic. PI., t. 3451, p. 5 (1947); and also the specimens referred to *M. altissima* by Mildbraed in Notizbl. Bot. Gart. Berlin, vii. 489 (1921).**



S.RC.

TABULA **3485.**

RHIPIDOGLOSSUM DENSIFLORUM *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

R. densiflorum *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xii. 91 (1945). Affine *R. obanensi* (Rendle) Summerh., a quo foliis apice valde inaequaliter bilobatis lobo longiore acuto lobo breviore fere nullo, floribus paulo majoribus, sepalis lateralibus quam intermedio longioribus angustioribusque, labello late orbiculari vel flabellato-orbiculari apice leviter exciso basi ante ostium calcaris callo transverso perhumili instructo satis distinguendum.

Herba epiphytica; caulis elongatus, usque ad 40-45 cm. longus, 2-3-5 mm. diametro, teres, superne multifoliatus, inferne vaginis foliorum delapsorum partim circumdatus, radices numerosas flexuosas ramosas laeves 3-4 mm. diametro emittens. *Folia* adscendentia vel fere patentia, 1-2 cm. distantia ; vagina inferne arcta, superne subdilatata, leviter compressa, valde nervosa, apice truncata, 1-2 cm. longa; lamina oblanceolata, oblongo- vel elliptico-lanceolata vel anguste lanceolata, apice valde inaequaliter bilobata, lobulo longiore leviter incurvato acuto 2-10 mm. longo, lobulo breviore brevissimo vel fere nullo, basi angustata, 4-12 cm. longa, 8-23 mm. lata, siccitate multinervosa, tenuiter coriacea. *Inflorescentiae* singulae vel geminae, foliis multo breviores, 1-4 cm. longae, fere ad basin dense multiflorae, basi vaginis paucis ovatis obtusis instructae ; rhachis teres ; bracteae vaginantes, superne dilatatae, truncatae vel subacutae, vix 1 mm. longae, 1-2 mm. distantes. *Flores* patentes, albi vel pallide cremei, eos *Convallariae majalis* revocantes, tepalis ± conniventibus; pedicellus cum ovario 2-3 mm. longus. *Sepalum* intermedium late ellipticum, apice obtusum vel rotundatum brevissime apiculatum, 2-4-2-8 mm. longum, 1-7-1-9 mm. latum, concavum, trinervium; sepala lateralia oblique late elliptico-lanceolata, apice subacuta vel obtusa, 3-3*5 mm. longa, 1 -3—1-7 mm. lata, 1-3-nervia. *Petala* suborbicularia, apice obscure apiculata, 2-25-2-75 mm. longa, 2-2-6 mm. lata, trinervia, nervis lateralibus ramosis. *Labellum* late orbiculare, flabellato-orbiculare vel fere transverse ellipticum, apice excisum, antice subtruncatum vel rotundatum et brevissime bilobatum, 2-75-3-75 mm. longum, 3-5-4-7 mm. latum, multinervosum, basi ante ostium calcaris callo transverso perhumili leviter emarginato instructum; calcar e basi angustiore dilatatum, ellipsoideum, apice rotundatum, 2-3 mm. longum, circiter 1-75 mm. diametro, intus prope ostium pilis patentibus instructum.

FIG. 1, flowering stem, *natural size*; 2, dorsal sepal, X 6 ; 3, lateral sepal, outer surface, x 6; 4, petal, X 6; 5, lip, lateral view, X 6; 6, the same, front view, spread out, x 6 ; 7, lip, longitudinal section, X 6 ; 8, column, lateral view, X 18; 9, the same, from above, anther removed, X 18 ; 10, anther, seen from above, X 18; 11, pollinium, x 18.

Columna deflexa, crassa, antice excavata, apice tnmcata, 1-1-25 mm. longa, androclinio leviter excavato ; anthera oblonga, valde convexa, antice truncata; pollinia subsphaeroidea vel ellipsoidea, circiter 0«5 mm. longa, stipitibus duobus subspathulato-ligulatis deorsum angustatis 0*75 mm. longis, viscidiis duobus elliptico-oblongis antice truncatis postice rotundatis; rostellum trilobatum, lobo intermedio porrecto carnoso subspathulato, lobis lateralibus intermedio brevioribus rotundato-triangularibus ; fovea stigmatica quadrata. *Capsulae* ellipsoideae, inferne angustatae, leviter curvatae, 1-1-25 cm. longae, 5 mm. diametro.

UGANDA. Bunyoro, Budongo Forest, Sept. 1933, *Eggeling* 1431 (Uganda Forest Service No. 1376); Sept. 1935, *Eggeling* 2172 ; same date, *Hancock* 13A ; Nov. 1943, in fruit, flowered Busingiro Aug. 1944, *Eggeling* 5475 ; Bugoma Forest, 1050 m. alt., *Dawe* 759; Masaka, South Buddu, *Fyffe* 187 ; Mengo, Kyagwe, Sept. 1921, *Lankester* 29 ; Mabira Forest, 1200 m. alt., Sept.-Oct. 1920, *Būmmer* 4438.

GABON. Upper Ngounyé Eiver, waterfall on Mboumi River, at Mbigou, Nov. 1925, *Le Testu* 5767 (type).

ANGOLA. Moxico Distr., River Lupula, in evergreen vegetation, Jan. 1938, *Milne-Redhead* 4239.

This species, although placed provisionally in the genus *Rhipidoglossum,* shows points of resemblance to the genera *Sarcorhynchus* and *Diaphananthe.* In the orbicular petals and general lip-shape it possesses features characteristic of *Rhipidoglossum,* whereas the leaf shape and tendency to blacken on drying are reminiscent of *Sarcorhynchus.* Technically the species falls into *DiapJiananthe* on account of the rim-like callus at the mouth of the spur, but it shows little resemblance to this genus in other respects. Recent work on species of this affinity suggests, however, that the presence or absence of a callus is not of generic significance.

It is clear from this and other evidence that the three genera are closely allied, but more research is necessary before a definite decision in the matter can be made.—V. S. SUMMERHAYES.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TABULA 3486.

DIAPHANANTHE PULCHELLA *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

D. pulchella *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. zii. 103 (1945). A. *D. stolzii* Schltr. caule multo breviore, foliis longioribus angustioribusque, inflorescentiis longioribus, floribus minoribus, tepalis obtusissimis vel rotundatis; a *D. ugandensi* (Rendle) Summerh. floribus majoribus, labello subflabellato distinguenda.

Herba epiphytica, pulchella; caulis brevis vel ± elongatus, ± dependens, usque ad 13 cm. longus, 3-4 mm. diametro, superne dense 4-9-foliatus, inferne vaginis foliorum delapsorum fere omnino circumdatus, radices flexuosas ramosas, griseas, laeves, 4-6 mm. diametro per totam longitudinem emittens. *Folia* circiter 7-5 mm. distantia, patentia ; vagina arcta, leviter compressa, valde nervosa, 5-10 mm. longa; lamina oblongo-ligulata, ligulata vel lineari-ligulata, apice inaequaliter bilobulata, lobulis rotundatis vel obtusissimis longiore 4-11 mm. longo, basi leviter angustata, 4-5-15 cm. longa, 7-11 mm. lata, ± coriacea. *Injlorescentiae* ex axillis foliorum vel foliorum delapsorum exortae, singulae, simpliciter racemosae, dependentes, 6-15 cm. longae, sublaxe multiflorae ; pedunculus 1-2 cm. longus, vaginis paucis ovatis subacutis instructus ; rhachis teres, circiter 1 mm. diametro ; bracteae 6-9 (-13) mm. distantes, ochreatae, ovato-triangulares, acutae, 1-5-3 mm. longae. *Fhres* patentes, pallide viridi-lutei, cremei-viridescentes vel viridescentes, translucentes; pedicellus cum ovario 3-4 mm. longus. *Sepalum* intermedium erectum, concavum, ellipticum, oblongo-ellipticum vel obovato-ellipticum, apice obtusissimum vel rotundatum, 4'75-7-25 mm. longum, 2-5-3-75 mm. latum ; sepala lateralia leviter curvatim oblonga vel elliptico-oblonga, apice rotundata, 5-75-7-5 mm. longa, 2-3-5 mm. lata; sepala omnia trinervia, nervis lateralibus saepius ramosis. *Petala* oblique ovata vel lanceolato-ovata, apice breviter acuminata, marginibus superne irregularibus vel fere denticulatis, 4-25-7-25 mm. longa, 3-4-75 mm. lata, 3-5-nervia, nervis lateralibus ramosis. *Labellum* late flabellato-suborbiculare, apice ± excisum apiculo saepe interjecto, antice obscurissime tri- vel quadrilobatum, marginibus irregulariter denticulatis vel excisis, totum 6-9-25 mm. longum, 7-25-10 mm. latum, nervis numerosis ± radiantibus, ante orificium calcaris calloerecto dentiformiinstructum ; calcarincurvatum, ex ore latiore angustatum, deinde fusiformi-cylindricum, apice angustatum, 8-5-11-5 mm. longum. *Columna* incurvatim porrecta, crassa, subteres, 1-8-2-8 mm. longa, apice truncata, androclinio leviter

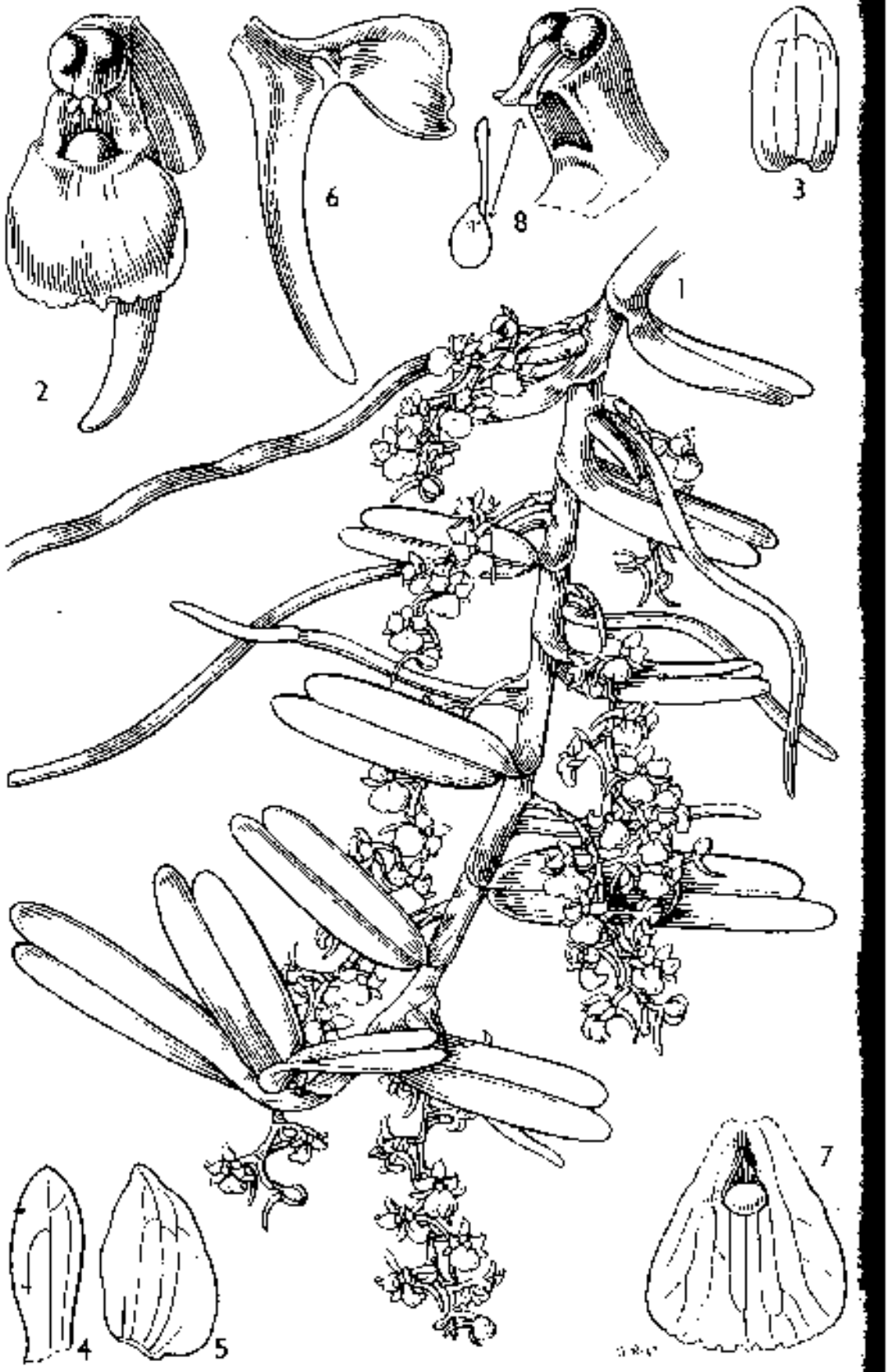
FIG. 1, flowering stem, *natural size ;* 2, dorsal sepal, X 4; 3, lateral sepal, x 4 ; 4, petal, X 4; 5, lip lamina, spread out, X 3 ; 6, column in three-quarter profile, X 8; 7, same, front view, stamen removed, X 8; 8, pollinarium, with two views of viscidium, x 12.

excavato; anthera subhemisphaerica, antice producta truncata; pollinia subsphaeroidea vel pyriformi-sphaeroidea, 0* 65-0* 8 mm. diametro, stipitibus linearibus superne leviter dilatatis inferne subulatis 1-05-1-4 mm. longis, viscidiis duobus distinctis orbicularibus vel sublunatis; rostellum convexum, antice productum, trilobatum, lobo intermedio leviter spathulato carnoso, lobis lateralibus dimidio brevioribus incurvatim triangularibus acutis; fovea stigmatica elliptico-quadrata.

KENYA COLONY. Mt. Elgon; Kitale, Caves of Elgon Farm, 2010 m. alt., May 1931, *Tweedie* 10; same locality, 2160 m. alt., on *Acacia* at edge of forest, May 1941, *Tweedie* 571; Suam Saw Mill, 2370 m. alt., edge of forest, high up on *Podocarpus gracilior,* May 1941, *Tweedie* 570; no local., 1800 m. alt., in forest, Feb. 1933, *Napier,* Coryndon Mus. No. 2524; Ngong, 10 miles W. of Nairobi, 1800 m. alt., Nov. 1938, *Cunningham-van Someren* 512.

TANGANYIKA TERRITORY. Masai-land, 50 miles S. of Moshi, Lolbeni Mt., in rich primary forest, April 1943, *Page-Jones in Moreau* 569; W. Usambara Mts., eastern edge, Mazumbai, 1350 m. alt., forest edge, March 1943, *Moreau* 611; E. Usambara Mts., Amani, 900 m. alt., in rain-forest canopy, April 1942, *Moreau* 64 (type); Tanga Prov., Handeni, 45 miles S.W. of Korogwe, 720 m. alt., in semi-evergreen bush, March 1943, *Moreau* 610.

D. pulchella is evidently most closely related to *D. ugandensis* (Rendle) Summerh. which has smaller flowers with a differently shaped lip. This latter organ is more or less orbicular, the basal margins being rounded but entire whereas in the apical part they are irregularly toothed. At the apex is a broad sublunate truncated sinus with a small central apiculus. In *D. pulchella* the basal part of the lip is distinctly cuneate-flabellate while the front margins are irregularly dentate and more or less obscurely trilobed, the middle lobe being narrowly and sometimes rather deeply incised to form two sub-lobes which give a four-lobed appearance to the whole. The narrow apical sinus or cleft has sometimes a small central apiculus.—V. S. SUMMERHAYES.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TABULA 3487.

DIAPHANANTHE SUBSIMPLEX *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

D. subsimplez *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xii. 107 (1945)— A *D. stolzii* Schltr. foliis angustioribus, floribus multo minoribus, labello suborbiculari-quadrato apice obscurissime trilobo ; a *D. tenuicalcari* Summerh. foliis apice haud angustatis sed lobulis rotundatis, floribus minoribus, calcari multo breviore differt.

Herba epiphytica, glaberrima; caulis elongatus, ± dependens, pauciramosus, 10-35 cm. longus, 2*5-3 mm. diametro, superne laxe foliatus inferne vaginis foliorum delapsorum fere omnino circumdatus, radices flexuosas simplices usque ad 35 cm. longas et 4 mm. diametro laeves griseas vel brunnescentes per totam longitudinem emittens. *Folia* erecto- ad recurvato-patentia, 1-2 cm. distantia ; vagina arcta, valde nervosa, apice truncata, 7-15 mm. longa, leviter compressa ; lamina ligulata (si mavis lineari-oblonga), apice inaequaliter bilobulata, lobulis rotundatis longiore usque ad 8 mm. longo, basi ± abrupte angustata, 2-5-8-5 cm. longa, 5-12 mm. lata, subcarnosa. *Inflorescentiae* axillares, simpliciter racemosae, patentes, 1*5-4 cm. longae, subdense 5-13-florae ; bracteae 2-7 mm. distantes, ochreatae, triangulares, subacutae, 1-2-5 mm. longae. *Fhres* patentes, cremei ad ochracei, ± viridi-tincti; pedicellus cum ovario 2*5-3 mm. longus. *Sepalum* intermedium oblongo- vel ovato-ellipticum, apice rotundatum vel obtusissimum, 2-7-4 mm. longum, 1-5-2 mm. latum, saepissime trinervium; sepala lateralia oblique oblonga vel oblongo-elliptica, apice obtusa, 3* 3-4* 5 mm. longa, 1*3-1-6 mm. lata, 1-2-nervia. *Petala* oblique triangulari-ovata, acuta, margine antico inferne dilatato, 2-8-3-5 mm. longa, 1*7-2*7 mm. lata, trinervia, nervis lateralibus saepe ramosis. *Labellum* suborbiculari-quadratum, apice obtusum vel obscurissime bi- vel trilobulatum, basi rotundato-cuneatum, 2-5-3-6 mm. longum, 2-8-3-5 mm. latum, basi ante orificium calcaris callo obtuso dentiformi instructum, disco multinervoso; calcar leviter incurvatum, cylindricum, apice leviter angustatum, 4*4-6*75 mm. longum, circiter 1 mm. diametro. *Columna* deorsum porrecta, crassa, brevis, apice truncata, 1*2-1*5 mm. alta, androclinio leviter excavato ; anthera hemisphaerica, antice producta truncata ; pollinia fere globosa, circiter 0-5 mm. diametro, stipitibus duobus linearibus superne dilatatis apice rotundatis 0 • 6 mm. longis, viscidiis duobus separatis orbicularibus; rostellum productum, lobo intermedio convexo carnoso apice sub-

FIG. 1, flowering stem, *natural size* ; 2, flower with sepals and petals removed, x 8 ; 3, dorsal sepal, × 8 ; 4, lateral sepal, × 8 ; 5, petal, × 8 ; 6, lip in longitudinal section, x o; 7, lip lamina, spreau out, A o; o, coiumn in three-quarter profile, anther removed, x 16, and viscidium with stipes, x 32.

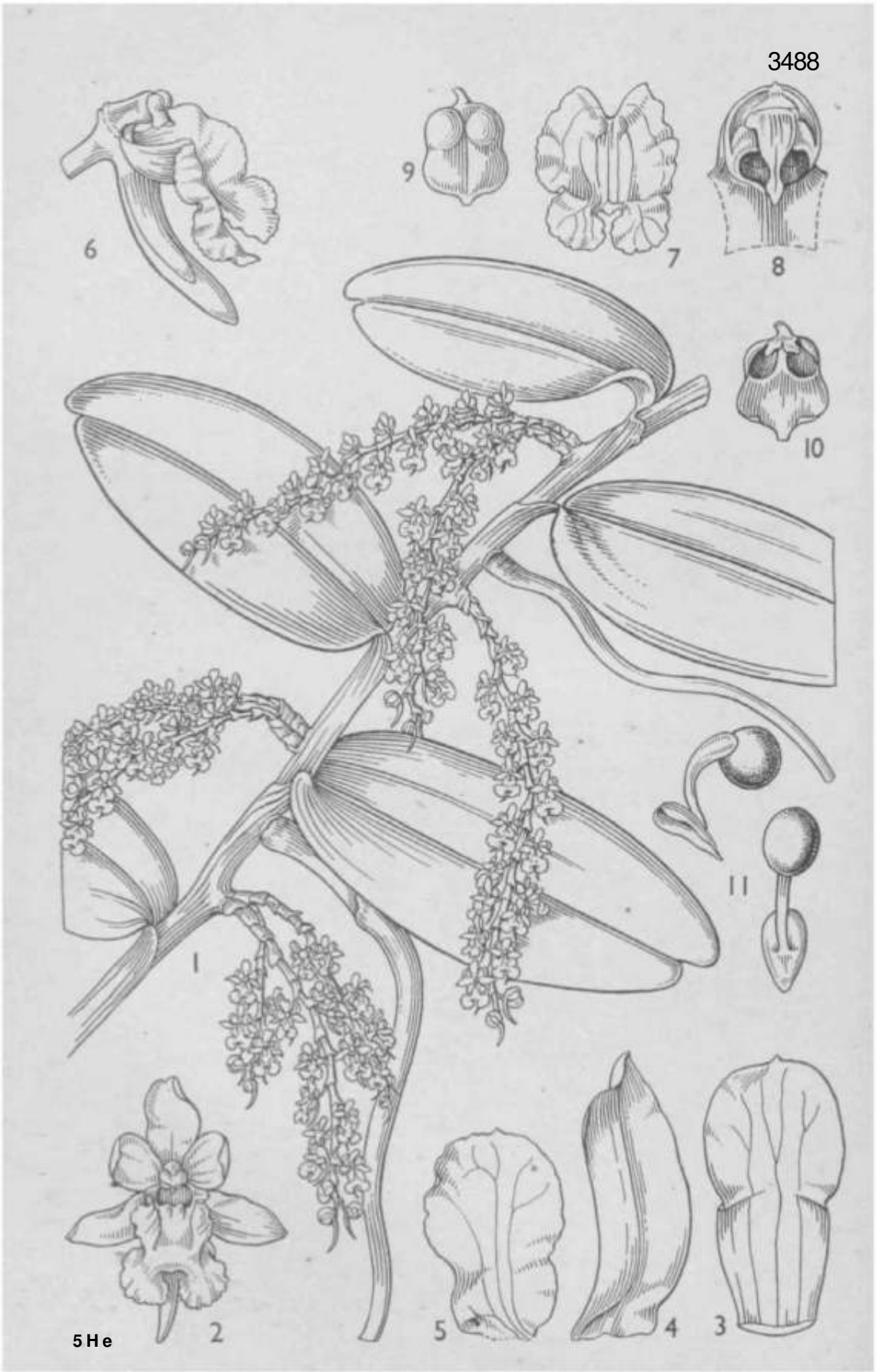
spathulato rotundato, lobis lateralibus duplo brevioribus triangularibus subacutis ; fovea stigmatica quadrata, margine inferiore i prominente.

UGANDA. Karamoja, Napak, 2250 m. alt., in ravine forest, occasional, May 1940, *Thomas* 3644.

KENYA COLONY. Mt. Elgon, Suam River Valley, 1950-2100 m. alt., Nov. 1934, *Tweedie* 289 ; July 1936, *Tweedie* 329; 330; Aberdare Mts., Kinangop, 2640-2670 m. alt., close to river, April 1938, *Chandler* 2400; Western Aberdare Mts., Kinobop Forest Station, 2580 m. alt., June 1931, *Dale* 2863 ; Naivasha, Sterndale, in forest, coll. W. Andrews, May 1943, comm. *Bally* B4496; Chyulu Hills, Central part, 1650 m. alt., in rain forest, June 1938, *Bally* Coryndon Mus. No. 7853 ; Nanyuki, N.W. of Mt. Kenya, 2040 m. alt., on bole of large tree by river, June **1943,** *Moreau* 578 (type).

This is an interesting member of the group in *Diaphananthe* possessing a column similar to that in the genus *Rhipidoglossum,* each pollinium being furnished with a separate stipes and viscidium. The stems are long and slender and the habit is very similar to that of *R. xanthopollinium* (Rchb. f.) Schltr. with which it is often confused. The small tooth in the mouth of the spur is a good distinguishing character.

V. S. SlJMMERHAYES.



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TABULA 3488.

SARCORHYNCHUS BILOBATUS *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

S. bilobatus *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xii. **III** (1945). A *S. polyantho* (Kraenzl.) Schltr. planta majore foliis duplo latioribus, tepalis latioribus, labello profunde bilobato, calcari multo longiore incurvato facile distinguendus.

Planta epiphytica vel rarius terrestris ; caulis elongatus, pauciramosus, usque ad 50 cm. longus, verosimiliter plus minusve dependens, circiter 4-6 mm. diametro, fere teres vel sectione ellipticus, radices 3-6 cm. distantes ad 15 cm. longas et 4 mm. diametro laeves griseas per totam longitudinem emittens. *Folia* disticha, 1*5-3 cm. distantia, fere patentia; vagina arcta, dorso leviter carinata, nervosa, 1*5-2-5 cm. longa, apice truncata ; lamina elliptico-oblonga vel fere elliptica, apice oblique inaequaliter bilobata, lobulis subconniventibus lobulo breviore vix distincto, basi subrotundata vel rotundata, 5-9*5 cm. longa, 1'5-4*25 cm. lata, siccitate nigrescens. *Inflorescentiae* 1-3-natae, folia aequantes vel paulo superantes, 5-9 cm. longae, fere ad basin subdense multiflorae, basi vaginis paucis ochreatis infimis truncatis superioribus lanceolatis acutis instructae ; rhachis teres, leviter fractiflexa ; bracteae laxe vaginantes, ochreatae, truncatae, 1-2 mm. longae, 3-4 mm. distantes. *Fbres* patentes, pellucidi, albidi vel viridescentes; pedicellus (cum ovario) 2-3 mm. longus. *Sepalum* intermedium elliptico-oblongum vel oblongo-obovatum, apice rotundatum, 3-75-4-75 mm. longum, 2-3 • 25 mm. latum ; sepala lateralia oblique vel leviter curvatim ligulato-oblonga, apice rotundata, 4'5-5" 5 mm. longa, 1*75-2-5 mm. lata, dorso humiliter carinata ; omnia sepala trinervia. *Petala* oblique, elliptico-oblonga vel elliptico-ovata, apice breviter acuminata, basi subrotundata, 3'5-4 mm. longa, 2-3 mm. lata, binervia vel trinervia, nervis lateralibus ramosis. *Labellum* ambitu late subpandurato-oblongum, trientibus duobus apicalibus recurvatis, triente apicali profunde trilobatum, in toto 4*75-5*75 mm. longum, 3-5-4*8 mm. latum; lobus intermedius brevissimus, dentiformis; lobi laterales subconniventes, oblique lanceolato-oblongi, 1*5-1*7 mm. longi, 1*25-2 mm. lati, inarginibus leviter incisis; calcar incurvatim dependens, cylindricum, apicem versus leviter angustatum, subacutum, 7-8*25 mm. longum, 1*75-2 mm. diametro. *Columna* horizontal, semiteres, 1 • 3-1 • 75 mm. longa ; anthera compresse hemisphaerica, antice breviter producta; pollinia subsphaeroidea, stipitibus subspathulato-ligulatis

FIG. 1, part of flowering stem, *natural size*; 2, flower, front view, x 3; 3, dorsal sepal, X 8; 4, lateral sepal, X 8; 5, petal, X 8 ; 6, lip and column in'side view, x 4; 7, lip lamina, spread out, X 4; 8, column from above, stamen removed X 12; 9, anther from above, X 12; 10, the same, from below, x 12 ; 11* pollinarium, in two views, x 24.

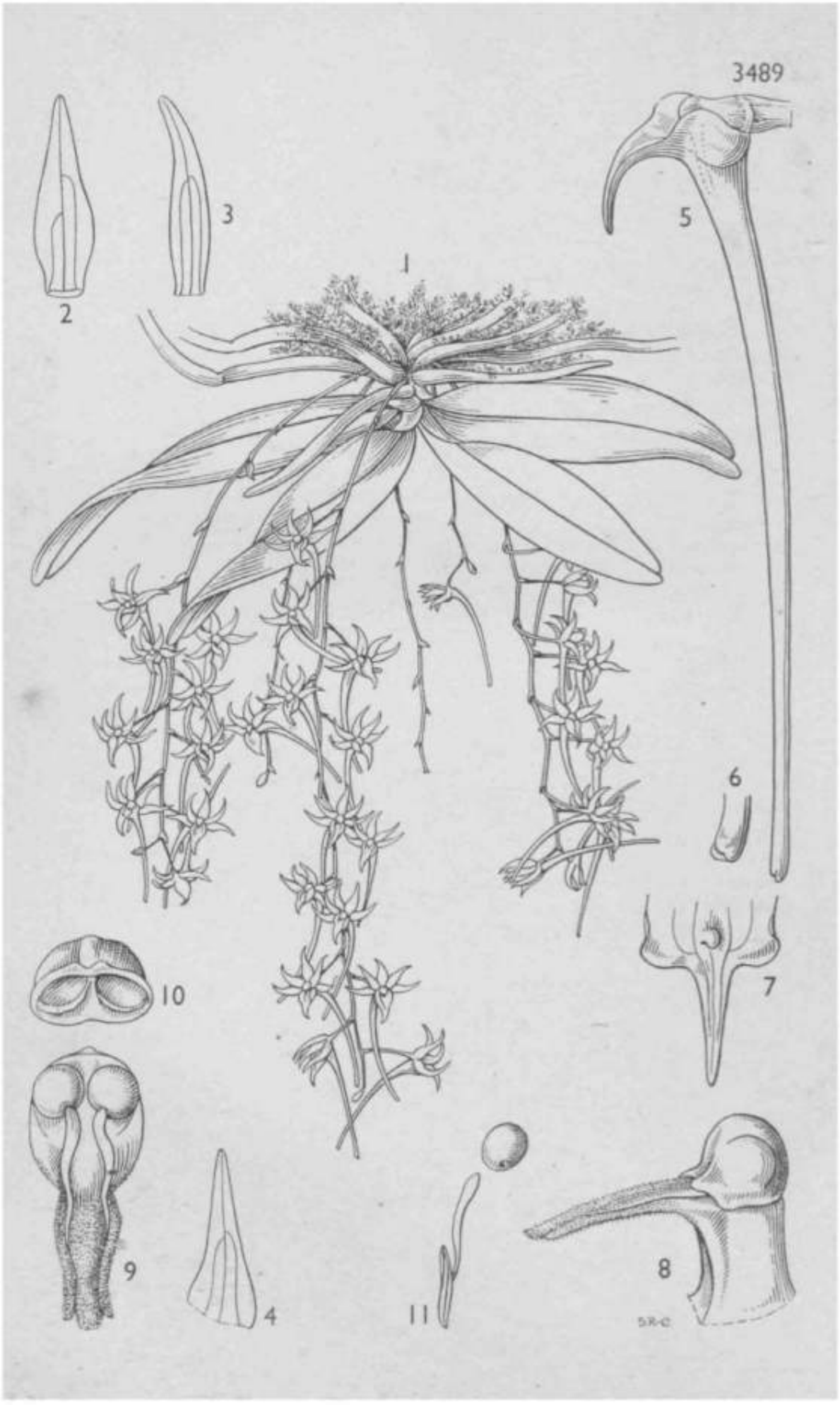
deorsum angustatis 0-6-0-8 mm. longis, viscidiis separatis fere orbicularibus antice truncatis; rostellum porrectum, lobo intermedio carnoso lanceolato, lobis lateralibus dimidio breviore leviter incurvatis obtusis ; stigma quadrato-ellipticum.

BELGIAN CONGO. Pare National Albert, Kibumba, between Rutshuru and Goma, 2000 m. alt., in mountain forest, Dec. 1944, *Germain* 2999.

UGANDA. Kigezi, Rutenga, Oct. 1940, *Eggeling* 4212 (type): Toro, Ruwenzori, Namwamba Valley, 1875 m. alt., in dense forest by river, Jan. 1935, *Taylor* 2807 a ; Toro, near mouth of Mpanga River, on rock close to river, Sept. 1906, *Bagshawe* 1205 ; Ankole, 1 mile from Mbarara on shorter Kabale road, April 1944, *Eggeling* 5496.

An outstanding addition to this small but interesting genus, and occupying an intermediate position as regards geographical distribution, the two other species coming from the Cameroons and Tanganyika Territory respectively. *S. bilobatus* has a longer stem and broader leaves than the other species, but differs most markedly in the lip being deeply incised in the apical third with two large somewhat connivent lateral lobes and a very much smaller triangular middle lobe ; the spur is also much longer. As in the other species the leaves blacken somewhat during drying while all three have similarly shaped tepals. Ip. column and pollinarium characters the species agree well.

V. S. SUMMERHAYES.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TABULA 3489.

MYSTACIDIUM TANGANYIKENSE *Summerhayes.*

ORCHID ACE AE. Tribus VANDEAE.

M. tanganyikense *Summerhayes* in Bot. Mus. Leafl. Harv. Univ. xii. 113 (1945). A *M. venoso* Harvey ex Eolfe foliis apice acutioribus, petalis latioribus, labelli calcari breviore, rostelli lobis lateralibus crassioribus haud barbatis sed tantum papillosis, pollinii stipitibus brevioribus latioribusque ; a *M. caffro* Bolus foliis majoribus, perianthii segmentis longioribus angustioribusque, labello basi ampliato apice acuminato, calcari haud apice inflato, pollinii stipitibus latioribus viscidiis minoribus satis distinguitur.

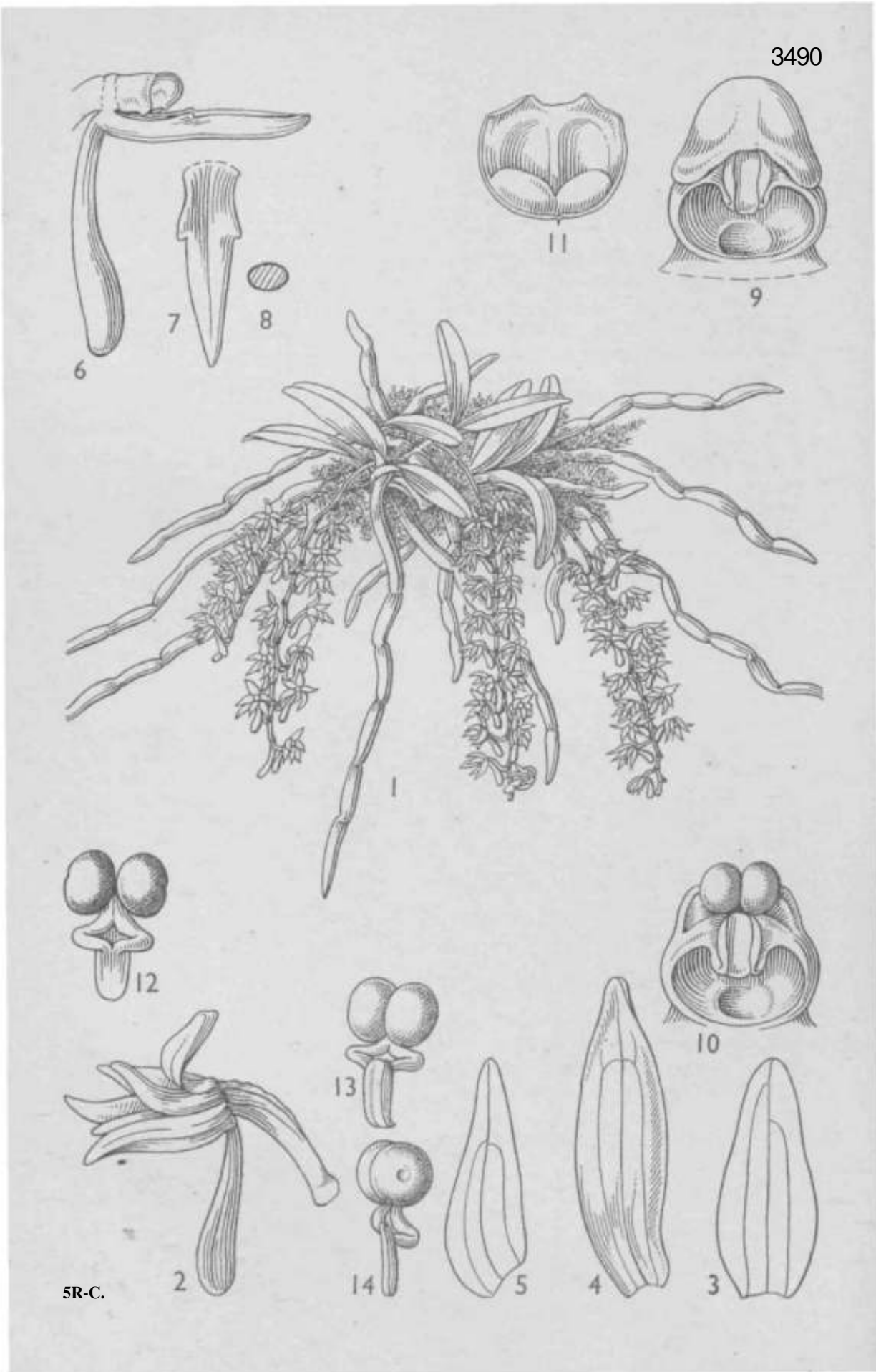
Plant parva, epiphytica; caulis brevissimus, vix 1 cm. longus, radices numerosas flexuosas tenues emittens. *Folia* circiter 4, plus minusve dependentia, ligulata vel lanceolata-ligulata, apice breviter inaequaliter bilobata, lobulis subacutis, 3-6 cm. longa, 8-14 mm. lata. *Inflorescentiae* dependentes, foliis duplo vel fere duplo longiores, dimidio apicali laxiuscule 5-12-florae, 5-10 cm. longae; pedunculus gracilis, vaginis paucis distantibus instructus ; rhachis gracilis, interdum levissime fractiflexa ; bracteae vaginis similes, ovatae, acutae vel acuminatae, 1-2 mm. longae, 3-7 mm. distantes. *Fhres* subpatentes, virides, flavido-virides vel cremei, fragrantes; pedicellus tenuis, cum ovario 6-9 mm. longus. *Sepalum* intermedium recurvatum, lanceolatum, leviter acuminatum, apice ipso obtusum, 5-7-75 mm. longum, 1-5-2 mm. latum ; sepala lateralia recurvata, oblique lanceolato-ligulata, apice obtusa, 6-8*5 mm. longa, 1-25-1-75 mm. lata; sepala omnia trinervia. *Petakt,* deltoideo-lanceolata, dimidio superiore valde angustata, apice subacuta, 4-75-7-25 mm. longa, prope basin 1-5-2-5 mm. lata, inferne trinervia ; omnia tepala saccis crystalliferis minutis numerosis instructa, dimidio basali tenuiora et pallidiora. *Labellum* basi valde ampliatum ita ut videatur obscure trilobatum, lobis lateralibus rotundatis semiorbicularibus, in calcar sensim angustatum, dimidio apicali (lobo intermedio) valde angustatum, lineari-ligulatum, sectione V-forme, apice anguste obtusum; totum labellum 4-7-6-6 mm. longum, 2-75-3 mm. latum, disco medio callo minuto dentiformi instructo ; calcar anguste cylindricum, leviter incurvatum, 17-21 mm. longum. *Columna* brevis, crassa, circiter 1-5 mm. alta, androclinio leviter excavato. *Anthera* hemisphaerica, antice leviter producta; pollinia subsphaerica, stipitibus duobus ligulatis deorsum angustatis circiter 1-5 mm. longis, viscidiis duobus lineari-oblongis antice acutis 0-8-0-9 mm. longis. *Rostellum* valde deorsum productum, viscidiis

FIG. 1, flowering plant, *natural size*; 2, dorsal sepal, x 6 ; 3, lateral sepal, x 6; 4, petal, x 6 ; 5, lip and column, lateral view, X 6 ; 6, apex of spur, x 12 ; 7, lip lamina, spread out, x 6; 8, column, lateral view, X 16 ; 9, apex of column with pollinaria, x 16; 10, anther, x 16; 11, pollinarium, x 12.

amotis trifidum; lobus intermedius subspathulato-ligulatus; lobi laterales breviores, lineares, acuti; omnes lobi dense papillosi.

TANGANYIKA TERRITORY. **Lake Daluti, 10 miles east of Arusha, in complete shade on underside of forest liane, June 1942, *Moreau* 317 (type); Uluguru Mts., west side of Lukwangule Plateau, 2400 m. alt., epiphytic in dry evergreen forest on *Xymalos monospora* Baill., Jan. 1943, *Moreau* 474.**

This species is a very characteristic member of the genus and may be distinguished from its allies chiefly by the combination of characters which it possesses. Its nearest relatives are undoubtedly the two South African species mentioned in the diagnosis. The lateral lobes of the rostellum are here merely densely papillose instead of shortly barbate as in many species of the genus.—V. S. SUMMERHAYES.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TABULA **3490.**

ANGRAECOPSIS BREVILOBA *Summerhayes.*

ORCHIDACEAE. Tribus VANDEAE.

A. **breviloba** *Summerhayes* in Bot. Mus Leafl. Harv. Univ. xi. 256 (1945).—Ab *A. parviflora* (Thou.) Schltr. foliis minoribus, inflorescentiis brevioribus dense multifloris, petalis liberis triangulari-lanceolatis, labelli lobis lateralibus ad dentes redactis, calcari satis breviore valde inflato distinguenda.

Herba epiphytica nana ; caulis brevissimus, circiter 1 cm. longus, radices numerosissimas flexuosas simplices applanatas circiter 1 - 5-3 mm. latas dense emittens. *Folia* pauca, cito decidua, ligulata, usque ad 3 cm. longa et 5 mm. lata, apice obtusa brevissime bilobulata, obscure viridia. *Inflorescentiae* patentes vel adscendentes, usque ad 7 cm. longae, dense multiflorae; pedunculus 1-2 cm. longus, vaginis paucis instructus ; rhachis flexuosa, angulata ; bracteae 2-4 mm. distantes, arete vaginantes, obtusae vel acutae, 1-2-5 mm. longae. *Flores* secundi, patentes vel adscendentes, pallide virides; pedicellus cum ovario circiter 4 mm. longus. *Sepalum* intermedium ± recurvatum, oblongo-lanceolatum, subacutum vel obtusum, 3-4*5 mm. longum, 1-1*5 mm. latum ; sepala lateralia parallele porrecta, e basi angustata oblique curvatim lanceolata, acuta, 4-5-5 mm. longa, 1-1*5 mm. lata. *Petala* libera, oblique triangulari-lanceolata, acuta, 2*75-4 mm. longa, prope basin 1-1*5 mm. lata ; omnia tepala trinervia. *Labellum* leviter incurvatum, dimidio inferiore breviter trilobatum, totum 3*75-4*5 mm. longum; lobus intermedius carnoso-subulatus, 2*5-3 mm. longus; lobi laterales dentiformes, subacuti, carnosi; calcar dependens vel leviter incurvatum, e basi angusta valde inflatum, 4*25-4*75 mm. longum, circiter 1 mm. diametro. *Columna* subteres, truncata, 0-65-1 mm. longa, androclinio leviter excavato ; anthera hemisphaerica, antice truncata; pollinia ovoideo-globosa, 0-5 mm. longa, stipitibus duobus genuflexis apice conniventibus, viscidio communi oblongo postice leviter retuso subtus concavo 0*6 mm. longo; rostellum leviter productum, porrectum, viscidio amoto bilobum, lobis obtusis. *Capsulae* ellipsoideae vel anguste pyriformi-ellipsoideae, 7-9 mm. longae, 2*5-4 mm. diametro, cum pedicello 2 mm. longo.

KENYA COLONY. Ngong, near Nairobi, on forest trees, May 1934, 0. *van Someren,* Coryndon Mus. No. 3653 ; Tana River basin, steppes of the Thika-thika, July 1893, *Gregory.*

FIG. 1, flowering plant, *natural size;* 2, flower, lateral view, x 6; 3, dorsal sepal, X 12 ; 4, lateral sepal, X 12 ; 5, petal, x 12 ; 6, lip and column in lateral view, X 8 ; 7, lip lamina, front view, X 8 ; 8, transverse section of lip middle-lobe, X 8; 9, column, front view, X 24; 10, the same, anther removed, X 24; 11, anther, from below, X 24; 12,13,14, pollinarium from above, below and in lateral view respectively, X 30.

TANGANYIKA TERRITORY. **Mondul, W. of Arusha, 1800 m. alt., on bole of tree 30 ft. from ground, May 1942, *Moreau* 304 (type); Mbulu, on bole of forest tree 12 ft. from ground, June 1942, *Moreau* 304A; Kilimanjaro, Marangu, 1350 m. alt., on tree in riverain forest, in fruit, Nov. 1941, *Moreau* 107.**

This species seems to be correctly referred to *Angraecopsis* in spite of the very short lateral lobes of the lip and the fact that the petals are not broadly triangular as in many other species. It possesses, however, the general habit and small leaves of the genus and also the subspathulate-lanceolate lateral sepals placed forward in a parallel position on each side of the lip.

V. S. SUMMERHAYES.


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TABULA 3491.

CAREX INVERSO-NERVOSA *Nelmes.*

CYPERACEAE. Tribus CARICEAE.

C. (Sect. Acutae) inverso-nervosa *Nelmes* in Kew Bull. 1946, 11.—C. *cernua* Boott var. *lobolepis* (F. Muell.) Kiikenth. in Engl. Pflanzenr. IV, xx. 354 (1909), partim. A *C. terete* Boott praesertim spicis brevioribus crassioribus utriculis majoribus ferrugineo-papillosis distinguenda.

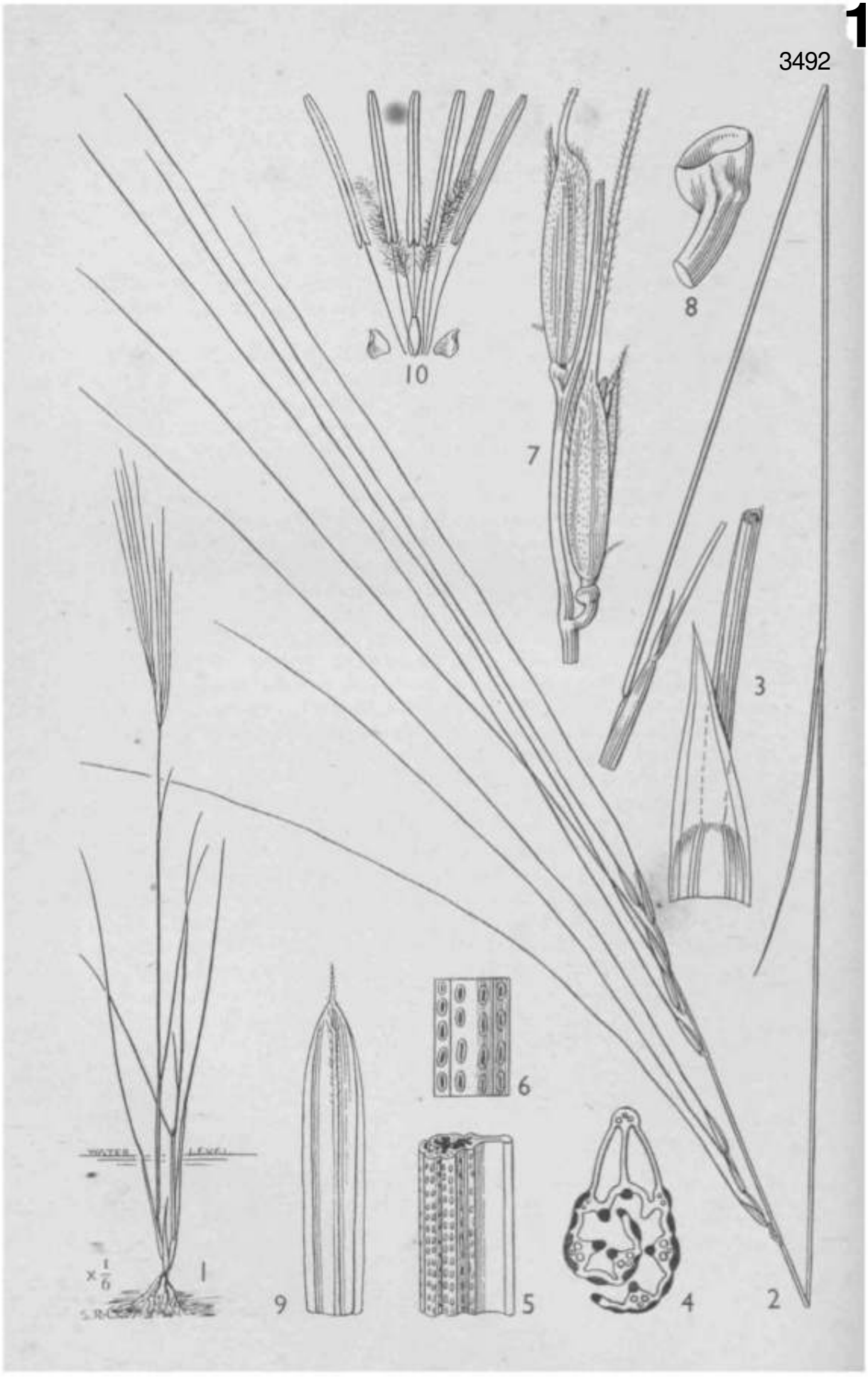
Herba laxe caespitosa. *Culmi* 60-100 cm. vel ultra alti, inferne 2-3 mm. crassi, superne 1*5-2 mm. crassi, acute triquetri, erecti, inferne laeves, superne (rhachidibus inclusis) secus angulos parce vel dense scaberuli, multicostati, triente infimo (plerumque basin versus) foliati, basi foliis paucis brevibus et vaginis aphyllis vel cataphyllis valde nervosis rubro-brunneis demum parce reticulatim fissis circumdati. *Folia* longissima, plerumque inflorescentiam longe superantia, 4-25-6*25 mm. lata, inferne conduplicata, superne plana, multinervia sed subtus nervo medio et nervis 2 lateralibus pallidis validioribus et magis prominentibus, inferne laevia, superne praecipue apicem longe attenuatum versus nervis prominentibus et marginibus scabriusculis, rigidiuscula; vaginae aureo-brunneae, marginibus membranaceis interdum parce reticulatim fissae. *Spicae* 5-8, superiores approximatae vel subapproximatae, inferiores subapproximatae vel infimae distantes, suberectae vel subcernuae, densiflorae nisi basi interdum laxiores cylindricae, superiores 1-3 masculae vel plus minus androgynaeceae, mediae (nisi apice et basi) femineae, inferiores femineae vel androgynaeceae sed parte mascula brevi, 1*5-5-5 cm. longae, parte mascula 1-5-4-5 mm. crassa, parte feminea demum 5-7 mm. crassa, superiores subsessiles vel pedunculatae, inferiores longe vel longissime pedunculatae; pedunculi graciles, obtusanguli vel acutanguli, parce vel subdense hispiduli. *Bracteae* foliaceae, plerumque inflorescentiam longe superantes, sed superiores multo redactae, supremae squamiformes et longe vel longissime aristatae, evaginantes vel inferiores interdum brevissime vaginantes; nodi incrassati. *Squamae femineae* 2-75-5 mm. longae (aristis 1-3 mm. longis inclusis), 1 mm. latae, plus minus oblongae, planiusculae vel leviter cymbiformes, marginibus interdum incurvis, basi subincrassatae et gibbae, apice obtusissimae vel bilobo-emarginatae, tenues, sublucidae, albidae, rubido-maculatae, e dorso late pallide viridi trinervi arista longa marginibus hispidula sensim excurrente. *Utriculi* 3* 25-3* 5 mm. longi, 2-2-5 mm. lati, late elliptico-lanceolati, interdum ovato-lanceolati, compressi vel compresso-plano-convexi, inferiores squamis breviores, superiores squamis longiores, squamis multo latiores, membranacei,

Fio. 1, plant, *one-ninth natural size;* 2, upper part of plant, *natural size;* 3, section of stem, x 4; 4, upper part of spike, X 3 ; 5, male flower, x 8; 6, gynoecium, x 8; 7, female glume, X 8; 8, utricle in ventral view, x 8; 9, the same in dorsal view, x 8 ; 10, nut, X 8.

glabri, demum patuli, ferruginei, minute ferrugineo-glanduloso-foveolati, dense et minute papillosi, apicem versus pluricostati, marginati, vix vel brevissime et valde stipitati, in rostrum breve subteres apice pallidum integrum sensim vel subsensim desinentes. *Nux* circiter 2-25 mm. longa, 1-5-2 mm. lata, suborbiculata, laevis, nitida, compresso-plano-convexa, minute alveolata, rubido-brunnea, brevissime et valde stipitata, substricto- vel leviter deflexo- et torto-rostrata. *Styli* basis aequalis. *Stigmata* 2.

NEW CALEDONIA. *Deplanche* in *Vieilktrd* 1466 ; Pont des Fran$ais, 1868-70, *Balansa* 701 ; *Pancher* (Mus. Neocal. 413); La Neia, *Cribs* 988; Isle of Pines, swampy places, mainland, Oct. 1853, *Milne* 175 (typus).

Eiikenthal (Engl. Pflanzenreich, 1909) recognizes seven subsections in the Section *Acutae* Fries, arctic and temperate species predominating in the earlier subsections, the later subsections largely comprising tropical and subtropical species. This arrangement is the reverse of the probable phylogenetic one, in which the species of the Pacific, India, and Malaysia, often with numerous, long, pendulous spikes, are considered to precede the mainly European and North American species, which are often smaller in size, with fewer, shorter, and straighter spikes. The distinctness of *C. inverso-nervosa* from *C. dimorpholepis* Franch. et Savat. *(C. cernua* Boott, *non* Gmel., etc.) is indicated by the fact that the utricles of this latter species are nerveless, whereas those of *C. inverso-nervosa* are strongly nerved. Even in the description of the Subsection *Praelongae* Kiikenth., in which this author places this New Caledonian plant, the utricles are given as " enervii vel obsolete nervosi." There is one further point of interest about the nervose fruit of *C. inverso-nervosa,* and it is from this that the epithet is taken. The nerves are stronger above than below, some, in fact, disappearing before reaching the base, whereas the nerves of the great majority of *Carices* are stronger below, often not extending to the apex. F. Mueller's name, *C. lobolepis,* originally referred only to the New South Wales plant, which was recently resurrected as a species in the original restricted sense (Proc. Linn. Soc. Sess. 155, 1942-43, 277 : 1944).—E. NELMES.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TABULA 3492.

ORYZA ANGUSTIFOLIA *C. E. Hubbard.*

GRAMINEAE. Tribus ORYZEAE.

Oryza angustifolia *C. E. Hubbard* ; species nova, affinis *0. brachyanthae* A. Chev. et Roehrich, sed foliorum laminis filiformibus angustissimis convolutis, ligulis angustioribus acutis, inflorescentiis gracilioribus, lemmatibus sterilibus nullis difFert.

Gramen annuum, usque 70 cm. altum. *Culmi* solitarii vel non numquam laxe fasciculati, erecti, vel basi prostrati vel geniculati et e nodis inferioribus radicantes, graciles, siccitate compressi, 3-4-nodes, simplices vel e nodis inferioribus ramosi, ramulis erectis, glabri, laeves, internodio supremo filiformi tenuissime striato e vagina suprema demum longe exserto. *Foliorum vaginae* compressae, carinatae, glabrae, laeves, tenues, fere membranaceae, tenuiter nerves, inter nervos transverse nervatae, ore auriculis erectis angustis ligula adnatis praeditae, inferiores laxae, pallidae, internodiis longiores, superiores virides, arete appressae, internodiis demum breviores; ligulae membranaceae, lanceolatae, apice acuto attenuatae et demum fissae, 3-7 mm. longae ; laminae filiformes, setaceae, apice acutae, 10-30 cm. longae, convolutae, basi carinatae usque 1 mm. latae, superne teretes usque 0-5 mm. diametro, strictae vel leviter flexuosae, virides, glabrae, nervis minutissime granulatae vel apicem versus minutissime scaberulae, inter nervos laterales et costam mediam translucidae et transverse nervatae. *Inflorescentia* angusta, gracilis, secunda, erecta vel leviter curvata, 3-8 cm. longa (aristis exclusis), simplex et racemiformis, vel ramos 1-2 gerens ; axis primarius gracillimus, laevis ; rami erecti et adpressi vel leviter patentes, 2-4 cm. longi, simplices, secundi, 1-6-spiculati ; rhachis laevis: pedicelli apice incrassati et oblique truncati, circiter 1 mm. longi. *Spiculae* anguste oblongae, 5-8 mm. longae, 1-1-3 mm. latae, contiguae vel leviter imbricatae, nervis virides, ceterum albidae vel rubido-guffusae. *Glumae* ad annulum cupulariformem obscurissimum redactae. *Lemmata sterilia* nulla. *Lemma fertile* anguste oblongum, ex apice longe aristatum, coriaceum, lateribus pilis minutissimis adpressis obscure asperulum vel fere laeve, marginibus prope apicem minute scaberulum, carina et marginibus apice pilis setaceis brevibus erectis hispido-ciliatum, 5-nerve; arista longissima, tenuissima, erecta, stricta, 11-18 cm. longa, scaberula, rubida, vel inferne albida et superne viridis. *Palea* lemmate paullo longior, lineari-oblonga, carina prope apicem hispido-ciliata, apice cuspidata, cuspide 1-2 mm. longa. *Antherae* purpureae vel albidae, 3-4 mm. longae. *Caryopsis* anguste oblonga, pallide brunnea, usque 3-5 mm. longa (juvenilis.)

FIGS. 1, habit figure, *one-sixth natural size*; 2, upper part of flowering stem, *natural size* ; 3, ligule, X 4 ; 4, transverse section of leaf-blade, x 30 ; 5, part of leaf-blade, X 20 ; 6, part of lower surface of leaf-blade, *much enlarged;* 7, spikelets^ X 6 ; 8, tip of pedicel, X 16 ; 9, palea, flattened, x 8 ; 10, flower, x 8.

NORTHERN RHODESIA. **Mwinilunga District: half a mile south of Matonchi Farm, in six inches of water over shallow soil overlying " laterite," 2-1-1938, *Milne-Redhead* 3928 (type).**

ANGOLA. **Moxico District; few miles west of River Mujilezhi, in shallow water flooding exposed " laterite," 7-1-1938, *Milne-Redhead* 3959.**

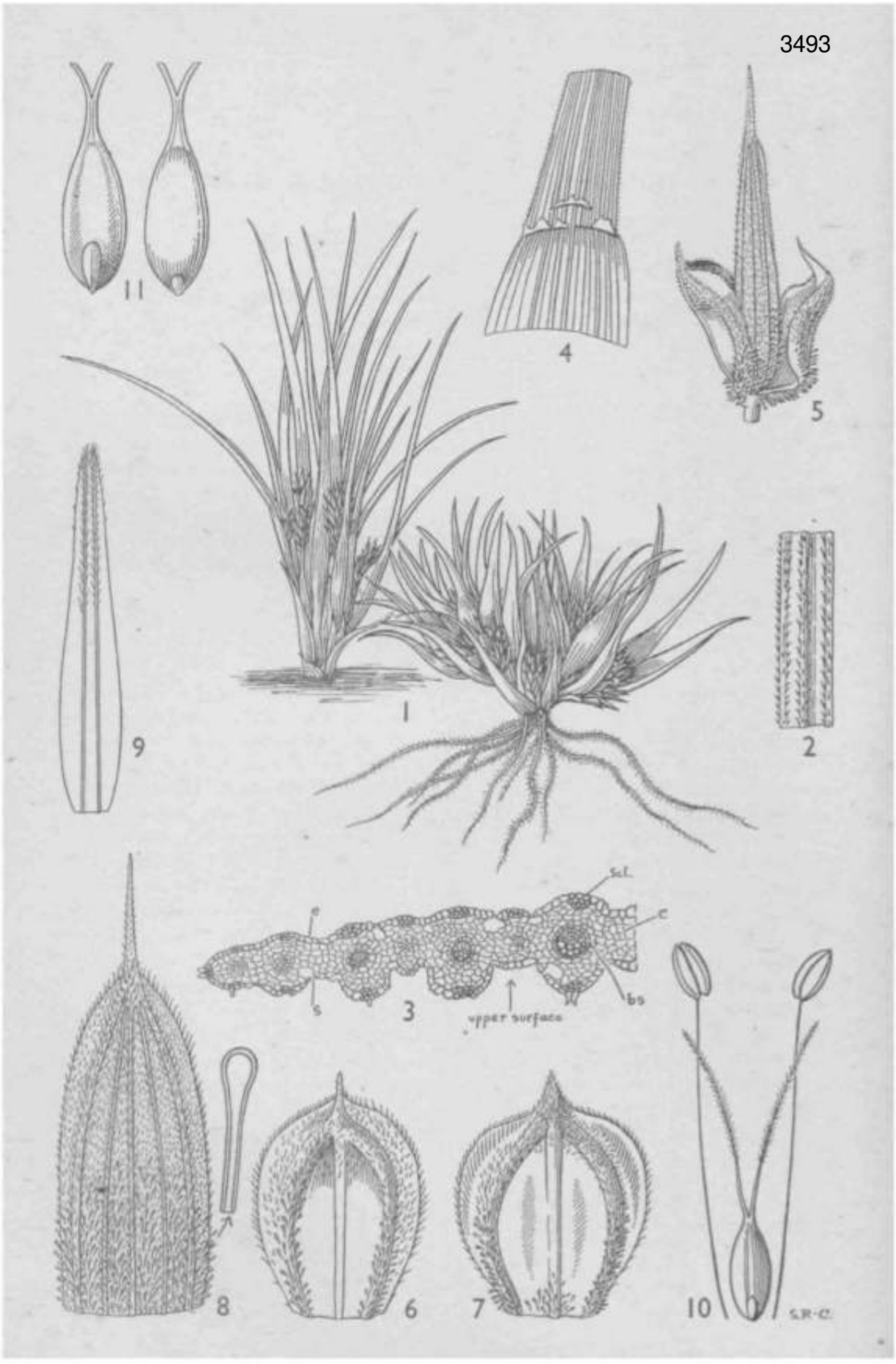
The flora of the shallow pans of concretionary ironstone (locally known as laterite) in the Mwinilunga District of Northern Rhodesia and the adjacent portion of Angola has yielded several remarkable endemic species, including the new species of *Oryza* described above, and the new genus *Hydroihauma,* figured in an earlier part of this work (t. 3458). These pans, which vary considerably in extent and floristic composition, are seasonably flooded by the rains from the end of September to April. Our new wild rice was discovered in two such pans, several miles apart, growing in thin muddy soil covered by about six inches of water. In the Rhodesian locality it was codominant with a white-flowered Liliaceous plant, in association with its near relative *Oryza brachyantha* A. Cheval. et Roehrich. The Angolan form, which resembles that from Rhodesia very closely in its vegetative characteristics and inflorescence, differs from it in possessing very slightly larger (6-8 mm.) and wider (up to 1 • 3 mm.) pallid spikelets.

The genera *Oryza* Linn, and *Leersia* Swartz are undoubtedly very closely related, as is shown not only by morphological similarities, but also by close resemblances in their anatomy, cytology and ecology. They have been distinguished mainly by the presence *(Oryza)* or the absence *(Leersia)* of two sterile lemmas (often mistaken for glumes) beneath the fertile floret, although other characteristics such as the relatively tough and coriaceous usually awned fertile lemma of *Oryza* contrasting with the thinner awnless lemma of *Leersia* have proved to be more reliable distinctions. This is demonstrated by our new species, for whilst it has the facies of an *Oryza,* and possesses a coriaceous long-awned fertile lemma, the two sterile lemmas, so long considered an important diagnostic feature of *Oryza,* are entirely suppressed. It shares this reduction with *0. Tisseranti* A. Cheval. of the Haut-Oubangui, and *0. Perrieri* A. Camus of Madagascar, both of which, however, have smaller spikelets (4-5 mm. long) with relatively short awns (up to 5 mm. long).

***Oryza angustifolia* is not likely to be confused with any other species of the genus on account of its very narrow convolute filiform leaf-blades, but if the absence of sterile lemmas is disregarded, its affinity clearly lies with *0. brachyantha* A. Cheval. et Roehrich. This species has a wide distribution in west tropical Africa, extending from French Guinea and Sierra Leone through French Sudan to the Oubangui-Chari of French Equatorial Africa. It has also been recorded from the Equatoria Province of the Anglo-Egyptian Sudan, and is now known to occur far away to the south in Northern Rhodesia with our new species.**

In his monograph of the wild and cultivated rices, Roshevitz (in -Bull. Appl. Bot. Genet. & PL-Breed, xxvii. no. 4, 86,120 : 1931), refers

0. brachyantha to his new section *Coarctata,* in which it is associated with three very distinct eastern Asiatic species, 0. *Schkchteri* Pilger, 0. *Ridleyi* Hook. f. and *0. coarctata* Roxb., solely on account of its almost smooth fertile lemmas and very narrow sterile lemmas. To none of these species, however, is 0. *brachyantha* at all closely related. Chevalier's treatment (in Rev. Bot. Appl. xii. 1015: 1932) of it as a member of sect. *Eu-oryza* Baill. (Hist. PL xii. 165: 1893) [sect. *Sativa* Roshev. in Bull. Appl. Bot. Genet. & PL-Breed, xxvii. no. 4,32,121:1931) appears to be a much more natural arrangement.—C. E. HUBBARD.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TABULA 3493.

RHIZOCEPHALUS ORIENTALIS *Boiss.*

GRAMINEAE. Tribus AGROSTEAE.

Rhizocephalus *Boiss.* Diagn. PI. Orient. Nov., ser. 1, no. 5,68 (1844); Steud. Syn. PI. Glum. i. 152 (1854); Boiss. Fl. Orient, v. 478 (1884); Post, Fl.'Syria, Palest. & Sinai, 863 (1896); Roshevitz in Komarov, Fl. URSS. ii. 126 (1936); Roshevitz, [Grass], 452 (1937); Grossheim, Fl. Kavkaza, i. 162 (1939); Schreder, Fl. Uzbekistanica, i. 192 (1941).

Spiculae persistentes, muticae, dense imbricatae, in paniculis spiciformibus brevissime pedicellatae vel subsessiles ; rhachilla inter glumas et anthoecium continua, supra anthoecium haud producta. *Anthoecium* 1, $, glumas superans. *Glumae* aequales, similes, basi connatae, plus minusve concavae, dorso rotundatae vel applanatae, primo erectae, tandem supra medium divergentes, explanatae late elliptico-obovatae vel obovatae, apice latae vel truncatae et abrupte acutae vel apiculatae primo erectae demum incurvae, marginibus et apice hyalino-membranaceis exceptis herbaceae, circa nervos demum incrassatae et coriaceae, 3-nerves, parte incrassata inferiore papillis minutis clavatis hirtellae, superne scaberulae. *Lemma* spiculam aequans, erectum, a latere visum anguste lanceolatum acutum, a dorso compressum, inferne dorso rotundatum et basi ventricosum, marginibus latis inflexis imbricatis praeditum, explanatum ovatum, apice breviter mucronatum, marginibus membranaceis exceptis herbaceum, demum coriaceum, nervis infra apicem plerumque confluentibus 5-nerve, parte inferiore ventricosa papillis clavatis dense hirtellum, superne scabridum. *Palea* lemmate brevior, explanata lanceolata, bidentata, hyalino-membranacea, 2-nervis. *Lodiculae* nullae. *Stamina* 2 ; filamenta elongata, capillaria ; antherae parvae, oblongae. *Ovarium* glabrum; styli terminales, connati; stigmata elongata, gracillima, sparse et minute puberula, ex apice anthoecii exserta. *Caryopsis* ovoidea, dorso leviter compressa, inter lemma et paleam arete inclusa; hilum basale, oblongo-ellipticum ; scutellum ellipticum, circiter tertiam partem caryopseos aequans.— *Gramen* annuum, humile, caespites hemisphericos densos efformans; culmi brevissimi;" foliorum laminae lineares, planae, breves, inflorescentiam superantes; ligulae brevissimae, membranaceae; panicula breviter stipitata, densissima, foliorum vaginis dilatatis spathiformibus plus minusve inclusa.

Species unica, Syriae, Transjordaniae, Persiae, Armeniae et Turkestaniae incola.

FIG. 1, plants, *natural size.*; 2, part of upper surface of leaf-blade, x 16; 3, transverse section of leaf-blade, X 60; 4, ligule, x 4; 5, spikelet, x 8; 6, 7, lower and upper glumes, X 12 ; 8, lemma, X 12, and club-shaped hair, X c. 86; 0, palea, X 12; 10, flower, x 12; 11, caryopsis, x 12. (bs = inner bundle-sheath, c = chlorenchyma, e = epidermis, s = stoma, scl = sclerenchyma.

Rhizocephalus orientalis *Boiss.* Diagn. PL Orient. Nov., ser. I, no. 5, 69 (1844), no. 13, 43 (1853); Steud. Syn. PL Glum. i. 152 (1854); Boiss. Fl. Orient, v. 478 (1884); Post, Fl. Syria, Palestine & Sinai, 863, fig. 386 (1896); Zohary in Beih. Bot. Centralbl. 1. heft 1, 53 (1932) ; Grossheim, Fl. Kavkaza, i. 162, map 108 (1939). *Crypsis pygmaea* Jaub. et Spach, Illustr. PL Orient, iv. 8. tab. 307 (1850). *Heleochloa orientalis* (Boiss.) Dinsmore in Post & Dinsmore, Fl. Syria, Palestine & Sinai, ed. 2, ii. 717, fig. 691 (1933). *Heleochloa turkestanica* Litw. in Komarov, Fl. URSS. ii. 743 (1934). *Rhizocephalus turkestanicus* (Litw.) Roshevitz, I.e. 127, tab. 8, fig. 6a-h ; Kolakovskii & Sahokia in Bot. Z. SSSR. xxi. 557-8 (1936); Schreder, Fl. Uzbekistanica, i. 192 (1941).

Gramen annuum, caespitosum, 1-6 cm. altum. *Culmi* brevissimi, 0-2-1 *5 cm. longi, basi divisi. *Folia* plerumque basalia, glabra, viridia ; vaginae imbricatae, usque 1 cm. longae, albidae, nervosae, tenuiter chartaceae, marginibus membranaceis, superiores latiusculae, dilatatae ; ligulae obscurae, brevissimae, demum laceratae ; laminae lineares vel lineari-subulatae, obtusae, 0*5-4 cm. longae, basi usque 3 mm. latae, planae vel superne involutae, erectae, subtus laeves, supra prominenter nervatae, nervis et marginibus scaberulae. *Panicula* subglobosa vel cylindrica, usque 1 "5 cm. longa, 0*5-1 cm. lata ; rhachis glabra, rigida, gracilis ; rami brevissimi. *Spiculae* 3 • 5-5 • 8 mm. longae. *Glumae* 2* 5-3* 5 mm. longae. *Lemma* 3'5-5*8 mm. longum. *Palea* 3 • 5-4 • 5 mm. longa, carinis circa medium scaberula. *Antherae* 0 • 5-0 • 7 mm. longae.

SYRIA. Qariateine (Qaryetein, Karyatayn) to Ain el Wa'ul, Palmyra Desert, *Post* (ex Post, Fl. Syria, 863). Palmyra Desert; about 25 km. to the east of Forkloss, in clayey *Artemisia* desert, *c.* 700 m., 16 Apr. 1933, *Samuelsson* 3408 ! In the neighbourhood of Horns, Forkloss, in steppe, on roadsides, c. 660 m., 18 Apr. 1933, *Samuelsson* 3603 ! Neighbourhood of Aleppo, in fields, *Aiicher-Ehy* 3096 (ex Jaub. et Spach, Illustr. iv. 8). Without precise locality, *Aucher-Eloy* 3066 !

TRANS-JORDAN. Edom, between El Hasi and Menzil, 15 Apr. 1929, *Eig & Zohary*!

TRANSCAUCASIA. Armenia : near Erivan, on dry hills in the valley of the River Zenga, 7 May 1936, *Tranzschel*! Erivan, Dzhanatlu, left bank of the Garni-Chaya, in the foothills of Eranos, 14 May 1933, *Takhtadzhan & Tamamshyan* (ex Grossheim, FL Kavkaza, i. 162).

PERSIA. Istakhar (Persepolis), near Shiraz, 1845, Kotschy (ex Boiss. FL Or. v. 478).

RUSSIAN CENTRAL ASIA. Bokhara : at Kermine, on sandy steppes, 16 Apr. 1895, *Korshinsky* (ex Komarov, FL URSS. ii. 743).

This distinct monotypic genus of grasses has apparently been collected on so few occasions and in such small quantity that very little material has been available for examination. Thus at the time of his preparation

of the classification of the genera of *Gramineae* (Journ. Linn. Soc, Bot., xix. 84,1881 ; Benth. et Hook. f. Gen. PL iii. 1146,1883), it is extremely doubtful whether Bentham had specimens for study, since the genus was not represented in the Kew Herbarium until 1938. It seems very probable that his knowledge of it was obtained from Boissier's description of *Rhizocephalus* and Jaubert and Spach's description and illustration of *Crypsis pygmaea ;* the superficial resemblance to some species of *Crypsis* leading him to suggest that together with *C. ambigua* Bal. and *C. crucianelloides* Bal., it might form a very good section of *Heleochloa*— then maintained as a genus distinct from *Crypsis,* characterized by the dwarf densely caespitose habit, almost echinate spikelets and by the narrow 3-nerved rigid acuminately tipped glumes. Hackel likewise does not appear to have had material for study for he too included *Rhizocephalus* in *Heleochloa* in his arrangement of the Gramineae prepared for Engler and PrantPs Pflanzenfamilien (ii. abt. 2, 48, 1887). This treatment of the genus has been followed by all those authors basing their classifications of the family on the works of Bentham or of Hackel. Russian authors, including Roshevitz (1934), Grossheim (1939) and Schreder (1941) have kept *Rhizocephalus* distinct from *Heleochloa,* placing it in the tribe *Agrosteae,* between *Heleochloa* or *Crypsis* and *Phleum.* In a later study, Roshevitz (Grass, 452, 1937) includes it in the tribe *Sporoboleae,* no doubt on account of its *Crypsis*-like appearance. Whilst the inclusion of *Crypsis* (and its synonym *Heleochloa)* in the *Sporoboleae* is fully justified on account of anatomical, cytological, as well as morphological similarities, *Rhizocephalus,* judging from its 5-nerved lemma, its grain-structure and leaf-anatomy, should be retained in the *Agrosteae,* preferably near *Phleum.* Transverse sections of the leaf-blades of *Rhizocephalus* show that the chlorenchyma forms a continuous layer between and around the vascular bundles; the bundles are well-developed, the larger ones possessing an inner bundle-sheath of which the inner cell-walls are relatively thick; the epidermis is composed of comparatively large cells except over the bundles.

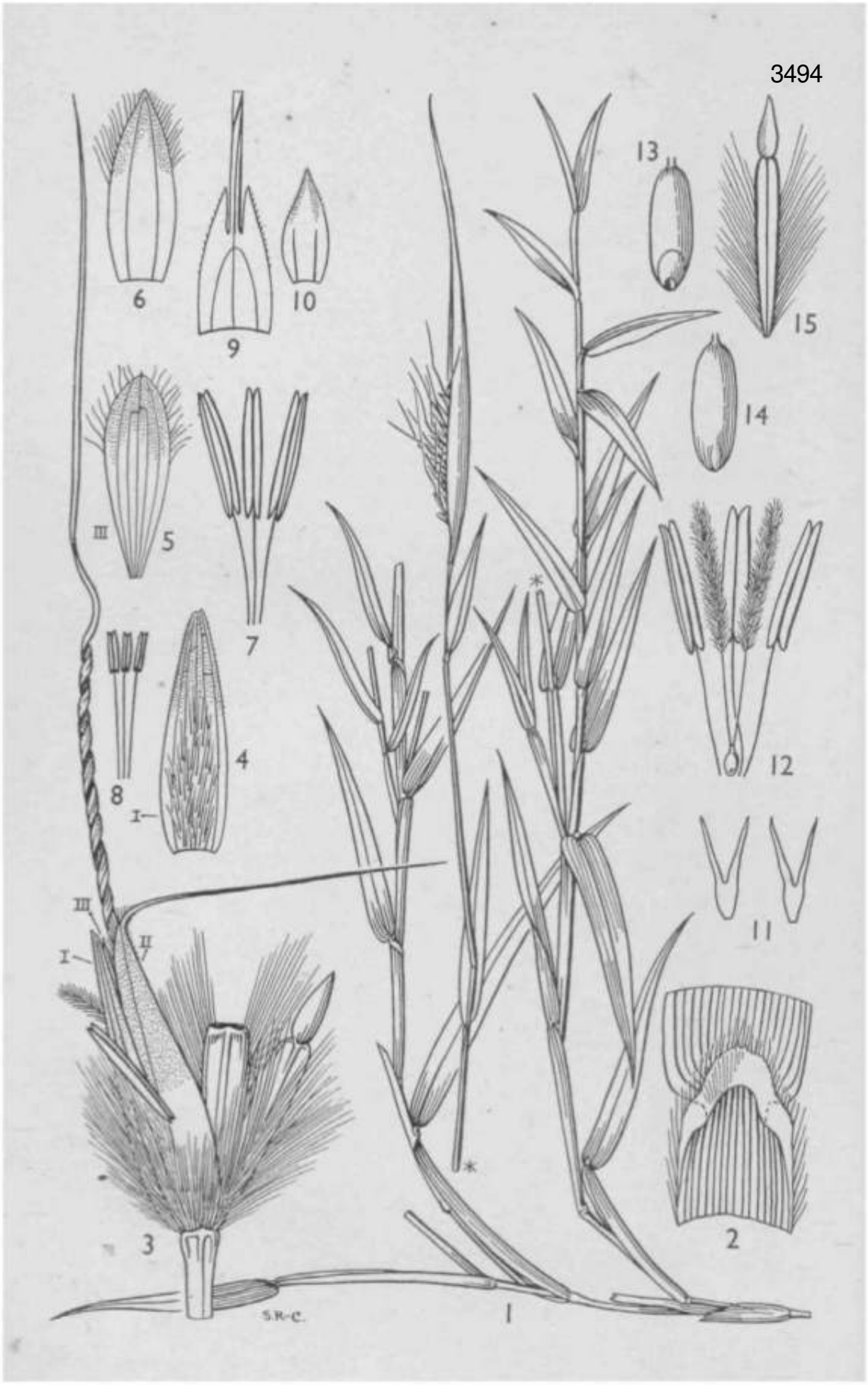
In order to estimate the range of variation in spikelet structure in one inflorescence, 25 spikelets forming it were dissected from a plant collected by Tranzschel near Erivan in Armenia. The glumes, lemmas and paleas were uniform in structure. In the lowest and youngest spikelet, the two anthers, each about 0-6 mm. long, were enclosed in the floret with a well-developed ovary, of which the comparatively long stigmas (connate near the base) projected from the tip of the spikelet. In succeeding young spikelets this evidence of protogyny was confirmed, and it was noted that the size of the anthers varied very slightly from 0*5 to 0-7 mm. in length. There were never more than two anthers, although one or both of these were usually shed in the mature spikelets of the upper part of the inflorescence. In all instances the lodicules were absent, and the stigmas always connate near the base, features of other genera in which protogyny is encountered.

In distinguishing *Rhizocephalus turkestanicus* (Litw.) Roshev. from *R. orientalis,* Litwinow has used as diagnostic characters, its very low

stature, the broadly auriculate membranous-margined tips of the glumes and the length of the lemma compared with that of the glumes. In view of its dry habitat, differences in the size of such grasses (always small), are of no value for specific distinction. The glumes are slightly variable in length, but the apparent difference in size of the glumes and lemma is due in part to the stage of development of the spikelet, since in young spikelets the erect-tipped glumes naturally extend further up the lemma, whereas in mature spikelets, the glume-tips becoming incurved and at the same time divergent, appear much shorter than the lemma.

Judging from published statements, *Rhizocephalus orientalis* has a wide area of distribution in the arid regions of South-West and South Central Asia extending from the southern endof the Dead Sea northwards to Syria and Transcaucasia, and then eastwards through Persia to Bokhara and the Western Tian Shan, occurring on dry saline sands. There has been some confusion in the interpretation of the numbers written on Aucher-Eloy's duplicates in various herbaria. For example, whilst no. 3096 is cited as the type of *Crypsis pygmaea* Jaub. et Spach, it is listed as *Pulicaria arabica* Cass. by Boissier (Fl. Or. iii. 205). Similarly no. 3055, cited under *Rhizocephalus orientalis* by Boissier, is also enumerated by him under *Festuca ovina* subsp. *laevis* var. *genuina* Hack. (Fl. Or. v. 619). It is probable that both these numbers should be read as 3066; this gathering being made either in Syria or Northern Iraq.

C. E. HUBBARD.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TABULA 3494.

KERRIOGHLOA SIAMENSIS *C. E. Hubbard.*

GRAMINEAE. Tribus ANDROPOGONEAE.

Kerriochloa *C. E. Hubbard.* Genus novum, *Isckaemo* L. affine, a quo racemis solitariis breviter pedunculatis e lateribus spatharum angustarum emergentibus, spiculis valde heteromorphis, spiculis sessilibus a latere leviter compressis, gluma inferiore chartacea dorso convexa ecarinata, spiculis pedicellatis dorso compressis ad glumam inferiorem redactis differt.

Spiculae valde heteromorphae, heterogamae, binatae, altera sessilis, altera pedicellata, in rhachi fragili articulata racemi spiciformis solitarii ortae. *Anthoecia* duo : inferum in spicula sessili £ vel sterile, in spicula pedicellata sterile; superum in spicula sessili 6, in spicula pedicellata sterile. *Spiculae sessiles* cum internodio rhacheos et pedicello deciduae, a latere leviter compressae; callus truncatus, brevissimus, barbatus. *Glumae* aequales vel subaequales ; inferior dorso convexa, marginibus demum incurvis, ecarinata, explanata lanceolato-oblonga, apice obtusa vel minute bidentata, firme chartacea, 5-nervis, nervis superne anastomosantibus ; superior a latere compressa, navicularis, carinata, explanata ovato-oblonga, apice minute biloba, e sinu aristata, arista stricta, 3-nervis, nervis superne anastomosantibus, firme membranacea vel tenuiter coriacea. *Anthoecium inferius* glumis panllo brevius; lemma explanatum oblanceolatum, subobtusum, apice integrum, marginibus superne latis hyalinis exceptis tenuiter membranaceum, 3-nerve; palea explanata elliptico-oblonga vel elliptica, obtusa, lemmati fere aequilonga, marginibus latis inflexis hyalinis exceptis tenuiter membranacea, 2-nervis. *Anthoecium superius* infero paullo brevius : lemma oblongum, bilobum, e sinu loborum aristatum, arista geniculata atque columna torta, hyalinum, tenuiter 3-nerve ; palea lemmate brevior, lanceolato-elliptica, acuminata, hyalina, tenuiter 2-nervis; lodiculae duae, latae, bidentatae, tenues ; stamina tria, antheris anguste oblongis; ovarium ellipsoideum, glabrum ; styli duo, terminates, elongati, basin versus connati; stigmata angusta, plumosa, purpurea, c lateribus anthoecii exserta; caryopsis elliptico-oblonga, teres, scutello tertiam partem caryopseos aequante, hilo basali anguste elliptico. *Spiculae pedicellatae* oblongae vel oblongo-lanceolatae, dorso compressae, persistentes, sessilibus multo minores, steriles, ad glumam inferiorem membranaceam enervem redactae.—*Gramen* perenne ; culmi gracillimi,

FIG. 1, part of a flowering plant, *natural size* ; 2, ligule, x 6 ; 3, intemode of rhachis with sessile and pedicelled spikelets, x 8 ; 4, lower glume of sessile spikelet, X 6; 5, lemma of lower floret, X 6; 6, palea, X 6; 7,8, stamens, x 8; 9, lemma of upper floret, x 6; 10, palea, x 6; 11, lodicules, X 8; 12, stamens and pistil, X 8; 13, 14, caryopsis, showing embryo and hilum respectively, x 8; 15, pedicelled spikelet and pedicel, X 6.

geniculato-adscendentes, ramosi, multinodes ; laminae anguste lanceolatae, planae, breves ; ligulae membranaceae ; racemi valde fragiles, a latere leviter compressi, subsecundi, breviter pedunculati, e lateribus spatharum angustarum leviter emergentes ; rhacheos internodia et pedicelli subsimiles, oblanceolato-lineares, apice truncati.

Species unica, Siamae incola.

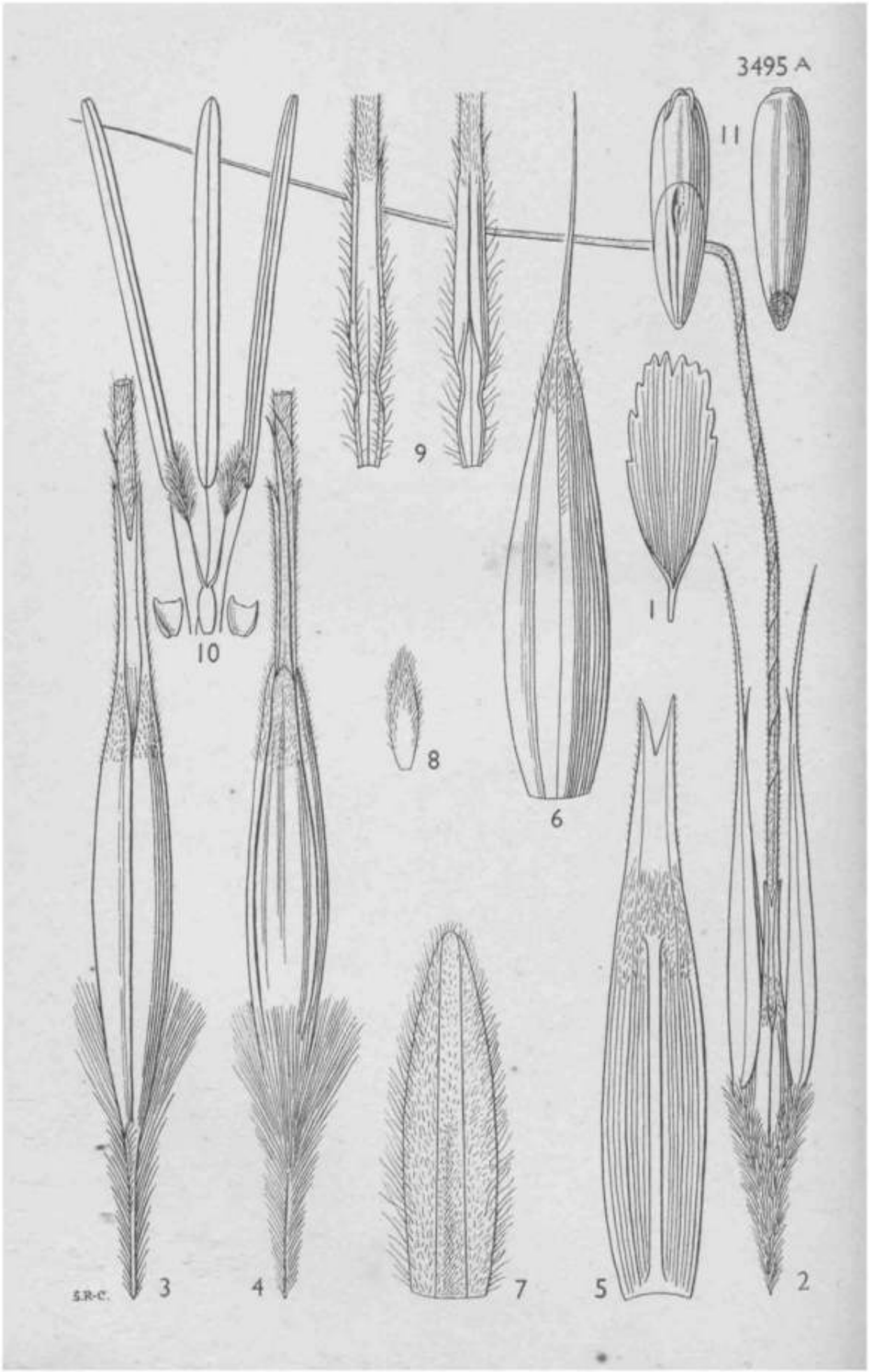
Kerriochloa siamensis *C. E. Hubbard,* species nova.

Gramen perenne, 20-25 cm. altum. *Culmi* e basi prostrata geniculato-adscendentes, gracillimi, multinodes, ramosi, ramulis brevibus foliaceis, teretes, rigidi, glabri, laeves. *Foliorum vaginae* internodiis longiores vel ilia aequantes, arete appressae, teretes, primo superne marginibus ciliatae, demum glabrae, laeves; ligulae truncatae, usque 1 mm. longae, membranaceae, ciliolatae ; laminae anguste lanceolatae, basi contractae, in apicem acutum attenuatae, 1-5-4 cm. longae, 2-5-4 mm. latae, planae, demum patentes vel reflexae, virides, firmae, primo inferne pilis e tuberculis ortis ciliatae et plus minusve sparse pubescentcs, vel omnino glabrae, marginibus apicem versus minute scaberulae, ceterum laeves. *Spathae* anguste lanceolatae, tenuiter acutae, usque 7 cm. longae, virides, pubescentes, demum convolutae. *Racemi* usque 2-5 cm. vel ultra longi, pallidi, villosi; pedunculi superne incrassati, filiformes, usque 5 mm. longi, glabri, laeves ; rhacheos internodia superne incrassata, dorso convexa et pilis patulis albidis usque 2-5 mm. longis villosa, facie applanata glabra, marginibus ciliata, 3-5-4 mm. longa ; pedicelli applanati, translucentes, dorso apicem versus excepto villosi, marginibus ciliati, 3-nerves, 4-4-5 mm. longi. *Spiculae sessites* a latere visae oblique lanceolato-oblongae, 5-6 mm. longae ; callus brevissimus, barbatus. *Gluma inferior* superiori aequilonga vel ea paullo brevior, prominenter nervata, minute asperula, dorso apicem versus excepto villosa ; gluma superior supra medium marginibus ciliata et carina scaberula, lateribus infra medium laevis et nitens supra medium pilis appressis minutissimis puberula, arista demum fere horizontaliter patula stricta 4-5-6-5 mm. longa tenuiter scaberula. *Anthoecium inferius* : lemma usque 5-3 mm. longum, supra medium dorso minute asperulum et marginibus ciliolatum ; palea usque 5 mm. longa, supra medium dorso minute asperula et marginibus ciliata ; antherae 0-8-2-3 mm. longae. *Anthoecium superius*: lemma 3-3-8 mm. longum, lobis acutis 1-1-5 mm. longis, minute ciliolatum ; arista usque 16 mm. longa, columna brunnea circiter 6 mm. longa, seta viridi: palea 2-5-3 mm. longa, supra medium minute asperula, ceterum glabra ; antherae 2-5 mm. longae; caryopsis 2-2-3 mm. longa, brunnea. *Spiculae pedicellatae* 0-5-2 mm. longae ; gluma inferior anguste ovata vel elliptica, membranacea, asperula, ciliata.

SIAM. Chantaburi: Krat, Kao Knap, in open rocky ground, *c.* 600 m., 23-xii-1929, *Kerr* 17718.

This new genus of the tribe *Andropogoneae* subtribe *Ischaeminae* belongs to a small group characterized by the sessile spikelets, and often the pedicelled (when present), bearing two flowers, with the lower male and the upper hermaphrodite, by the lemma of the upper floret being awned, and by the internodes of the rhachis and also the pedicels being widened and usually thickened upwards. In *Kerriochloa* the pedicelled spikelets are very much reduced, only the lower glume being developed, a condition found also in a few anomalous species of *Ischaemum,* such as *I. brachyatherum* Fenzl ex Hack., but from which it may be readily distinguished by the other characters given in the differential diagnosis. The relationship of *Kerriochloa* and *Ischaemum* appears to be very close judging from certain structural resemblances in the sessile spikelets, but the general appearance of the single species is very different from any species of *Ischaemum.* It is true that two species of *Ischaemum,* namely *I. fragile* R. Br. and *I. baileyi* C. E. Hubbard of N.E. Australia (treated as species of the genus *Digastrium* A. Camus by Pilger in Engl. u. Prantl, Nat. Pflanzenfam. ed. 2, He: 125, 1940) are provided with solitary racemes, but their lower glumes are indurated and tough and in the upper part 2-keeled and winged, their pedicelled spikelets are usually well-developed, whilst in habit they are also quite distinct. The genus *Sehima* Forsk., another representative of the *Ischaeminae* in which the racemes are solitary, and also occurring in Siam, may be distinguished by the reduction of the ligule to a ciliate rim, by the lower glume of the sessile spikelet being medianly grooved on the back and acutely 2-keeled in the upper part, and by the pedicelled spikelets possessing prominently nerved enlarged lower glumes.

C. E. HUBBARD.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3495 B
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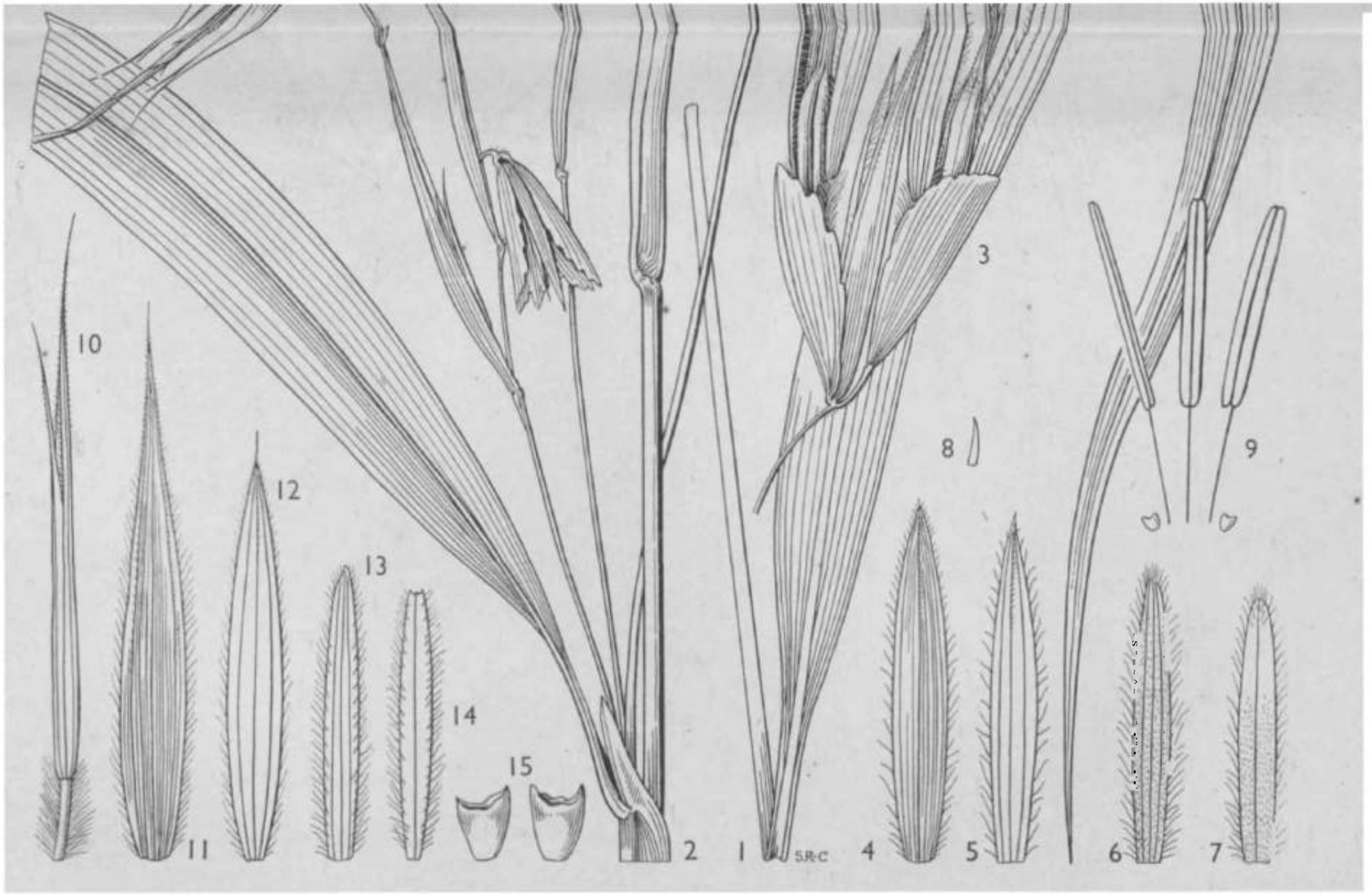
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TABULAE 3495 A et B.

HYPARRHENIA EDULIS C. *E. Hubbard.*

GRAMINEAE. Tribus ANDROPOGONEAE.

Hyparrhenia edulis *C. E. Hubbard*; species nova, affinis *H. macrolepidi* (Hack.) Stapf et *H. cornucopiae* (Hack.) Stapf, sed ab ilia appendiculis et spiculis omnibus multo longioribus, ab hac ligulis longioribus, appendiculis lobatis vel dentatis majoribus, spiculis omnibus multo longioribus, spiculis fertilibus glabris differt.

Gramen annuum, usque 5-7 m. altum (teste *Myers). Culmi* erecti vel basi leviter geniculati, e nodis inferioribus radices validas longas usque 4 mm. diametro agentes, robusti, teretes, usque 9 mm. diametro, inferne simplices vel ramosi, infra inflorescentiam usque 10-nodes, solidi, nitentes, glabri, laeves, primo pruinosi, demum straminei vel purpureo-suffusi, internodiis usque 45 cm. vel ultra longis. *Foliorum vaginae* teretes, laeves, glabrae vel nodis barbatae, coriaceae, nitentes, prope nodos tumidulos usque 1 • 4 cm. diametro purpurascentes, apicem versus angustatae, apice auriculatae, auriculis erectis anguste triangularibus 1-2-2*4 cm. longis, inferiores laxae, internodiis longiores, superiores arete appressae, internodiis breviores; ligulae anguste oblongae vel lanceolato-oblongae, truncatae, 1-2-2-5 cm. longae, firme scariosae, auriculis adnatae; laminae lanceolato-Iineares, in acumen tenuiter setaceum longum attenuatae, basin versus in pseudo-petiolum (costam mediam) usque 16 cm. longum et 3 mm. latum supra sulcatum gradatim angustatae, usque 1 m. vel ultra longae et usque 3-8 cm. latae (teste *Myers),* planae, virides, siccitate firme papyraceae, supra pilis patentibus longiusculis demum deciduis laxe hirsutae, vel glabrae, marginibus serrato-scabridae, ceterum laeves, costa media alba subtus prominente et rotundata supra plana vel leviter depressa usque 2 mm. lata, nervis lateralibus usque 16. *Panicula* foliacea, usque 1-5 m. longa, erecta vel demum nutans, laxissima, plerumque ramosissima, usque 8-nodis ; rami et ramuli graciles, rigidi, laeves. *Spatheolae* lanceolatae, tenuiter acutae, 6-5-10 cm. longae, usque 1-5 cm. latae, scariosae, demum papyraceae, pruinosae, pallide virides et purpureo-suffusae, nodis pilis moUibus patentibus laxe barbatae, apicem versus

A. FIG. 1, appendage, x 2 ; 2, fertile sessile and two pedicelled spikelets, X 2; 3, 4, fertile spikelet, front and back views respectively. Fertile spikelet: — 5, lower glume, X 4; 6, upper glume, X 4; 7, lower lemma, X 4; 8, palea, X 4; 9, upper lemma, two views, X 4; 10, flower, X 4; 11, caryopsis, showing embryo and hilum, X 3.

B. Fio. 1, leaf, *natural size*; 2, part of inflorescence, *natural size*; 3, pair of racemes, x 2. Homogamous spikelet:— 4, lower glume, X 2; 5, upper glume, X 2 ; 6, lower lemma, X 2 ; 7, upper lemma, X 2 ; 8, palea, X 2 ; 9, lodicules and stamens, x 4. 10, pedicelled spikelet, X 2. Pedicelled spikelet:— 11, lower glume, x 2; 12, upper glume, X 2; **13, lower** lemma, x 2; **14,** upper lemma, X 2 : If), lodicules, x 8.

scaberulae, ceterum glabrae laevesque, demum involutae et a latere visae anguste lanceolatae. *Racemi* subcontigui, patentes, 4-5-6 cm. longi, e spatheolis demum lateraliter exserti, pallide virides vel purpureo-tincti, singuli spiculam fertilem singulam ferentes, inferior tantum par singulum spicularum homogamarum basi ferens ; pedunculi filiformes, glabri, 1-3 cm. longi; racemorum bases subaequales vel paullo inaequales, inferior circiter 1 mm. longa, superior 1-4 mm. longa, in axillis pubescentes, apice appendiculam scarioso-chartaceam glabram pallide viridem vel purpureo-tinctam nervosam usque 2 cm. longam apice lobatam vel dentatam explanatam oblanceolato-oblongam basi vaginiformem gerentes ; pedicelli 7-8 mm. longi, applanati, pilis albis sericeis usque 5 mm. longis densissime ciliati. *Spiculae homogamae $* vel steriles, sessiles, 2*5-3 cm. longae, lineari- vel anguste oblongo-lanceolatae, acutae, dorso compressae; gluma inferior dorso plana, arete multinervis, firma, primo ciliata ; gluma superior 3-8-nervis, firme membranacea, marginibus hyalinis ciliata; lemmata usque 2 - 6 cm. longa, hyalina, ciliata, inferius anguste lanceolato-oblongum, tenuiter 3-nerve, superius lineare, 1-nerve ; palea angusta, usque 3 mm. longa ; antherae usque 4 mm. longae. *Spiculae fertiles* oblongae vel anguste elliptico-oblongae, fere teretes, usque 2•5 cm. longae (callo excluso); callus pungens, tenuis, acutissimus, 8-10 mm. longus, pilis appressis sericeis albis densissime barbatus; gluma inferior apice in rostrum nervosum chartaceum scaberulum lineare bifidum bimucronatum 6-10 mm. longum demum deciduum producta, cetera coriacea, rigidissima, pallida, laevissima, nitens, apice hispidula excepta glabra, circiter 12-14-nervis, primo dorso rotundata, tandem sulco angustissimo profundo praedita ; gluma superior explanata elliptico-oblonga, apice fragili acuto ciliato scaberulo demum deciduo aristam strictam usque 10 mm. longam gerens, coriacea, usque 2-0 cm. longa, 3-^5-nervis, glabra; lemmata hyalina, ciliata, usque 1*4 cm. longa ; lemma inferius oblongum, obtusum, tenuissime 2-nerve; lemma superius anguste oblongum, 3-nerve, apice bilobum, lobis angustis 2 mm. longis ; arista usque 14 cm. longa, validiuscula, rigida, columna hirtella prima aurea demum fulva ; palea oblonga vel elliptica, usque 4 mm. longa, hyalina, pubescens; lodiculae latae, truncatae, usque 1-3 mm. longae, glabrae; antherae usque 9 mm. longae: caryopsis oblonga vel anguste elliptico-oblonga, 9-12 mm. longa, subcylindrica, pallida; scutcllum circiter dimidiam partem caryopsis aequans; hilum rotundatum, basale. *Spiculae pedicellatae* ♀ vel steriles, spiculis homogamis nonnihil similes sed multo majores, lineari-lanceolatae vel angustissime lanceolatae, acuminatae, tenuiter acutae, dorso compressae, usque 4-6 cm. longae, circa columnam aristae demum nonnumquam contortae ; gluma inferior multinervis, apice in setam scaberulam usque 10 mm. longam producta, glabra, carinis superne scaberula ; gluma superior usque 3-2 cm. longa, 3-nervis, ciliata; lemmata anguste oblonga, usque 2-5 cm. longa, hyalina, ciliata, inferius 3-nerve, superius 1-nerve ; palea angusta, usque 2-5 mm. longa ; antherae usque 19 mm. longae.

ANGLO-EGYPTIAN SUDAN. **Equatoria Province: Zande District; Mabu, Abu Satta Hills, north of Tambura, abundant in pure stands at foot of rock outcrops, 5-10-1940, *J. G. Myers* 13533 (type); ibid., 2 & 17-7-1937, J. *G. Myers* 7099, 7154 ; ibid., 20-9-1947, *Mrs. Culwick* 27.**

This giant annual species of *Hyparrhenia,* with very stout solid bamboo-like culms, is closely related to two other Anglo-Egyptian Sudan annual species, *H. macrolepis* (Hack.) Stapf and *H. cornucopiae* (Hack.) Stapf, both of which were collected in the same region by Schweinfurth. In its general structure, *H. edulis* is very similar indeed to *H. macrolepis,* so much so that in view of the greater size of all its parts, one might even suggest it to be a polyploid derivative of that species. It may be readily distinguished, however, by the longer spikelets and appendages, and by the glabrous glumes of the fertile spikelets. In addition to the greater development of the basal appendages than in other members of the genus, these three species, as well as the perennial *H. dissoluta* (Nees ex Steud.) C. E. Hubbard *(H. ruprechtii* Fourn.), are characterized by the presence of one pair of more or less persistent homogamous spikelets at the base of the lower raceme and of one fertile spikelet in each raceme, and by the elongated basal callus and prominently longitudinally grooved lower glume of the fertile spikelet.

The development of a scarious bract-like appendage at the tip of each raceme-base is a feature of all the species of three of Stapf's subsections of *Hyparrhenia.* In those of sect. *Pogonopodia* subsect. *Bracteatae* Stapf (in Prain, Fl. Trop. Afr. ix. 293, 1919), it ranges from an obscure auricle to a linear or oblong toothed or lobed scale up to 5 mm. long. In *H. dissoluta* and *H. macrolepis,* comprising sect. *Ruprechtia* subsect. *Ruprechtiae* Stapf (I.e. 293), it is larger, being 5-8 mm. long in the former and 7-12 mm. long in the latter species; it is most prominent in *H. cornucopiae* of sect. *Apogonia* subsect. *Cornucopias* Stapf (I.e. 294) and in *H. edulis,* in the former attaining 10 mm. and in the latter 20 mm. in length. These organs have been variously interpreted, for example in *Hyparrhenia bracteata* (Humb. et Bonpl. ex Willd.) Stapf *(Anthesteria humboldtii* Nees), the small two-toothed appendages were regarded by Nees (Agrost. Bras. 370, 1829) as minute imperfect spikelets. Many years later, Hackel (in Mart. Fl. Bras. iii. pt. 3, 279-80, 1883), who observed them in several species in which they ranged in size from a minute outgrowth to a sheath-like organ in *H. cornucopiae,* at first described them as bracteoles, but afterwards (in DC. Monogr. Phan. vi. 361,1889) treated them merely as appendages. He pointed out that there were no traces of bracteoles on the rhachis at the origin of the pairs of spikelets and that the appendages developed after the spikelets. Their leaf-like structure and their position at the base of each partial inflorescence strongly suggests an origin similar to that of the spatheoles, that is by the reduction of the leaf to its basal portion—the sheath.

The remarkable range in the development of the culms, leaves and inflorescences of some African species of *Hyparrhenia* under varying

edaphic conditions is very well illustrated by specimens of *H. edulis* obtained from depauperate plants grown in England contrasted with Myers' extremely luxuriant Sudan material. These cultivated specimens, raised from a few seeds collected by Myers at the type locality, were sown and grown in the winter of 1942-43 in a small (three-inch wide) pot in a heated greenhouse at Oxford Botanic Gardens. Although the seeds germinated fairly rapidly, there was little development of the culms owing to the very unfavourable growing conditions and the first plants commenced flowering on 16 March 1943 when only 15 cm. high. Others grew slightly taller and continued to flower up to the end of November of the same year, when being annuals they all died. As a result of the lack of nutriment and sunshine, all these plants were very weak, with slender geniculately ascending culms not exceeding 30 cm. in height or 0 • 6-1 • 3 mm. in diameter compared with the robust erect gigantic culms of the wild plants from which the seed was taken and which were up to 5 • 7 m. high and 9 mm. in diameter. The growth of the leaves was also considerably affected by the poor conditions, the blades being weak and flaccid, up to 30 cm. long and 6 mm. wide, whilst the largest ligule was only 3 mm. long. The inflorescences were very much reduced, sometimes consisting of only three raceme-pairs. As the racemes developed, the minutely hairy pulvini in the axils of the raceme-bases became turgid, causing the racemes to diverge from one another until they were spreading at an angle of 90° or some almost horizontally. In these plants the raceme-bases were unequal, the lower raceme being subsessile and the upper on a somewhat flattened stalk up to 4 mm. long. The green fertile sessile spikelets were smaller than in the wild specimens, ranging from 1 • 5 to 2 • 0 cm. in length, while the lower glume in the fresh state was perfectly smooth and rounded on the back, becoming longitudinally grooved only when dry. The time and method of flowering were not observed ; it may have taken place in the early morning since later in the day the densely plumose deep purple stigmas were laterally exserted just below the middle of the gaping glumes and the three 6 mm. long yellow anthers were pendulous on fine filaments. The awn varied in length between 6 and 10 cm., being straight and untwisted when fresh, although differentiated into a yellow column and a pale brown bristle. No seeds were formed, but some of the racemes eventually broke up leaving the foliaceous appendages and a pair of persistent homogamous spikelets at the base of the lower raceme. A second batch of seed from the same source, sown in larger (seven-inch) pots in the summer of 1943, gave rise to much more vigorous plants, larger in all their parts, which made rapid growth as a result of increased root development and longer periods of sunshine. These plants attained a height of 180 cm. by 17 Nov. 1943 ; their culms were moderately stout and produced thick rigid prop roots from the lower nodes up to 25 cm. above the soil. At first the culms and leaf-sheaths were coated with a whitish wax, but this gradually disappeared leaving the normal green or purplish colouring. The very graceful leaf-blades spread horizontally from the culms, with their tips finally curved downwards or

drooping. The largest were up to 1 m. or more long and up to 2*7 cm. wide at or just above the middle, gradually tapering to a finely pointed tip, and downwards into a stout midrib, this forming a petiole-like base. The white or crimson midrib, rounded on the lower surface of the blade and slightly channelled above, provided the only change of colour in an otherwise uniformly green blade. The leafy inflorescences, at first erect, loosened as the branches developed and then drooped, the narrow 'lanceolate purple-tinged spatheoles and the laterally exserted long-awned racemes being the most conspicuous features. None of these plants or those sown the following year developed seed, and all died on the completion of flowering.

It was in July 1937, whilst travelling through the Equatoria Province of the Anglo-Egyptian Sudan, that the late Dr. J. G. Myers first became acquainted with *Hyparrhenia edulis.* He was in the country of the Belanda (Balanda) people, in a region of rocky hills known as the Abu Satta Hills, about 80 miles north of Mt. Nakbi, when he noticed his Belanda porters eating the grain of a local grass which he failed to recognize. The grain had apparently been stored from the previous year's harvest as the grasses at that time were only just beginning to flower. It was known to the Muegumba Belanda as " Penze " and to the Mberidi Belanda as " Funje," but the Azande people called it " Bagau," a name which they also applied to *Hyparrhenia macrolepis* (Hack.) Stapf, a moderately tall annual species which Myers had collected a few days earlier at the base of Mt. Nakbi, in the Zande country (no. 6961). The natives explained to him that there were two kinds of " Bagau," the small-seeded plains variety *(H. macrolepis),* and the large-seeded edible kind *(H. edulis),* the latter found only in pockets in the rocky Abu Satta Hills where it often covered considerable areas as pure stands. At that time (mid-July), only a single flowering specimen could be found, but already the grass was 12 ft. high. Myers informed us that although *H. edulis* was an important food grass, it was not cultivated by the Belanda, who are a rather shiftless people suffering on this account, from periodic food shortage. At harvest time the ripe inflorescences are collected into bundles, placed on a flat rock, and ignited to burn off the long awns and chaff. This singeing loosens or removes the indurated lower and upper glumes and causes some grains to " pop." The threshed grains are available for immediate use or they may be stored for a long time. In a sample received at Kew, many of the grains were damaged, either being fractured, charred, or in the majority without the large embryos (about half the length of the grain), thus reducing their nutritive value. The relatively large grains (9-12 mm. long) are oblong to elliptic-oblong in outline, pallid, very hard arid flinty, somewhat translucent, and almost terete except for the fine longitudinal groove caused by pressure from a similar groove in the lower glume. They are cooked in the same manner as rice and " pop " on boiling. Myers stated that this product was very similar to cooked whole oats, both in flavour and consistency, and somewhat superior to rice. In Oct. 1942, he was able to visit the Abu Satta Hills again, at the

height of the harvest of *Hyparrhenia edulis,* and to gather excellent herbarium material, seed for growing, besides about 70 lb. of the singed seeds as used for food.

Although the *Andropogoneae* includes the very important cereal Sorghums, very few other genera of the tribe have grains sufficiently large or abundant to attract the attention of natives. It was somewhat surprising, therefore, to receive material of a species of *Hyparrlienia* used as a food plant, particularly one with such a high proportion of male or barren spikelets in the inflorescence, where only two out of eight spikelets in each raceme-pair are fertile. The genus *Hyparrhenia* is, however, important economically in other respects, since many species are utilized by natives for thatching, fencing, and in the manufacture of mats and screens, whilst some have proved suitable for the preparation of paper pulp.—C. E. HUBBARD.


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TABULA 3496.

AMYRIS SANDEMANII *Sardwith.*

EUTACEAE. TribuS TODDALIEAE.

Amyris sandemanii *Sandwith* ; species nova perinsignis, foliis alternis unifoliolatis, ab *A. simplicifolia* Karst. petiolo brevi forma folioli statim distinguitur ; *A. monophylla* Brandeg. species mexicana, e descriptionibus foliolis ovatis vel late ellipticis, petalis obovatis 3-3-5 mm. longis, stylo 1 mm. longo differt.

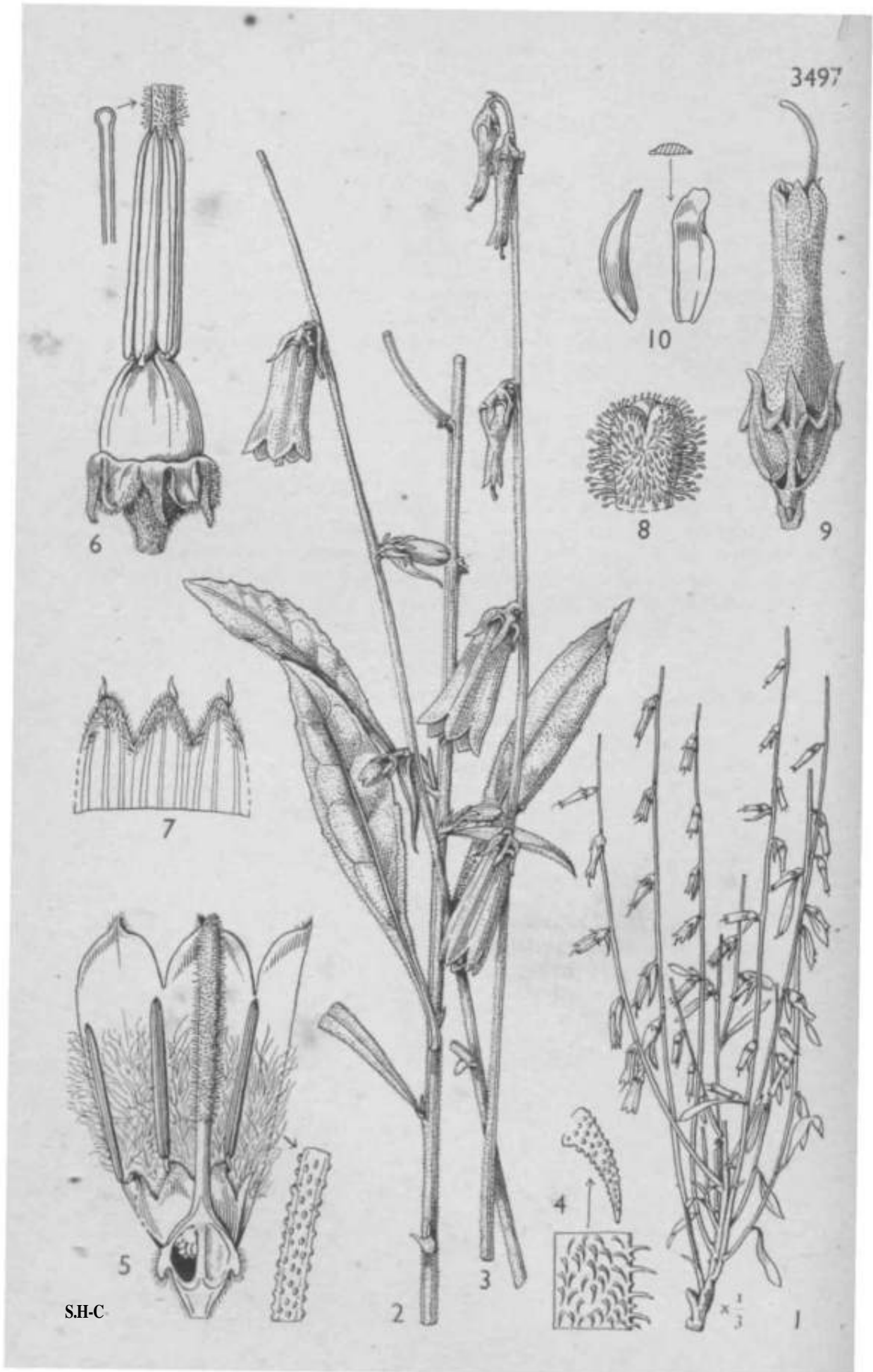
***Frutex,* omnino glaber, ramulis annotinis griseis cortice longitudinaliter fisso, hornotinis gracilibus olivaceis 1-1-2 mm. diametro. *Folia* alterna, unifoliolata, petiolo gracili subterete senectute rugosulo 4-8 mm. longo, petiolulo saepe quidpiam crassiore 1-2 mm. longo ; foliolum ellipticum, elliptico-oblongum vel elliptico-ovatum, apice obtusum vel brevissime late obtuse acuminatum, basi rotundatum nonnunquam brevissime cordatulum, 2-7-6-2 cm. longum, 1-2-2-9 cm. latum, annotinum subcoriaceum marginibus plus minusve revolutis supra olivaceum nitidulum subtus griseo-glaucescens, hornotinum chartaceum concolor pallidius flavo-viride, costa supra plana vel canaliculato-impressa subtus praesertim inferne valde prominente, nervis lateralibus primariis utrinsecus circiter 12 angulo satis lato patulis marginem versus arcuato-anastomosantibus utrinque prominulis, intermediis parallelis saepe fere aequaliter obviis, rete venularum folioli annotini sub lente tantum obvio hornotini utrinque prominulo intricatissimo, punctis more generis creberrimis subtus sub lente obviis. *Thyrsi* axiUares atque terminates, 2-4 cm. longi; pedunculi cymarum inferiores saepius 0*7-1-2 cm. longi, superiores multo breviores; bracteae subulato-lanceolatae, 0-5-1 mm. longae; pedicelli 1-2 mm. longi. *Flores* flavo-cremei, ut videtur superfeminei tantum visi. *Calyds* tubus late cupularis, 1 mm. altus, 2 mm. latus; lobi inaequales, late deltoideo-ovati, obtusi, 0-7-1 mm. longi, 1-2-1-5 mm. lati, glanduloso-punctati. *Petala* 4, patula, orbiculari-ovata, apice rotundata, inaequalia, 2-2-2-5 mm. longa, 1-75-2 mm. lata, glanduloso-punctata. *Stamina* 8, valde inaequalia, filamentis applanatis 0-5-1-75 mm. longis; antherae ad 0-75 mm. longae atque latae. *Gynophorum* conico-pulvinare, rubro-brunneum, 0-75 mm. altum, 1-3 mm. latum. *Ovarium* ovoideum, 0-6 mm. longum, 0-6 mm. diametro ; stylus crassus, circiter 0-2 mm. longus atque 0-3 mm. latus ; stigma peltato-capitatum, applanatum, circiter 0-5 mm. diametro. *Fructus* non visus.**

PERU. **Dept. Cajamarca: Llama, Cutervo, 2250 m., July 1943,**

FIG. 1, flowering branch, *natural size*; 2, lower surface of leaflet, X 8; 3, flower, X 6; 4, flower, longitudinal section, x 10; 5, calyx, X 8; 6, petals, outer surface, X 8; 7, stamen before dehiscence of anther, front view, X 16; 8, the same back view, X 16; 9, gynoecium, X 10.

Christopher Sandeman 4232 (type in Kew Herb.; dupl. in Oxford Univ. Herb.). " Shrub in semi-shade, averaging about 6 ft. Flowers yellowish cream-coloured. Leaves alternate, with waved margins."

The genus *Amyris* consists of about 25 species occurring in the West Indies and from Florida and Texas through Central America to Colombia, Venezuela, Ecuador and Peru. The type locality of *A. humboldtii* Krug et Urb., a plant with 3-foliolate leaves, is unknown. Hitherto, only *A. pinnato* H. B. K., with 2-4 pairs of leaflets, has been recorded from Peru, from a single locality in Amazonas. Mr. Sandeman's discovery of a new species at an unusually high altitude is therefore of great interest, especially as his material does not closely resemble that of any *Amyris* represented in the Kew Herbarium, nor does it fit the descriptions of the members of this genus which possess alternate unifoliolate leaves and a well-developed gynophore. Several species with these characters occur in the West Indies and Central America, but only one of them, *A. simplicifolia* Karst., is known from northern South America, where it grows at a low altitude on the arid north coasts of Colombia and Venezuela, as well as in the adjacent islands and in Trinidad. This species has very distinctive leaflets like leaves of a poplar, borne on long petioles, and bears no resemblance to Mr. Sandeman's Peruvian plant which seems, from the evidence of the description, to be allied to *A. monophylla* Brandeg. of the states of Oaxaca and Puebla in southern Mexico. It is probable that further undescribed species of *Amyris* await discovery in the Andes.—N. Y. SANDWITH.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TABULA 3497.

ZEUGANDRA IRANIGA *P. H. Davis.*

CAMPANULACEAE. Tribus CAMPANULEAE.

Zeugandra *P. H. Davis,* gen. nov. Genus hoc ad *Campanulam* ipsam approximat; ab illo genere filamentis in coronam firmam coalitis imprimis divergit; insuper corollae anguste infundibularis tubo intus villosissimo lobis pro tubo brevissimis haud reflexis, ramis styli brevissimis haud patentibus recedit.

Planta perennis. *Rhizoma* sublignosum. *Inflorescentia* centrifuga, floribus in paniculas ut videtur laxissime racemosas dispositis breviter pedicellatis nutantibus. *Calycis tubus* adnatus hemisphaericus turbinatus ; limbus alte 5-fidus, sinubus in appendices linguiformes abeuntibus. *Corolla* anguste infundibularis (senectute, basi excepta, anguste tubiformis), crassiuscula, violacea, ad sextam vel septimam partem in lobos triangulares erectos quinquilobata, extra densissime ac adpresse retrorso-scabro-pubescens, intus supra glabrescens, in parte inferiore pilis longis haud septatis dense papillosis villosissima. *Stamina* 5, iuxta corollam toro inserta, inclusa, filamentis per duas partes vel paulo ultra in coronam firmam coalitis, partibus liberis infra medium triangularibus villosulis, superne linearibus, antheris liberis linearibus apiculo terminatis. *Stylus* tenuiter columnaris a basi sensim dilatatus, in statu $ recte exsertus, ad quadrantem glaber, ad apicem brevissime trifidum dense hirtellus, lobis haud patentibus. *Discus* nullus. *Ovarium* inferum, triloculare, placentis ex angulo superiore loculorum pendulis. *Capsula* nutans, infera, calycis lobis coronata, vertice manifeste convexa, prope basin inter costas valvulis singulis dehiscens. *Semina* subplana, ovato-oblonga, fulva, circa 15 per loculum.

Zeugandra iranica *P. H. Davis,* sp. nov.

Planta perennis. *Caudex* crassus, sublignosus, squamosus. *Cauks* aliquantum numerosi erecti, 20-35 cm. alti, laxissime racemoso-ramosi (raro simplices), centrifugi, rigidissimi, canescentes, internodiis 1*5-4 cm. longis lineis decurrentibus striatis, pilis biformibus aliis brevibus dense adpressis retrorso-scabris aliis longioribus sparsis retrorso-strigosis hirti. *Folia* basalia non vidi; caulina inferiora pilis dense papillosis retrorso-strigosa, aliquantum evanescentia, plerumque 4-6 cm. longa, ad 1 cm. lata, anguste ovato-oblonga, in petiolum sensim

Fio. 1, whole plant, *one-third natural size*; 2 and 3, part of leafy stem and two inflorescences, *natural size;* 4, underside of leaf, X 8, and a single hair, *much enlarged;* 5, flower in longitudinal section, X 3, and part of one hair, *much enlarged ;* 6, flower, with corolla and part of style removed, X 4, and one glandular hair from style, x 40 ; 7, three of the five filaments, inner surface, X 4; 8, stigma, x 12 ; 9, fruit with two valves open, X 3; 10, seed in front and three-quarter back view and in transverse section, X 8.

attenuata, irregulariter subdentata, subamplexicaulia fere decurrentia ; superiora (et bracteae) parva, anguste oblongo-lanceolata, integra, sessilia, floribus breviora vel nunc supcrantia. *Flores* in axillis bractearum solitarii (vel raro bini), 1*5-2 cm. longi (vel paulo minores), brevipedicellati, nutantes, extra omnino adpresse retrorso-scabro-pubescentes ; *calyx* hemisphaerico-turbinatus, 4-6 mm. longus, laciniis triangulari-lanceolatis receptaculo aequilongis vel sublongioribus, appendicibus breviter linguiformibus; *corolla* anguste infundibularis, 1-1-1-4 cm. longa, 0-4-0*6 cm. lata, violacea, extra propter pilos subalbicans, intus ad medium longe villosissima, lobis triangularibus erectis £-$• tubum aequantibus. *Stamina* inclusa, filamentis per duas partes vel paulo ultra in coronam firmam coalitis. *Stylus* exsertus, dense hirtellus, brevissime trifidus, lobis haud patentibus. *Capsula* trilocularis vix dilatata, prope basin inter costas valvulis singulis dehiscens. *Semina* subplana, ovato-oblonga, haud numerosa, 2 mm. longa, 1 mm. lata. Floret Jul.-Aug.

IRAN. On the pass between Khanikin and Kermanshah above the village of Shahabad, in stony calcareous ground, alt. c. 1400 m.; growing with *Linum* sp. an[0], *rigidissimo* Post; 23 Jul. 1939, *Davis* 706. Ibid., 1 Sept. 1939, *Davis* 854 (Type in Kew Herb.).

' The new monotypic genus described above was collected in Iran while I was travelling there with the Hon. Edward Gathorne-Hardy in 1939. It was almost the first plant we gathered in that country, and it was found, not in an inaccessible part of the mountains, but growing beside the main road that runs from Ehanikin to Kermanshah ; it was, in fact, seen from the car. That such a plant has been missed by previous travellers can only be explained by its time of flowering; it blooms in late summer—a season when, in so arid a region, few botanists are about.

Zeugandra is related most closely to *Campanula L.* It may be at once distinguished from that genus by the filaments ; they are fused for the greater part of their length into a firm corona. In addition, the narrow funnel-shaped corolla is divided to only one-sixth or less into erect lobes, the tube being covered within in its lower part by very long hairs (non-septate and papillose) which surround the genitalia. Another distinguishing feature is that the exserted style (in itself not a unique character) is so very shortly trifid that the stigmas are not at all reflexed; the style therefore appears almost entire.

Besides the above characters there are others which in *Campanula L.* are found rarely or in less marked degree : the indumentum on the outside of the corolla is remarkably dense ; the loculi contain comparatively few rather large seeds; the habit of the plant is uncommonly rigid, though in this respect *Campanula leucoclada* Boiss. is not dissimilar.

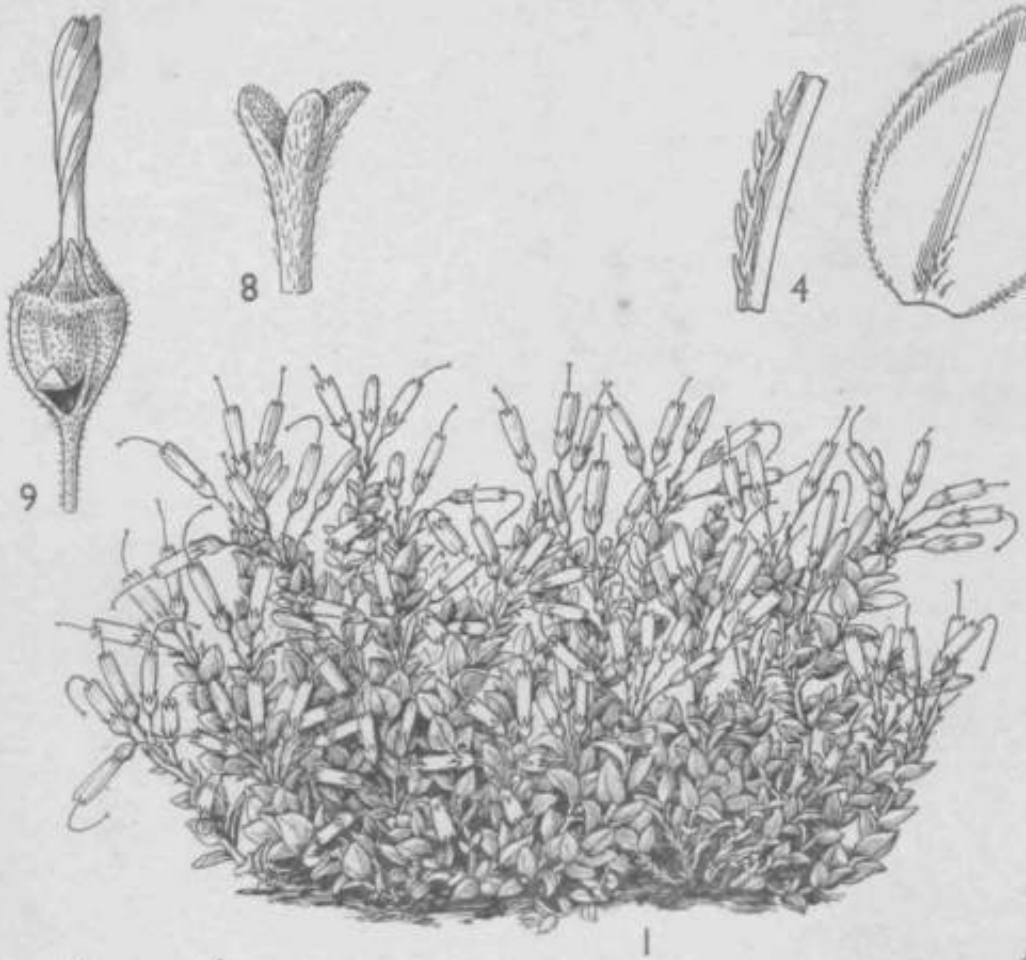
It may be seen from the characters cited that *Zeugandra* is a well distinguished genus. It differs from *Campanula L.* more markedly, for instance, than do *Symphyandra D.C.* or *Adenophora* Fischer. The

structure of the flower would seem to indicate a higher degree of evolutionary development than is found in *Campanula L.*, and its elaborate hairiness suggests extreme xerophytic adaptation. The absence of a nectary may be correlated with the curious wadding of wool that fills the lower part of the corolla. Though it has no doubt evolved from an ancestral *Campanula* stock, the new genus, like so many Persian plants, seems likely to be fairly old.

Zeugandra belongs to the Irano-Turanian element and grows on rocky calcareous hillsides in company with *Linum* sp. aff. *rigidissimo* Post and *Acanthophyllum* sp. We collected seed on our way out of Iran, but, being probably unripe, it failed to germinate.

My thanks are due to Professor Sir William Wright Smith and to Dr. H. R. Fletcher for their advice in the preparation of the description.

P. H. DAVIS.



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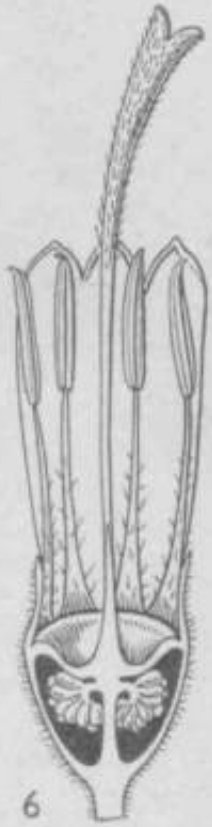

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TABULA **3498.**

TRAGHELIOPSIS ANTILIBANOTICA P. *H. Davis.*

CAMPANULACEAE.

Tracheliopsis antilibanotica *P.* *H. Davis,* sp. nov. Species haec a *T. tubulosa* (Boiss.) Buser statura nana, foliis minoribus ± orbicularibus semper integris enerviis, corymbis paucifloris, corolla tubulosa (haud anguste infundibulari) lobis haud patentibus inter alia differt. Planta elegantula habitu *Diosphaerae asperuloidi* (Boiss. et Orph.) Buser haud dissimilis.

Planta perennis, caespitosa, nana, petrophila. *Caudex* lignosus, brevis, caudiculis numerosis nodulosis. *Caules* simplices, numerosi, ascendentes, fragiles, 1-2-5 cm. longi, lineis decurrentibus angulati, dense foliosi. *Folia* imbricata, integra, basi subamplexicauli-sessilia, orbicularia vel late ovata vel obovata, ad 4 mm. longa et lata, crassiuscula, fere, enervia, glabra nisi ad marginem et supra ad basin sparse ciliato-scabra, emarcida persistentia. *Inflorescentia* corymbosa, 4—14-flora, cymulis 1-3-floris e foliorum summorum axillis enatis. *Pedicelli* capillares, hirsuto-pubescentes, bracteolati, floribus breviores. *Calyx* 2-3 mm. longus, hirsuto-pubescens, sepalis triangulari-lanceolatis receptaculo turbinato-pyriformi aequilongis. *Corolla* tubulosa, glabra, lacteo-alba vel pallido-caerulescens, 3-5 mm. longa, 1-2 mm. lata, lobis triangularibus porrectis vel subconniventibus £-J tubum aequantibus. *Filamenta* linearia pilosula saepe basi sensim paulo dilatata antheris inclusis longiora. *Stylus* longe exsertus, quam corolla plerumque duplo longior, in parte superiore pilosus, inferne glaber, apice 2-3-fidus, ramis patentibus vel revolutis. *Discus* manifeste annularis. *Capsula* pyriformis, 1-5-2 mm. longa, prope basin poris 2-3 dehiscens. *Semina* ignota. Floret Aug.

LEBANON. Antilebanon: E. side of Talaat Musa, c. 2500 m., on vertical rocks with *Veronica bombycina,* 22 Jun., 1943, *Davis* 6654; ibid., 11 Aug. 1945, *Davis* 9966 (Type in Kew Herb.); Talaat Musa, 2600 m., in rocks with *Veronica bombycina,* flowers white or pale bluish, 11 Aug. 1945, *Davis* 9942 ; Hursh Imarra between Talaat Musa and Bir Jebâb, *c.* 2400 m., 12 Aug. 1945, *Davis* 9793 ; top of Wadi Jebâb above Baalbek, *c.* 2400 m., flowers white, 12 Aug. 1945, *Davis* 9769.

The Syrio-Lebanese frontier bisects Talaat Musa, and it is therefore probable that the first two gatherings should be referred to Syria. The" species occurs always within the zone of *Juniperus excelsa* which forms an open forest in the high Antilebanon unaccompanied by any other tree.

Fio. 1, flowering plant, *natural size;* 2, flowering branch, X 2; 3, leaf, X 6; 4, leaf-margin, x 16; 5, flower, X 6; 6, flower in longitudinal section, X 8; 7» young unopened stigma, X 8; 8, opened trifid stigma, x 16; 9, fruit, with one valve opening, x 6.

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A second new species of this interesting genus was collected by Professor 0. Schwarz on his Anatolian journey of 1938. It is :—

Tracheliopsis fruticulosa *0. Schwarz et P. H. Davis,* sp. nov.

Planta fruticulosa. *Caudiculi* ramosi, lignosi, apicem versus caulium residuis squarruloso-nodulosi. *Caules* simplices* 2-12 cm. alti, fragilissimi e caudiculorum apicibus nascentes, dense et patentim villosi. *Folia* suborbicularia usque lanceolato-elliptica, ad 18 mm. longa et 12 mm. lata, tenerrima, obtusa vel acutiuscula, integra vel nunc serraturis minutis perpaucis denticulata, sessilia, pilis minutis albis ± appressis pubescentia, infima atque suprema diminuta. *Inflorescentia* corymbosa compacta, multiflora, cymulis in foliorum supremorum axillis saepe ad florem unicum reductis. *Pedicelli* villosuli bracteolati. *Calyx* 3-5 mm. longus, patule villosulus, laciniis lineari-subulatis tubo late obovato fere l£-plo longioribus. *Corolla* lactea, anguste infundibuliformis, extra sparsim puberula, 4-7 mm. longa, lobis lingulatis i conniventibus rariusve porrectis acutiusculis quartern vel quintam tubi partem aequantibus. *Filamenta* linearia basi vix dilatata antheris subinclusis. *Stylus* corolla saltern duplo longior, in parte superiore initio brevissime pilosiusculus, apice bifidus vel trifidus, ramis deinde revolutis. *Capsula* ignota. Floret Aug.

ANATOLIA. Prov. Mugla, distr. Fethiye : on vertical calcareous rocks of Mt. Maşdadağ above the village of Maşdaköy, *c.* 2400 m., 4 Aug. 1938, *Schwarz* 446 (type), and of Mt. Teke Punari Dag near Seki Yaylâ, c. 1800-2200 m., 25 Jul. 1938, *Schwarz* 161—a form with smaller, narrower, often denticulate leaves. Type in Berlin Herb. ; Isotype in Kew Herb, and Haussknecht Herb.

The* description of *T. fruticulosa* has been made to cover both gatherings. The type—No. 446—is of more vigorous growth than No. 161. The latter is rather dwarf with short twigs that have been appressed to the rocks ; its leaves are narrower and smaller (12 x 5 mm.), generally a little denticulate, and the corymbs consist of only 4-7 flowers whilst those of the type have up to 30. It grew in a more sunny place than the type.

T. fruticulosa is related to *T. tubulosa* (Boiss.) Buser but differs in its extreme fragility, broader and generally more or less entire leaves with rather indistinct nervature, the pubescence of the calyx and corolla, and in its general villosity. Its habit is also rather different—the thick woody stems bear interlaced papery bark, and are densely covered above with the node-like remains of the twigs. In these characters it approaches *T. myrtifolia* (Boiss. et Heldr.) Schwarz et Davis* which, in

* Tracheliopsis myrtifolia *(Boiss. et Heldr.) Schwarz et Davis,* comb. nov.—*Campanula myrtifolia* Boiss.et Heldr. in Boiss., Diag. PI. Orient. Ser. 1,(11) 69(1849). *Trachelium myrtifolium* (Boiss. et Heldr.) Boiss. in Boiss., Fl. Orient. 3, 962 (1875). Schwarz and Davis are jointly responsible for the remarks on *T'. fruticulosa.*

spite of its short style, is a close relative of our new Turkish species and of *T. tubulosa. T. fruticulosa* holds a place intermediate between *T. myrtifolia* and *T. tubulosa.*

Buser's revision of the genus *Trachelium* L. in 1894 (Bull. Herb. Boiss. [Ser. 1] 2, 501-532) by no means settled the fate of the species formerly included in that genus. He placed the Oriental *Trachelia* of Boissier (Fl. Orient 3, 960-962 : 1875) in two new genera, *Diosphaera* Buser and *Tracheliopsis* Buser,* with the exception of *Trachelium myrtifolium* (Boiss. et Heldr.) Boiss. which he transferred to *Campanula* L. In *Tracheliopsis,* Buser also included *Campanula petraea* L. and the very closely related *Tracheliopsis albicans* Buser ; these were placed in a separate section—Sect. *Codonosphaera* Buser. *Trachelium* L. he reduced to a bispecific genus containing *T. caeruleum* L. (West Mediterranean) and the Sicilian *T. lanceolatum* Guss., both species with very similar and characteristic flowers and between which a hybrid is known. He considered *Diosphaera* and *Tracheliopsis* to be most closely related to *Campanula* L.

Engler in 1897 (Pflanzenf, Nachtr. [1] 319) accepted Buser's concept of *Trachelium* but reduced *Diosphaera* and *Traclieliopsis* to subgenera (or sections) of *Campanula* L. while at the same time retaining the subgrouping of Buser within those subgenera. Engler's ruling has not been generally followed: Halácsy (Consp. Fl. Graecae, 2, 278: 1902), Hayek (Prodr. Fl. Bale. 2, 552-553: 1930), and K. H. Rechinger (Fl. Aegaea, 604 : 1943) have all treated *DiospJiaera* as a separate genus ; similarly, *Tracheliopsis* was so recognized by Post (Fl. Syria, Palestine and Sinai: 1896).

Bornmüller, in a paper on *Asyneuma (Podanthum)* in 1921 (Beih. Bot. Centralbl. 38, [2] 333-351), proposed a more natural grouping of the species placed by Buser in *Tracheliopsis* and *Diosphaera.* He tentatively recommended the merging of these two genera into one, but emphatically maintained that the two species composing *Tracheliopsis* Sect. *Codonosphaera* should in all circumstances be separated and placed in *Campanula.*

* Buser's classification (Bull. Herb. Boiss. [Ser. 1] 2, 501-532 : 1894) was as follows :—

Diosphaera Buser
Sect. *Eu-Diosphaera : D. jacquini* (Sieber) Buser, *D. rumeliana* (Hampe) Bornm., *D. chalcidica* Buser
Sect. *Chamaetrachelium*: *D. asperuloides* (Boiss. et Orph.) Buser

Tracheliopsis Buser
Sect. *Eu-Tracheliopsis : T. tubulosa* (Boiss.) Buser, *T. postii* (Boiss.) Buser
Sect. *Codonosphaera : T. petraea* (L.) Buser, *T. albicans* Buser

Diosphaera is confined to the Balkan Peninsula, and *Tracheliopsis* Sect. *Eu-Tracheliopsis* to the Levant; *Tracheliopsis* Sect. *Codonosphaera* occurs only on the southern rim of the Alps. The Moroccan *Trachelhim angustifolium* Schousboe, on account of the apical dehiscence of its capsule, was removed by Buser from this alliance and made the type of a new monotypic genus—*Feeria* Buser—related to *Jasione* L. *Trachelium sensu stricto* has a very slender corolla tube and a characteristic style.

Tracheliopsis antilibanotica is a very distinct plant evidently most closely related to *T. tubulosa* (Boiss.) Buser—a rather polymorphic species showing considerable geographical variation. Certain features of *T. antilibanotica* confirm the opinion that Bornmiiller's concept of *Diosphaera* and *Tracheliopsis* is the most natural hitherto proposed. In view, however, of the repercussions that might ensue in the interrelationship of allied groups, it seems to me that a satisfactory grouping of the Oriental *Trachelia* can only be achieved by a monographer of *Campanula* and related genera. In the meantime, in placing the two new species in *Tracheliopsis,* Buser's classification has been followed.

The differences between *Diosphaera* and *Tracheliopsis* as specified by Buser are extremely slight. *Diosphaera* is characterized by having a corolla that is divided to the middle into linear spreading lobes, and has a cylindrical tube ; the filaments are linear and undilated, and the stigmas of the exserted style are scarcely revolute. *Tracheliopsis,* on the other hand, is described as having an infundibular corolla divided to a variable depth, filaments dilated towards the base, and the stigmas of the exserted style as being markedly revolute. Both genera are exclusively saxatile, and, with the exception of *Tracheliopsis* Sect. *Codonosphaera,* have overlapping sessile stem leaves of firm texture, erect flowers borne in a corymbose inflorescence, bracteoles, and a similar facies.

Even the slender differences between the two genera scarcely hold. I have found that the filaments of *Tracheliopsis tubulosa* (Boiss.) Buser and of the two new species described here are frequently undilated, and that the stigmas of *Diosphaera* may be eventually revolute. So far as the corolla is concerned, that of *Tracheliopsis postii* (Boiss.) Buser* is divided to the middle and closely resembles that of a *Diosphaera.* In *T. antilibanotica* the very shortly lobed corolla is entirely tubular, not funnel-shaped. The inflorescence is a modified corymb ; in this, as well as in its general habit, the Antilebanon species recalls *Diosphaera asperuloides* (Boiss. et Orph.) Buser from the Styx gorge. The gynoecium, as in *T.fruticulosa,* is 2-3-merous—a condition noted by Buser for *Diosphaera* but not for *Tracheliopsis,* which he described as having a trimerous gynoecium.

Tracheliopsis Sect. *Codonosphaera* seems to me much less closely related to the other species of *Tracheliopsis* (Sect. *Eu- Tracheliopsis)* than those species are to *Diosphaera.* The two species of Sect. *Codonosphaera—T. petraea* (L.) Buser and *T. albicans* Buser—have a capitate inflorescence, pedicels without bracteoles, and the corolla and general facies of *Campanula.* Their character of the exserted style is of course an unusual one in *Campanula.* This, however, should certainly not preclude the placing of Sect. *Codonosphaera* in the latter genus, for

• I have not seen flowering material of this rare species, but a sheet has been found in the Kew Herbarium (under *Teucrium)* in early bud, which matches very well Buser's description and illustration of *Tracheliopsis postii* except for the rather more dense indumentum of the upper leaf-surface. The specimen was collected by Sintenis (Iter Orientale 1888), and the label reads " Mardin : Lurgberg, 28. 7. 88."

some few species of *Campanula,* such as *C. elatines* L. and *C. affinis* Roem. et Schult., do have the style well exserted.

**On the other hand the position of *Tracheliopsis myrtifolia* (Boiss. et Heldr.) Schwarz et Davis presents problems to which Bornmiiller did not refer. This rare species from the Isaurian Taurus undoubtedly holds a position somewhat intermediate between *Campanula* and *Tracheliopsis* Sect. *Eu-Tracheliopsis.* Boisser, having described it in *Campanula,* later transferred it to *Trachelium.* Buser, owing to its sturdy included style (which is not glabrous as Boissier supposed), replaced it in *Campanula.* Apart from the shortness of its style, it appears to Schwarz and me, especially in the shape of its corolla and filaments, and in its characteristic habit, certainly more closely related to *Tracheliopsis fruticulosa* (and, through the latter, to *T. tubulosa* (Boiss.) Buser) than it is to any species of *Campanula.* Consequently a classification that would widely separate this Isaurian endemic from *Tracheliopsis* Sect. *Eu-Tracheliopsis* would be unnatural. The species has therefore been transferred here to the latter genus, the exserted style being abandoned as a generic character. If the description of *Tracheliopsis* as understood here (comprising *T. tubulosa, postii, fruticulosa, antilibanotica, myrtifolia)* were amplified to include *Diosphaera* (or the latter made to include *Tracheliopsis),* a more natural grouping might be attained ; but whether or not such a group should be kept generically distinct from *Campanula* (or even from *Trachelium sensu stricto,* which shows marked similarities in habit) is another matter. It is unfortunate that, although several species are in cultivation, the cytology of Boissier's Oriental *Trachelia* is still uninvestigated.

I am indebted to Professor 0. Schwarz for giving me joint authorship of his new Turkish species, to Professor Sir William Wright Smith and Dr. H. R. Fletcher for their advice, and to the Keeper of the Kew Herbarium for the loan of material.—P. H. DAVIS.

Since the above was written, I have been able to collect *Tracheliopsis myrtifolia* in the Isaurian Taurus and (taking the Göksu as the boundary) the adjacent part of Cilicia Trachea. The following gatherings were made, and seed obtained for cultivation.

Prov. Konya, distr. Ermenek (Isauria): Ermenek at Meydan Kebeni çesmesi, 1400 m., in crevices of sloping or vertical limestone rock with *Teucrium cavernarum* Davis, flowers white, 13 Aug. 1949, No. 16136 ; Kamis dere, between Ermenek and Oyuklu dag, 1400-1500 m., vertical rocks,'local, 14 Aug. 1949, No. 16173.

Prov. Mersin, distr. Anamur (Cilicia Trachea) ; near Qamurlu yaylâ, between Anamur and Ermenek, 2100 m., rocks, flowers blue, 17 Aug. **1949,** No. 16260.


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TABULA 3499.

HYPERIGUM TRIGHOGAULON BOISS. ET HELDR.

HYPERICACEAE. Tribus HYPERICEAE.

H. trichocaulon *Boiss. et Heldr.* in Boiss. Diagn. ser. 1, 8,110 (1849); Boiss. Fl. Or. 1, 812 (1867) ; Halácsy, Consp. Fl. Graec. 1, 279 (1901) ; Vierhapper in Oesterr. Bot. Zeitschr. 64, 476 (1914) ; Gandoger, FL Cret. 21 (1916) et in Bull. Soc. Bot. Fr. 64, 120 (1917) ; Hayek, Prodr. Fl. Penins. Balcan. 1, 536 (1925) in Fedde, Hep. Sp. Nov. Beih.; Keller in Engl. et Prantl, Die natiirl. Pflanzenfam. 2 Aufl. 21, 180 (1925) ; Stefanoffin Jahrb. Land- u. Forst-wissen. Fak. Univ. Sofia, **11,**30 (1933) et 12, 86 (1934) ; K. H. Kechinger, Fl. Aegaea in Denkschr. Akad. Wiss. Wien, **105,** 1 Halbband, 264 (1943), et Neue Beiträge zur Flora von Kreta, op. cit. **105,** 2 Halbband, 1 Abt., 82 (1943), et Fl. Aegaeae Suppl. in Phyton, 1, 200 (1949).—Species *H. australi* Ten. affnis sed habitu tenuiore, foliis minoribus, floribus solitariis vel 2-3 (haud numerosis) facile distinguitur. *H. kellerii* Bald, differt foliis multo minoribus anguste ellipticis breviter petiolatis, floribus majoribus, sepalis glanduloso-ciliatis.

Herba caulibus numerosis gracilibus prostratis vel e saxis pendulis sparse ramosis, 0-5 mm. diametro, glabris, levissime compressis et bicarinatis. *Folia* sessilia, oblonga vel elliptica, apice obtusa basi plus minusve rotundata, glabra, pellucide punctata, subtus ad apicem et margines irregulariter et sparse nigro-glandulosa, 10-12 mm. longa 4-6 mm. lata, inferiora gradatim minora. *Flores* plerumque solitarii, interdum 2-3 cymose dispositi, 2-2 • 5 cm. diametro, pedicello longitudine variabili plerumque bracteola lineari circiter 2 mm. longa praedito suffulti. *Sepala* 5, leviter inaequilata, plus minusve oblonga, 6 mm. longa, et 2-2• 5 mm. lata, apice acuta, basi per 1-5 mm. inter se coalita, margine dentato-glandulosa, dorso nigro-maculata. *Petala* 5, aureo-lutea, dorso (ad partem in alabastro haud obtectam) rubra, libera, 1-1 • 2 cm. longa, 6-8 mm. lata, oblique obovata, margine obtuse crenata, apice rotundata, nigro-maculata. *Stamina* numerosa ; exteriora ad basin libera filamentis 7 mm. longis praedita ; interiora inter se in fasciculos tres coalita filamentis parte libera 8 mm. parte coalita 2 mm. longa praedita; antherae orbiculares 0-5 mm. longae, dorsifixae, supra filamenti insertionem nigro-maculatae. *Ovarium* triloculare, ovulis in loculis numerosis, 3 mm. longum, 1*5 mm. diametro, manifeste trisul-. catum ; carpella apice divergentia in stylos 6 mm. longos patentes glabros stigmatibus parvis capitatis terminalibus producta. *Fructus* calyce persistente, petalis et staminibus marcidis basi circumcinctus,

FIG. 1, flowering plant, *natural size*; 2, part of lower surface of leaf, X 8; 3, calyx, X 4 ; 4, petal, outer surface, X 4 ; 5, part of androecium, X 4 ; 6, anther in back view, X 8; 7, receptacle and gynoecium, x 4; 8, fruit, with withered petals and stamens, and persistent calyx, X 3 ; 9, seed, x 16.

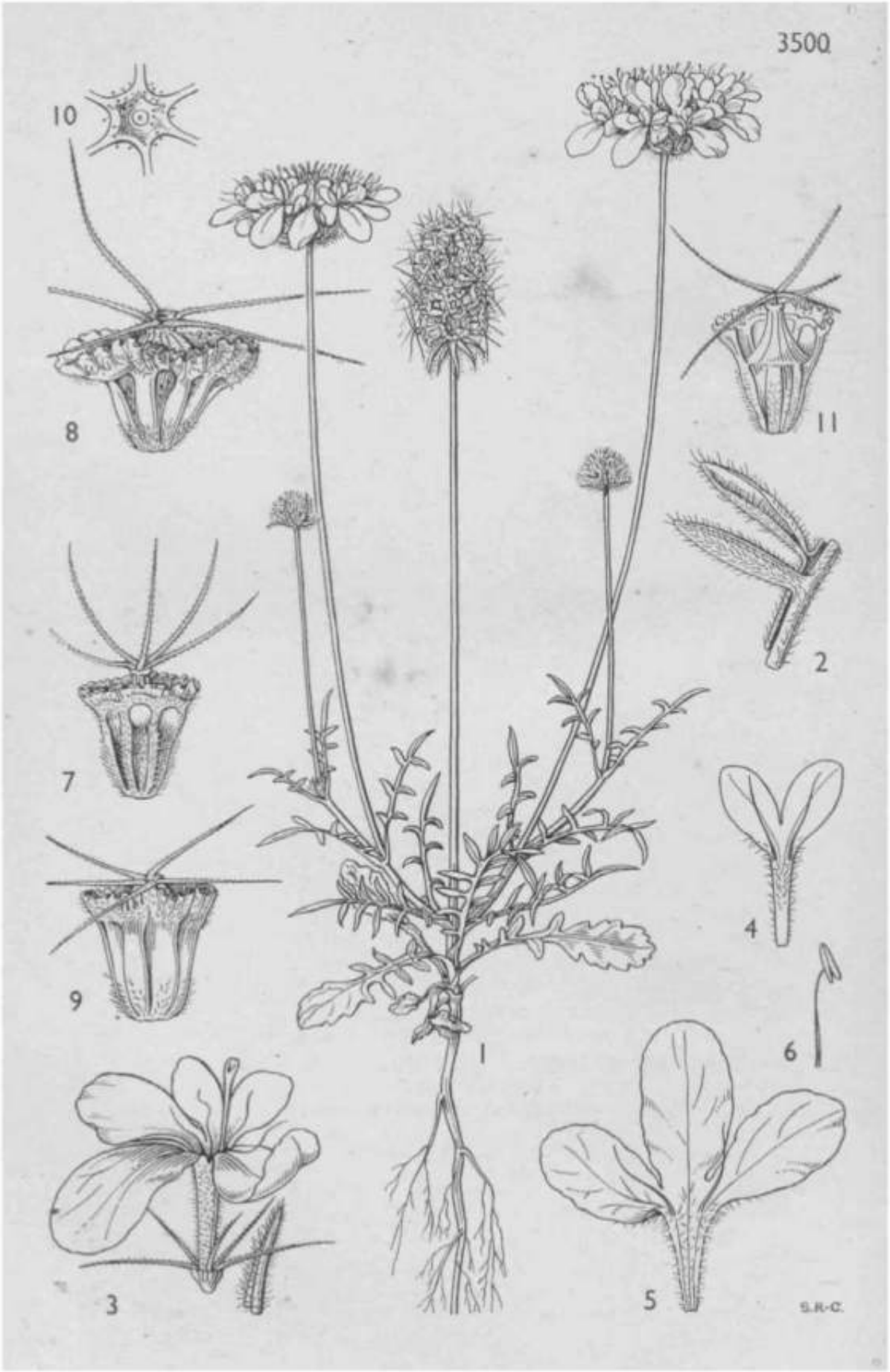
capsularis, trilocularis, trisulcato-ovatus, circiter 8 mm. longus, apice tricornutus. *Semina* levissime curvata, 1 -5 mm. longa, longitudinaliter striata, apice basique obtusa.

CRETE. In quercetis montis Idae, 900-1500 m., May 1846, *Heldreich.* Mont Amalos, 12 June 1884, *Reverchon.* Rethymo, Mt. Khedros, 1350 m., 2 June 1915, *Gandoger.* Mt. Ida, July 1906, *Biró.* Mt. Ida, in argillosis altoplanitiei Nida, 1400 m., 7 July 1942, *Rechinger* 14222. Between Argiropolis and Kalychratis, 25 May 1938, *Davis* 182 : Between Neffsamari and Gerakari, 21 May 1938, *Davis* 178. In die Weissen Berge, oberhalb Kapsika, 1700-1800 m., 28 June 1937 *Lempberg* 599 (mixed with *H. kellerii* Bald.).

The opportunity of illustrating this interesting Cretan endemic arose when plants introduced from Crete by Mr. P. H. Davis flowered in the Herbarium Ground at Kew in 1948. The illustration was made from the living plants. No previous figure of the species has been traced.

Hypericum trichocaulon resembles *H. australe* Ten., a species which is found in Italy, Sicily, Sardinia, Corsica and the Balearic Islands. There is thus no geographical overlap. Moreover, the more robust habit and larger inflorescence of *H. australe* provide sufficiently striking differences to prevent any confusion arising.

H. kellerii Baldacci is an even more distinct species having small more or less elliptic and acute leaves, only about 4 mm. long and shortly but distinctly petiolate. The flowers, too, are much smaller than in *H. trichocaulon* and have distinctly fringed calyces. However, *H. kellerii* is another Cretan endemic and it and *H. triclwcaulon* may be found growing in consort. Rechinger (Fl. Aeg. Suppl. in Phyton, 1, 200 : 1949) reports that hybrids between these species occur and cites *Davis* 182 as being of this nature : the Kew specimen of this number is, however, true *H. trichocaulon.* The distributed material of *Lempberg* 599 to reach Kew consists of a mixed gathering of *H. trichocaulon* and *H. kellerii* but here again it is all either one species or the other. It is to be hoped that the next botanist who has the opportunity to collect the two species will make a critical search for any signs of hybridity in the living populations.—B. L. BURTT.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TABULA 3500.

SCABIOSA LEPTOPODA *Boissier.*

DIPSACACEAE.

S. (§ Cyrtostemma) leptopoda *Boiss.* Diagn. PL Or. Nov. ser. 1, x. 78 (1849). ? *S. arenaria* Forsk. Fl. Aegypt. Arab. p. lxi (1775)—nomen subnudum ; Boiss. Fl. Or. iii. 135 (1875) pro parte. ? *Asterocephalus arenarius* (Forsk.) Vis. PL Aegypt. Nub. 6, t. 1 (1836) quoad syn. tantum, excl. spec, et icon.—species *S. rhizanthae* Viv. affinis sed caule elato gracillimo, foliis radicalibus paucis mox marcescentibus, foliorum superiorum segmentis linearibus, capitulis minoribus recedit.

Herba annua, gracilis, 25 cm. usque (vel ultra ?) alta, simplex vel a basi vel medio parce ramosa, caulibus ramisque pilis albis plerumque crispatis deflexis interdum supra nodos patentibus vestita. *Folia* radicalia mox marcescentia, quamobrem nondum bene cognita, ut videtur oblanceolata *c.* 2^m5 cm. longa 7 mm. lata marginibus crenatis vel lyrato-pinnatifidis ; caulina ambitu late oblanceolata circiter 5 cm. longa et 1 cm. lata, pinnatipartita, segmentis linearibus 1 mm. latis inter se distantibus apice acutis marginibus recurvis utrinsecus circiter 6, utrinque breviter scabro-pubescentia. *Capitula* solitaria, pedunculis 6-20 cm. usque longis breviter deflexo-pubescentibus suffulta. *Bracteae* involucrales laminis linearibus circiter 6 mm. longis vix 1 mm. latis, parte basali 3 mm. longa dilatatae, apicem versus uti folia pubescentes ad basin tenuiter et basi ipsa manifeste pilosae ; eae receptaculi (sub anthesin ovoideae, post anthesin valde elongatae) 3 mm. longae 0*5 mm. latae, plus minusve membranaceae, acutae, apicem versus ciliato-pilosae, uninerves, dorso leviter carinatae, post fructus delapsos persistentes. *'Mores* exteriores calycis setis sub anthesi 5 mm. longis, corollis radiantibus tubo 4-5 mm. longo extra breviter et patule pubescente limbo profunde 5-lobo, lobis oblongis rotundatis marginibus crispo-undulatis, anteriore 8-5 mm. longo et 5 mm. lato, antico-lateralibus 6 mm. longis et 4 mm. latis, postico-lateralibus 3-5 mm. longis et 2 • 5 mm. latis; interiores corollae lobis diminutis. *Filamenta* filiformia, glabra, 5 mm. longa, corollae fauce inserta ; antherae 1-5 mm. longae, dorsifixae. *Stylus* 8 mm. longus, glaber; stigma 1 mm. longum, oblongum, obliquum, medio leviter umbilicatum. *Involucellafructifera* saepissime homomorpha quadrangularia, octosulcata, 3 mm. longa,

FIG. 1, flowering plant, *natural size*; 2, part of leaf, X 4; 3, outer flower and the involucral bract which subtended it, X 3 ; 4, upper part of corolla and filaments (anthers fallen), X 3 ; 5, lower part of corolla and filaments (anthers fallen), X 3; 6, stamen from young flower, X 3; 7, fruiting involucel (within which the true fruit is enclosed) and persistent calyx, from centre of capitulum, X 6 ; 8, the same from margin of capitulum, X 6 ; 9, the same from margin of capitulum of another specimen, X 6 ; 10, centre of calyx seen from above, X 12 ; 11, fruiting involucel with part of the corona removed to show the conical diaphragm. [illegible] and 11 from *E. 8. Broivn* (Tripoli, Apr. 1946); FIG. 9 from *Sandwith* 2111.

costis breviter pilosis apice supra sulcos arcuatim conjunctis, corona 1 mm. longa nervosa crispato-undulata ; rarius exteriora heteromorpha sulcis minus profundis costis superne extrorsus curvatis sub corona infundibulum parvum formantibus. *Calyx fructifer* e setis quinque 3 mm. longis supra coronam exsertis.

ALGERIA. Plaine de sidi-Khalifa, cercle de Saida, 27 May 1852, *Balansa* 682 (as *S. semipapposa* Salzm. var.).

TRIPOLITANIA. Sandy desert between Syrte and Bou Nofilia, 73 km. from Nofilia, fls. pale mauve, 29 March 1939, *Sandwith* 2111. Circa Tripolim, 1827, *Dickson.* Sidi Musa, 17 miles S. of Tripoli, Apr. 1946, *E. S. Brown* ; Tripoli, 24 March 1946, *E. 8. Brown.*

TRANSJORDAN ? " Arabia petraea ad fines Palaestinae," Apr. 1866, *Boissier* (typus).

EGYPT. Marmarica, between Matruh and Barrain ; sandy soil, 11 Apr. 1932, *Shabetai* 79.

PALESTINE. Planitiei Philistaeae in arenosis ad Asdod, 30 May 1897, *Bornmüller* 808. Tel Fara, 14 March 1930, *Harding* 173.

Scabiosa arenaria Forsk. was never fully described. The brief note *"flore albo* ; *calyce longiore* " and the information that it was found at Rosetta comprise the only certain evidence on which to base an identification, for Christensen (in Dansk Bot. Arkiv. IV. iii. 36 : 1922) reports that no specimen of *S. arenaria* is to be found in Forskaal's herbarium. Béguinot and Vaccari (in Ann. di Bot. XIII. 30: 1915) have already rejected *S. arenaria* as " *nomenfere nudum,"* but their action in doing so and at the same time including it without question as a synonym of *S. rhizantha* Viv. (Fl. Lib. Spec. 6, t. 3 : 1824) which is the name they adopt, is open to criticism. It is not, however, by any means certain that Forskaal's plant is *S. rhizantha* Viv.; it might be the plant now figured, *8. leptopoda* Boiss., a species which Boissier later united with *S. rhizantJia,* but which I prefer to keep distinct; or it might be *S. eremophila* Boiss., an opinion held by that careful French botanist Jacques Gay, whose richly annotated herbarium is now at Kew. In the absence of any authentic specimen or description it seems obvious that *S. arenaria* Forsk. should be discarded as *nomen subnvdum et dubium,* and that the three names given above should stand for their respective species.

It is not feasible to allocate the many subsequent references to the name *S. arenaria* to the appropriate species ; most often it appears to have been used in the sense of Boissier's *Flora Orientalis* (III. 135 : 1875) to include both *S. rhizantha* Viv. and *S. leptopoda* Boiss. Delile identified a plant from Aboukir as *S. arenaria* (Fl. Aeg. III. 53 : 1813) but he added nothing to Forskal's meagre description. An illustration which Delile had prepared is often mentioned as " Del. Fl. Aeg. t. 63, f. 8." The last published plate in this work, however, is t. 62. Plates 63 and 64 had, nevertheless, been prepared and were eventually reproduced by C. & W. Barbey (Herbor. Levant, 1882). The illustration of *S.*

arenaria is very poor, but probably represents a caulescent form of *S. rhizantha.* Similarly the plant figured by Visiani (PL Aegypt. Nub. 6,1.1 : 1836) as *Asterocephalus arenarius* (Forsk.) Vis. is *S. rhizantha* Viv.

The section of *Scabiosa* to which these species belong is section *Cyrtostemma* Mertens & Koch (Deutschl. PI. I. 756 : 1823). This name was published before July 1823 (see review in Flora, 385, 7 July 1823) and thus has priority over section *Vidua* Coult. (Mém. Dipsac. 33 : 1823) as Coulter's paper was not read until 4 Sept. of that year. Another synonym is section *Spongostemma* Reichb. (Hort. Bot. I. 38: 1824).

The oldest specific name in this section is *S. atropurpurea* L. (Sp. PL 100: 1753) which, as the name indicates, refers to the dark-flowered scabious that has long been cultivated. In Latin countries this plant, highly popular for funereal wreaths, is known as Widow's scabious (Spanish *Viuda),* whence Coulter surely took his sectional name *Vidua* (Latin=widow). Wittstein's derivation (Handwörterbuch, ed. 2, 923 : 1856) from the adjective *viduus,* in reference to the frequent absence of grooves on the tube of the involucel is quite improbable. Briquet and Cavillier (in Burnat, Fl. Alp. Marit. V. 241: 1914-15) believe that *S. atropurpurea,* although very rare, is certainly native in the littoral of the Alpes Maritimes ; it is, however, so well established elsewhere that it is difficult to see how certainty can be attained, and it is not impossible that *S. atropurpurea* had an early origin in cultivation from *S. maritima* L. (Cent. PL II. 8: 1756), which differs in having lighter-coloured flowers.

The latter plant, perhaps better classified as *S. atropurpurea* L. subsp. *maritima* (L.) Jahand. & Maire (Cat. PL Maroc. III. 728: 1938), was originally described from near Montpellier in S. France and is widespread in the north-western area of the Mediteranean region, but becomes rarer eastwards. For the present purpose I include under the epithet *maritima* various plants such as *S. grandiflora* Scop. (Delic. Insubr. III. 29, t. 14: 1788), *S. saviana* Reichb. (Hort. Bot. I. 38: 1824), *S. acutiflora* Reichb. (PL Crit. IV. 24, t. 326: 1825), and *S. cupani* Guss. (Fl. Sic. Prodr. I. 160: 1827) which more critical investigations may succeed in separating as distinct species. These plants are found in the main distribution area from Spain to Italy, but *maritima* also grows on the Atlantic Islands (Canaries, Azores, Madeira) and in North Africa west of the Libyan desert. Here alone it comes into contact with *S. leptopoda* Boiss. which reaches from Palestine eastwards along the southern Mediterranean shore to Algeria. The allied *S. rhizantha* Viv., in which I include *S. fenestrata* Pomel (Fl. Atlant. 63 : 1874), ranges from Egypt to Tunis, while the more distinct little *S. eremophila* Boiss. is found from Palestine to Libya. *S. leptopoda, S. rhizantha* and *S. eremophila* are thus seen to inhabit a circumscribed area along the south-central and south-eastern shores of the Mediterranean which only touches the area of *S. atropurpurea* subsp. *maritima* at its western margin.

To complete a rough survey of section *Cyrtostemma* mention may be made of the only other distinct species, *S. semipapposa* Salzm. ex DC.

sens. lat. [i.e. including var. *gracilis* Boiss. (Voy. Bot. Esp. II. 297 : 1839) which is *S. gracilis* (Boiss.) Boiss. (Fl. Or. III. 135 : 1875)—non Boem. & Schultes, (Syst. Veg. III. 64 : 1818)]. This species is found in Spain, Morocco and Algeria and is easily distinguished from the rest of the section by the absence of calyx-setae on the fruits in the lower (outer) half of each capitulum.

I have seen no modern work in which *S. leptopoda* Boiss. and *S. rhizantha* Viv. have been retained as distinct species, and justification for this course is therefore desirable. The primary distinguishing character lies in the habit, and this alone would have made me reluctant to apply the earlier name, *S. rhizantha* Viv., to the plant now illustrated. The type specimen of *S. leptopoda* agrees very closely with that shown in the accompanying plate; the slender slightly branched stem, from the base of which the entire radical leaves soon wither, and the rather small capitula on slender peduncles are characteristic. *S. rhizantha,* on the other hand, is a dwarfer yet stouter plant; the radical leaves are habitually numerous and well-developed and have not withered at flowering time ; the capitula are larger and the peduncles stouter. The emphatic development of the radical leaves in *S. rhizantha* compared with their fewness and rapid withering in *S. leptopoda* suggests a difference in growth rhythm between the two species, and it may be that *8. rhizantha* is essentially a biennial plant.

In Cyrenaica *(Sandwith* 2617) and Tripolitania *(Bornmūller* 717) more robust, branched specimens have been collected which might be regarded as caulescent *rhizantha* or robust *leptopoda.* The capitula are rather small for *rhizantha* and I therefore prefer the latter alternative at present. They serve to emphasize our incomplete knowledge of these species. Even if the identity of these two plants is doubtful, however, it does not justify the union of *8. leptopoda* and *S. rhizantha* into a single species ; that would require confirmation from a far greater range of material than is at present available.

One morphological character of some interest deserves to be mentioned. The true fruit of a scabious is hidden away inside the involucel, above which the bristles of the persistent calyx may be seen projecting. It is this compound structure, the false fruit, which is shown in figs. 7, 8 and 9 of the accompanying illustration : it will be seen that the involucel of fig. 7 has much more strongly defined ridges than those of figs. 8 and 9, and the difference is correlated with its position in the middle of the capitulum, the other two being from marginal positions. We have already seen that there is a differentiation between central and marginal fruits in the development of the fruiting calyx in *S. semipapposa,* and there is, of course, nearly always a floral differentiation in *Scabiosa,* the outer flowers having the anterior lip of the corolla more strongly developed. It is interesting, therefore, to find this difference between the fruiting involucels from central and marginal positions; but it is not apparently uniform throughout the species. An opportunity to examine plentiful fruiting material of *S. leptopoda* would therefore be welcomed.

Fig. 11 shows the same structure with part of the corona of the involucel removed so as to display the conical diaphragm. The details of the arrangement of the ovary and seed do not differ from the condition found in *Scabiosa* sect. *Sclerostemma* for which reference may be made to the illustration of *S. tenuis* already published (Hook. Ic. PI. t. 3355). Comparison with that plate will also bring out the differences in the structure of the involucel between these two sections.—B. L. BURTT.