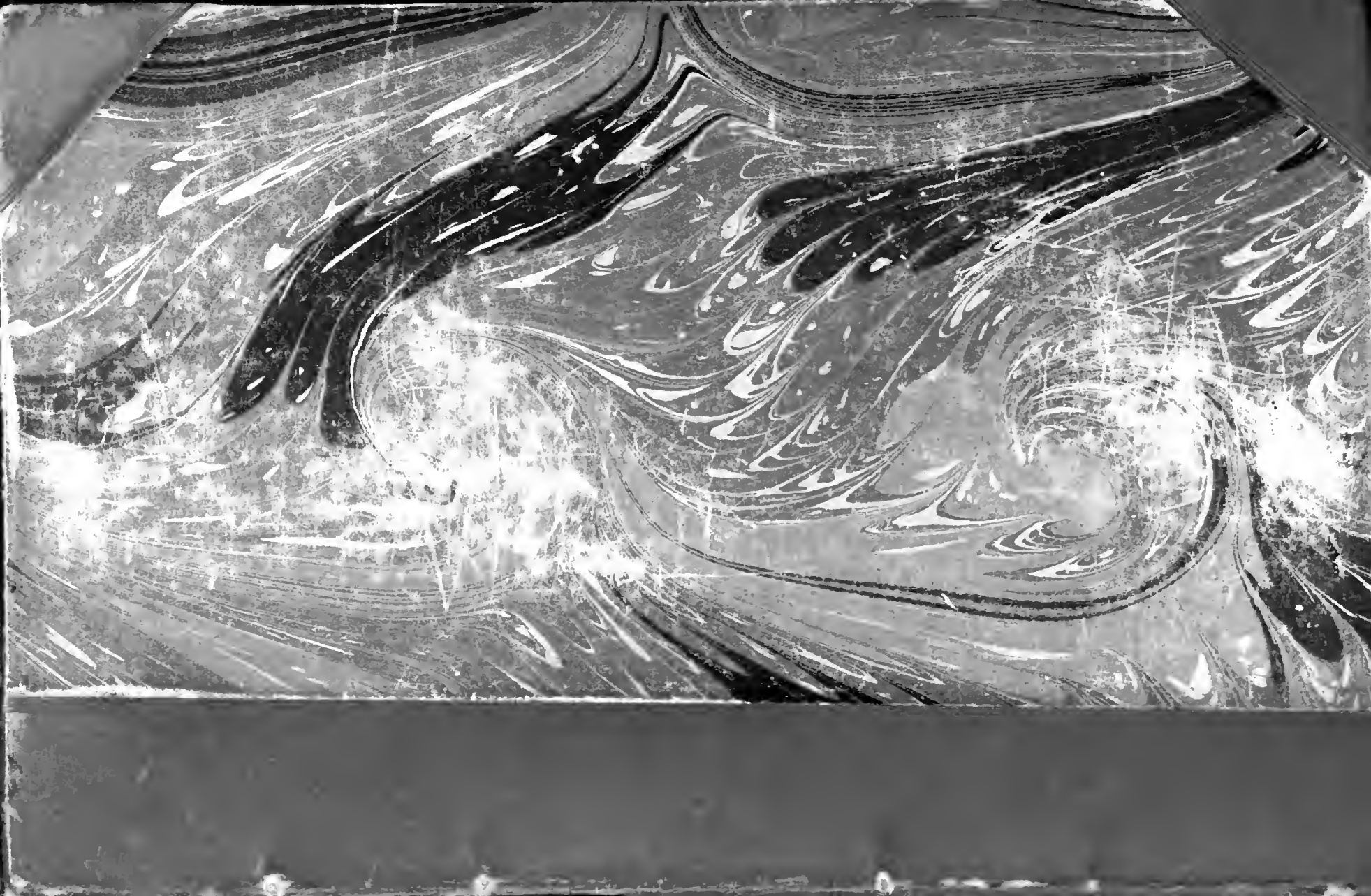

HOOKER'S

ICONES PLANTARUM;

OR,

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

SELECTED FROM THE

KEW HERBARIUM.

FIFTH SERIES.

EDITED FOR THE BENTHAM TRUSTEES BY

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DIRECTOR, ROYAL BOTANIC GARDENS, KEW.

VOL. II.

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1933.

INDEX TO THE PLATES AND NAMES

The names given in **clarendon** type are those of plants described or renamed in the work; an * is prefixed to the names of those not figured. Synonyms are printed in *italics*; names in roman characters are those of plants discussed in the text.

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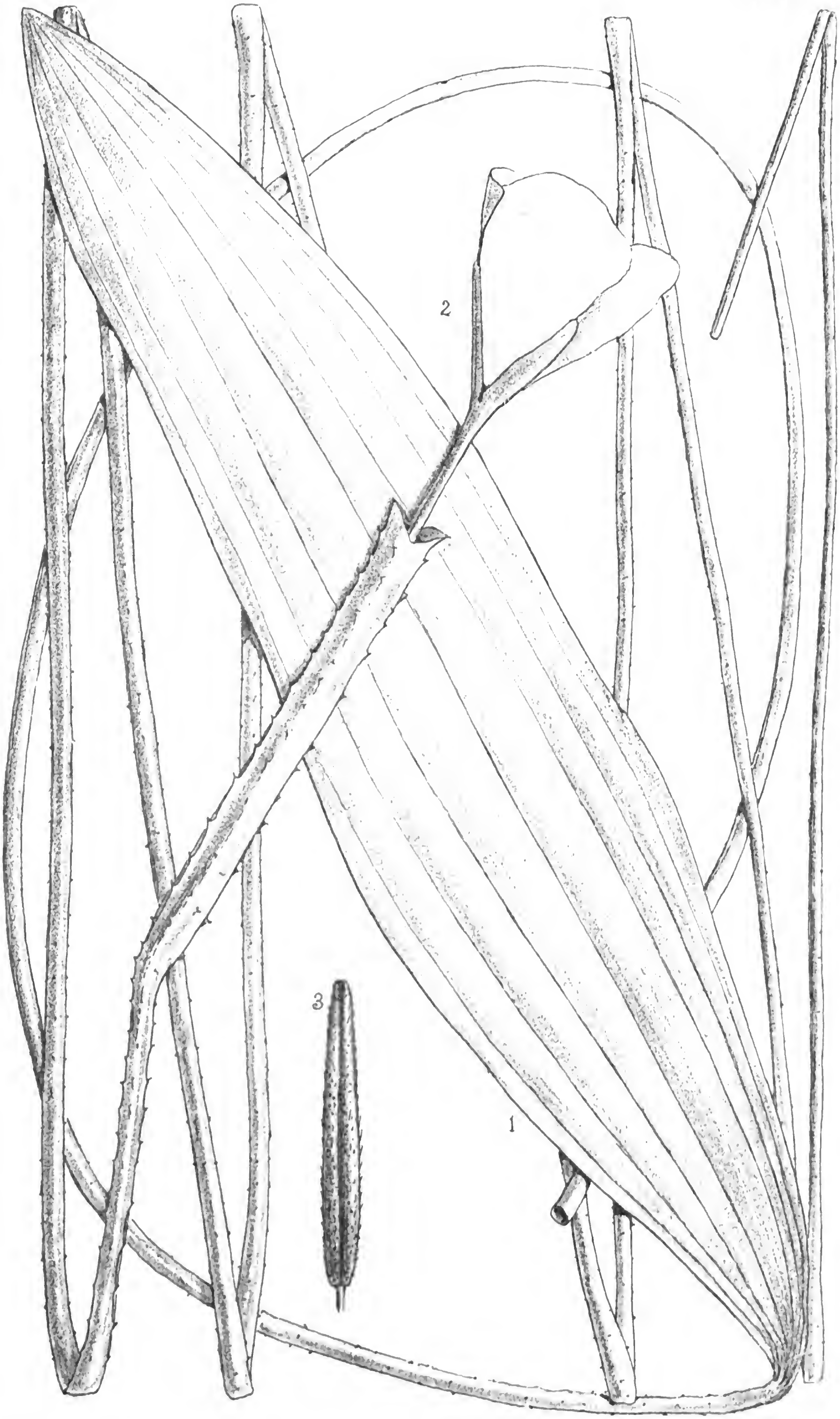
3101



GA. del et lith

Tabula 3101.

BOOTIA MURICATA, *C. H. Wright.*

Hydrocharitaceae.

B. muricata, *C. H. Wright in Thiselton-Dyer, Fl. Trop. Afr.* vol. vii. p. 569; species *B. Schinzianae,* Aschers. et Gürke, affinis, spatha cylindrica breviore muricata differt.

Planta aquatica, floribus exceptis submersa. *Folia* lanceolata, acuta, integra, circiter 7-nervia, 22 cm. longa, 4 cm. lata; petiolus elongatus, inermis; vagina 15 cm. longa, muricata. *Flores* masculi solitarii; pedunculus metralis vel ultra, muricatus; spatha cylindrica, bilobata, muricata, 6·5 cm. longa. *Calycis* tubus, 8 cm. longus, 2 mm. diametro, cylindricus; lobi lineares, obtusi, 2 cm. longi, 3 mm. lati, virides. *Petala* obovata, alba, 3 cm. longa, 2·5 cm. lata. *Antherae* oblongae, luteae. *Flos femineus* ignotus.

South Tropical Africa. Ngamiland: Botletle River, *F. D. and E. J. Lugard,* 13; Okarango River, *E. J. Lugard,* 279; River Chobe, *Atherstone,* 35, *McCabe,* 32. Rhodesia: Kafue River, *C. E. F. Allen,* 329.

This species was first discovered by Dr. Atherstone in 1856, but the material he collected was insufficient for specific description, and it was not until 1896 that adequate material for that purpose was collected by Major F. D. and Lieut. E. J. Lugard. Since then specimens with leaves have been found, but the female flower is still unknown. The plant including the leaves is submerged to within 2 or 3 inches of the flowers, which alone protrude into the air, and grows in water 10 to 12 feet deep. The nearest ally of this species is *B. Schinziana,* Aschers. et Gürke, which has smaller thicker leaves and shorter ovoid spathes.—C. H. Wright.

Fig. 1, leaf, *natural size*; 2, male flower, *natural size*; 3, stamen, *much enlarged.*

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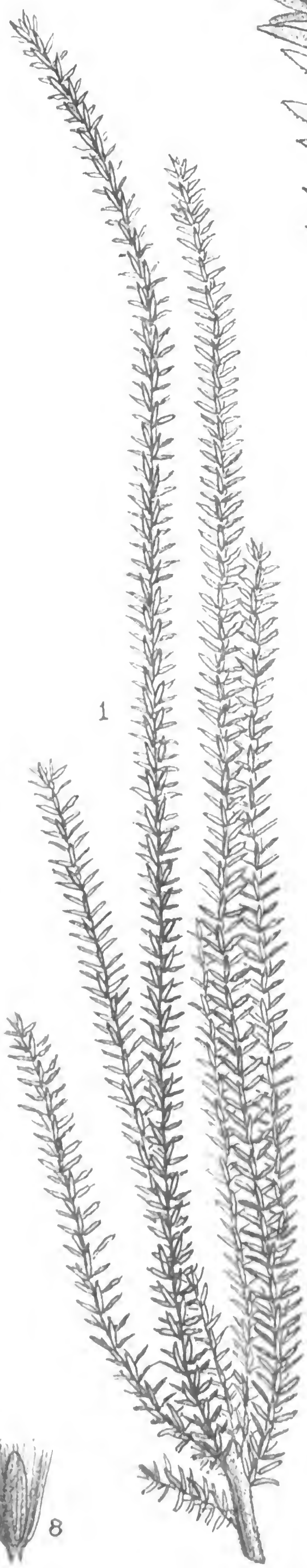

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G.A del. et lith.

Tabula 3102.

STRUTHIOLA EPACRIDIOIDES, *C. H. Wright.*

Thymelaeaceae. Tribus Euthymelaeeae.

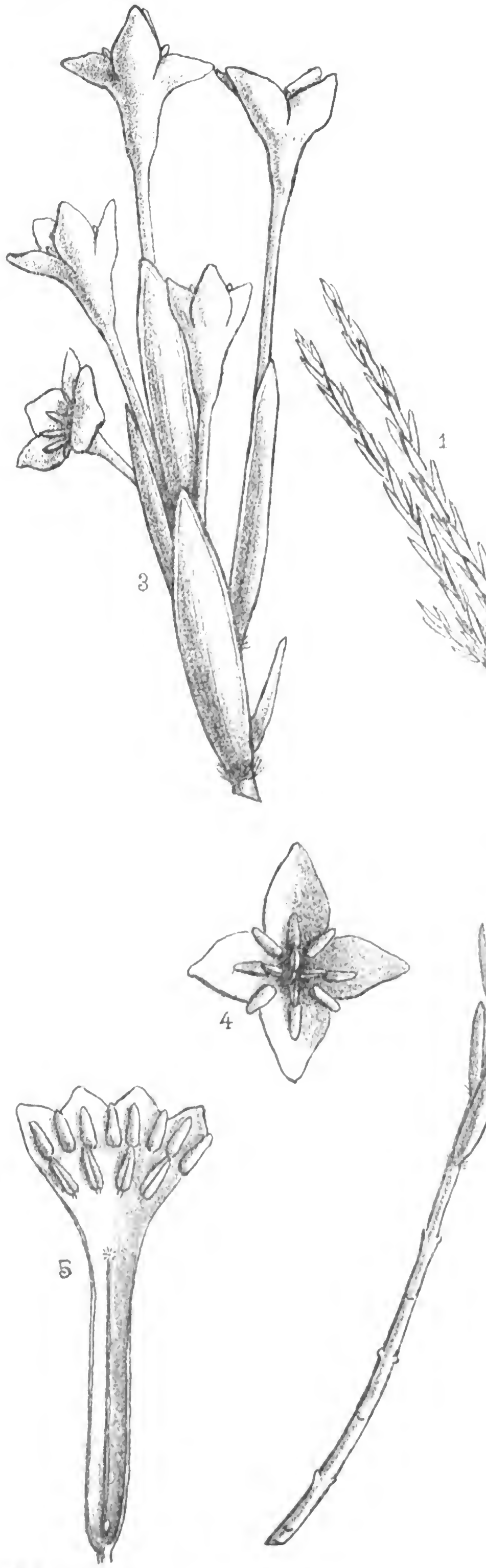
S. epacridioides, *C. H. Wright in Kew Bulletin*, 1915, p. 387, *and in Thiselton-Dyer, Fl. Cap.* vol. v. sect. 2, p. 29 ; species *S. ovatae*, Thunb., affinis, foliis patentibus floribusque in axillis fere foliorum omnium dispositis differt.

Rami longi, primum pilosi, demum glabri. *Folia* patentia, lanceolata, plana, acuminata, 1·2 cm. longa, 3 mm. lata, marginibus ciliatis. *Flores* axillares ; bracteolae fere 4 mm. longae, subulatae, leviter recurvae, ciliatae. *Calycis* tubus subrectus, glaber, 1·4 cm. longus, 0·7 mm. diametro ; lobi ovati, obtusi, 2 mm. longi, 1·5 mm. lati. *Petala* 8, 1·5 mm. longa, pilis acquilongis circumdatis instructa. *Antherae* breviter oblongae, paullo super calycis faucem affixae. *Ovarium* oblongum, glabrum ; stylus filiformis, calycis tubo brevior ; stigma penicillatum.

South Africa, without precise locality, *Mund*, 19.

This is a very distinct species with the general appearance of an *Epacris*. It differs from its nearest ally, *S. ovata*, Thunb., in bearing flowers in the axils of most of the leaves, instead of their being congested into an inflorescence at the apex of the stem, and thus must be a very attractive plant when in flower. The fleshy petals are entirely surrounded by hairs. It is unfortunate that Mund, who collected between 1827 and 1829, has not recorded the locality where he collected this plant.—C. H. Wright.

Fig. 1, portion of the plant to show branching, *reduced* ; 2, 3 and 4, portions of flowering branches, *natural size* ; 5, entire flower, *enlarged three times* ; 6, flower cut open, *enlarged* ; 7, anther, *enlarged* ; 8, petal, *enlarged four times*.



G.A.del et lith

Tabula 3103.

STRUTHIOLA LONGIFOLIA, *C. H. Wright.*

Thymelaeaceae. Tribus Eutlymelaeeae.

S. longifolia, *C. H. Wright in Kew Bulletin,* 1915, p. 389, *and in Thiselton-Dyer, Fl. Cap.* vol. v. sect. 2, p. 33; affinis *S. erectae,* L., foliis oblongis duplo longioribus differt.

Planta lignea, ramosa. *Rami* erecti, virgati, quadrangulares, glabri, cicatricibus prominentibus foliorum delapsorum vestiti. *Folia* oblonga, acuta, glabra, 1·2–1·4 cm. longa, 1–2 mm. lata. *Flores* in axillis foliorum plurium dispositi; bracteolae oblongae, obtusae, carinatae, glabrae, 5 mm. longae, marginibus membranaceis. *Calyx* glaber; tubus parte inferiore cylindricus, parte superiore inflatus, 1·2 cm. longus; lobi ovati, acuti, apice incrassati, 3 mm. longi, 2 mm. lati. *Petala* 8, carnosa, glabra vel basi pilis paucis brevibus vestita. *Antherae* connectivo acuto coronatae. *Ovarium* oblongum; stylus filiformis, 1 cm. longus; stigma penicillatum.

South Africa. Caledon Division: Zoetemelks Valley, *Burchell,* 7578.

This species is allied to *S. erecta,* L., but has the leaves at least twice as long in proportion to their width, and its flowers are borne in the axils of the leaves for a long distance down the stem, while those of *S. erecta* are generally confined to the region near the apex, thus giving a different facies to each species. Further, the petals of *S. erecta* are surrounded by hairs as long as themselves, while those of *S. longifolia* are either glabrous or scantily hairy. Meisner has written on the sheet of Burchell's 7578 "*Struthiola erecta* var. *vulgaris,* Meisn.," but it is a totally different plant from Burchell's 208 from the Cape Flats, on which he has written the same name.—C. H. Wright.

Fig. 1, portion of plant to show branching, *reduced*; 2, upper part of plant, *natural size*; 3, apex of flowering branch; 4, flower seen from above; 5, flower laid open; the last three *much enlarged.*

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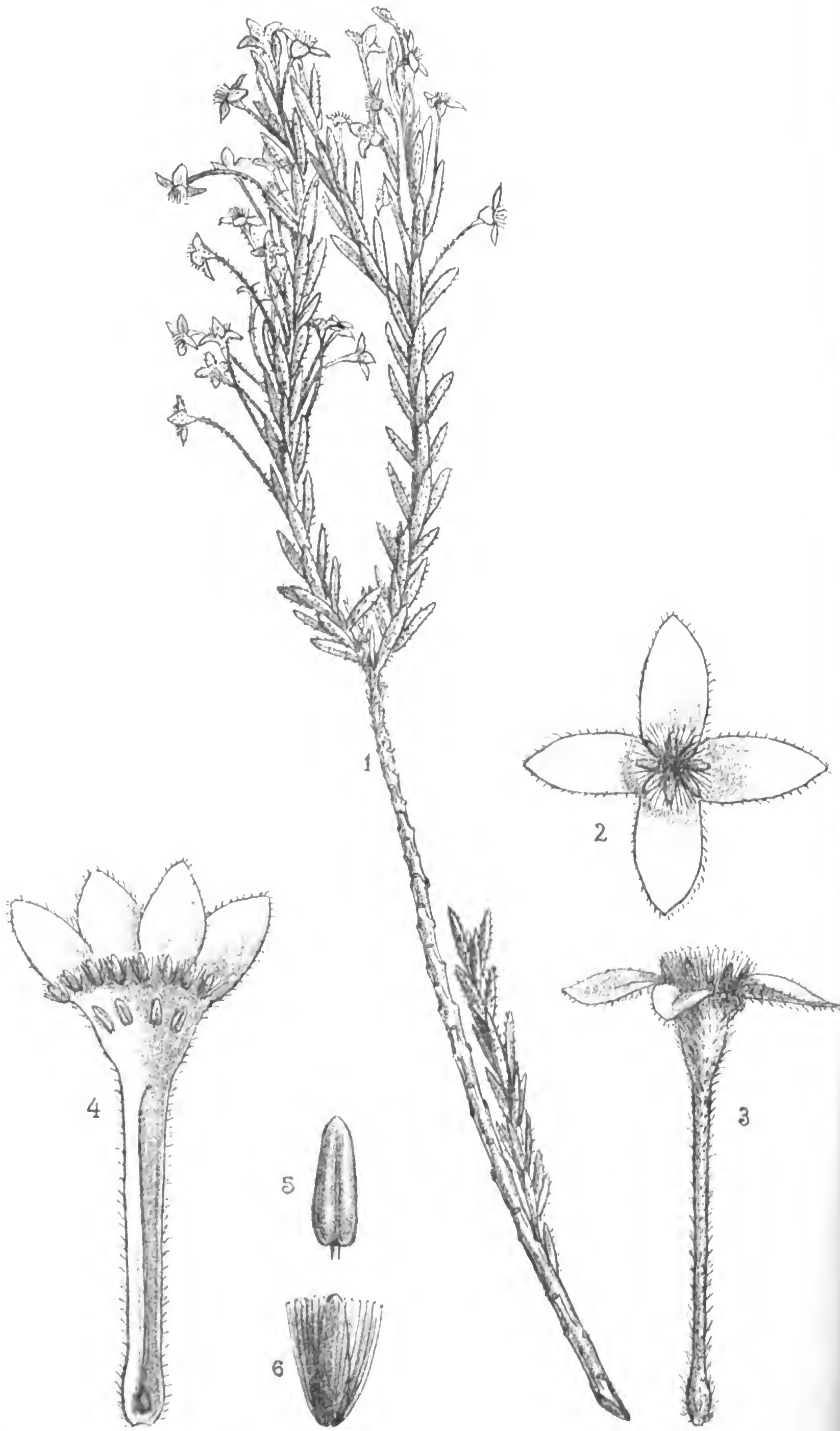


G.A. del.et lith

Tabula 3104.

STRUTHIOLA FLORIBUNDA, *C. H. Wright.*

Thymelaeaceae. Tribus Euthymelaeeae.

S. floribunda, *C. H. Wright in Kew Bulletin*, 1916, p. 43, *and in Thiselton-Dyer, Fl. Cap.* vol. v. sect. 2, p. 35; species *S. longiflorae*, Lam., affinis, foliis oblongis, obtusis, pilosis differt.

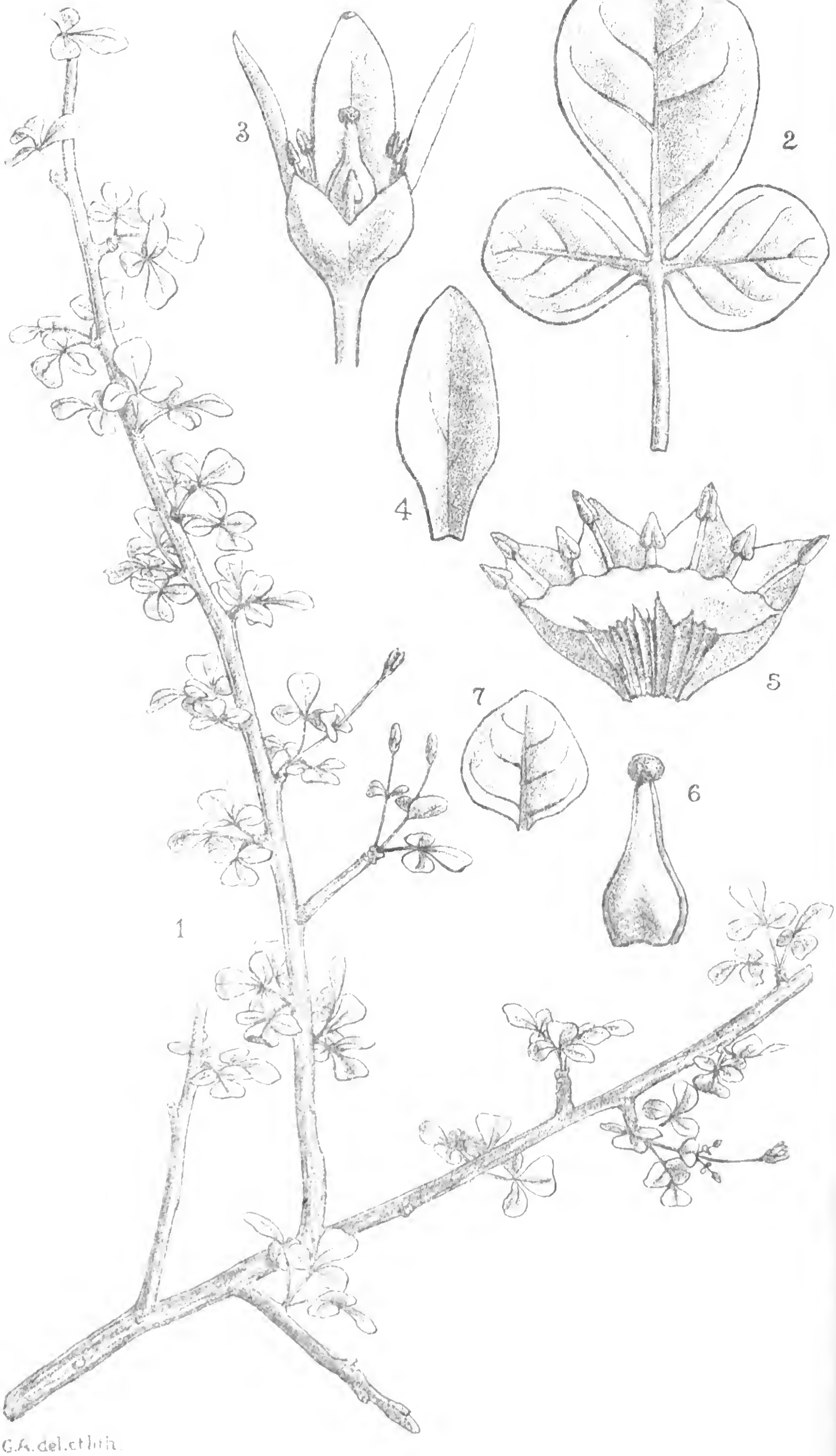
Caulis ramosus, ligneus; rami primum pubescentes. *Folia* opposita, approximata, oblonga, obtusa, 7 mm. longa, 1·5 mm. lata, primum pilosa, demum dorso verrucosa. *Flores* axillares, secundum ramos dispositi; bractcolae 6 mm. longae, 0·6 mm. latae, oblongae, obtusae, longe ciliatae. *Calyx* pubescens; tubus tenuis, 1·7 cm. longus; lobi oblongi, obtusi, 5 mm. longi, 2 mm. lati. *Petala* 8, oblonga, 1·5 mm. longa, pilis aequilongis circumdata. *Antherae* obtusae. *Ovarium* oblongum, glabrum; stylus filiformis, 9 mm. longus; stigma penicillatum.

South Africa. Clanwilliam Division: Zekoe Vley, *Schlechter*, 8506. Without locality, *MacOwan*, 2470.

This species is allied to the widely spread *S. longiflora*, Lam., which differs in having ovate- or linear-lanceolate acuminate leaves, which are ciliate in the early stage. The hairs at length break away from *S. floribunda*, leaving asperities on the back of the leaves. The numerous flowers clustered at the ends of the branches must make this a beautiful object, and it is a matter for regret that so few of the showy-flowered members of this family have found their way into cultivation.—C. H. Wright.

Fig. 1, portion of plant, *natural size*; 2, flower seen from above; 3, flower seen from side; 4, flower cut open; 5, anther; 6, petal with surrounding hairs, 2-6 *much enlarged*.

3105.



G.A. del. et lith.

Tabula 3105.

COMMIPHORA FOLIACEA, *Sprague.*

Burseraceae.

C. foliacea, *Sprague* ; species nova, affinis *C. Opobalsamo*, (L.) Engl., a qua pedunculis longis gracilibus, bracteolis magnis foliaceis, pedicellis longis gracilibus recedit.

Ramuli inermes, leviter flexuosi, longitudinaliter rugoso-costatuli, fusci, glabri, satis graciles, circiter 3 mm. diametro 15 cm. infra apices. *Ramuli abbreviati* usque ad 1·5 cm. longi, plerumque multo breviores, cicatricibus foliorum asperati, apice minute pilosi, folia plura et interdum inflorescentias 1–2 gerentes. *Folia* trifoliolata, 0·5–1·5 cm. longa, glabra ; petiolus gracilis, 2–9 mm. longus ; foliola sessilia, terminali quam lateralibus majore ; foliolum terminale obovatum vel cuneato-obovatum, apice obtusum usque ad subtruncatum, in basin cuneato-angustatum, in foliis majoribus 5–10 mm. longum, 4·5–7 mm. latum ; foliola lateralia late obovata vel suborbicularia, apice obtusa vel rotundata, interdum apiculata, basi plus minusve inaequilateralia, in foliis majoribus 3–6 mm. longa, 2·5–5 mm. lata ; nervi laterales utrinsecus 3–4, arcuato-patuli, procul a margine indistincte anastomosantes. *Pedunculi* plerumque 1-flori, rarius 3-flori, 0·5–1 cm. longi, graciles, apice bracteolas 2 gerentes. *Bracteolae* foliaceae, suborbiculares, apice obtusae rotundatae vel retusae, interdum apiculatae, basi rotundatae vel leviter cordatae, 2·5–5·5 mm. diametro, glabrae. *Pedicelli* floris solitarii vel terminalis gracilcs, circiter 1 cm. longi, superne in basin floris sensim ampliati ; pedicelli florum lateralium multotics breviores. *Flores* ♂ : *Calycis tubus* cupularis, 0·8 mm. longus ; lobi 0·6 mm. longi. *Petala* lanceolato-oblonga, apice uncinato-inflexa, 3·2 mm. longa parte inflexa 0·3 mm. longa exclusa. *Stamina* antepetala 1·8 mm. longa ; antherae ovato-oblongae, obtuse apiculatae, 0·75 mm. longae ; stamina antesepala longiora. *Discus intrastaminalis* crenulatus, calycis tubum vestiens. *Pistillodium* minimum, ima basi calycis tubi situm. *Flores* ♀ : *Calyx* extra minute sparse pilosulus ; tubus patelliformis ; lobi deltoidei, 0·7–0·8 mm. longi, obtuse carinati. *Staminodia* antesepala 1·5 mm. longa, antherodiis oblongis, antepetala 1 mm. longa, antherodiis ovato-acuminatis. *Discus intrastaminodialis* crenulatus, crenis cum staminodiis alternantibus. *Pistillum* vix ultra

2 mm. longum; ovarium ellipsoideum, 1 mm. longum, vix 1 mm. diametro, bisulcatum; stylus 1 mm. longus; stigma capitatum, indistincte bilobum, circiter 0·5 mm. diametro.

Arabia. At the foot of the Dhofar Mountains, S.E. Arabia, *Bent*, 137 (type).

C. foliacea is remarkable for its foliaceous bracteoles, which with the slender peduncles and pedicels serve to distinguish the species from *C. Opobalsamum*, (L.) Engl., with which it has hitherto been identified.—T. A. Sprague.

Fig. 1, branch with short-shoots bearing leaves and inflorescences; 2, leaf; 3, female flower with one of the petals removed; 4, petal; 5, interior of female flower, with the petals and pistil removed; 6, pistil; 7, a bracteole. *All enlarged except* 1, *which is of natural size.*

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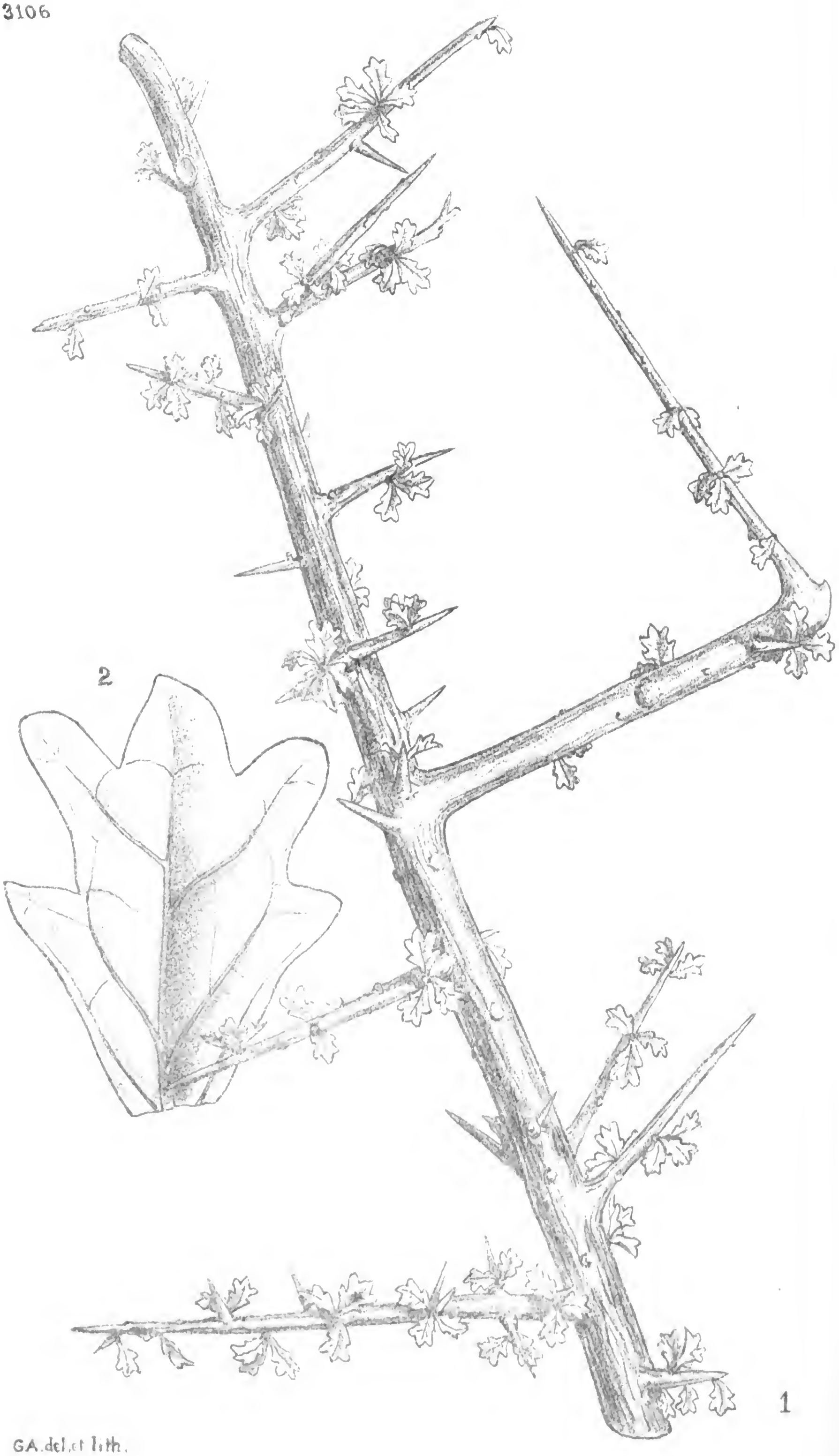


GA. del. et lith.

Tabula 3106.

COMMIPHORA CANDIDULA, *Sprague.*

Burseraceae.

C. candidula, *Sprague*; species nova affinis *C. flaviflorae*, Engl., a qua cortice ramulorum candidulo, foliis multo minoribus et pro rata magis incisis recedit; a *C. crenulata*, Chiov., forma et magnitudine foliorum differt.

Arbuscula valde spinosa, 1·8–2·1 m. alta. *Rami* subrecti, crassi, circiter 8 mm. diametro 20–25 cm. infra apices, longitudinaliter rugosi, ceterum laeves, glabri, fusco-cinerei, juniores candiduli; internodia plerumque 0·5–1 cm. longa; ramuli patentes spina valida terminati, 1–8·5 cm. longi, ima basi 2–3·5 mm. diametro, a basi usque ad apicem sensim angustati, plus minusve longitudinaliter rugosi, candiduli, glabri; ramulorum internodia plerumque 3–5 mm. longa. *Ramuli abbreviati* initio perbreves, applanati, breviter rufo-pilosi, demum lente accrescentes ad 2 mm. longi, interdum tandem in ramulum spiniformem plus minusve elongatum crescentes. *Folia* ad ramulos abbreviatos plura, fasciculata, sessilia, cuneiformi-obovata, 4–7 mm. longa, 3–5 mm. lata, superne grosse inciso-dentata, inferne integra, in basin angustata, chartacea, glabra, supra nervo medio et nervis lateralibus leviter elevatis, subtus pallidiora, nervis reteque venularum fuscis itaque manifestis; dentes plerumque ovati, 0·75–1·5 mm. longi. *Flores* et *fructus* ignoti.

British Somaliland. Haud District, *Drake-Brockman*, 799 (type).

C. candidula belongs to § *Subsessilifoliae*, Engl. in Engl. Jahrb. vol. xlviii. p. 460 (1912), and is easily distinguishable from the other species of this Series by its small cuneate-obovate deeply incised leaves.

It is a thorny tree, growing to a height of 6 or 7 feet, and called Rahanreb by the Somalis. It yields a very dark yellowish-red bdellium known as Habbak Rahanreb (*vide* Drake-Brockman, British Somaliland, p. 317: 1912).—T. A. Sprague.

Fig. 1, leafy branch and branchlets, *natural size*; 2, a leaf, *enlarged.*

G.A.del.et lith.

Tabula 3107.

COMMIPHORA CRASSISPINA, *Sprague.*

Burseraceae.

C. crassispina, *Sprague*; species nova, forsan e Serie *Orbicularium*, spinis nigris brevibus in basin valde incrassatis, foliis eutrifoliolatis glabris, foliolis subintegris, lateralibus oblique ovatis obtusis distincta.

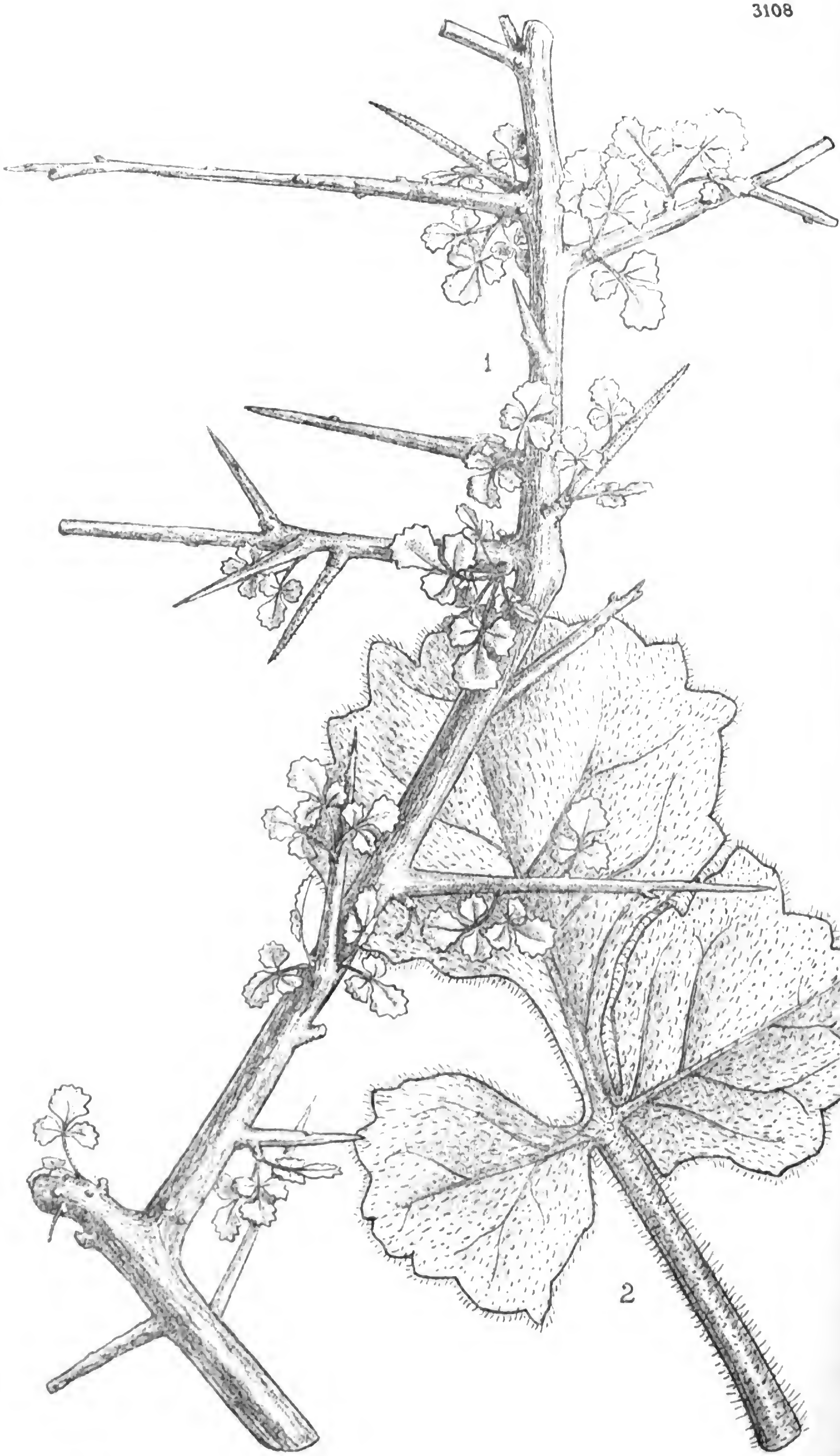
Dumus parvus, nigrescens, intricate ramosus, spinosus, glaber. *Rami* seniores exstantes 5–7 mm. diametro, leviter flexuosi, longitudinaliter rugosi, fusco-nigrescentes; ramuli spiniformes 1–10 cm. longi, basi 2·5–7 mm. diametro, satis recti, spina valida pungente terminati, spinas ordinis inferioris et ramulos abbreviatos foliatos gerentes. *Ramuli abbreviati* initio brevissimi, pulviniformes, tandem usque ad 1·5 cm. longi, basi 2–2·5 mm. diametro, irregulariter rugosi, cicatricibus foliorum subasperati. *Folia* trifoliolata, foliolis sessilibus; petiolus gracilis, 7–8 mm. longus; foliolum terminale transverse ellipticum, apice obtusissimum, in basin abrupte breviter cuneatum, usque ad 8–9 mm. longum, et 9–10 mm. latum, integrum vel brevissime crenulatum; nervi laterales utrinsecus circiter 4, e basi patula arcuato-ascendentes, satis procul a margine anastomosantes, rete venularum utrinque manifesto crebro venulis translucentibus; foliola lateralia late ovata, apice obtusissima, basi inaequilateralia, dimidio versus basin petioli spectante basi rotundato, dimidio altero basi oblique ascendente, usque ad 9 mm. longa, et 7–8 mm. lata; petioli et foliola supra juventute minute papillato-pilosi, demum glabrescentes. *Fructus* (immaturi tantum visi) breviter pedunculati et pedicellati; pedunculus 1 mm. longus; pedicellus 3 mm. longus, vix 1 mm. supra basin bibracteolatus.

British Somaliland. Nogal Valley, *Drake-Brockman*, 770 (type).

C. crassispina is a well-marked species which may provisionally be referred to § *Orbiculares*, Engl. in Engl. Jahrb. vol. xlviii. p. 454 (1912). This and § *Socotranae*, Engl., l.c., are, however, closely allied, and may have to be united when they are better known. *C. crassispina* has the eutrifoliolate leaves of the *Orbiculares*, but the leaflets are sometimes shortly crenulate, and the short-shoots resemble those of *C. socotrana*, (I. B. Balf.) Engl., which is probably its nearest ally.

It is a small black thick-set thorny bush, with very black and stout thorns. The Somali name is Aliboy, and it yields a gum known as Habbak Aliboy, which is at first quite clear and colourless, but when old becomes semi-opaque (*vide* Drake-Brockman, British Somaliland, p. 318 : 1912).—T. A. Sprague.

Fig. 1, leafy branch, *natural size* ; 2, leaf, *enlarged*.



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G.A. del. et lith.

Tabula 3108.

COMMIPHORA TUBUK, *Sprague.*

Burseraceae.

C. tubuk, *Sprague*; species nova affinis *C. truncatae*, Engl., sed spinosa, ramulis foliisque patenter pilosis, foliis minoribus, foliolo terminali orbiculari-obovato rotundato.

Arbuscula usque ad 1·8 m. alta vel ultra, valde spinosa, cortice trunci et ramorum majorum flavo exfoliante. *Rami* seniores exstantes fusci, rugosuli, glabrati, circiter 7–8 mm. diametro 45 cm. infra apices, ramulos plus minusve elongatos spiniformes et ramulos abbreviatos inermes gerentes; ramuli spiniformes 1·5–13 cm. longi a basi ad apicem angustati, primum fulvi, costati, dense patule pilosi, demum fusco-brunnei, glabrati. *Ramuli abbreviati* initio pulviniformes tandem usque ad 0·5 cm. longi, basibus foliorum persistentibus asperati, nigrescentes, apice pilosi, interdum serius in ramulos spiniformes crescentes. *Folia* trifoliolata, 1–2 cm. longa; petiolus 4–7·5 mm. longus, dense patule pilosus; foliola grosse irregulariter crenato-serrata, densiuscule pilosa, pilis suberectis; foliolum terminale obovato-orbiculare, superne late rotundatum, in basin abrupte anguste cuneatum; foliola lateralia oblique elliptica, dimidio versus basin petioli spectante majore basi truncato vel rotundato, dimidio altero e basi oblique ascendente. *Fructus* unicus exstans sessilis, oblique ovoideus, aliquantum plano-convexus, 7 mm. longus, glaber.

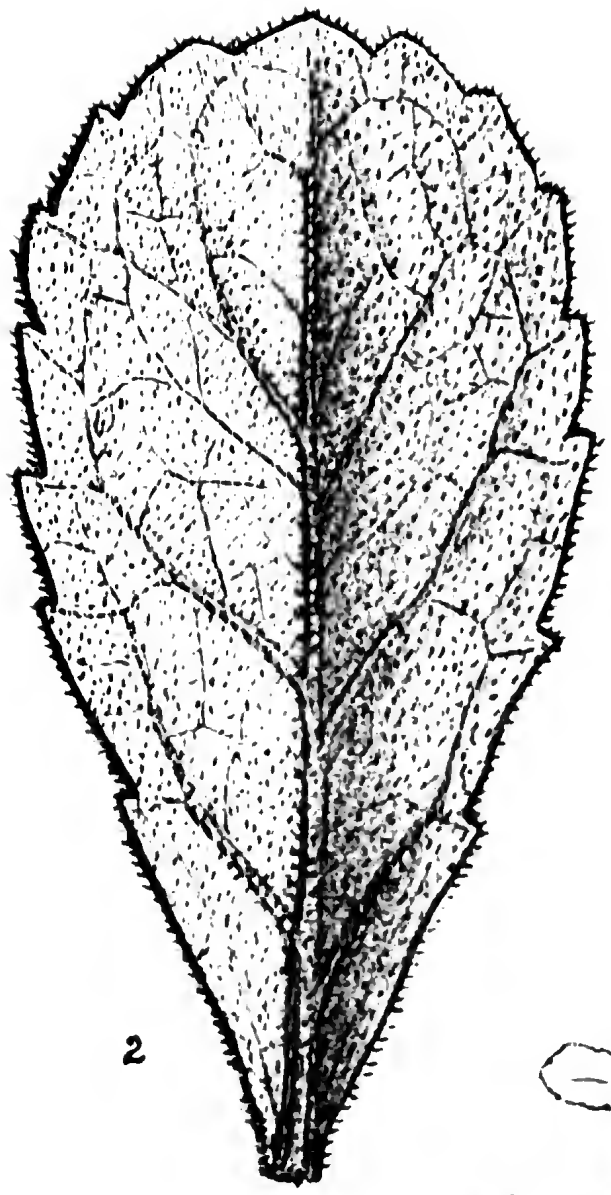
British Somaliland. Haud District, *Drake-Brockman*, 780.

C. tubuk belongs to § *Pilosae*, Engl. in Engl. Jahrb. vol. xlviii. p. 464 (1912), and is closely related to *C. truncata*, Engl., from which it differs in the presence of spines, the shape of the terminal leaflet, and the spreading indumentum of the branchlets and leaves.

"The tree grows to a height of six feet or more. The bark of the trunk and larger branches is of a yellow colour and usually seen to be peeling off. It is found in the Haud, Western Nogal Valley, and Ogadyn, but is not very common."

The Somali name of the tree is Tubuk, and it yields a rare gum known as Habbak Tubuk (*vide* Drake-Brockman, British Somaliland, p. 320 : 1912).—T. A. Sprague.

Fig. 1, leafy branch, *natural size*; 2, leaf, *enlarged.*



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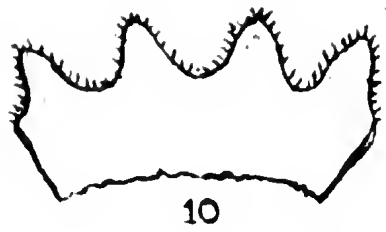

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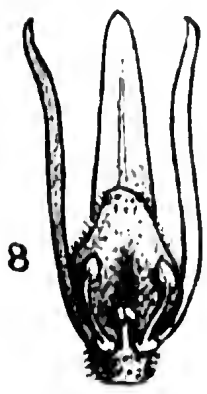

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G.A del. et lith.

Tabula 3109.

COMMIPHORA GOWLELLO, *Sprague.*

Burseraceae.

C. gowlello, *Sprague*; species egregia, foliis sessilibus simplicibus breviter dense pilosis crenato-serratis, floribus sessilibus facile dignoscenda.

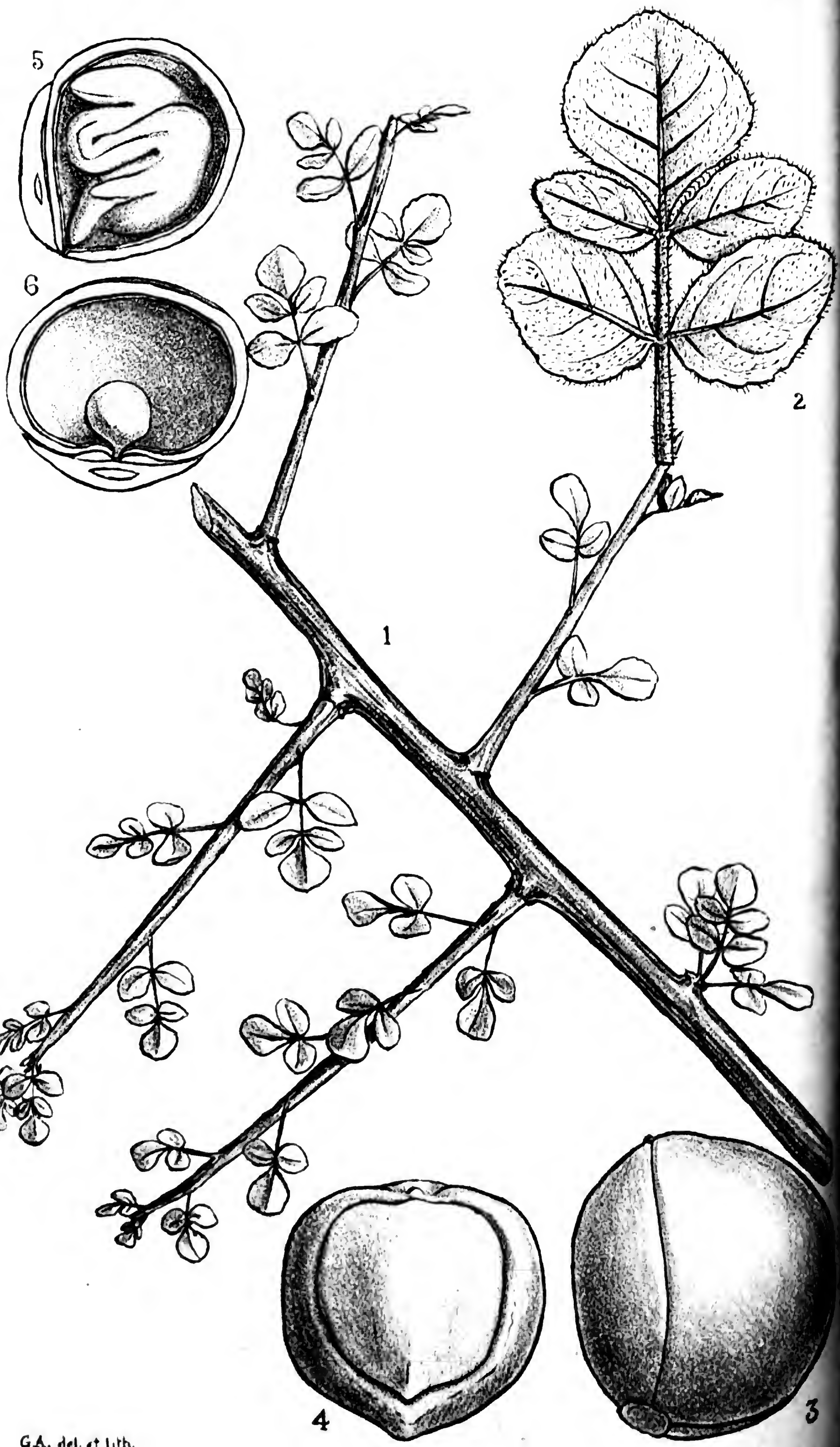
Arbuscula 1–1·5 m. alta, spinosa. *Rami* crassi, fusci, longitudinaliter rugosi, glabrati, seniores exstantes basi fere 1 cm. diametro; ramuli patuli, plerumque subrecti, citius seriusve spina valida pungente terminati, 1–2·3 cm. longi, ramulos spiniformes vel spino terminatos et ramulos abbreviatos gerentes, juniores costati, cinerei, dense minute pilosi. *Ramuli abbreviati* usque ad 1 cm. longi, basi 1·5–2·5 mm. diametro, rugosi et cicatricibus foliorum asperati, apice breviter pilosi. *Folia* sessilia, simplicia, anguste obovata, plerumque circiter 1 cm. longa et 5–6 mm. lata, apice rotundata, in basin cuneatim angustata, conspicue crenato-serrata, utrinque breviter dense pilosa; nervi laterales utriusecus circiter 4, obliqui, procul a margine anastomosantes, subtus manifestiores; rete venularum in sicco occultum. *Flores* versus apices ramulorum abbreviatorum sessiles. *Flores* ♂: *Calyx* cupularis, extra dense pilosus; lobi anguste triangulares, circiter 0·8 mm. longi. *Petala* extra pilosa, carinata, vix ultra 2·5 mm. longa, 0·75 mm. lata. *Stamina* in flore dissecto exesa. *Pistillodium* stylodio magno quam parte basali latiore. *Flores* ♀: *Calycis lobi* circiter 0·6 mm. longi. *Petala* circiter 3 mm. longa. *Staminodia* antesepala circiter 0·75 mm. longa, antepetala duplo breviora. *Ovarium* late ovoideum stigmate sessili. *Fructus* ignoti.

British Somaliland. Haud District, *Drake-Brockman*, 800 (type).

C. gowlello cannot be placed satisfactorily in any of the Series of *Commiphora* as defined by Engler in Engl. Jahrb. vol. xlviii. p. 451 (1912), but may be attached provisionally to § *Subsessilifoliae*, near *C. Scineri*, the only species of that Series having pilose leaves.

The specific name of *C. gowlello* is the Somali name of the tree, which yields a pale opaque bitter gum known as Habbak Gowlello, used by the Somalis in the preparation of ink (*vide* Drake-Brockman, British Somaliland, p. 317 : 1912).—T. A. Sprague.

Fig. 1, branch; 2, leaf; 3, short-shoot, bearing a leaf and flower-buds; 4, petals and pistillode of male flower; 5, petal from back; 6, calyx; 7, female flower; 8, female flower, with calyx and one petal removed; 9, petal from back; 10, calyx laid open. *All enlarged, except* 1, *which is of natural size.*



G.A. del. et lith.

Tabula 3110.

COMMIPHORA ALLOPHYLLA, *Sprague*.

Burseraceae.

C. allophylla, *Sprague*; species nova affinis *C. somalensi*, Engl., a qua foliis minoribus saepe bijugis, foliolis lateralibus sessilibus basi inaequaliter rotundatis, nervis lateralibus minus obliquis indumento densiore differt.

Arbor usque ad 3–3·6 m. alta. *Rami* seniores leviter sinuosi, erassiuseuli, eireiter 6 mm. diametro 25–30 cm. infra apiees, striato-rugosuli, fuseo-brunnei, puberuli, tandem glabrati; internodia 1·5–2·5 em. longa; rami juniores satis graeiles, eireiter 3 mm. diametro 15 em. infra apiees, leviter eostati, brunnei, minute pubeseentes vel puberuli; ramuli patentes vel patuli, 5–8(–16) em. longi, dense ineano-pubeseentes; ramulorum internodia irregularia, saepius 0·5–2 em. longa. *Ramuli abbreviati* 3–5 mm. longi, dense pubeseentes. *Folia* plerumque 1–3 em. longa, heteromorpha, plerumque trifoliolata, saepe quinquefoliolata; petiolus 0·2–1·4 em. longus, dense pubeseens; foliola supra dense pubeseentia, subtus subvelutina; foliolum terminale sessile vel petiolulatum petiolulo usque ad 3 mm. longo, euneato-obovatum, apiee plerumque rotundatum vel subtruneatum, usque ad 1·5 em. longum et 1·2 em. latum, superne ineonspieue erenulatum, inferne integrum, nervis lateralibus utrinseeus eireiter 4, aseendentes, satis procul a margine anastomosantes, rete venularum utrinque inconspieuo; foliola lateralia oblique elliptiea vel elliptieo-ovata, usque ad 1 em. longa et 0·7 em. lata, basi valde inaequilateralia, margine inferiore rotundato vel subtruneato, superiore oblique aseendente. *Fructus* transverse ellipsoidei, eireiter 5 mm. longi et 6 mm. lati, glabri, apiee stylo persistente eireiter 0·2 mm. longo cuspidatuli, uniloeulares, carpello altero valde applanato loculo minimo vaeuo; endoearpium earpelli sterilis aspidiforme, longitudinaliter eostatum. *Embryo* eotyledonibus pluries conduplieatis.

British Somaliland. Maritime hills south of Berbera, *Drake-Brockman*, 754, 756 (type), 757, 760, 761; near Bulhar, *Drake-Brockman*, 670.

C. allophylla is a tree which grows to a height of 10 or 12 feet in suitable localities, and is fairly common on the maritime hills to the

south of Berbera, as far as the Golis range. Its Somali name is Hagar Madow, and it yields a bdellium called Habbak Hagar which is sometimes found mixed with Guban myrrh (*C. Myrrha* var. *molmol*, Engl.). For further details see Drake-Brockman, British Somaliland, p. 308 (1912).—T. A. Sprague.

Fig. 1, leafy branch ; 2, a quinquefoliolate leaf ; 3, fruit, side view ; 4, endocarp, showing the shield-shaped sterile segment ; 5, longitudinal section of endocarp showing the conduplicate embryo ; 6, transverse section of endocarp, with an immature embryo. *All enlarged except* 1, *which is of natural size.*

GA. del. et lith.

Tabula 3111.

COMMIPHORA HODAI, *Sprague.*

Burseraceae.

C. hodai, *Sprague*; species nova affinis *C. abyssinicae*, (Berg) Engl., a qua habitu inermi, ramulis annotinis brunneis nitidulis, foliis minoribus profundius crenato-serratis recedit.

Arbor 2–2·4 m. alta, inermis, trunco ad 20 cm. diametro vel ultra. *Rami* seniores rugosi, fusco-cinerei, unicus exstans 5–6 mm. diametro; ramuli annotini basi fere patentes demum ascendentes, satis graciles, 14–25 cm. longi, costati, laete brunnei, nitiduli, glabri, a basi 3–4 mm. diametro ad apicem sensim angustati, ramulos abbreviatos foliatos primum pulviniformes serius lente crescentes gerentes. *Folia* papyracea plerumque 1–2 cm. longa, simplicia, nonnulla trifoliolata, foliolis lateralibus pro rata minimis vel parvis; petiolus gracilis, 1·5–3·5 mm. longus, supra canaliculatus, sparse ferruginco-pilosus; foliolum terminale (vel unicum) plerumque obovatum usque ad oblanceolatum, rarissime ovatum, 1–1·5 cm. longum, 5–9 mm. latum, apice obtusum vel rotundatum, in basin cuneatim angustatum, grosse irregulariter crenato-serratum, glabrum, nervo medio utrinque manifesto, supra nervis lateralibus inconspicuis rete venularum subocculto, subtus nervis lateralibus et rete sub lente conspicuo; nervi laterales utrinsecus 4–6, satis procul a margine anastomosantes. *Flores* et *fructus* ignoti.

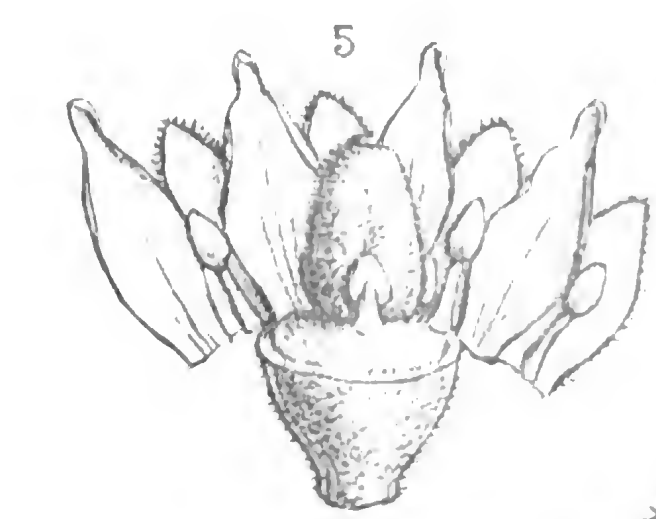
British Somaliland. Maritime hills south of Berbera, *Drake-Brockman*, 688; Nogal valley, *Drake-Brockman*, 784 (type), 785.

C. hodai is evidently closely related to *C. abyssinica*, (Berg) Engl., from which it may easily be distinguished by the coarser serration and other characters mentioned above.

It is described as a tree 7 or 8 feet in height, and is said to be fairly common on the maritime mountains to the south and south-west of Berbera, where it is known under the Somali name Hodai.

It yields an opaque bdellium called Habbak Hodai and used by the Somali women for washing their hair, and also as a liniment for rubbing over an inflamed area. Some Somalis also give it in emulsion to their horses as a purgative (*vide* Drake-Brockman, British Somaliland, pp. 250–252, 310: 1912).—T. A. Sprague.

Leafy branch, ***natural size*****; a single leaf,** ***enlarged.***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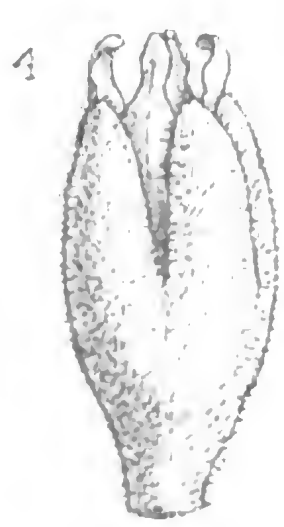
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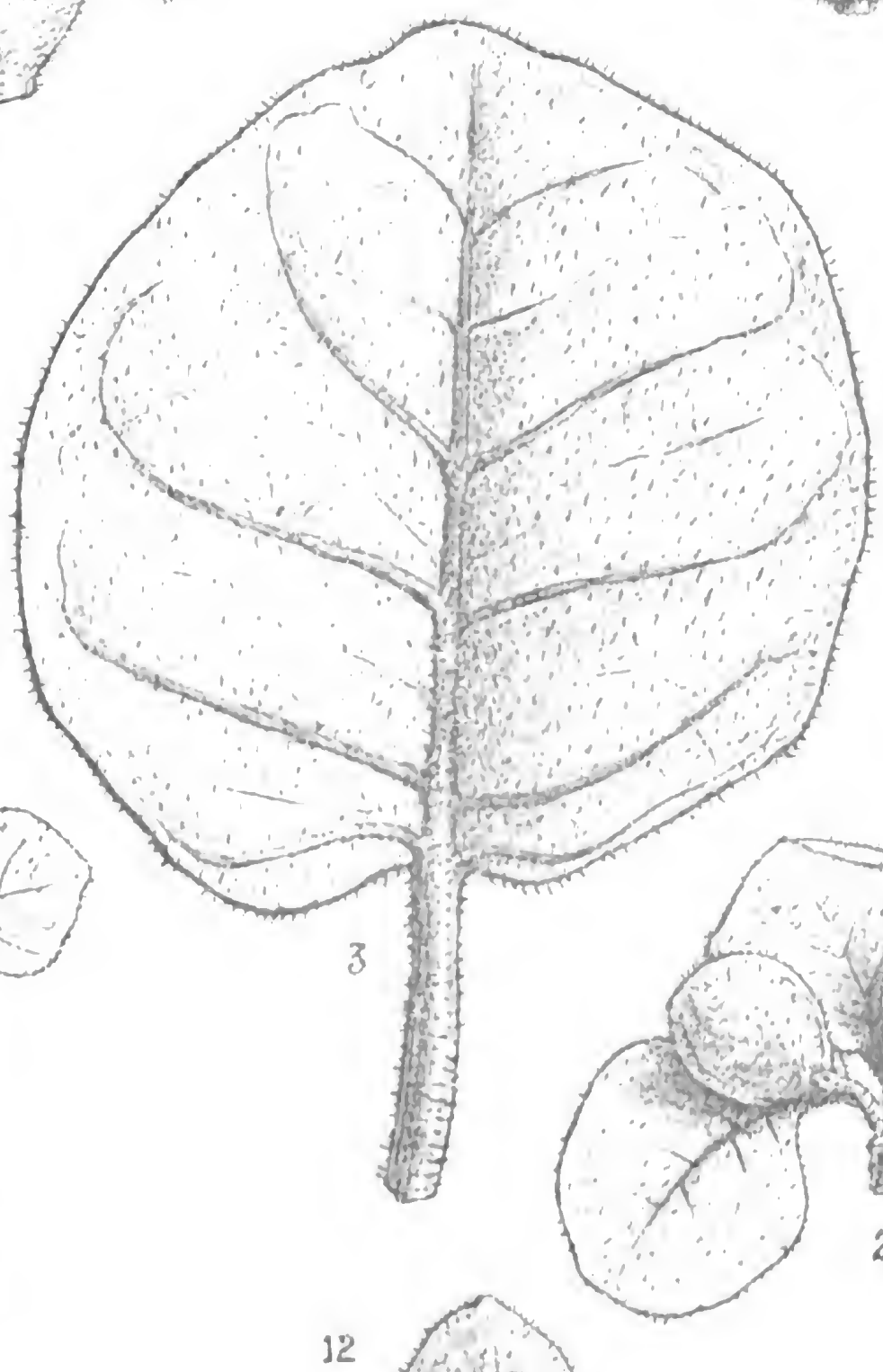
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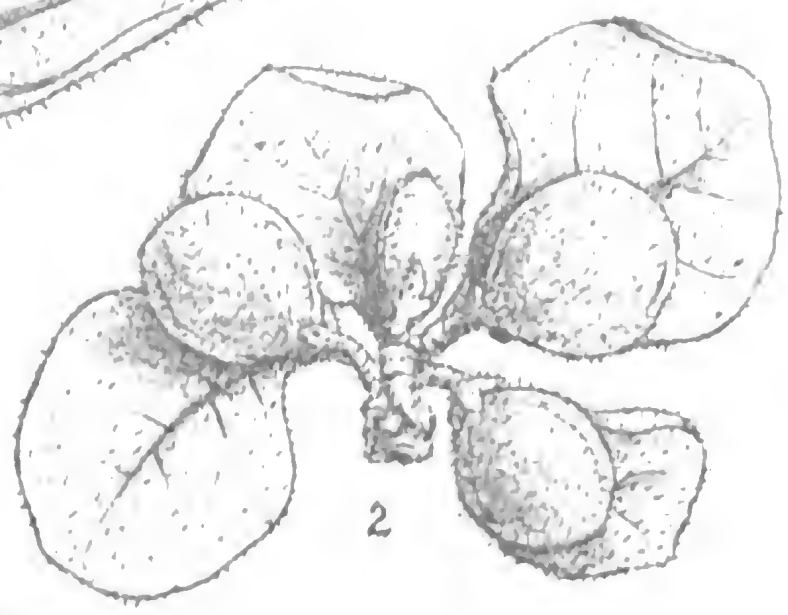
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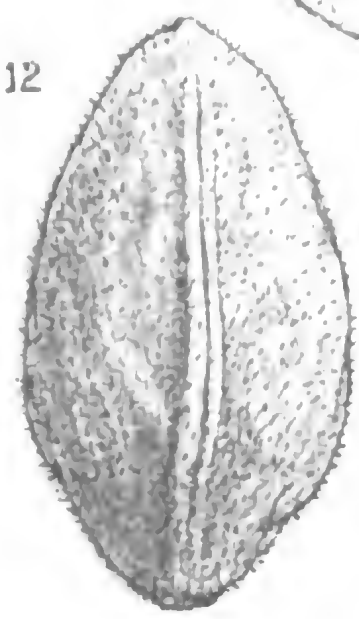
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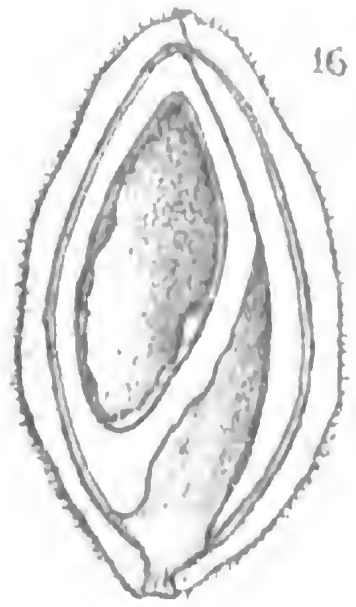
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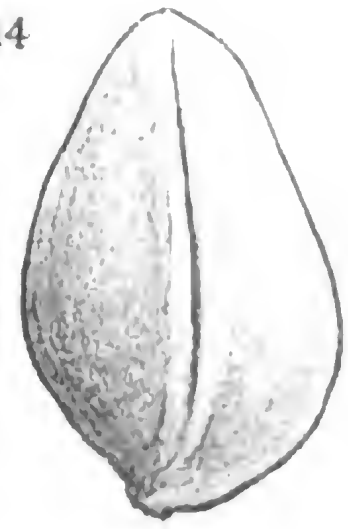
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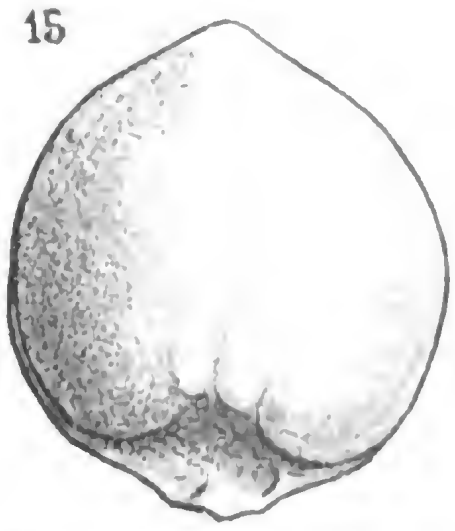
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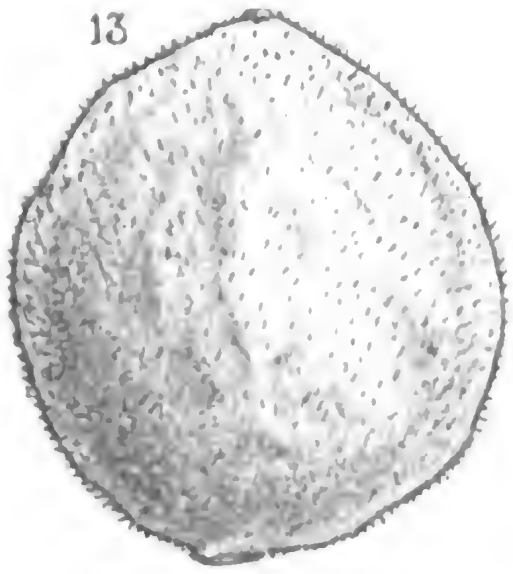
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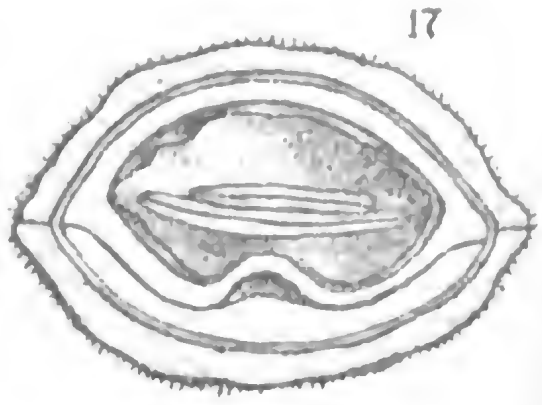
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G.A. del. et lith

Tabula 3112.

COMMIPHORA DRAKE-BROCKMANII, *Sprague.*

Burseraceae.

C. Drake-Brockmanii, *Sprague*; species nova affinis *C. erythraeae*, (Ehrenb.) Engl., a qua foliis simplicibus integris rete venularum inconspicuo necnon floribus subsessilibus differt.

Arbuscula circiter 1 m. alta. *Ramuli* exstantes 0·5–2 cm. longi, breviter dense retrorse pubescentes, alius abbreviatus, 0·5 cm. longus, cicatricibus foliorum notatus, apice folia bracteas inflorescentiasque axillares gerens, alius circiter 2 cm. longus, inferne cicatricibus crebris notatus, apice folia inflorescentiasque gerentes, internodiis intermediis satis elongatis; folia intermedia hujus ramuli delapsa, de caule per internodia duo decurrentia, cicatrice trilobato, parte decurrente valde prominente tricostato costa media quam lateralibus majore. *Folia* simplicia, longiuscule petiolata, suborbicularia vel subreniformia, apice obtusissima, rotundata vel leviter retusa, basi subtruncata vel subcordata, 1–1·8 cm. diametro, coriacea, utrinque pilis valde curvatis dense pubescentia; nervi laterales utrinsecus circiter 4, satis irregulares, procul a margine anastomosantes, utrinque praecipue subtus prominentes, rete venularum in sicco inconspicuo; petioli 4–6 mm. longi, satis graciles, pubescentes vel tomentelli, basi in formam triangularem valde inerassati. *Inflorescentiae* plerumque triflorae, in axillis foliorum vel bractearum solitariae; bracteae suffulcientes cicatrice cordiformi basali lateraliter compressae, 2–2·5 mm. longae, tomentellae, a latere visae interdum semilunares; pedunculus 2–4 mm. longus, tomentellus; pedicelli 0·5–1 mm. longi. *Flores* ♀ tantum visi. *Calyx* in toto 3 mm. longus, extra retrorse tomentellus, intus sparse appresse pilosus; tubus (ab exteriore visus) 1·7 mm. longus; lobi ovato-deltoidei, 1·3 mm. longi. *Petala* lanceolato-oblonga, 2·5 mm. longa, parte suprema 1 mm. longa marginibus inflexis, dorso incrassata, medio 1 mm. lata, apice inflexa. *Staminodia* antesepala longiora 1·1–1·2 mm. longa antherodiis ovatis, antepetala breviora 0·6 mm. longa antherodiis late ovatis basi cordatis. *Ovarium* oblongum, ovoideum, 2 mm. longum (cum stigmate subsessili 2·3 mm. longum) basi 1·5 mm. diametro, pilis brevibus plerumque retrorsis tomentellum, biloculare loculo altero biovulato altero vacuo; stylus subnullus (usque ad 0·2 mm. longus); stigma capitatum, circiter 0·5 mm. diametro.

Ovula ascendentia, ⅓ supra basin suam affixa. *Drupa* compresso-ellipsoidea, 9–11 mm. longa, 9 mm. lata, 6–7 mm. crassa, epicarpio velutino-pubescente, mesocarpio tenui carnoso valde reticulato, endocarpio lenticulari 5·5–7 mm. longo, 6·5–7 mm. lato, 4–5 mm. crasso. *Semen* solitarium. *Cotyledones* foliaceae, basi cordatae.

British Somaliland. Maritime hills S.E. of Berbera, *Drake-Brockman*, 755 (type), 758.

C. Drake-Brockmanii, though very different in appearance from *C. erythraea*, (Ehrenb.) Engl., seems to be closely related to that species. The indumentum is of the same character, and the drupes are almost alike. The step from trifoliolate to unifoliolate (simple) leaves is a small one in *Commiphora*, leaves of both types frequently being present on the same species. The entire margin and indistinct reticulation of the leaves, and the much reduced inflorescences with subsessile flowers, form the best diagnostic characters of *C. Drake-Brockmanii*. It is known by the Somalis under the name Dunkal, and is described by the collector as a tree, seldom more than 3 or 4 feet in height, with a sturdy gnarled appearance, and only scantily covered with leaves. It yields a kind of bdellium known as Habbak Dunkal (*vide* Drake-Brockman, British Somaliland, p. 311 : 1912).—T. A. Sprague.

Fig. 1, branchlet with female flowers; 2, branchlet with fruits; 3, leaf; 4, female flower; 5, do., laid open; 6, pistil; 7, 8, petals; 9, antepetalous staminode; 10, antesepalous staminode; 11, bract; 12, 13, fruit, side and face views; 14, 15, endocarp, side and face views; 16, 17, endocarp, longitudinal and transverse sections. *All enlarged, except* 1 *and* 2, *which are of natural size.*

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G.A. del. et lith.

Tabula 3113.

ISOTHECA ALBA, *Turrill*.

Acanthaceae. Tribus Justicieae.

Isotheca, *Turrill in Kew Bulletin*, 1922, p. 187 ; ab *Herpetacantho*, Nees, floribus in thyrsum terminalem dispositis, staminum abaxialium thecis aequalibus parallelis, pollinis granulis ad typum " Staehelpollen " pertinentibus differt.

Calyx 5-partitus, segmentis angustis acutis subaequalibus. *Corollae* tubus elongatus, superne parum ampliatus ; limbus 2-labiatus, labio adaxiali e segmentis 2 lateralibus composito, abaxiali breviter trilobo. *Stamina* 4, didynama, filamentis basi per paria lateralia connatis ; antherae staminum adaxialium monothecae, abaxialium ditheeae, thecis oblongis aequalibus parallelis mutieis. *Pollinis* granula sphaeroidea, e typo " Staehelpollen." *Discus* annularis, brevis. *Stylus* filiformis, apice minute 2-dentatus ; ovula in quoque loculo 2. *Capsula* (fere matura) oblongo-elavata, basi in stipitem longum solidum contracta. *Herba* vel suffrutex, erecta. *Folia* integerrima. *Flores* pedicellati, flavi, fasciculati vel solitarii, in axillis bractearum parvarum in thyrsum terminalem dispositi.

I. alba, *Turrill*, species unica.

Caules erecti, glabri. *Folia* elliptica, apice acute angustata vel acuminata, basi in petiolum cuneato-angustata, usque ad 2·2 dm. longa (petiolo exclusō), costa nervisque in pagina superiore subimpressis, in pagina inferiore conspicuis, lateralibus utrinsceus circiter 12 marginem versus anastomosantibus, glaberrima ; petiolus usque ad 5 cm. longus, glaber. *Inflorescentia* thyrsoidea, terminalis, cum pedunculo 3 cm. longo 2 dm. longa, glabra. *Calycis* segmenta 5, lanceolato-acicularia, subaequalia, apice acuminata, 7 mm. longa. *Corolla* alba (ex *Williams*), tubo 4 cm. longo faucc 8 mm. diametro glabro ; labii adaxialis segmenta 2, lateralia, 7 mm. longa, 2·5 mm. lata, labio abaxiali trilobo, lobis subaequalibus 1·5 mm. longis. *Stamina* leviter exserta ; antherae thecis 4 mm. longis, filamentis circiter 4·5 cm. longis ; pollinis granula circiter 65 μ diametro. *Ovarium* cylindricum, 3 mm. altum, 1·5 mm. diametro, glabrum, loculis biovulatis ; stylus 5·5 mm. longus.

West Indies. Trinidad: heights of Aripo, 13.1.1922, *R. O. Williams*.—W. B. Turrill.

Fig. 1, portion of plant ; 2, calyx ; 3, androecium ; 4, anthers ; 5, transverse section of abaxial anther ; 6, transverse section of adaxial anther ; 7, pollen grain ; 8, gynaeceum with ovary in longitudinal section and much enlarged stigma. *All enlarged except fig.* 1.

G.A. del et lith

Tabula 3114.

BELOPERONE FLAVIFLORA, *Turrill.*

Acanthaceae. Tribus Justicieae.

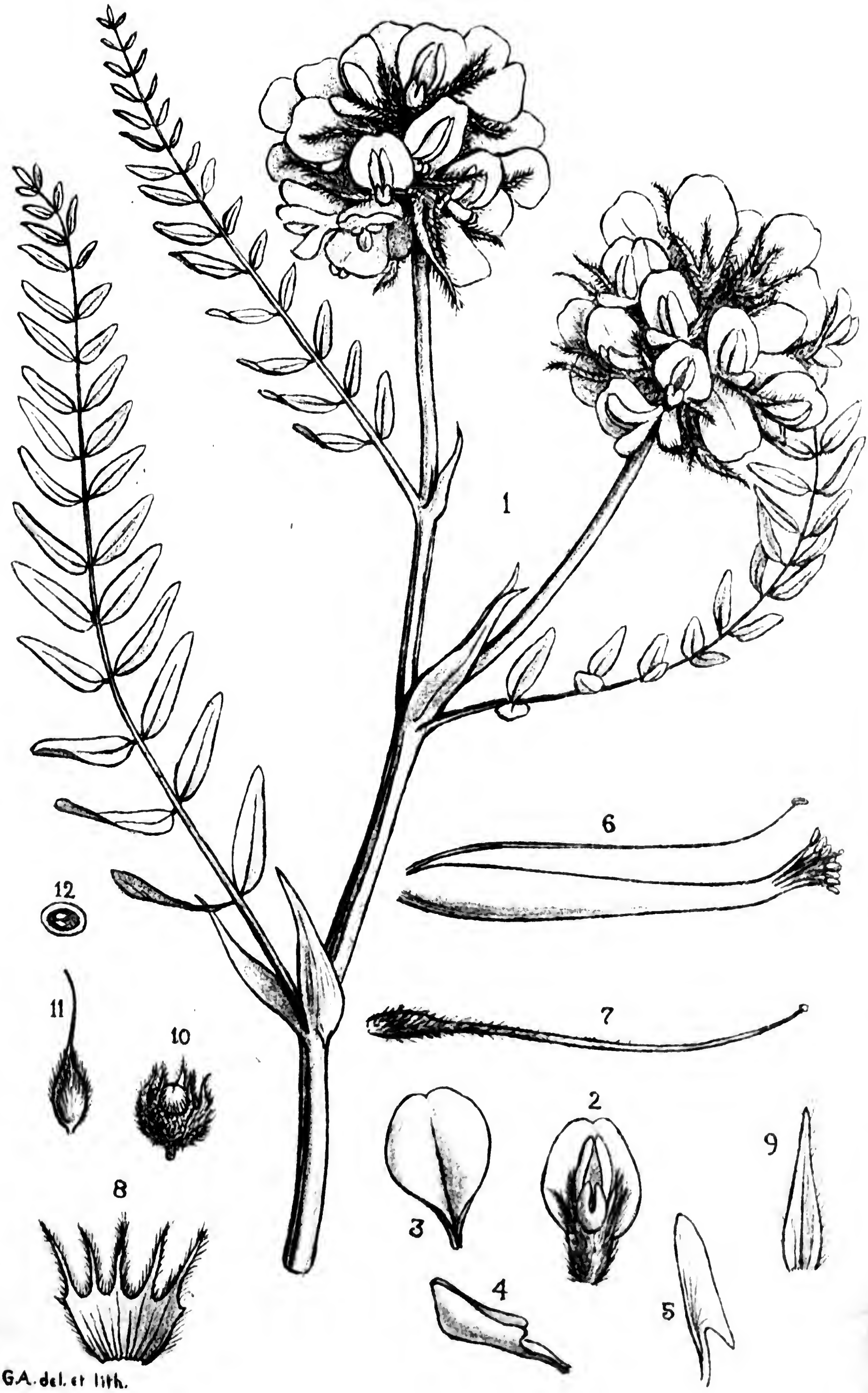
B. flaviflora, *Turrill in Kew Bulletin*, 1922, p. 187; a *B. tenera*, Turrill, planta fulvo-hirsuta, foliis multo majoribus, floribus flavis facile distinguitur.

Herba (vel suffrutex) erecta, caulibus subteretibus junioribus dense fulvo-hirsutis deinde subglabris. *Folia* oblongo-elliptica vel elliptica, usque ad 2·75 dm. longa (petiolo excluso) et 1·1 dm. lata, apice acute acuminata basi cuneata vel acuta, costa nervisque in pagina utraque conspicuis pilis fulvis in juventute praecipue instructis, nervis lateralibus utrinsecus circiter 12; petiolus usque ad 6 cm. longus, fulvo-hirsutus. *Inflorescentiae* axillares vel terminales; bracteae lineari-lanceolatae, 3 mm. longae, extra dense glanduloso-puberulae, caducae; bracteolae lineares, 2·5 mm. longae, dense glanduloso-puberulae. *Calycis* segmenta lanceolato-linearia, acuta, 5 mm. longa, 1 mm. lata, puberula. *Corolla* anguste cylindrica, superne leviter ampliata, 2·8 cm. longa, flava, extra glanduloso-puberula, labio adaxiali 1·2 cm. longo apice emarginato, abaxiali 1·2 cm. longo leviter aequaliterque trilobato. *Stamina* 2, leviter exserta, filamentis 1·8 cm. longis inferne pilis brevibus reflexis instructis, antheris dithecis, thecis superpositis utrisque vix 2 mm. longis calcaratis; pollinis granula ellipsoideo-oblonga, 55–58 μ longa, 32–33 μ diametro. *Ovarium* cylindrico-conoideum, 3 mm. altum, basi 1·25 mm. diametro, puberulum; stylus 2·2 cm. longus, inferne puberulus.

West Indies. Trinidad: heights of Aripo, 13.1.1922, *R. O. Williams.*

This is a very distinct species of *Beloperone*. It is related to a plant collected by C. G. Pringle at Las Canoas, State of San Luis Potosi, Mexico, 1891, no. 3933, and described by B. L. Robinson in Proc. Amer. Acad. vol. xxvii. p. 183 (1892), as *Beloperone fragilis*, Rob. Unfortunately this name cannot stand, since the same combination had been used previously by Martius in Flor. Bras. vol. ix. p. 140 (1847), to designate a plant, which, from the description, is a quite distinct species, from Prov. Bahia, Brazil. For the Mexican plant it is proposed that the name *Beloperone tenera*, Turrill, should be substituted for *Beloperone fragilis*, Robinson.—W. B. Turrill.

Fig. 1, portion of plant; 2, stamens; 3, pollen grains; 4, gynaeceum with ovary in longitudinal section; 5, lower lip of corolla; 6, calyx. *All enlarged except fig.* 1.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G.A. del. et lith.

Tabula 3115.

ASTRAGALUS DURHAMII, *Turrill.*

Leguminosae. Tribus Galegeae.

A. Durhamii, *Turrill in Kew Bulletin,* 1922, p. 294, et l.c. 1924, p. 320; ab *A. ajubensc,* Bge, vexilli lamina elliptico-ovata latiore differt.

Caules glabri, leviter longitudinaliter costati, teretes. *Folia* caulina usque ad 1·7 dm. longa, glabra vel fere glabra, foliolis circiter 30 elliptico-lanceolatis vel oblongo-lanceolatis apice obtusis saepe breviter apiculatis basi rotundatis petiolulatis petiolulis 1 mm. longis costa in pagina utraque prominente nervis lateralibus in pagina superiore impressis in pagina inferiore prominentibus; stipulae lanceolatae, apice attenuatae, usque ad 2·7 cm. longae, interdum pilis albis longis paucis instructae. *Inflorescentiae* axillares, multiflorae, globosae; pedunculi usque ad 5·5 cm. longi, pilis albis paucis dispersis praediti, bracteae lineari-lanceolatae, apice attenuatae, circiter 1 cm. longae; margine longe albo-ciliatae. *Calyx* longe albo-pilosus, tubo 9 mm. longo, dentibus lineari-acicularibus usque ad 9 mm. longis inter se subaequalibus. *Corolla* intense lutea, vexillo 2·2 cm. longo, lamina late elliptico-ovata apice leviter emarginata 1·5 cm. longa 1·2 cm. lata, alis 2·1 cm. longis 4 mm. latis, carina 2·1 cm. longa 6 mm. lata basi filamentorum tubo distincte adnata. *Filamenta* glabra. *Ovarium* longe denseque albo-pilosum; stylus inferne pilis albis dispersis instructus.

Europe. Gallipoli Peninsula, *Durham,* 11.

Further specimens of this interesting plant were collected by Capt. Ingoldby on the cliff at Maidos in 1923 and show that the leaves and leaflets are sometimes larger than those of the original specimen. The leaves are up to 3 dm. in length, and the leaflets up to 4·5 cm. long and 1·3 cm. broad. Fruit was also collected. Each legume is enclosed in a persistent calyx, which becomes enlarged and membranaceous, and corolla, and has long white silky hairs which are much denser in the upper part; it is slightly keeled on both sutures, the adaxial keel being broader than the abaxial; it is nearly ellipsoid with a slight lateral compression, and its length is 8 to 10 mm., its breadth from suture to suture nearly 6 mm., and at right angles to the suture plane

5 mm.; it is completely divided from suture to suture into two loculi by a yellow shining septum. Apparently only one ovule in each loculus normally matures to a seed. All the seeds examined had collapsed.

The section *Alopecias*, to which our plant belongs, consists of two series, *A. Durhamii* being placed in the *Ebracteolati* and in the subseries *Megalotropi*. In this subseries it is further delimited by its globose and long peduncled inflorescences. From species with similar characters, other than *A. ajubensis*, it is distinguished by its indumentum, the shape and teeth of the calyx, and the details of corolla structure. Of species occurring in Europe it most nearly resembles *A. ponticus*, Pall., from which it differs in its glabrous stems and nearly glabrous foliage, its long peduncle, linear-acicular calyx teeth which are subequal and approximately as long as the calyx-tube, the larger corolla and broader vexillum, and in the lamina of the carina being broader than that of the wings.—W. B. Turrill.

Fig. 1, plant; 2, flower; 3, standard; 4, keel; 5, wing; 6, androecium; 7, gynaecceum; 8, calyx spread open; 9, bract; 10, fruit and calyx; 11, fruit; 12, transverse section of fruit. *All enlarged except fig.* 1.

G.A. delet lith.

Tabula 3116.

EPIMEDIUM PUBIGERUM, *Morren et Decaisne.*

Berberidaceae. Tribus Berbereae.

E. pubigerum, *Morren et Decaisne in Ann. Sci. Nat. 2me Sér.* vol. ii. p. 355 (1834); Boiss. Flor. Or. vol. i. p. 101 (1867); Stoyanoff, N., et Stefanoff, B., in Oesterr. Bot. Zeitschr. vol. lxx. p. 296 (1921), et in Flore de la Bulgarie, p. 468, t. 565 (1924). *E. alpinum* var. *pubigerum*, DC. Syst. vol. ii. p. 28 (1821), et Prodr. vol. i. p. 110 (1824); D'Urville in Mém. Soc. Linn. Paris, vol. i. p. 274 (1822); Franchet in Bull. Soc. Bot. Fr. vol. xxxiii. p. 107 (1886); ab *E. alpino*, Linn., rhizomate breviore crassiore, foliis maturis latioribus valde cordatis subtus in axillis lanatis marginem versus linea rubra haud vel vix instructis, floribus pallidioribus lutcis differt.

Rhizoma horizontaliter vel subhorizontaliter repens, crassum, radices numerosas emittens, squamarum vestigiis vestitum, nodosum, nodis squamis subrotundatis concavis venosis fuscis foliorum basin circumdantibus instructis. *Folia* radicalia 1–2, usque ad 2·7 dm. longa, saepissime triternata, petiolo communi circiter 7–10 cm. longo ad petiolulorum insertiones intumescenti piloso pilis mollibus coloratis fortasse glandulosis, petiolulis lateralibus 3–5 cm. longis ad foliolorum insertionem piloso-lanatis; foliola subrotundato-ovata, apice acuta vel breviter acuminata, basi valde cordata, 4–4·5 cm. longa, 3–3·5 cm. lata, margine acutissime dentata, dentibus ad folioli apicem curvatis, adulta chartacea, supra viridia, subnitida, subtus glaucescentia, reticulato-venosa, venis prominulis, juniora submembranacea, pilis mollibus albis inspersa ad petioluli insertionem dense lanata; folium caulinum saepissime solitarium, foliis radicalibus simile sed brevius. *Inflorescentia* terminalis, laxiflora, erecta, pilis numerosis articulatis probabiliter glandulosis instructa; bracteae ovatae, 1–4 mm. longae. *Flores* pedicellis 4–9 mm. longis suffulti. *Sepala* 4, inaequalia, exteriora minora. *Petala* 4, aequalia, ovato-oblonga, obtusa, sepalis duplo majora, 5–7 mm. longa, nectariis breviter cylindricis apice rotundatis. *Stamina* gynaeceo longiora. *Ovarium* ellipsoideo-ovoideum, stylo laterali.

Bulgaria. Strandja Planina, in wet forests of *Fagus orientalis*, May 1921, *N. Stoyanoff* and *B. Stefanoff*.

The species figured in our plate is, so far as is known, limited, in the Balkan Peninsula, to the south-eastern part from the Belgrade Forest, north of Constantinople, to the north-western Strandja in S.E. Bulgaria. It is also recorded from Asia Minor and the Caucasus. It was collected in Thrace by D'Urville and by Sibthorp. An oversight in the Flora Graeca requires attention. In the Sibthorp Herbarium at Oxford there are two specimens of *Epimedium*, both without flowers and fruits. One is certainly *E. pubigerum*, little doubt from the Belgrade Forest, the other may or may not be this species. In the Flora Graeca, t. 150 (1913), the plant figured is *E. alpinum*, and this is the name correctly used there for the plate, though the locality is given as " in sylvis ad pagum Belgrad, in agro Constantinopolitano." It would thus appear that the plant figured and described was not that collected by Sibthorp in Thrace, but was possibly a cultivated specimen.—W. B. Turrill.

Fig. 1, portion of plant, *natural size*; 2, plant, *reduced*; 3, flowers and young fruit; 4, androecium; 5, longitudinal section of gynaeceum; 6, petal. *All enlarged except figs.* 1 *and* 2.

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3

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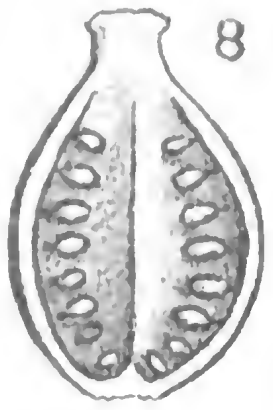

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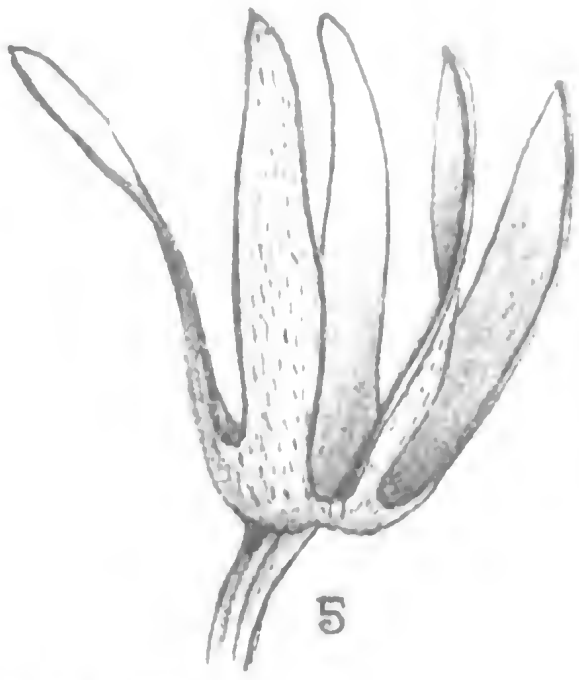

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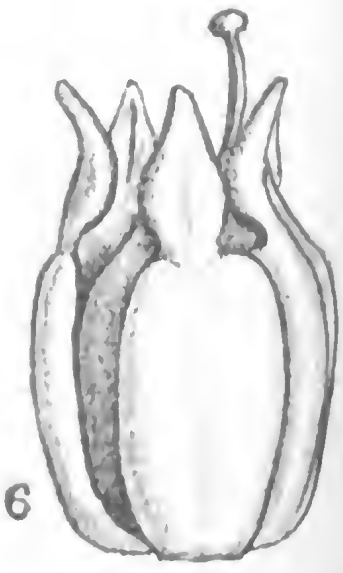

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G.A. del. et lith

Tabula 3117.

VIOLA DELPHINANTHA, *Boiss.*

Violaceae. Tribus Violeae.

V. delphinantha, *Boiss.*, Diagn. Ser. I. vol. i. p. 7 (1842), et Flor. Or. vol. i. p. 453 (1867); Hal. Consp. Flor. Gr. vol. i. p. 137 (1900); Hervier in Bull. Acad. Internat. de Géogr. Bot. vol. xv. p. 58 (1905); Becker Violae Europeae 73 (1910), et in Fedde Repert. vol. xviii. p. 142 (1922); N. Stoyanoff in Oesterr. Bot. Zeitschr. vol. lxx. p. 110 (1921); ab *V. cazorlensi*, Gdgr, sepalis lineari-lanceolatis acutis, dorso ad medium gibbosis, basi rotundatis appendicibus minutis semilunaribus instructis, petalis obovatis, petalo infimo caeteris subaequali apice leviter emarginato recedit.

Planta perennis, glabra, caulibus numerosis erectis vel suberectis simplicibus e rhizomate suffruticoso orientibus. *Folia* linearia vel lineari-oblanceolata, usque ad 1·5 cm. longa et 1·5 mm. lata, acuta, sessilia, basin versus attenuata, uninervia, nervo subprominente; stipulae in foliis superioribus integrae, folio persimiles, in foliis inferioribus bipartitae partitionibus exterioribus folio minoribus. *Flos* singulus, pedunculo 2·5–5 cm. longo erecto ebracteolato e folii inferioris vel medii axilla oriens. *Sepala* linearia vel lineari-lanceolata, acutiuscula, 5–6 mm. longa, obtuse et brevissime appendiculata. *Petala* persistentia, obovata, 1·1 cm. longa; calcar 1·5–2·5 cm. longum. *Stamina* ovario adpressa, filamentis planis 1 mm. longis 1 mm. latis, antheris vix 1 mm. longis. *Ovarium* ovoideum, 1·25 mm. altum; stylus in parte inferiore geniculatus, in parte superiore capitato-crassatus antice breviter rostratus.

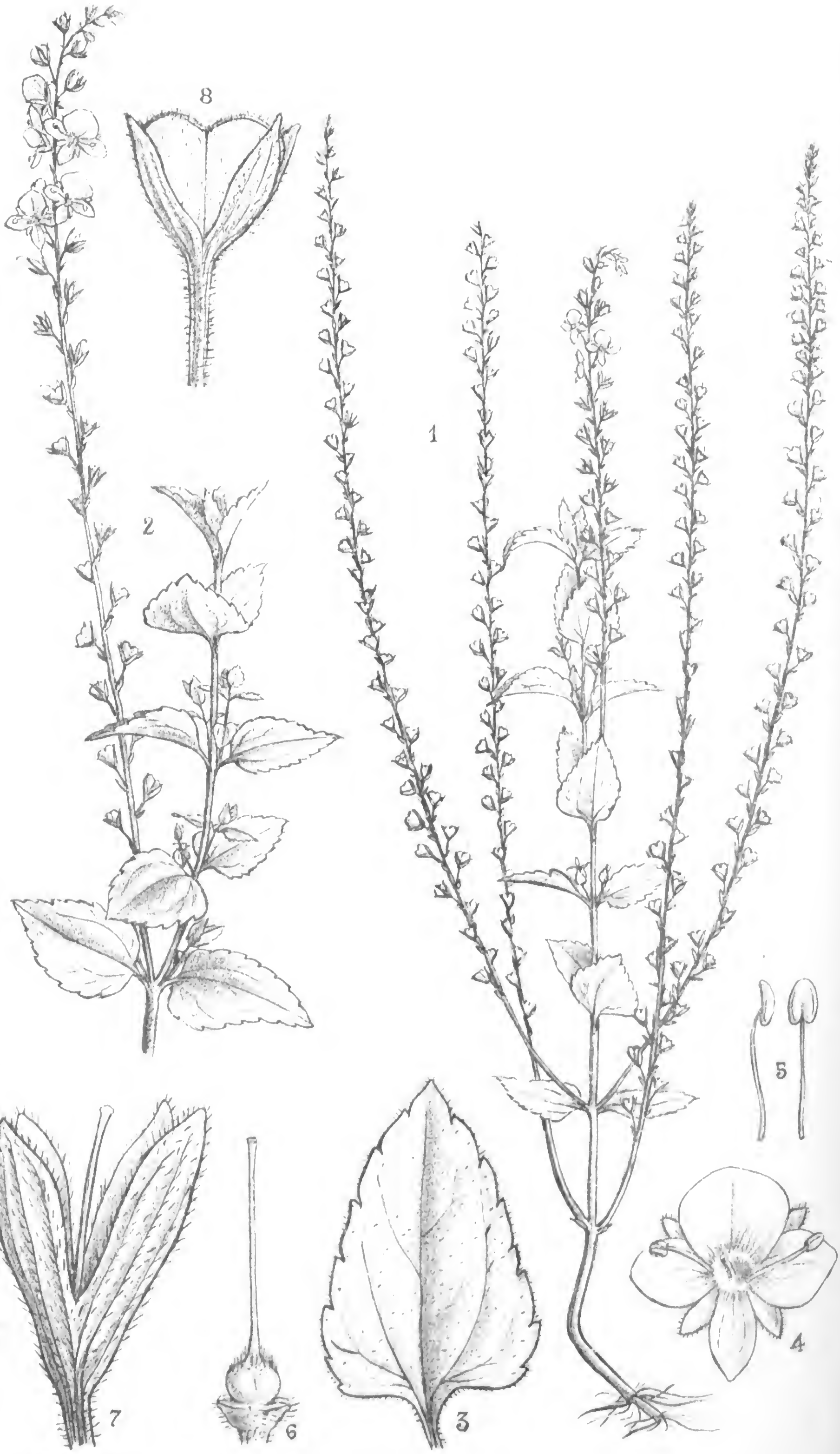
Bulgaria. In rupestribus calcareis mt. Ali-Botuš, prope Paril, 12.7.1920, *N. Stoyanoff.*

The remarkable violet figured is limited to Mt. Olympus in Thessaly, Mt. Athos in S. Macedonia, and Mt. Ali-Botuš, a south-western outlier of the Rodope Mountains in S. Bulgaria. It is only recently that it has been discovered on Mt. Ali-Botuš by Dr. Stoyanoff, to whom we are indebted for the specimens figured.

Not only is the species geographically isolated, it is also morphologically remarkable since it has important characters which are shared with only two other known species: *V. cazorlensis*, Gandoger in Bull. de

l'Assoc. franç. de Bot. vol. v. p. 226 (1902) non vidi, et in Bull. Acad. Intern. Géogr. Bot. vol. xv. p. 57 (1905), and *V. Košaninii*, Degen in Mag. Bot. Lap. vol. x. pp. 109, 116 (1911). *V. cazorlensis* occurs in South Spain, Prov. Jaën : in fissuris calcarum mont. dict. Sierra de Castril et de Cazorla 15–1900 m. ; Barrancon de Valentina, sources du Guadalquivir ; Sierra del Poza ; Cerro Jilio, ad fontem del Tejo ; Sierra de Cabrilla. The subsection *Delphinoideae* of the section *Nomimium* was formed by Boissier in Flor. Or. vol. i. p. 451 (1867), for *V. delphinantha*, and *V. cazorlensis* has been placed by Becker, l.c., in the same subsection. A careful account by Hervier, l.c., makes clear the characters which separate the two species, and also clears up certain mistakes in Gandoger's original description of *V. cazorlensis*. *V. Košaninii* was described by Degen, l.c. p. 108, as *V. delphinantha* subsp. *Košaninii*, but the specific combination is made as cited above, and also by Hayek in Denkschr. Akad. Wiss. Wien, vol. xciv. p. 155 (1918). It was originally described from specimens collected on Mt. Solunska, the highest peak of the Jakupica, in the southern part of the Golešnica Planina, south of Ueskueb (Skoplje), by Dr. Košanin. Dörfler also collected it on the Albanian-Montenegrin boundary near Rapša. It differs from *V. delphinantha* in having the petals much narrower, the lower anticous one more deeply emarginate, nearly bilobed, and the spur only half as long or even shorter.—W. B. Turrill.

Fig. 1, plant ; 2, leaf ; 3, abaxial petal and spur ; 4, an adaxial petal ; 5, calyx ; 6, androecium and gynaeceum ; 7, gynaeceum ; 8, longitudinal section of ovary. *All enlarged except fig.* 1.



G.A. del et lith

Tabula 3118.

VERONICA RIGIDA, *Turrill.*

Scrophulariaceae. Tribus Digitaleae.

V. rigida, *Turrill in Kew Bull.* 1922, p. 186 ; ab *V. Chamaedrys*, L., caulibus rigidioribus ramosioribus, foliis petiolatis, infructescentiis saepe longioribus, pedicellis brevioribus, corollis minoribus differt.

Planta perennis (vel interdum biennis), caulibus cylindricis adscendentibus ramosis rigidis inferne pilis in lineis duabus dispositis instructis superne undique hirsutis. *Folia* oblongo-ovata vel ovata, apice subobtusa, basi subcordata deinde in petiolum angustata, usque ad 3·8 cm. longa et 2·7 cm. lata (petiolo excluso), saepissime minora et circiter 2 cm. longa et 1·5 cm. lata, margine inciso-dentata, in pagina superiore leviter hispida vel glabra nervis impressis, in pagina inferiore nervis prominentibus valde hispidis ; petiolus 6–7 mm. longus, hispido-hirsutus. *Inflorescentia* 3–12 cm. longa, glanduloso-hirsuta ; bracteae lincari-lanceolatae, 4–5 mm. longae, 1 mm. latae, glanduloso-hirsutae ; pedicelli floriferi 2 mm. longi. *Infructescentia* usque ad 3·4 dm. longa ; pedicelli fructiferi 4 mm. longi. *Calyx* 5 mm. longus, sepalis costis extra prominentibus instructis. *Corolla* 8–10 mm. diametro, intense caerulea, lobis lateralibus adaxialiquc 3–5 mm. latis, abaxiali circiter 2 mm. lato. *Stamina* 3 mm. longa, caerulea. *Ovarium* biconvexum, ambitu circulare, 0·75 mm. altum, marginibus apiceque albo-hirsutum ; stylus 3·5 mm. longus, inferne albus, medio purpureus, superne intense caeruleus. *Capsula* obcordata, 3·5 mm. longa, 4 mm. lata, margine albo-hirsuta, saepissime pubescens ; semina oblongo-orbicularia, pallide flava.

Greek Macedonia. Southern slopes of Krusa Balkan ; north of Karamudli, *Turrill*, (seed-number) 49, seeds collected 18.6.17, in flower and fruit at Kew from May to September.

This plant was originally described (in Kew Bull. 1920, p. 192) as a variety of *Veronica Chamaedrys*, L. After cultivating it for five successive years and finding that its important differential characters remain constant it was thought advisable to raise it to specific rank. In cultivation it has behaved both as a biennial and as a perennial flowering the second and succeeding years after being sown.—W. B. Turrill.

Fig. 1, plant, *reduced* ; 2, portion of plant, *natural size* ; 3, leaf ; 4, flower ; 5, stamens ; 6, gynaeceum ; 7, calyx and gynaeceum ; 8, fruit. *All enlarged except figs.* 1 *and* 2.

S.Gower del.,G.A. lith.

Tabula 3119.

PSEUDOSCOLOPIA POLYANTHA, *Gilg.*

Flacourtiaceae. Tribus Scolopieae.

P. polyantha, *Gilg in Engl. Bot. Jahrb.* vol. liv. p. 343 (1917); species unica foliis oppositis placentis uniovulatis valde distincta.

Arbor circiter 5 m. alta; ramuli glabri. *Folia* 2–7 cm. longa, 1–3 cm. lata, petiolata, lanceolata vel elliptico-lanceolata, apice acuminata vel subacuminata, basi angustata, subintegra vel serrata, glabra. *Cymae* foliis breviores. *Pedicelli* 1·2 cm. longi, pubescentes vel subglabri, basi bractcolati. *Sepala* fere ad basin libera, 7 mm. longa, 2·5 mm. lata, lanceolata, apice obtusa, pubescentia, ciliata, venosa. *Petala* sepalis subsimilia. *Stamina* ∞; filamenta 4·5 mm. longa, filiformia, glabra. *Ovarium* 1-loculare, ovulis 2; stylus 3 mm. longus, teres, apice bilobus. *Capsula* 9 mm. longa, basi 6 mm. lata, ovoidea, apice acuminata. *Semina* arillata, pilis stellatis tecta.—*Pseudoscolopia Fraseri*, Phillips, Gen. South Afr. Fl. Pl. 416 (1926).

South Africa. Pondoland: Ntsubane Forest, *Fraser* in Herb. S. Afr. Forest Dept. 3058, 3105, 3133; and in National Herbarium 1417. On the Enkweni and in the Egosa Forest, along streams, up to 500 m., *Bachman*, 1712, 1713. *Beyrich*, 116, 125 (Herb. Berlin).

The specimen from which the accompanying plate was drawn was collected by Forester G. Fraser in the Ntsubane Forest, Pondoland. In forwarding specimens Forester Fraser writes: "So far I have only seen this tree within 100 yards of the edge of the forest or on the actual forest edge with the exception of a few small individuals which grow well within the forest among taller timber trees. It appears therefore that its natural habitat is on the fringe of the forest. The largest specimen I came across measured 3 ft. 10 in. in circumference and about 15 feet high, and this was growing about 30 yards within the forest on a steep slope. The trees usually do not grow to this height. The bark is rough and flaky, and the wood, as far as I have been able to ascertain, is not put to any economic use."—E. P. Phillips.

The genus *Pseudoscolopia* has been described independently by two botanists, and it is a remarkable coincidence that both of them should

have selected the same name for the plant in reference to the affinity with the genus *Scolopia*. In the family *Flacourtiaceae* the genus is well marked on account of its opposite leaves and uniovulate placentas.—J. HUTCHINSON.

FIG. 1, flower seen from above; 2, anther; 3, pistil; 4, longitudinal section of ovary showing the uniovulate placentas; 5, seed; 6, stigmas and style; 7, open capsule. *All enlarged.*

G.A. del. et lith.

Tabula 3120.

ZYGOTRITONIA CROCEA, *Stapf.*

Iridaceae. Tribus Ixieae.

Z. crocea, *Stapf*; species nova *Z. bongensi*, Mildbr., proxima, sed caule elongato, foliis latioribus, floribus croceis, perianthii segmento postico semper incurvato, nec demum erecto distincta.

Herba perennis, sub anthesi 2–4 dm. alta. *Cormus* globoso-bulbosus cum tunicis arcte reticulato-fibrosis, ad 3 cm. diametro. *Cataphylla* 2–3-na, vaginantia, cinereo-brunnea, arcte nervoso-striata, ore valde obliquo, summum ad 8 cm. longum, subacutum. *Folia* 2-na e vagina summa exserta, aliud caulinum internodio ad 15 cm. longo remotum, illa equitantia, e basi longissime anguste attenuata lanceolato-linearia, longe acuta, 20–30 cm. longa, 12–25 mm. lata, breviter marginata, nervis crassioribus 3, rarius 4, hoc ad medium vel fere totum compresse cymbiforme, 5–15 cm. longum, 5–8 mm. latum. *Inflorescentia* pedunculo 5–8 cm. longo suffulta, e spicis 3 (rarius 2 vel 1) distantibus virgatis laxis constituta; spicae bracteis spathoideis anguste acutis, quarum infima 3–5 cm. longa (caeteris multo minoribus), suffultae, laterales 10–16 cm. longae, terminalis paulo longior; spathae florales late ovatae, 3–5 mm. longae, apice scariosae, adaxialis breviter 2-loba. *Flores* 5–8 mm. distantes, crocei (fide *Dalziel*). *Perianthii* tubus leviter vel vix curvatus, 4–5 mm. longus; segmentum posticum anguste galeatum, circiter 6 mm. altum, demum magis apertum, sed minime rectum, caetera spatulato-oblonga, obtusa, 4–5 mm. longa, 1·5–1·75 mm. lata. *Filamenta* ad 6 mm. longa; antherae 3 mm. longae. *Receptaculum* 2 mm. longum, spathis inclusum; stylus galea brevior. *Capsula* subglobosa, 3-loba, lobis in dorso obtusissimis, 5–6 mm. diametro. *Semen* 1 (raro 2) pro loculo.

Northern Nigeria. Zungeru, *Dalziel*, 558; Abinsi, Katsina Allah, on stony hills, *Dalziel*, 848 (19.6.12).

French Guinea. "Bissikrima," *Pobéguin*, 1123, p.p.

The Abinsi specimens have simple or nearly simple spikes and, like Pobéguin's plant, slightly less obtuse floral spathes, whilst the few flowers preserved are more of the type of those of the Sudanese *Z. bongensis*, although smaller. Dr. Dalziel also collected near Abinsi,

and about the same time, another species, which differs rather strikingly from *Z. crocea* as well as from *Z. bongensis*. This may be diagnosed here briefly as **Z. praecox,** *Stapf* (nov. spec.) :

Planta sub anthesi 15–35 cm. alta, gracilis. *Cormus* 1·5–3 cm. diametro, tunicis laxe reticulato-fibrosis. *Cataphylla* 2 vel 3, tenuiter striata, parte supravaginali 5–10 m. longa, acuta vel acutissima, apice summi 5–12 cm. supra cormum. *Folium* basale unicum, caulem floriferum praeiens, sub anthesi nullum, 15–20 cm. longum, 2·5–5 mm. latum, longe acutum, nervis crassioribus 2 vel 3 ; folia caulina 1 vel 2 distantia, valde reducta. *Spicae* 3–1, terminalis 10–15 cm. longa, laterales breviores, interdum pauciflorae. *Spathae florales* 2·5–3 mm. longae, obtusae. *Flores* intermedii 5–6 mm. distantes, albi. *Perianthii* tubus 3 mm. longus, anguste infundibuliformis ; segmentum posticum leviter incurvum vel demum rectum, 6 mm. longum, lateralia 3–4 m. longa. *Capsula* 4 cm. diametro, lobis in dorso sub dehiscentia ipsa subcarinatis.

Northern Nigeria. Abinsi, on alluvial soil amongst grasses, *Dalziel*, 847 (1.6.1912).

The sheet of specimens collected by Pobéguin at "Bissikrima" in French Guinea (no. 1123) contains a combination similar to that of Dalziel's Abinsi collecting—namely, a flowering stem with a pair of basal leaves, like *Dalziel* 848, and a flowering stem without basal leaves, like *Dalziel* 847. The description on the label of the flowers as "jaune roux" refers evidently to the former, the flowers of the latter being very pale but not so uniformly white as in *Dalziel* 847.—O. Stapf.

Fig. 1, corm and leaves, *natural size* ; 2, inflorescence, *natural size* ; 3, a flower in front view, × 6 ; 4, the same in side view, × 6 ; 5, one of the lateral inner perianth-segments, flattened out and (below) in its natural condition, × 9 ; 6, one of the lateral outer perianth-segments, flattened out, × 9 ; 7, the frontal perianth-segment, flattened out, × 9 ; 8, part of the perianth tube with stamens and dorsal segment, straightened and flattened out ; the pistil in front, × 9 ; 9, part of a leaf, × 2 ; 10, floral spathes, × 6 ; 11, fruit in top and side view, × 4.

W.E.T. del. et lith

Tabula 3121.

PLEIADELPHIA GOSSWEILERI, *Stapf.*

Gramineae. Tribus Andropogoneae.

Pleiadelphia, *Stapf*; genus novum cum *Anadelphia*, Hack., et cum *Elymandra*, Stapf, comparandum; ab illa racemis aliter constitutis, e spicularum paribus 3 vel 4 inferis neutris homomorphis et spicula unica fertili cum pedicellis 2-nis vacuis adiectis trionem terminalem imperfectum formante compositis; ab hac racemis solitariis, spiculis parium homomorphorum ad glumas reductis distinctum.

Spiculae 2-natae; illae parium inferiorum 3 vel 4 neutrae, homomorphae, una sessilis, altera pedicellata, summa fertilis pedicellis trionis terminalis vacuis adiectis; paria sterilia secundum racemi rhachin laxe disposita, rhachi inter ea tenaee. *Racemi* solitarii, pedunculo gracili fere toto in spatheola incluso suffulti, in paniculam foliatam spatheatamque colleeti, maturi infra spiculam fertilem cum pedicellis adiectis deciduam disarticulati; articuli pedicellique tenuiter filiformes. *Anthoecia* 2 in spicula fertili, inferius ad lemma vacuum reductum, superius ♀, nulla in spiculis neutris. *Spicula fertilis* subteres, aristata, eallo longo pungente dense sericco-tomentoso. *Glumae* subacqualcs; inferior subcoriacea, in dorso rotundata, tota ecarinata, apiee obtusa, 6-nervis; superior tenuior, minute emarginata, e sinu tenuiter aristata, utrinque leviter sulcata ad pedicellos adiectos recipiendos, 3-nervis. *Lemma inferius* oblongum, hyalinum, 2-nerve, ciliatum; *superius* 2-lobum, infra lobos hyalinos eciliatos valde attenuatum, e sinu loborum aristatum, arista valida appresse pubescente medio in columnam et setam divisa. *Lodiculae* 2, minutae, glabrae. *Stamina* 3. *Stigmata* lateraliter exserta; styli subterminales, liberi. *Caryopsis* subcylindrica, ob styli basin persistentem minute apiculata; scutellum dimidium caryopsis subaequans. *Spiculae neutrae* subulatae, acutae, mutieae, callo nullo; *gluma inferior* explanata lanceolata, acuta vel minutissime bidenticulata, late involuta, ecarinata, nervis 9, lateralibus in vittas virides a nervo et a margine aeque distantibus collectis, *superior* similis, minor, hyalina, 3-nervis.—*Gramen* annuum, culmo subvalido pro maxima parte in paniculam foliatam decompositam soluto, foliorum laminis longis angustis duris.

Species 1, in Africa tropica occidentali.

P. Gossweileri, *Stapf*; species nova, unica.

Gramen annuum, plerumque pluricaule, ultra 1·5 m. altum, subglabrum. *Culmi* erecti, multinodes, inferne validiusculi, simplices et teretes, superne (a nodo 3º vel 6º) ramosi et in latere ad ramos spectante magis minusve sulcati; internodia infera 5–12 cm., supera ad 15 cm. longa; rami simplices vel iterum ramosi, saepe perlongi, erecti, uti ramuli 2–5-ni cincinnatim fasciculati; ramuli omnes florentes. *Foliorum vaginae* 7–9 cm. longae, dorso rotundatae, glabrae laevesque, firmae, infimae laxae, latae, intra rubro-castaneae, superiores arctae; *ligulae* brevissimae, truncatae, scariosae, ciliolatae; *laminae* lineares, e basi vix 5 mm. latiore longe attenuatae, acutae, ad 30 cm. longae, facie virides, hicinde vel rubro suffusae vel maculatae, dorso subglaucae, ad ligulam plus minusve barbatae, pilis albis longis, costa albida facie basin versus latiuscula, dorso tenui, nervis lateralibus primariis utrinque 3–4, margine asperulo. *Panicula* saepe 1 m. excedens, decomposita, foliata foliis sursum gradatim angustioribus et eorum laminis redactis, ultimis anguste spathuloideis; *spatheolae* angustissime involutae, laminam setaceam gerentes vel subelaminatae, circiter 8 cm. longae; pedunculi tenuiter filiformes, glabri, breviter e spatheola exserti. *Racemorum* rhachis 6–10 mm. longa, glabra; pedicelli tenuissimi, inferiores ad 3 mm. longi, laeves vel sublaeves, ei trionis 2 mm. longi et ciliati. *Spicula fertilis* cum callo 14–16 mm. longa, callo fulvo-tomentoso 5–6 mm. longo; *gluma inferior* matura flavido-brunnea, 8–10 mm. longa, dense appresse pubescens, *superioris* aristula ad 3 cm. longa, scaberula; *lemmatis fertilis arista* 8–9 cm. longa, medio geniculata, abhinc setosa; *antherae* ad 6 mm. longae. *Spiculae neutrae* 6–7 mm. longae, ad nervos laete virides, caeterum pallidae. *Caryopsis* brunnea, circiter 6 mm. longa, 1 mm. diametro.

Tropical Africa. Portuguese Congo; Sumba, Peco, near the Congo in sandy soil, 30 m. alt., *Gossweiler* 8739, coll. 1923.

The genus now proposed affords a further instance of the wealth of types of structure exhibited by the *Andropogoneae* of tropical Africa, where the factors governing the building up and grouping of the racemes and spikelets of the tribe induce much diversity without, however, obscuring the essential linkages in which the tribal characters find expression. This diversity cannot, except along fractional lines, be reduced to such a direct course of evolution as might be rendered graphically in a phylogenetic tree.

By its general appearance *Pleiadelphia* suggests an *Elymandra* (see t. 3092 of this series) in which one member of the raceme-pair is tracelessly suppressed and the male spikelets either become neuter or, in the terminal trio, are lost altogether. The spikelets too recall those of *Elymandra*, except that, as in *Anadelphia*—another more distantly related type—the upper glume of the fertile spikelet is notched and awned and the reduction of the hyaline wings of the upper lemma is less marked, whilst the distribution of the nerves of

the lower glume of the neuter spikelets points to derivation from a dorsally more flattened, two-keeled state. Otherwise *Anadelphia* differs typically in the absence of homogamous spikelets, all the pairs being heterogamous.—O. STAPF.

FIG. 1, base of a plant, *natural size*; 2, a portion of a leaf from the junction of blade and sheath, *natural size*; 3, a portion of a paniele, *natural size*; 4, a raceme, × 2 (awn cut); 5, a pediceIled spikelet, × 6; 6, a sessile neuter spikelet, × 6; 7, the lower glume of a neuter spikelet, × 6 (flattened out); 8, a portion of the same in the fresh state, × 6; 9, upper glume of a neuter spikelet, × 9 (flattened out); 10, a portion of the same in the fresh state, × 6; 11, a fertile spikelet, × 2 (awn cut); 11a, the empty pedicels of a trio with the callus of the fertile spikelet, × 2 (the ciliae of the pedicels are drawn too short); 12, lower glume of a fertile spikelet, × 3 (flattened out and seen from within); 13, upper glume of the same, × 3 (drawn in the same condition as 12); 14, lower lemma with the lodicules of the upper floret attached, × 3; 15, upper (fertile) lemma, × 4 (awn cut); 16, a portion of the column of the awn, × 8 (the minute hairs of the awn are much more numerous than shown here, and they are closely appressed); 17, a flower and lower lemma, × 4; 18, diagram of a fertile spikelet; 19 and 20, caryopsis in back and front view, × 5.

O.S anal. G.A. del. et lith

Tabula 3122.

VIGUIERELLA MADAGASCARIENSIS, *A. Camus et Stapf.*

Gramineae. Tribus Festuceae.

V. madagascariensis, *A. Camus et Stapf in Bull. Bimens. Soc. Linn. Lyon* (1926), 11, *et in Bull. Soc. Bot. Francc,* vol. lxxiii. p. 404 (1926); species unica.

Gramen annuum, 10–20 cm. altum. *Culmi* e basi ascendente geniculati, plurinodes, ramosi, graciles, glabri. *Foliorum vaginae* summis tumidulis exceptis angustae et quam internodia breviores, glabrae. *Ligulae* ad seriem pilorum redactae; *laminae* anguste lineares, exsiccando involutae, 2·5–4 cm. longae, explicatae fere ad 2 mm. latae, rigidulae, facie et dorso pilosae pilis illic crebris hic sparsis paucisque flexuosis ultra 1 mm. longis tenuissimis, sursum scaberulae. *Inflorescentia* basi vagina summa involuta, bracteata, spicata, densa vel laxa, erecta, 4·5–5 cm. longa, axi angulato supra bractearum insertionem canaliculato-excavato; bracteae explicatae oblongae, longiuscule acuminatae, 2 mm. longae, enerves, ciliolatae, spiculas suffulcientes vel vacuae, persistentes. *Spiculae* sessiles solitariae, totae deciduae, irregulariter dispositae, nunc 2–3 mm. distantes, nunc magis approximatae, nunc specie geminatae vel ternatae, oblique erectae, callo aristisque demptis 4–5 mm. longae, nonnullae varie imperfectae minoresque, summa ad aristas redacta; perfectae cum flore unico; callus fere acicularis, 1 mm. longus, dense appresse pilosulus. *Glumae* subaequales, oblongae, saepe obliquae, apice inaequaliter minute bilobae, e sinu aristatae, 1-nerves, ciliolatae, inferior 1·5–1·75 mm. longa, superior paulo longior; arista recta, gracilis, 6–10 mm. longa, scaberula. *Anthoecia* 2, rhachillae filiformes internodio 1·5 mm. longo glabro separata; inferius perfectum, superius admodum redactum; rhachilla ultra id in setulam ad 2·5 mm. longam producta. *Lemma fertile* a latere valde compressum, carinatum, oblique lanceolatum, explicatum ovato-oblongum, 3–4 mm. longum, sensim in aristam rectam gracilem 6–7 mm. longam abiens, pallidum, glabrum, 3-nerve nervis prominulis viridi-marginatis, ciliolatum, in carina scaberulum. *Palea* navicularis, oblique lanceolata, rostrata, 2-carinata carinis approximatis, 2–5 mm. longa. *Lodiculae* 2, subquadratae. *Stamina* 3; filamenta capillaria, 2 mm. longa; antherae lineari-oblongae, 0·4 mm. longae, vel breviter oblongae, minores.

Ovarium lageniforme; styli ad 0·5 mm. longi, stigmata aequantia. *Lemma sterile* 1 mm. longum, arista ut in fertili, sine palea. *Caryopsis* ignota.

MADAGASCAR. Sakoa-be, on dry alluvial hills, *Perrier de la Bathie*, 889; near Majunga on the north-west coast, on limestone cliffs, *Perrier de la Bathie*, 11044, 13018; near Amposimentera, on triassic sandstone, *Perrier de la Bathie*, 11246.

The affinity of this remarkable little grass is evidently with *Fingerhuthia*, a genus belonging to a group of *Festuceae* rich in peculiarly modified and specialised types. The structure of the spikelets is, apart from the very definite limitation of the nerves of the fertile lemma to three, similar to that of *Fingerhuthia*, with which the grass also shares the spicate inflorescence and the shedding of the spikelets as wholes, no disarticulation occurring within them. It possesses, however, this striking peculiarity, that each of the spikelets, whether perfect or not, is supported by a small persistent bract. Moreover this bract is also present whenever the spikelet has become entirely suppressed and its presence is merely suggested by a groove, conforming to the excavation of the rhachis which accompanies the insertion of the spikelets which have actually developed. In our original description these bracts were disguised in the term "(spiculis) lateralibus reductis," the assumption being that the spikelets occurred in triplets, the central one being perfect and deciduous and the lateral reduced to solitary persistent glumes. Some such arrangement is suggested where two bracts owing to the extreme reduction of the intervening internode become practically collateral and only one spikelet is present, the other being either suppressed or having been shed. In such a case the spikelet may appear to rise from between the two bracts, forming with them a "triplet." Renewed and more careful examination, however, indicates that in this we were mistaken. The spikelets are arranged in an irregular alternately expanded and contracted spiral. They are sessile on a rhachis which is grooved from the insertion of each spikelet upwards, the collateral grooves being separated by narrow ridges which give the rhachis its angular appearance. It is just below the theoretical insertion-point of the spikelets that those supposed "lateral reduced spikelets" occur, their insertion stretching right across the corresponding groove and between the accompanying ridges. Bracts, grooves and ridges are present in just the same relative position, whether the spikelets are perfect, more or less reduced or quite suppressed, but with this difference, that the grooves, and with them at least one of the corresponding ridges, become less marked and even faint whenever the co-ordinated spikelets are reduced, and still more so when they are suppressed and at the same time situated in a contracted section of the rhachis. They are in every respect placed as one would expect bracts to be placed. They are small, membranous, nerveless, more or less involute along their margins when dry, but when wetted they assume the shape shown in fig. 5

of the accompanying plate. Bracts are known to occur occasionally in the inflorescences of grasses and particularly in the *Festuceae*. Godron (in Mém. Soc. Nat. Sci. Nat. ex Math. Cherbourg, vol. xxii. pp. 247, 248 ; 1880) has given a list of genera (almost all Festuceae) in which bracts are known to occur, but their occurrence was considered by him, no doubt rightly, as anomalous. In *Viguierella* we have thus the very exceptional case of a grass with a normally bracteate inflorescence. *A priori* one would be inclined to see in this a " primitive " feature, but it is difficult to reconcile such " primitiveness " with the otherwise highly specialised structure of the inflorescence and the spikelets. We therefore prefer to treat *Viguierella* as an isolated type of *Festuceae* approaching most nearly to *Fingerhuthia*, a genus with a wide but remarkably disconnected area, the main area covering all South Africa, whilst a very small subarea occurs on the Punjab-Afghanistan frontier.

FIG. 1, whole plant, *natural size* ; 2, top of an inflorescence, × 4 ; 3, middle part of another inflorescence, × 4 ; 4, a pair of closely approximate spikelets, × 6 ; 5, a bract, expanded, × 20 ; 6, a perfect spikelet, × 6 ; 7 and 8, lower glumes, expanded, × 6 ; 7a and 8a, upper glumes expanded, × 6 ; 9, a spikelet without its glumes, opened out, × 6 ; 10, a spikelet in its usual closed condition, without its glumes, × 6 ; 11, lemma of the fertile floret with the awn cut off, flattened out, × 6 ; 12, palea, × 6 ; 13, stamens and pistil of a cleistogamous (?) flower, × 12 ; 14, flower with the halved palea behind it and one of the lodicules detached to the right, × 12.

O.S. anal. G.A del. et lith.

Tabula 3123.

LECOMTELLA MADAGASCARIENSIS, *A. Camus.*

Gramineae. Tribus Paniceae.

L. madagascariensis, *A. Camus in Bull. Soc. Bot. France,* vol. lxxiii. p. 405 (1926); species unica adhuc nota.

Gramen perenne, 1–2 mm. altum, multiramosum, undique glabrum. *Culmi* fistulosi, teretes, internodiis superioribus vaginis inclusis. *Foliorum vaginae* teretes, laeves, superiores 5–3 cm. longae; *ligulae* ad rimam dense ciliatam redactae; *laminae* lineari-lanceolatae, longissime acutae, 12–22 cm. longae, 1–1·8 mm. latae, chartaceae, ad margines cartilagineas scaberulae, nervis primariis utrinque 6 uti costa albida gracilibus, nervis secundariis 6–9-nis arcte approximatis interjectis, venis transversis nullis. *Panicula* contracta, angusta, 5–6 cm. longa, ramulis saepius paucifloris; pedicelli tenues, filiformes, apice vix crassiores, truncati, 3–5 mm. longi. *Spiculae* lanceolato-oblongae, pallide virides, 2-florae, 9–10 mm. longae, omnes eadem forma, sed sexu diversae, nempe inferiores unisexuales ♂, summae nonnullae bisexuales, cum flore superiore ♀. *Spiculae unisexuales: glumae* tenuiter herbaceo-papyraceae, a latere anguste lanceolatae, acuminatae, inferior 3-nervis, 5 mm. longa, superior 7-nervis, 7 mm. longa; *lemma infcrius* utriusque anthoecii glumarum indole nisi angustius tenuiusque, 5-nerve, spiculam aequans, vel *superius* eam subaequans; *palea* lineari-lanceolata, hyalina, lemma subaequans, 2-carinata, carinis angustissime alatis virescentibus. *Lodiculae* 2, late cuneatae. *Stamina* 3; filamenta 5 mm. longa; antherae 4·5–6 mm. longae. *Spiculae bisexuales: glumae* ut in spiculis ♂, sed longiores, superior spicula paulo brevior; *anthoecium inferius* ut in spiculis ♂; *anthoecium superius* ♀, breviter stipitatum, articulo (stipite) ad spiculae insertionem utrinque obtuse auriculato, in mucronulum minutum continuato; *lemma* ambitu oblongum, dorso convexum, obtusum, chartaceum vel demum crustaceum, 4–5 mm. longum, fere 2 mm. latum, apice coronula tuberculorum notatum, obscure 5-nerve; *palea* consistentia et longitudine lemmatis nisi ad margines tenuior, 2-nervis, apice tuberculis 2-nis, lemmate more *Panici* arcte implexa. *Lodiculae* 2. *Stamina* nulla. *Ovarium* lineari-oblongum; styli a basi liberi, tenuiter capillares, ad 5 mm. longi; stigmata ex apice

anthoecii exserta, laxe plumosa, 3–3·5 mm. longa. *Caryopsis* (immatura ?) arcte in anthoecio inclusa, plano-convexa, ambitu oblonga, hilo basilari punctiformi, embryonis macula obscura.

MADAGASCAR. Andringitra Massif, 1200–2400 m., *Perrier de la Bathie*, 74 (H. Kew) ; 10816, 13589 (Hb. Paris).

Mlle. Aimée Camus, who justly calls this grass "extrêmement curieux," places it in *Paniceae* with affinities with *Olyra* and *Ichnanthus*. There seems to be no doubt as to its position in *Paniceae*, the structure of the spikelets being decidedly panicoid. It differs, however, fundamentally from *Ichnanthus* in the sexual differentiation of the spikelets into such as are purely male and others which possess a male lower floret and a female upper floret. No approach to it is known in any of the species of *Ichnanthus*, whose spikelets are uniformly bisexual, the upper floret being always hermaphrodite. The affinity was probably suggested by the presence of auricles at the base of the fertile spikelet ; but these auricles are in *Lecomtiella* borne on the rhachilla and remain attached to it if the spikelet becomes detached, whereas in *Ichnanthus* the auricles are part of the lower glume. As to *Olyra*, I would remark that this genus can hardly be included in the *Paniceae*, although the fertile floret is very similar to the fertile florets of a typical *Panicum*. The spikelets are definitely one-flowered, having no trace of a second lower floret of either sex. They agree with those of *Pharus*, and *Olyra* has, for this and also for other obvious reasons, been placed in a special tribe, *Phareae*. I have failed to recognise an immediate affinity with any of the paniceous genera and would suggest that *Lecomtiella* should for the present be included in *Paniceae* as a "*genus incertae sedis*," as is the case with *Spinifex*. It may be the end-link of a phylum whose earlier stages have been lost, but as to that we can offer at present nothing more definite than speculation.—O. STAPF.

FIG. 1, a flowering branch, *natural size* ; 2, a portion of a leaf, × 2 ; 3, a portion of an inflorescence showing two male and one bisexual spikelet, × 3 ; 4, a male spikelet, × 6 ; 5, a bisexual spikelet, × 6 ; 6, a palea of a male floret with stamens still enclosed, × 6 ; 7 and 8 female floret, front and side view, × 7 ; 9, "stipe" of a female flower with continuation of rhachis and auricles, × 7 ; 10, tip of palea of a female floret, × 14 ; 11, pistil and lodicules, × 7 ; 12, lodicules, × 20 ; 13 and 14, immature caryopsis in side and back view, × 7.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O.S. anal. G.A. del. et lith

Tabula 3124.

LASIORRHACHIS HILDEBRANDTII, *Stapf*.

Gramineae. Tribus Andropogoneae.

Lasiorrhachis, *Stapf*; genus novum cum *Sorgho*, Pers., et *Miscanthidio*, Stapf, comparandum; ab illo differt spiculis saepissime homozygis ♀, glumis totis tenuiter chartaceis, lemmate fertili lato; ab hoc spiculis secundariis plane sessilibus, primariis saepe reductis et tunc ♂ vel neutris, glumarum nervatione, lemmate fertili lato brevissime aristulato: potius inter *Sorghastra* ponendum ob spicularum indolem, quamvis quoad rhizoma, caules, folia cum *Miscanthidiis* quibusdam bene quadrat.—*Andropogon*, sect. *Lasiorrhachis*, Hack. in Flora, vol. xxviii. p. 142 (1885) (subgen. *Lasiorrhachis*, Hack. in A.DC., Mon. Phan. vol. vi. p. 472; 1889).

Species 1, madagascariensis.

L. Hildebrandtii, *Stapf* (*nov. comb.*); species unica.

Gramen perenne, ad (vel ultra ?) 1 m. altum, compacte caespitosum, rhizomate brevi, internodiis brevissimis, innovationibus extravaginantibus. *Culmi* erecti, simplices, 2–3-nodi, inferne compressi, glabri vel ad nodos et paniculam versus molliter pilosi. *Nodi* magis minusve tenuiter sericei. *Foliorum vaginae* basalium valde compressae, obtuse carinatae, circiter ad 15 cm. longae, durae, inferne appresso pilosae vel glaberrimae laevesque, magis minusve glaucescentes, caulinorum minus compressae vel subteretes, vix carinatae, summa ultra 30 cm. longa; *ligulae* rotundato-truncatae, ad 3 mm. longae, scariosae, in dorso pilosae, pilis in barbam ad 5 mm. longum collectis; *laminae* lineares longe acutae, acutissimae, foliorum basalium in petiolum canaliculatum angustum ad 10 cm. longum sensim attenuatae, eo dempto saepe ultra 40 cm. longae, 8–15 mm. latae, foliorum superiorum basi vix angustiores, multo breviores, omnes planae, pallide virides, rigidae, glabrae vel basin versus molliter pilosae, ad margines scaberulae, costa albida in facie latiuscula nervis primariis utrinque 4–6 tenuibus. *Panicula* demum longissime exserta, pedunculo vel caulis internodio summo saepe ultra 50 cm. longo, ambitu oblonga vel ovato-oblonga, flaccidula; rhachis uti omnes axes inflorescentiae molliter sericeo-pilosae; rami ad nodos 2-ni vel inferiores solitarii, flexuosi, infimi ad 10 cm. longi et ad 2 cm. indivisi, racemos 4–1 gerentes. *Racemi*

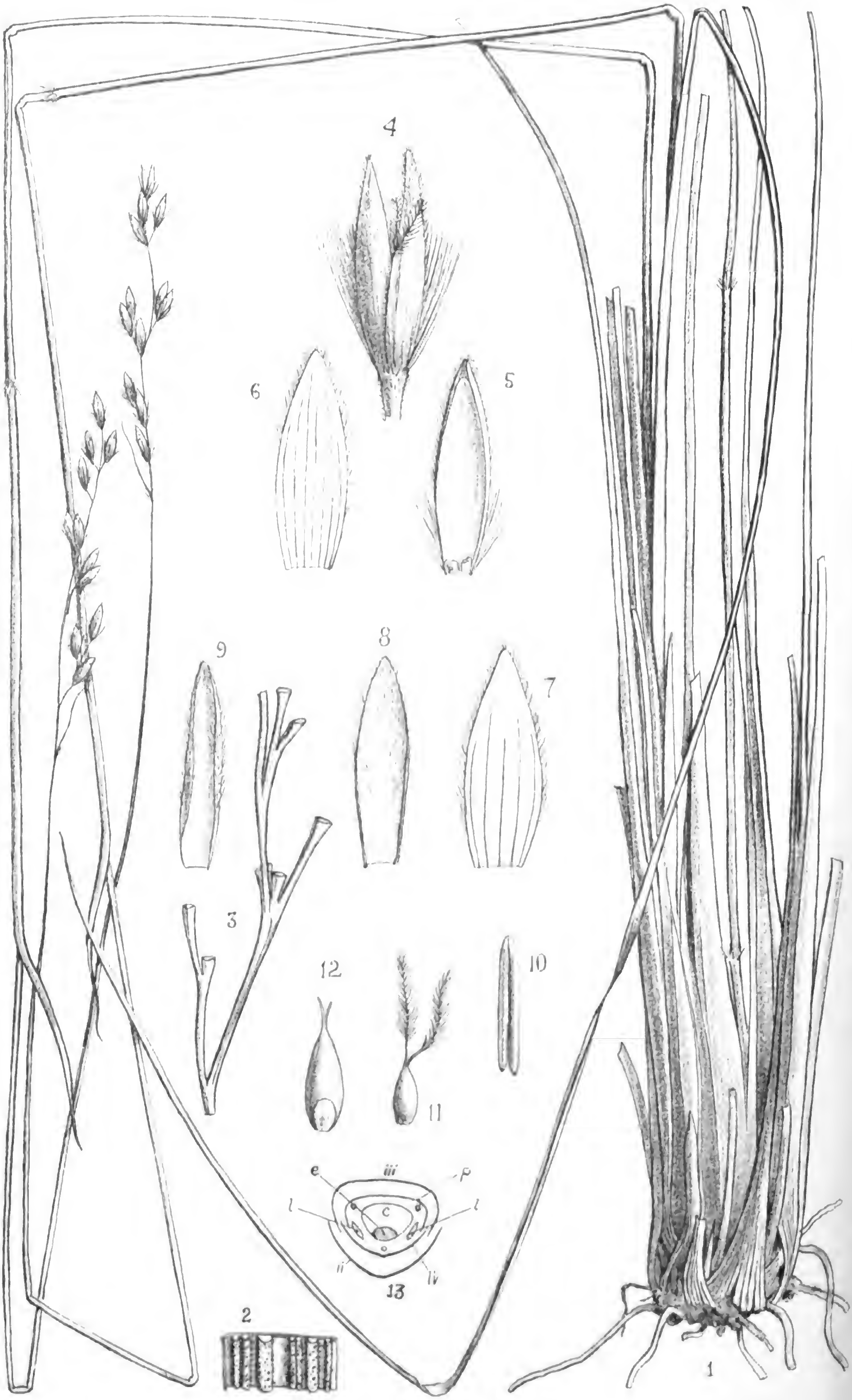
longiores breviter pedunculati, 3–4 cm. longi, 5–6-articulati, infra spiculas fertiles ut videtur tarde disiuncti, articulis filiformibus 4–5 mm. longis apice paulo incrassatis et recte truncatis. *Spiculae sessiles* semper cum flore unico ♀, oblongae, 5·5 mm. longae, pallidae, callo brevi sericeo. *Glumae* aequales, chartaceae, sericeo-pilosae; inferior dorso plana, apicem subtruncatum versus anguste implicata atque 2-carinata, carinis ciliolato-scabris, tenuiter 7-nervis; superior similis, sed magis acuta et supra medium subcarinata, nervis tenuissimis 7. *Anthoecium inferius* ad lemma glumas aequans lanceolato-oblongum subhyalinum tenuiter 2-nerve ciliatum reductum. *Anthoecium superius* ♀: *lemma* explicatum ellipticum, latum, subbilobum, 2 mm. longum, tenuissimum, ciliolatum, 3-nerve, brevissime aristulatum, aristula setiformi quam lemma plerumque breviore; *palea* ovata, ciliolata, vix 1 mm. longa, enervis. *Lodiculae* 2-cornutae, ad cornu maius barbatulae. *Antherae* 2 mm. longae. *Ovarium* anguste oblongum, glaberrimum; stigmata stylum aequantia, 1 mm. longa, e spicula late hiante lateraliter exserta. *Spiculae pedicellatae* sessilibus consimiles et tunc ♀ vel magis minusve reductae et ♂ vel neutrae, interdum subnullae; pedicelli articulis simillimi, sed longiores.—*Andropogon Hildebrandtii*, Hack. ll.cc.

Central Madagascar. Near Andrangoloaka, sunny hills on the edge of virgin-forest, *Hildebrandt*, 3755 (Nov. 1880); *Baron*, 1991, 2017, 3871. Without exact locality.

When describing this grass in Flora as *Andropogon Hildebrandtii*, Hackel said of it, "Nulli alii affinis, potius typus sectionis propriae (Lasiorrhachis) habendus." A few years later, in his monograph of the *Andropogoneae* he recognised its peculiar position in *Andropogon* by founding on it a new subgenus " inter *Arthrolophin* et *Amphilophin* medium, pistilli indole ab utroque diversum," the character of the pistil alluded to consisting in the presence of hairs at the top of the ovarium (" ovarium pilis coronatum "). In this he was mistaken, the ovary being in fact perfectly glabrous. It happens, however, occasionally that some of the stiff hairs of the lodicules become attached to the ovary at an early state and are subsequently carried up with it as it lengthens out. This was no doubt the case with the young flowers he examined. It may also explain his description of the lodicules as glabrous. They had apparently given up their hairs to the ovary when this was still young and had still " styli obsoleti." Why he placed *Lasiorrhachis* between his sections *Arthrolophis* and *Amphilophis* is more difficult to understand, as the application of his key-characters of the subgenera of *Andropogon* leads direct to *Sorghum*. It might indeed be included in this group but for the imperfect sexual differentiation of the spikelets, which points to the more primitive, that is less specialised, *Saccharastrae*. In some panicles, as the one used for the preparation of the present plate, the homogamy of the spikelets—they have all a bisexual flower—is complete; in others, as in Hildebrandt's specimens, the pedicelled (primary) spikelets are either

male or neuter, showing all stages of reduction down to a subulate rudiment barely 1 mm. long and consisting usually only of a much reduced lower glume and a minute scale representing the upper glume, whilst *Baron* 1991 and 3871 have nearly all the pedicelled spikelets male. The reduction of the pedicelled spikelets from the perfect male state to rudiments of glumes or even to complete suppression is common enough in the *Sorghastrae*, but no case of variation equal to that observed in *Lasiorrhachis* is known so far in this group. It seems nevertheless appropriate to place *Lasiorrhachis* here rather than in *Saccharastrae*, as the structure of the panicle and of the spikelets has more in common with certain types of *Sorghum* than with any other genus; but the disposition of the branches of the panicle, the thin texture of the glumes, the broad fertile lemma with its minute bristle-like awn to which the broad lobes are almost completely adnate, are distinctive characters which, in addition to the sexual condition referred to above, appear to justify the procedure followed here, according to which *Lasiorrhachis* is treated as a distinct genus, closely allied to *Sorghum*. The mode of growth and the foliage are on the whole as in the South African species of *Miscanthidium*. This genus, however, differs widely from *Lasiorrhachis* in having both spikelets of a pair pedicelled, in its differently nerved glumes and its narrow distinctly awned fertile lemma. Its spikelets are moreover always perfectly homogamous.—O. Stapf.

Figs. 1 and 2, part of a tuft with a flowering culm, *natural size*; 3, a joint and a pedicel with spikelet, × 6; 4, a spikelet in side view not quite opened, × 6; 5, lower glume, back view, × 6; 5a, the tip of the same, seen from within, × 12; 6, upper glume, back view, × 6; 7, lower lemma, × 6; 8, upper (fertile) lemma, flattened out, × 6; 9, palea and lodicules, × 6; 10, pistil, × 6.



O.S.anal G.A del.et lith

Tabula 3125.

LEPTOSACCHARUM FILIFORME, *A. Camus.*

Gramineae. Tribus Paniceae.

Leptosaccharum, *A. Camus in Bull. Soc. Bot. France*, vol. lxx. p. 737 (1923) (descr. emend.); *Leptocoryphio*, Nees, proximum, sed panicula macra spiciformi rigida, lemmate fertili et eius palea etiam maturitate tenuissime hyalinis, glumae unicae et lemmati sterili adpressis et cum iis caryopsin laxe includentibus.

Spiculae e callo barbato obscuro oblongo-lanceolatae, leviter a dorso compressae, in paniculam angustam spiciformem macram dispositae, maturae totae deciduae. *Anthoecia* duo, inferius ad lemma redactum, superius ♀. *Gluma* ob inferioris abortum unica, tenuiter membranacea, inter nervos fere hyalina, sericeo-pilosa. *Lemma anthoecii inferioris* glumae simile, 5-nerve, brevius pilosum. *Lemma anthoecii superioris* oblongum, tenuissime membranaceum, hyalinum maturitate nullo modo induratum, enerve, sursum pilosiusculum cum palea simillima aequilonga. *Lodiculae* 2, late cuneatae, glabrae. *Stamina* 3. *Ovarium* late oblongum; styli quam stigmata breviores. *Caryopsis* subellipsoidea, hilo punctiformi, embryonis maeula maiuscula, in spicula laxe inclusa.—*Gramina* perennia, compacte caespitosa foliorum laminis angustissimis duris; *panicula* aureo- vel fulvo-sericea, rhachi tenace gracili compressa, ramis brevibus 3–1-spiculatis.

L. filiforme, *A. Camus l.c.* (descr. emend.); species unica.

Gramen sub anthesi 40–70 cm. altum, e rhizomate brevi compacte caespitosum. *Culmi* filiformes, glabri, 2–3-nodi, internodiis elongatis, summo ad 30 cm. longo. *Nodi* sericeo-barbati. *Foliorum vaginae* basalium angustae, laevissimae, arcte nervoso-striatae, ad 30 cm. longae, durae, summa vix laxior, 8–10 cm. longa; *ligulae* ovatae, ad 1·5 mm. longae, e dorso pilis stipatae; *laminae* e basi aequilata a vagina vix distincta angustissime lineares, acutae, culmeae inferiores ad 30 cm. longae, 1–2 mm. latae, planae, exsiccando facile involutae, imo apice pilosulae, caeterum in dorso glabrae laevesque, summa 2·5–1·5 cm. longa, innovationum filiformes vel setaceo-convolutae, 20–30 cm. longae, omnes circiter 6-nerves, nervis primariis crassiusculis in facie pruinoso-puberulis albidis. *Inflorescentia* 4–7 cm. longa, aureo- vel rufo-sericea; rhachis ad nodos sericeo-pilosa, 6–7-nodis,

e nodis inferne et medio 1 cm. distantibus ramulos ad 1 cm. longos subadpressos spiculas 3–2 (vel imprimis superne 1) gerentes edens; pedicelli laterales brevissimi, terminales 3–4 mm. longi, omnes sericeo-pilosi, apice incrassati et barbati. *Spiculae* oblongo-lanceolatae, subacutae, 5–6 mm. longae, 2 mm. latae, aureo- vel rufo-sericeae, calli pilis ad 3 mm. longis. *Gluma* in dorso undique pilosa, explicata ovato-lanceolata, 7–8-nervis. *Lemma inferius* glumae simile, sursum leviter involutum, spiculae longitudine. *Lemma superius* explicatum oblongum, 4 mm. longum, supra medium pilosulum cum palea simili lineari-oblonga ad latera inflexa. *Antherae* lineares, 3 mm. longae. *Ovarium* ovato- vel oblongo-ellipsoideum; stigmata ad 2 mm. longa. *Caryopsis* 2 mm. longa, subplano-convexa.—*Saccharum filiforme*, Hack. in A.DC. Mon. Phan. vol. vi. p. 127 (1889).

South America. Brazil: Goyaz, between the rivers Rio Torto and Paranã, *Glaziou*, 32. Paraguay: Caaguazu, in marshy prairies, *Balansa*, 231.

Hackel, in his monograph of the *Andropogoneae*, p. 127 (1889), described from specimens, collected by Balansa (no. 231) in Paraguay, an atypical *Saccharum*, *S. filiforme*, for which he said he would have proposed a new genus had he not suspected that the specimens at his disposal were depauperate and that their lack of one of the universal characters of *Saccharum* was due to their impoverished condition and therefore taxonomically of doubtful account. In the circumstances he confined himself to the creation of a subgenus (*Leptosaccharum*) for the reception of the species in question. The character he had in mind was that in typical *Saccharum* the spikelets occurred in pairs at each node, whilst in the subgenus *Leptosaccharum* the spikelets were solitary. More recently Mlle. Aimée Camus made the grass the subject of a short article in the Bulletin of the Société Botanique de France (vol. lxii. p. 737; 1923). Having ample material at her disposal she was able to establish the fact that Hackel's suspicion was unfounded. She drew therefore the only conclusion that appeared reasonable—namely, that of according the subgenus *Leptosaccharum* generic rank, adding as further but minor characters certain features which determine the habit of the panicles. Having had lately occasion to examine part of Balansa's collecting referred to above, I have convinced myself that the grass in question does not belong to the *Andropogoneae*, but to the *Paniceae*, and that it approaches indeed so closely to *Leptocoryphium* that if we accepted the wider generic concepts of the Genera Plantarum we should have to merge it in *Leptocoryphium* and finally with this in *Anthenantia*.[1] The mistake arose from an erroneous conception of the homology of the foliar parts of the spikelet, according to which the upper glume of the grass became gluma I, to use Hackel's terminology, the lemma of the lower barren floret gluma II,

[1] Beauvais, the author of *Anthenantia*, gives the derivation of the name from ἀνθέω and ἐνάντιον. It is true he spells it *Anthaenanthia* in the text, but in the index he corrects it to *Anthenantia*, and this is no doubt the proper spelling. There is no justification for the introduction of an "a" into the second syllable.

the lemma of the upper fertile floret gluma III and its palea gluma IV. There was then still, if Hackel's interpretation were right, the palea to glume IV to be looked for. He actually records its existence and describes it as " minutula." I have not been able to find an organ to correspond to it and must assume that he was misled by a small piece of the lemma or the palea of the fertile floret having become detached, mimicking a very much reduced palea. I myself in dissecting the first spikelet had the same experience. Now the palea of the upper floret of an andropogoneous grass is sometimes entirely suppressed. Its absence is therefore not decisive. In all such cases it is the orientation of the lodicules and that of the ovary which, as fixed features, help us in the construction of the diagram of the spikelet and the interpretation of its parts. The lodicules, where there are two, are always placed to the right and the left of the ovary, so that they converge dorsally to the ovary (that is towards the middle of its back), whilst the ovary faces the palea ventrally, that is with its carpellary suture. Here is where the hilum is formed, the embryo and consequently the embryo-mark being dorsal. Applied to our grass, this allows only of one interpretation—namely, that, from the position of the lodicules as well as that of the hilum and of the embryo-mark being what they are, Hackel's gluma IV is in fact the palea of the fertile upper floret, whence gluma III becomes its lemma, gluma II the lemma of the lower floret, and gluma I the upper member of the glumal involucre, the lower member being absent. This, however, is the structure of the *Anthenantia* group. Bentham in Genera Plantarum, and Hackel, following him in the Natürliche Pflanzenfamilien, extended the original concept of *Anthenantia* (Beauvais, Agnost. 48, t. x. f. 7; 1912) so as to take in also Nees's *Leptocoryphium* (Agrost. Bras. 83; 1829). Mrs. Chase has since reseparated the two genera, and, as it seems to me, for good reasons. According to her concept of them *Anthenantia* has tightly closed indurated " fruits " much after the fashion of *Panicum*, whilst in *Leptocoryphium* the fertile floret remains thinly membranous in its upper part and gapes at maturity. This accounts for the relative plumpness and heaviness of the mature spikelets of *Anthenantia* and the lightness of those of *Leptocoryphium*, characters which impart quite distinctive features to the ripe panicles. In *Leptosaccharum* the lemma and the palea of the fertile floret undergo no change whatever during maturation, remaining very delicate nerveless hyaline structures applying themselves to the lower lemma and the upper glume, which close up loosely and by becoming more rigid take over the protective functions which in *Paniceae* fall generally to the fertile lemma and its palea. To this may be added as a minor but convenient diagnostic character the contraction of the panicle into a narrow rather scanty false spike and the soft silky hairiness of the spikelets.

Geographically these genera are so distributed that *Anthenantia* (2 species) is confined to the southern states of North America, whilst *Leptocoryphium* (1 species) ranges widely over the whole of tropical and subtropical America from Mexico and the West Indies to Uruguay

and Northern Argentina. *Leptosaccharum*, on the other hand, is recorded so far only from one locality in Paraguay, Caaguazu, about halfway between Assuncion and the river Parana, and another in Brazil in the Serra do Paranã, about 47° W. 15° 30′ S. Both lie within the wide area of *Leptocoryphium*.—O. Stapf.

Fig. 1, part of a plant, *natural size* ; 2, part of leaf, unrolled, in face view × 10 ; 3, part of panicle with indumentum omitted and spikelets removed, × 3 ; 4, spikelet in side view ; 5, upper glume and fertile lemma inside it with lodicules in front ; 6, upper glume, flattened out, seen from within ; 7, sterile lemma, flattened out, seen from within ; 8, fertile lemma, seen from back ; 9, palea ; 10, anther ; 11, pistil ; 12, caryopsis ; 13, diagram of spikelet (II = upper glume, III = lower (sterile) lemma, IV = fertile lemma, p = palea, l = lodicules, c = caryopsis, e = embryo). *Figs.* 4–12 × 6.

3126

Tabula 3126.

WIDDRINGTONIA STIPITATA, *Stapf.*

Pinaceae. Tribus Cupresseae.

W. stipitata, *Stapf*; species nova, affinis *W. Whytei*, Rendle, sed monoica (semper ?), ramulis gracilioribus inter foliorum paria constrictis, foliis pro rata longioribus, conis maturis laxe et saepissime racemose aggregatis bene stipitatis ovoideis, sursum attenuatis, seminibus numerosis distincta.

Arbor. Folia juvenilia ignota; adulta squamiformia, *macrocladiorum* fere sua longitudine dissita, subadpressa, lanceolata, acuta vel acuminata, parte libera circiter 2 mm. longa, *brachycladiorum* arcte adpressa, quadrifaria, dorso bene rotundata ut ramulos teretes (0·6–1 mm. diametro) reddant, e basi cuneata ad medium adnata, oblonga, acuta vel obtusiuscula, tota 2 mm. longa, subglauca, apice subflavescentia, duetibus resiniferis. *Strobili* ♂ cum fructibus maturis coëtanei, breviter cylindracei, ad 4 mm. longi, sessiles; squamae circiter 12, decussatae, late rhomboidcae, acutae, inferiores 1 mm. longae lataequc, infra medium in dorso transverse depressae; antherae inter squamas protrusae, loculis 4. *Strobili* ♀ florentes ignoti. *Coni* maturi 3–5 laxe racemose aggregati, rhachi spuria 2–3 cm. longa, vel laxe glomerati, stipitati, stipite robusto ad 6 mm. longo, castanei, basin versus ut stipes glauco-pruinosi, ovoidei, apice obtusi et breviter 4-cornuti, 2 cm. longi, infra medium 1·5 cm. lati; valvae plane apertae, apicibus 2 cm. distantibus, duae ovato-oblongae ad 11 mm. latae, duae lineari-oblongae ad 8 mm. latae, omnes obtusae, rarius subacutae, 4·5 mm. infra apicem breviter mucronato-cornutae. *Semina* 7–10 cum quaque valva, ovato-oblonga vel oblonga, tenuiter rostrata, rostro excluso ad 5·5 mm. longa, 3 mm. lata, nigro-brunneo, ala e basi angustissima secundum rostrum ad 3 mm. producta et ibi ad 4 mm. lata, biloba, lobis incurvis obtusis, flavo-brunnea.

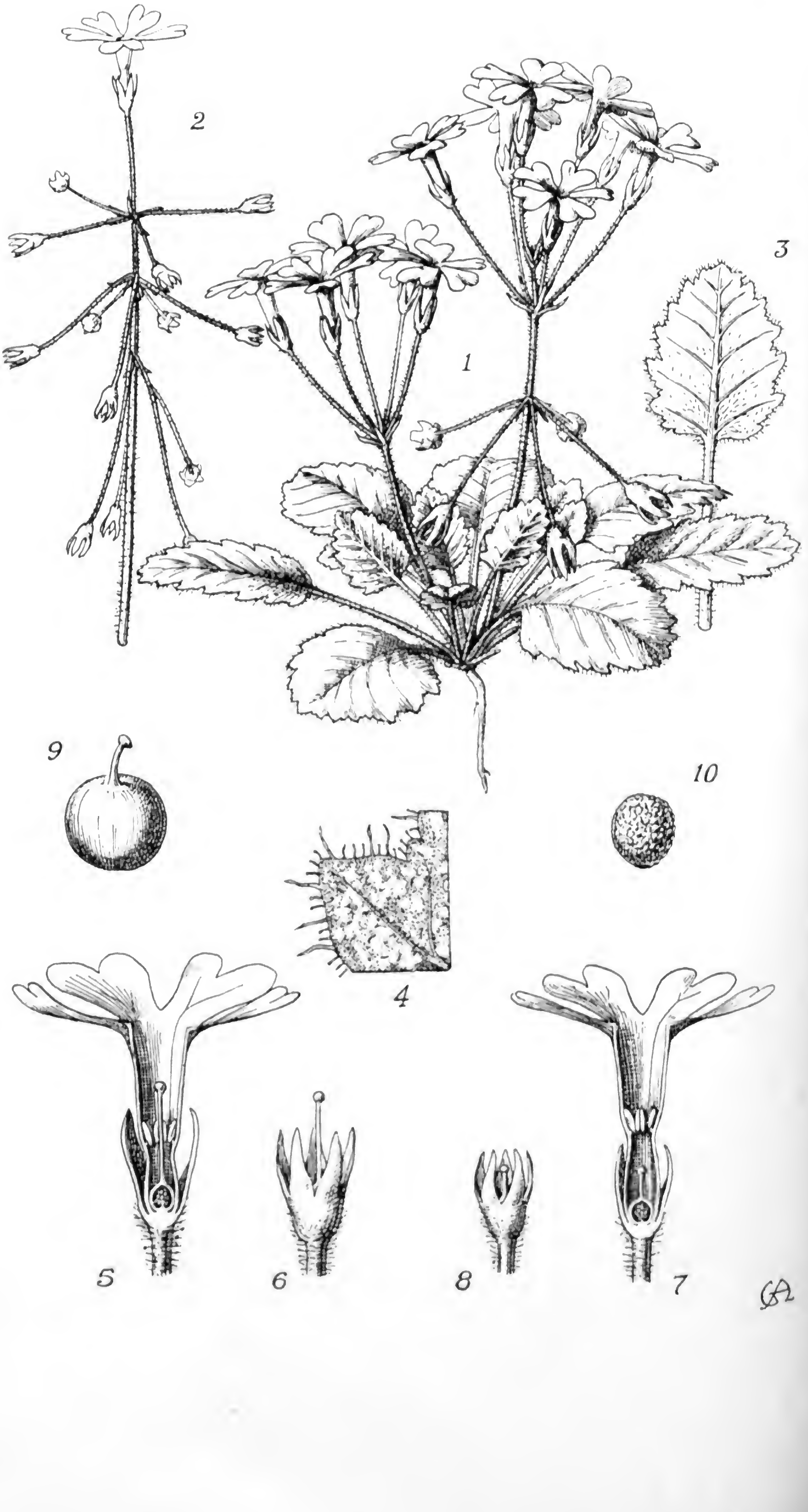
Transvaal. Zoutpansberg, North Transvaal, *Forest Dept. Herb., Union S. Afr.*, 7048, 7313.

The present plate was prepared from specimens taken from a tree growing in Mr. H. Hansen's garden at Piet Retief and originally obtained from the Zoutpansberg. *W. stipitata* resembles the more northern *W. Whytei* rather than the southern species of South Africa. It

can be easily distinguished by its distinctly stipitate, more loosely clustered cones, and it is remarkable on account of its being apparently monoecious, its congeners having been found so far to be dioecious.

Since the present plate was prepared, further specimens of the Piet Retief plant have been communicated by Mr. J. J. Kotzé. These bear perfectly mature female cones and minute rudimentary male cones, but otherwise they agree perfectly with the original specimens. As stated above, the Piet Retief tree was originally "obtained from the Zoutpansberg," no exact locality being stated. According to a letter from Mr. Kotzé (F.2149, R.2453), it was taken from the farm "Hillside" near Louis Tricharat, but specimens collected there (F.D. Herbarium No. 7297) represent typical *W. Whytei*, as also do specimens taken farther west, in the Forest Reserve Hanglip, in the same range of mountains (Zoutpansberg; F.D. Herbarium No. 7298). Referring to these, Mr. Kotzé says they appear to him alike and that he is informed that "in general appearance the trees in the field also seem to be the same." He further adds that "they do not possess the markedly stipitate cones of the Piet Retief tree," which he "cannot connect with either the Hillside or Hanglip specimens." The appearance of *W. Whytei* in the Zoutpansberg is not surprising considering that its nearest station is in the Melsetter district in South-eastern Rhodesia. It appears, therefore, that there are two species of *Widdringtonia* in the Zoutpansberg, one new to science, *W. stipitata*, and the other *W. Whytei*, so far only known from the Mlangi Mountains, the Melsetter district and Gorongosa Mountains, Portuguese East Africa.—O. Stapf.

Fig. 1, a branch with unopened fruits of last year's growth and with male catkins of this year's growth, *natural size*; 2, a cluster of dehisced fruits, *natural size*; 3, seeds in front, back and side view, × 2; 4, portion of a branchlet with male strobili, × 3; 5, male strobilus, × 6; 6, a scale of a male strobilus with pollen sacs in back view, × 12; 7, the same in front view, × 12; 8, back, front and side view of a leaf, the middle figure (b) showing the extent to which the leaf is adnate to the axis, × 6.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Tabula 3127.

PRIMULA DUCLOUXII, *Petitmengin.*

Primulaceae. Tribus Primuleae.

P. Duclouxii, *Petitmengin in Monde d. Pl.* 1908, p. 7; *Handel-Mazzetti, Naturbild. a. Südwest-China*, p. 11 (1927); inter species gregis *Malacoidearum* pedicellis demum 1–3 cm. longis refractis insignis, calyce sub fructu 6–7 mm. longo, dentibus lincari-lanceolatis, corollae tubo 6–8 mm. longo, foliorum laminis lobulatis acutc dentatis 1·5–4·5 cm. longis, 1–2·5 cm. latis, petiolo 1–4 cm. longo.

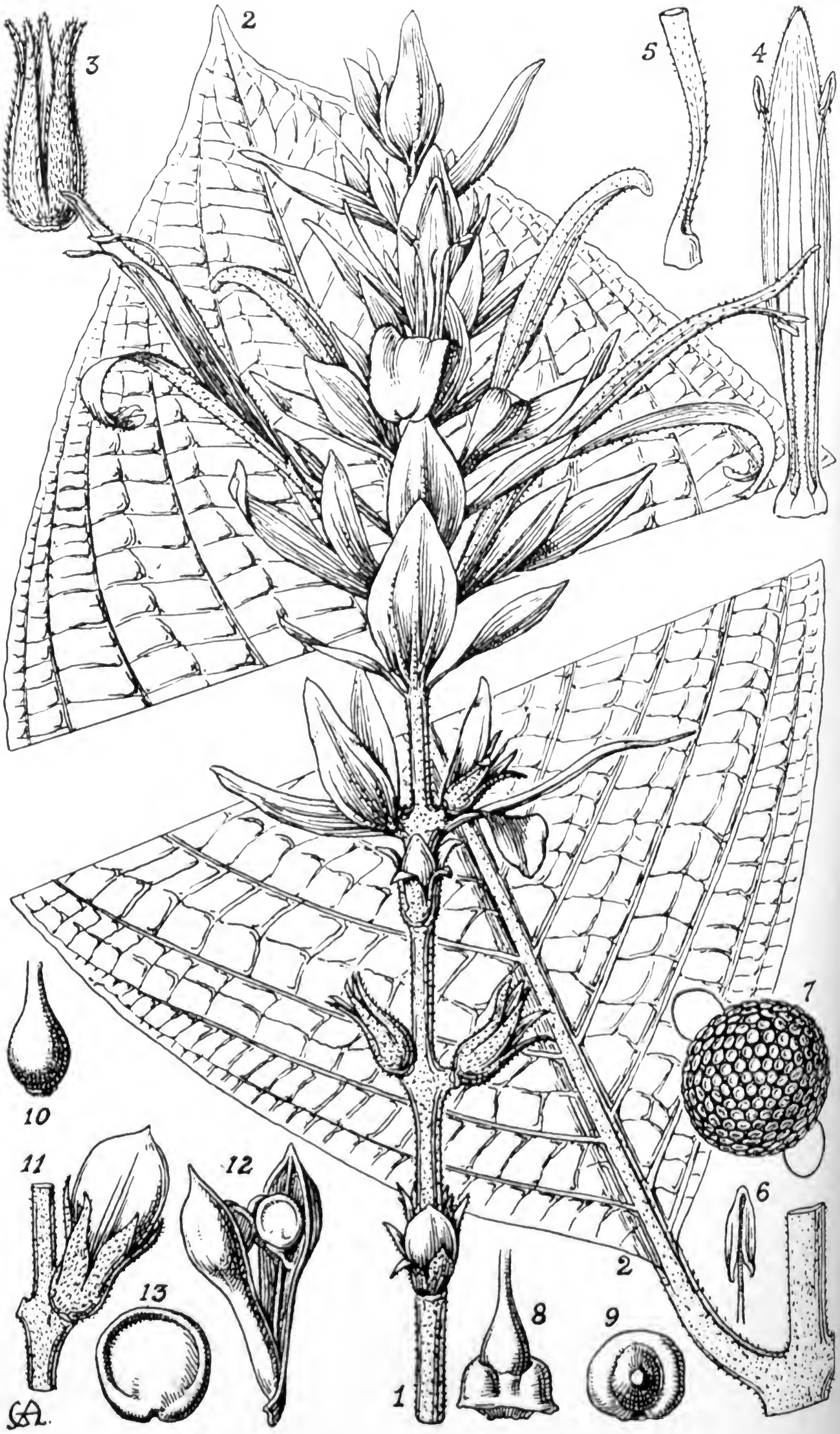
Herba perennans, radice tenui, stolonifera, rosulans, c rosula scapos plures umbelliferos vel saepius verticilliferos emittans, omnibus partis magis minusve farinosa. *Folia* saepissime longiuscule petiolata; lamina ovata vel obovato-oblonga, basi rotundata, rarius subcordata, apice obtusa, sublobulata, lobulis inaequaliter acute dentatis, 1·5–4·5 cm. longa, 1–2·5 em. lata, utrinque paree tenuissime glanduloso-pilosa, in dorso saepc dense albo-farinosa; petiolus 1–4 cm. longus, pilosus. *Scapi* 1–5 cm. longi. *Umbellae* vel *verticilli* pedicellis 3–6 filiformibus minutc pilosulis, sub anthesi suberectis, deinde patulis vel demum refractis ct ad 3 em. longis, bracteis subulatis vel basi lanceolato-dilatatis, ad 6 mm. longis. *Calyx* 4–6 mm. longus, fere ad medium fissus, dentibus lineari-lanceolatis, demum modice elongatis. *Corollae* tubus 6–8 mm. longus; limbus roseus, 12–17 mm. diametro, lobis profunde obcordatis. *Stamina* ad vel paulo infra medium inserta. *Ovarium* globosum; stylus in statu brevistylo ovario paulo longior, in statu longistylo antheras valde superantc. *Capsula* e calycis emarcidi tubo brevissime exserta, 2–2·25 mm. diametro, tenuiter crustacea. *Semina* globosa, obscure verruculosa.—*P. refracta*, Handel-Mazzetti in Akad. Anzeig. Akad. Wiss. Wien, 1920, No. 15, p. 1; 1924, No. 17, p. 3.

China. Yunnan, in fissuris humidis rupium calcearum umbrosarum montis Hsi-shan ad litus occidentale lacus Kun-yang-hay prope Yunnan-fu, 2250 m., *Ducloux, C. K. Schneider, Handel-Mazzetti*, 351; Shi-lang-ba prope Yunnan-fu, *C. K. Schneider*, 4012.

A very distinct member of the "*Malacoides* Series" of *Primula*, remarkable on account of its peculiar habit in the fruiting stage when most of its pedicels become refracted and often closely appressed to

the stem, the capsules opening earthwards. This naturally restricts the area for dispersal, but at the same time enhances the chances of the seeds falling into the moist rock-fissures, where the mother plant had already found a suitable home.—O. Stapf.

Fig. 1, a whole plant in flower; 2, an inflorescence in a very advanced state; 3, a leaf in back view; 4, a portion of the margin of the same in back view showing marginal hairs and farina; 5, a pin-eyed flower in longitudinal section; 6, the same without the corolla; 7, a thrum-eyed flower in longitudinal section; 8, the same without the corolla; 9, capsule of a thrum-eyed flower; 10, seed. *Figs.* 1, 2, 3, *natural size*; *figs.* 4, 10, *considerably enlarged*; *figs.* 5, 6, 7, 8, × 2½; *fig.* 9, × 9.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Tabula 3128.

MEGASKEPASMA ERYTHROCHLAMYS, *Lindau*.

Acanthaceae. Tribus Isoglosseae.

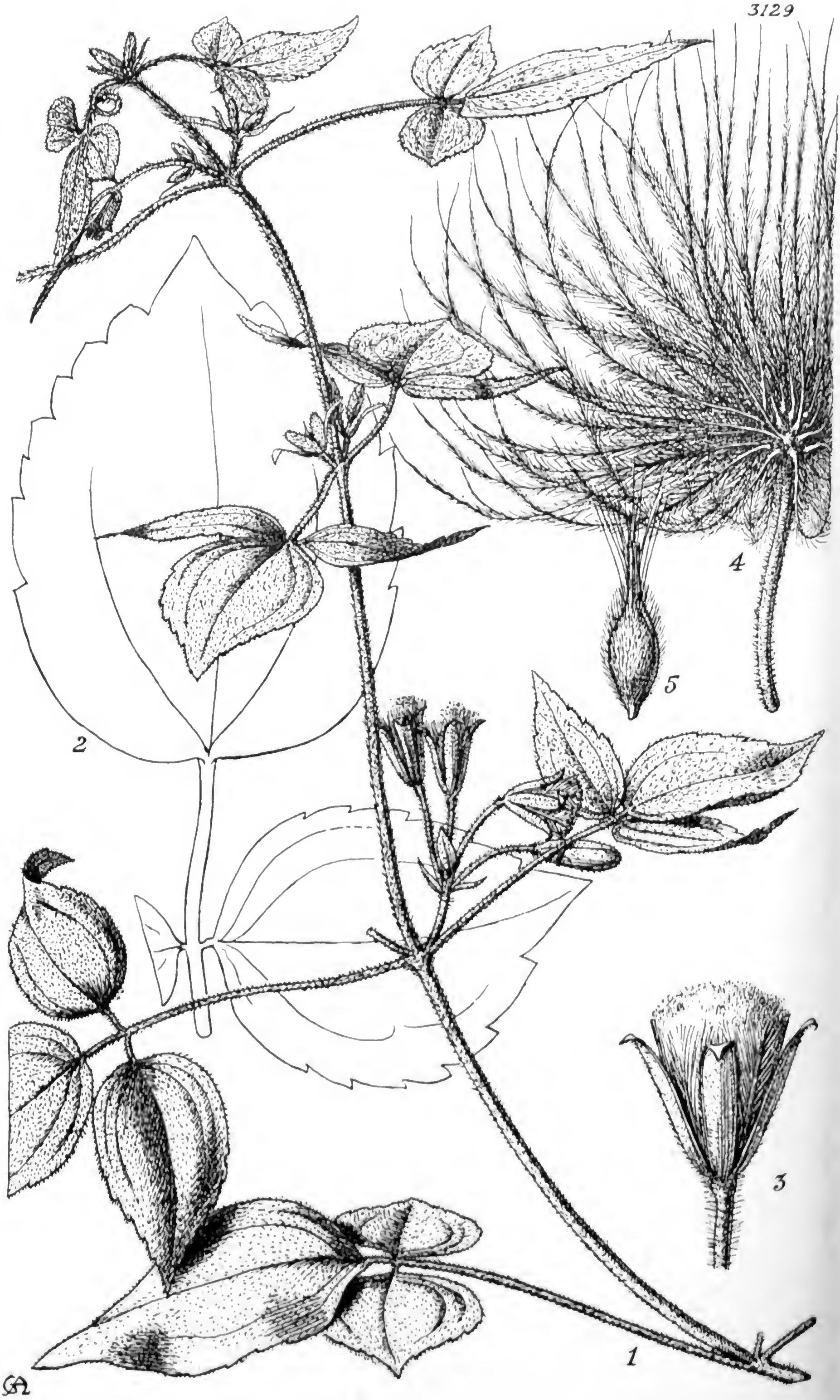
M. erythrochlamys, *Lindau in Bull. Herb. Boiss.* vol. v. p. 666 (1897); species unica.

Frutex ultra 3 m. altus, plurimis partibus pube tenui adpressa fulvida demum magis minusve evanescente indutis; rami teretes vel obscure tetragoni, crassiusculi, ad angulos lineis decurrentibus glanduligeris notati, ad nodos admodum constricti. *Folia* petiolata; lamina oblongo-elliptica, apice basique acuta vel breviter acuminata, 15–30 cm. longa, 6–16 cm. lata, utrinque circiter 11-nervia, venis transversis tenuibus laxe reticulata, pube in gemma densissima, in dorso ad nervos persistente, caeterum mox evanida; petiolus 2–4 cm. longus. *Spicae* in paniculam terminalem 20–30 cm. longam colleetae, lateralium spicarum paribus plerumque binis rarius ternis quam spica terminalis multo brevioribus, omnes pedunculo 3–4 cm. longo suffultae, eximie bracteatae; bracteae ovatae vel ovato-lanceolatae, utrinque acutae vel subacutae, trinerves, maiores 2·5–4 cm. longae, laete roseae; bracteolae lanceolatae, basi longe attenuatae, quam bracteae breviores. *Calyx* alta fissus, segmentis 5 aequalibus lineari- vel subulato-lanceolatis, 12–14 mm. longus, persistenter dense pubescens. *Corolla* bilabiata, 6–8 cm. longa, alba vel levissime roseo-suffusa, extra puberula; tubus tenuis, 2·5–3·5 cm. longus; labium superum lanceolato-lineare, integrum, subacutam vel obtusiusculum vel minute 2-dentatum, ad 4·5 cm. longum, subrectum; labium inferum vix brevius, in tertia parte supera revolutum, apice 3-dentatum. *Stamina* 2, ad tubi os inserta, filamentis basin versus decurrentibus, parte libera sub labio supero adscendente ad 3 cm. longa; antherae ad 4·5 mm. longae, lobulis subaequalibus basi minute apiculatis. *Pollinis* grana globosa, *poris* 2-*nis, ubique verruculis orbicularibus centro depresso tecta*. *Ovarium* basi disco annulari cinctum, ovoideum; stylus filiformis, circiter 5 cm. longus; stigma punctiforme. *Capsula* ad 3·2 cm. longa, a dorso visa subspatulata, acute apiculata, stipite 1·5–1·7 mm. longo a dorso valde compresso, valvis demum cymbiformibus; retinacula ad 4 mm. longa. *Semina* disciformia, margine paulo incrassato, glabra, 5 mm. diametro.

Venezuela. Province of Merida, 1600 m., *Funck & Schlim*, 1171; et (culta in insula Trinidad), *Broadway*, 4403.

The plant from which the present plate was prepared has been grown for a number of years in the Royal Botanic Gardens at Kew. The label containing the entry number was lost, so that the origin of the plant could not be traced with certainty, but there is very little doubt that it was raised from seed communicated by Mr. W. E. Broadway, who in 1913 sent dried specimens in flower and in fruit to Kew with the statement that they were obtained from "Lafond's garden, Valley Road, Belmont," Trinidad. These specimens and the Kew plant agree so completely with Lindau's description of *Megaskepasma erythrochlamys* that I do not hesitate to identify them. It is true that Lindau says the pollen grains of *Megaskepasma* are devoid of pores; but this statement is a priori open to doubt and may be due to the circumstance that he worked with dried specimens. In the fresh Kew material the pores are easily demonstrated. The sculpturing of the exine of the pollen is singular in that it is characterised by the presence of numerous almost contiguous circular slightly concave discs. The affinity is otherwise with *Rhacodiscus*, another member of the *Porphyrocoma* group, easily distinguished by its inconspicuous subulate bracts and echinate pollen grains.—O. Stapf.

Fig. 1, terminal spike of an inflorescence; 2, a leaf with middle cut out, the upper portion showing the upper surface, and the other the lower; 3, calyx; 4, upper lip of corolla, with stamens; 5, corolla tube in side view; 6, anther; 7, pollen grain; 8, base of a pistil with the surrounding disc; 9, the same seen from above; 10, the ovary without the disc; 11, a capsule not yet dehisced; 12, the same after dehiscence; 13, a seed. *Figs.* 1, 2, 4, 5, 11, 12, *natural size*; *figs.* 3, 6, 8, 9, 10, 13, all × 2; *fig.* 7, × 270.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Tabula 3129.

CLEMATIS RUBIFOLIA, *C. H. Wright.*

Ranunculaceae. Tribus Clematideae.

C. rubifolia, *C. H. Wright in Kew Bull.* 1896, p. 21 ; *C. gratae,* Wall., affinis, foliolis non lobatis inflorescentiaque subsessili distinguitur.

Frutex sarmentosus. *Caulis* tenuis, tomentosus. *Folia* trifoliolata, pilis appressis vestita ; foliola ovata, acuminata, dentata, trinervia. *Cymae* axillares, 5–8-florae ; pedunculi brevissimi. *Sepala* oblonga, acuta, dorso marginibusque dense tomentosa. *Filamenta* sepalis aequilonga, pilis antheras attingentibus vestita. *Stylus* columnaris, pilis altis rigidis hirsutus, in fructu 5 cm. longus.

China. Yunnan : Mengtze, 1800 m., rocky places, seemingly rare, Dec. 1893, *W. Hancock*, 18 ; Kochin Mountains, 600 m., 24 Dec. 1895, *W. Hancock*, 577.

This species is allied to the Northern Indian *C. grata*, Wall., from which it is readily distinguished by its unlobed, but dentate, leaflets and its almost sessile inflorescence. *C. Wightiana*, Wall., another Indian species, differs in its leaves being much more densely tomentose beneath.—C. H. Wright.

Fig. 1, portion of a branch ; 2, two leaflets ; 3, old flower ; 4, head of achenes ; 5, lower portion of a single achene. *Figs.* 1, 2, 4, *natural size* ; *fig.* 3, × 2 ; *fig.* 5, × 4.

3130

Tabula 3130.

SMILAX MEGALANTHA, *C. H. Wright.*

Liliaceae. Tribus Smilaceae.

S. (Eusmilax) megalantha, *C. H. Wright in Kew Bull.* 1895, p. 118, *et in Journ. Linn. Soc., Bot.*, vol. xxxvi. p. 99; *W. J. B. in Kew Bull.* 1920, p. 124; *S. stenopetalae*, A. Gray, affinis, racemo ex axilla folii juvenilis oriente distinguitur.

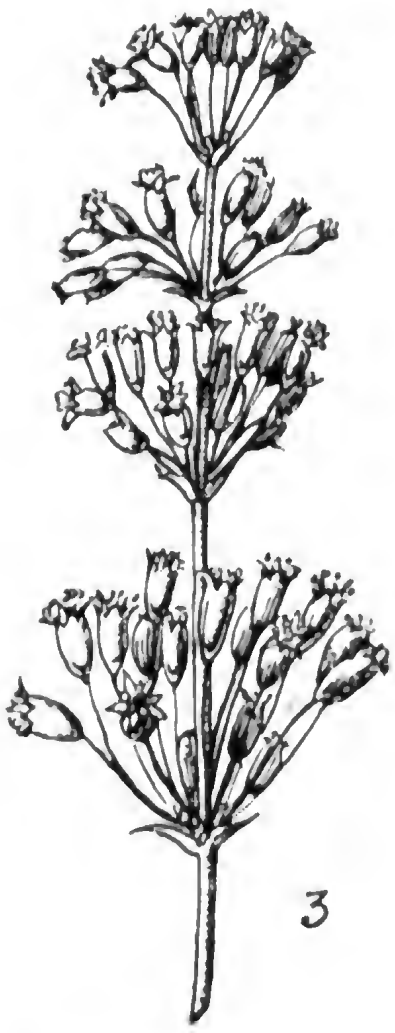
Frutex scandens, ad 5 m. altus, sempervirens. *Caulis* flexuosus, leviter suleatus, spinis paucis brevibus compressis instructus. *Folia* valde variabilia, ovata vel oblonga, acuta, nervis primariis 3–5 praedita, subtus glaucescentia, 9–18 cm. longa, 5·5–12 cm. lata; petiolus 2–4 cm. longus, vagina 1–2 cm. longa cirrhis usque ad 16 cm. longis terminata. *Inflorescentia* subumbellata, ex axilla folii juvenilis in ramo laterali 2 cm. longo oriens, squama magna persistente folii vaginae opposita; pedunculus 2·5 cm. longus; bracteolae subulatae. *Flores* ♂: perianthium 6-partitum, 1 cm. longum; segmenta lanceolata, acuminata, exteriora latiora; filamenta filiformia, perianthio paullo breviora. *Flores* ♀ non visa. *Fructus* globosus, 1 cm. diametro, corallinus.

China. Western Szechuen: near Tachienlu, between 2700 and 4000 m., *A. E. Pratt*, 811; Mount Omei, *Rev. E. Faber*; Mount Wa, in thickets at 1500 m., *E. H. Wilson*, 3253 (young flowers, May) and 3254 (fruit, November).

This species is allied to *S. stenopetala*, A. Gray, a native of Formosa, the Luchu Archipelago, and Japan, from which it differs in its inflorescence, which, instead of arising directly from the axil of a mature leaf, consists of a much contracted raceme borne in the axil of a very young leaf (rarely an inch long) situated on an axillary branch about 4 in. long, at the base of which a large bud-scale persists opposite to the leaf-sheath. The size and outline of the leaves vary considerably on the same plant, and the flowers are amongst the largest in the genus. This species has proved hardy in English gardens, where it is a valuable evergreen climber.—C. H. Wright.

Fig. 1, branch, *natural size*; 2, flower seen from above, × 3; 3, side view of flower, × 3; 4, inner perianth-segment, × 5; 5, outer perianth-segment, × 5; 6, anther, × 10; 7, fruit, × 2; 8, transverse section of fruit, × 2; 9, leaf, *natural size*.

3131



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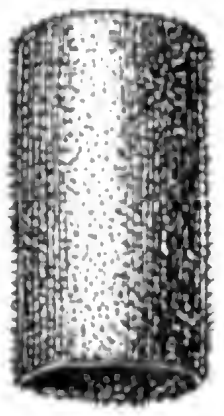

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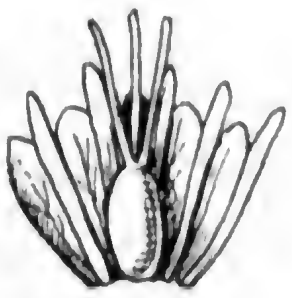

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Tabula 3131.

SILENE OTITES, *Sm.*, var. PSEUDOTITES, *Vis.*

Caryophyllaceae. Tribus Sileneae.

S. Otites, *Sm.*, var. **pseudotites,** *Vis. Flor. Dalm.* vol. iii. p. 170 (1850); a planta borcali inflorescentiae ramis clongatis patentibus differt.

Herba erecta, dioica, usquc ad 9 dm. alta, caulibus inferne minutissime puberulis superne glabris plus minusve viscosis. *Folia* radicalia oblanceolato-spathulata, apice rotundata saepe apiculata, basi in petiolum gradatim angustata, usque ad 14 cm. longa et 3 cm. lata, saepissime circiter 8 cm. longa et 1·8 cm. lata, in pagina superiore glabra vel leviter puberula, in inferiore plus minusve puberula; folia caulina gradatim minora, angustiora, acuta vel subacuta. *Inflorescentia* ramosa mascula praecipue, bracteis lanccolatis albo-membranaceo-marginatis ciliatis basi connatis. *Flores masculi:* calyx oblongo-obconicus, 4 mm. longus, lobis ovato-orbicularibus rotundatis 1 cm. longis margine late scarioso-membranaceis minute ciliolato-fimbriatis; petala lincaria, 4·5 mm. longa, viridi-lutea; stamina 6 mm. longa, antheris oblongis 1·5 mm. longis; gynaeceum inchoatum, 4·5 mm. longum, stylis tribus instructum. *Flores feminei:* calyx oblongus vel oblongo-ellipticus, 4 mm. longus; petala linearia, 4–4·5 mm. longa, viridi-lutea; gynaeccum perfectum, ovario oblongo-ellipsoideo 2·5 mm. alto, stylis tribus 3 mm. longis. *Capsula* anguste ovoideo-ellipsoidea, 6–7 mm. alta, 3 mm. diametro, dentibus patentibus. *Semina* subreniformia, vix 1 mm. longa, non acute tuberculata sed "armadillo."—*S. pseudotites*, Besser in Reichb. Flor. Germ. Excurs. p. 819 (1832); Aschers. u. Graebn. Syn. Mitteleur. Flor. vol. v. sect. 2, p. 196 (1921). *Lychnis Otites* Scop. Flor. Carn. ed. 2, vol. i. p. 305 (1772), e descr. et loc., excl. syn.

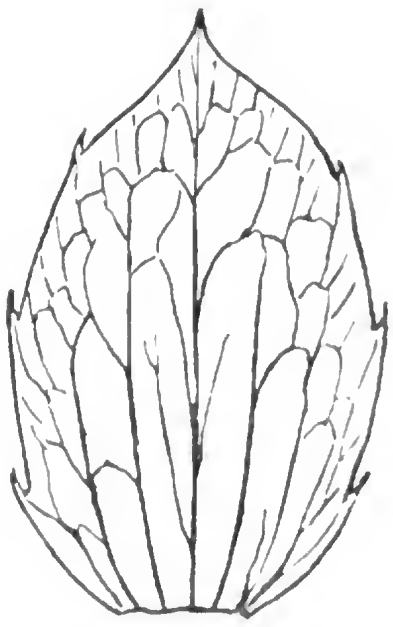
Karst. Trieste, *Herb. Bentham*; Karstwiesen bei Triest, 26.5.65, *M. Bihoda*; Monte Spaccato, 22.6.37, *Bentham*, 756; bei Bazovizza, 6·81, *Pospichal*; in dry stony pasture, near Briščiki, seeds collected 11.8.22, cultivated at Kew as *Turrill*, K. 163; from the same locality, seeds collected 15.8.25, and cultivated at Kew as *Turrill*, K. 320.

The variety here figured was originally described from specimens collected in stony pasture on Mt. Spaccato near Bassowitza, east of Trieste. From the writer's observations and re-interpreting the remarks

of Pospichal (*Flora des Oesterr.-Küstenl.* vol. i. p. 463: 1897), it appears that this is the common variety on the dry stony limestone karstlands of the northern Adriatic districts. That the variety extends south to Dalmatia is indicated by Visiani's conclusions and there are specimens from Italy, France, and other European countries in the Kew Herbarium which must either be placed in the same variety or considered as links between it and the northern type variety. The leaves are not glabrous as stated in a differential diagnosis attached to the original description of Besser.

In the figure published by Reichenbach (*Ic. Flor. German.* vol. vi. t. cclxxxix.: 1841) the flowers are shown as hermaphrodite—very clearly so in the enlarged uncoloured drawing of a flower. Neither in wild nor in cultivated material have other than dioecious plants been found by the writer. The peculiarities of sex-behaviour in crosses between the different varieties of *S. Otites* are being worked out at the John Innes Horticultural Institution, Merton. Sibs of the material here figured (*Turrill*, K. 163, 320) have been used in these experiments.—W. B. Turrill.

Fig. 1, plant, $\times \frac{1}{3}$; 2, leaf, *natural size*; 3, portion of male inflorescence, *natural size*; 4, portion of young infructescence, *natural size*; 5, portion of stem, $\times 3$; 6, male flower, $\times 3$; 7, female flower with corolla opened, $\times 3$.



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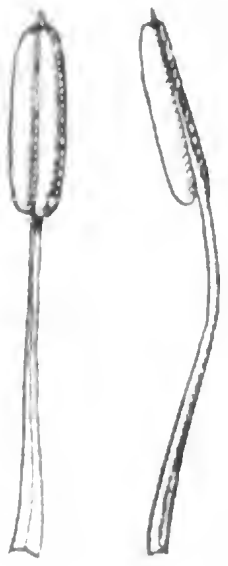

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Tabula 3132.

JASIONE BULGARICA, *Stoy. et Stef.*

Campanulaceae. Tribus Campanuleae.

J. bulgarica, *Stoy. et Stef. in Oesterr. Bot. Zeitschr.* vol. lxx. p. 105 (1921), et *Flor. de Bulg.* p. 1095 (1925); *Stoy. in Notizbl. Bot. Gard. Mus. Berlin-Dahlem*, vol. ix. p. 555 (1926); a *J. orbiculata* rhizomate repente saepe ramoso, foliis bracteis calycibusque omnino glabris, staminis liberis distinguitur.

Herba perennis, glabra. *Rhizoma* tenue, repens, saepe ramosum. *Caulis* erectus, teretiusculus, sulcato-striatus, ad medium vel supra foliatus, 5–22 cm. altus. *Folia* radicalia rosulata, oblanceolata, apice obtusa vel subacuta, basi gradatim attenuata, 1·5–2·5 cm. longa, 5–6 mm. lata, integra vel obsolete et remote denticulata; folia caulina lanceolata vel oblongo-oblanceolata, integra vel leviter denticulata. *Flores* in capitulum terminale 1·5–2·2 cm. diametro aggregati; involucri phylla elliptico-ovata vel elliptico-lanceolata, apice acuminata, circiter 7 mm. longa et 4 mm. lata, margine remote setaceo-denticulata; pedicelli 2–2·5 mm. longi. *Calyx* laciniis lanceolato-subulatis acutis fere 3 mm. longis. *Corolla* 6 mm. longa, laciniis oblongo-lincaribus vel apice obtusis linearibus primo erectis deinde divaricatis. *Stamina* antheris liberis nec connatis, 3 mm. longa. *Receptaculum* oblongo-obconicum, 1·3 mm. altum, 1 mm. diametro; stylus 7 mm. longus.—*Jasione orbiculata* Griseb. var. *orbelica* Vel. Flor. Bulg. Suppl. vol. i. p. 188 (1898), pro parte.

Bulgaria. Rila Planina, in saxosis montis Mus Allah, 2000 m., 21.8.07, *C. K. Schneider*; Musalla, in stony and rocky places in open vegetation, 2200 m., 29.7.26, *Turrill*, 1263; Mt. Pirin, Spano Pole, in alpine meadow, 2000 m., 4.8.21, *Stoyanoff & Stefanoff*, 873.

In addition to the specimens represented at Kew and quoted above, Stoyanoff and Stefanoff record the species from: in pascuis regionis superioris (2000–2500 m.) montis Rila ad rivum Urdinam et sub cacumine Cader-Tepe, 7–9.19 (typc); Rila in cacumine Ibar, 5.8.99, *Stribrny*; in lapidosis in Musalla, 1906, *Urumoff*; in monte Kostenski Balkan, Belmeken, 1910, *Urumoff*; Kostenski Balkan, Kotlimite 12.7, *S. Georgieff*; Rila, subalpine Matten unter dem Gipfel Sari-Gjol, 9.19; Pirin, in rupestribus alpinis montis Jel-Tepe, alt. 2100 m., 7.09, *Dimonie*; in graminosis alpinis montis Pirin, 27.7.18, *Urumoff*.

The species has often been confused with *J. orbiculata*, Griseb., from which it is quite distinct morphologically, and no intermediate forms or possible hybrids have been recorded between the two species. *J. orbiculata* has a wider distribution than *J. bulgarica* and is known from mountains in Albania, N. Macedonia (S. Serbia), Bulgaria, Serbia, Montenegro, Bosnia and Hercegovina, as the var. *supinoides*, Stoy., from Epirus, and as the var. *italica*, Stoy., from Mt. Serino in S. Italy.

Phytogeographically the group of species centering round *J. supina*, (Sieb.) Griseb., is of great interest. Stretching from Asia Minor to S. Italy, the allied species and varieties exemplify the essential unity of the flora of the Balkan Peninsula and Asia Minor, and indicate the route along which so many species spread when the Balkan Peninsula was joined by land to Asia. Stoyanoff (l.c. 1926) gives evidence that *J. bulgarica* is one of the younger of this group of species, though it must be noted that in the character of having free stamens it is related to some Spanish species.—W. B. Turrill.

Fig. 1, plant, *natural size*; 2, involucral leaf, × 5; 3, flower, × 5; 4, stamens, × 10; 5, gynaeceum, ovary in section, × 5.

3133

Tabula 3133.

CERINTHE MINOR, *L.*, var. HISPIDA, *Turrill.*

Boraginaceae. Tribus Borageae.

C. minor, *L. Sp. Pl.* p. 137 (1753), var. **hispida**, *Turrill in Kew Bull.* 1924, p. 355 ; *Hayek, Prodr. Flor. Penins. Balcan.* vol. ii. p. 91 (1928) ; pedicellis hispidis distinguitur.

Herba perennis, caulibus ascendentibus vel prostrato-ascendentibus usque ad 5 dm. longis foliosis glabris. *Folia* oblongo-ovata, acuta vel subacuta vel interdum obtusa, basi valde amplexicaulia, media circiter 3–4 cm. longa et 1·5 cm. lata, glabra, saepe glauca, haud vel vix aspera. *Inflorescentia* primum compacta deinde valde elongata ; bracteae foliis similes sed gradatim minores ; pedicelli 3–12 mm. longi, hispidi. *Sepala* inaequalia, margine hispido-ciliata, externum ovato-oblongum, acutum, 1 cm. longum, 5·5 mm. latum, media lanceolata, 8 mm. longa, 2–3 cm. lata, interna lanceolato-linearia, 7–8 mm. longa, 1–1·5 mm. lata. *Corolla* 1·1 cm. longa, lobis lineari-triangularibus 5·5 mm. longis conniventibus. *Antherae* 6 mm. longae. *Gynaeceum* glabrum ; stylus 1·1 cm. longus. *Nuculae* inaequaliter ovoideae, 2·75 mm. longae, atro-brunneae.

Balkan Peninsula. Greece : in rupestribus herbidis regionis superioris Taygeti loco Koupartos dicto, July 1844, *de Heldreich.* Macedonia : in dumetis ad Veles, June 1905, *Adamović.* Thrace : Gallipoli Peninsula, Angadere, 22–24 July 1923, *C. M. Ingoldby*, 450 (type of variety). N. Bulgaria, Varna, vineyards to the north of the town, 20 May 1923, *B. Gilliat-Smith*, 108 ; hills to the north of Varna, 25 July 1924, *B. Gilliat-Smith*, 852 ; Varna district, cult. Herbarium Experimental Ground, Kew, 1925–1930, from seeds collected in 1924, K. 119. S. Bulgaria : prope Sliven in graminosis ad collum Sekerdze, 16 July 1907, *C. K. Schneider*, 456. Rodopes : hills above Bačkova, 600 m., 24 July 1926, *W. B. Turrill*, 1453. Dobruja : Tultscha, Steppe bei Malkodz, 8 May 1872, *Sintenis*, 285.

South Russia. Crimea : Sebastopol, 1855, Saint-Supéry ; prope Demerdski, litus meridion., 25 May 1905, *N. A. Busch.* Prov. Kursk, in aggeribus prope Kursk, 7 Jun. 1897, *D. Kladbisczew*, 127. In Podolia australi, *W. Besser.*

Asia Minor. Boli, *Wiedemann* ; Sabounjou-Kaïvé, entre Smyrne

et Magnésie, dans les terrains calcaires, 8 Jun. 1854, *Balansa*, 366 ; ad Angora Galatiae, 1892, *Bornmüller*, 3076 ; Cilicia, 1896, *Siehe*, 422 ; in monte Tauro, 1838, *T. Kotschy*, 366, 367 ; bords des champs humides près Ermenek, Jul. 1872, *A. Péronin*, 190 ; in monte Solyma, Lyciae, Mai 1845, *de Heldreich* ; Ali Dagh, à 7 kilom. au SE de Césarée (Cappadoce), vers 1400 mètr. d'alt., Jul. 1856, *Balansa*, 967 (pro parte) ; Arzani, *Mitchell*.

ARMENIA. Inter Baibont et Erzeroum, in valle Kassuklu, Mai 1853, *Huet du Pavillon* ; prope Zara (Wilajet Siwas), 1300–1400 m., May 1893, *Bornmüller*, 3440 ; Egin, Kemengvep, 28 May 1890, *Sintenis*, 2423.

CAUCASUS. Pactigorsk, *Becker* ; sine loc., 1831, *Prescot* ; sine loc., *Radde* ; ex Iberia, 1824, *Wilhelms*.

KURDISTAN. Sine loc., 1840, *J. Brant, W. H. F. Strangways*.

SYRIA. Inter Bludan et Palmyra in jugis fissuras rupium incolit 5500 ped. 12 Jun. 1855, *Kotschy*, 115 ; sine loc., 1846, *Pinard*.

PERSIA. Yam, north of Tabriz, 22.5.27, *B. Gilliat-Smith*, 1860 ; 21.8.27, *B. Gilliat-Smith*, 2125.

Cerinthe minor, L., is known to be a moderately polymorphic species. The chief interest of the character of hispid pedicels lies in its geographical distribution. The greater number of specimens from the eastern part of the Mediterranean Region, from Asia Minor, Caucasus, Armenia, Kurdistan, and Syria, as well as from S. Russia, and many from the southern and eastern parts of the Balkan Peninsula have hispid pedicels. On the other hand, all the numerous specimens examined from the central and western parts of the Mediterranean Region and from Central Europe have glabrous pedicels. The only exception to this last statement is a plant from Steier, Upper Austria, ex Herbario Brittingeriano, in which some of the pedicels have one or two short hispid hairs. The geographical separation of the two variants is not complete. Both occur in the Caucasus and in Greece (Peloponnesus), and a few specimens from northern Asia Minor and Armenia have glabrous pedicels, though the majority have hispid pedicels. It is not without interest that the sheet of *Balansa*, 967, at Kew, quoted above (pro parte), has one specimen with glabrous and one with hispid pedicels. The pedicels of specimens from "Kurdistan" range from hispid to slightly hispid or even doubtfully glabrous. It is quite evident that the two variants meet and overlap, or alternately diverge from the Balkan Peninsula, northern Asia Minor and southern Russia.

The variety has been cultivated since 1925 in the Herbarium Experimental Ground at Kew from seed collected in 1924 near Varna by Mr. B. Gilliat-Smith. Only one plant now survives and makes luxuriant annual growth. It flowers from spring to late autumn and is visited by enormous numbers of hive and other bees. In spite of this it has never set seed till 1929 when, in the latter part of the season, a fair number of nutlets ripened. Why the self-sterility should thus

suddenly break down is unknown. The plant behaves as a hemicryptophyte at Kew, but the new annual shoots appear very early in the year. The figure has been made from living material (K. 119). The flowers are pale yellow except for a reddish purple band around the top of the tube and involving the bases of the corolla lobes.—W. B. Turrill.

Fig. 1, upper portion of branch, *natural size*; 2 and 3, flowers, × 2; 4, flower, with calyx removod, × 2; 5, flower with corolla opened up, × 2; 6 and 7, stamens, × 7; 8, ovary, × 7; 9, portion of pedicel, × 9; 10, fruit, × 3.

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Tabula 3134.

VERBASCUM LUTEO-VIRIDE, *Turrill.*

Scrophulariaceae. Tribus Verbasceae.

V. luteo-viride, *Turrill in Kew Bull.* 1924, p. 263; *Stoyanoff et Stefanoff, Flor. de Bulg.* p. 988 (1925); *Hayek, Prodr. Flor. Penins. Balean.* vol. ii. p. 119 (1929); species Sect. *Lychnitidis,* Benth. in DC. Prodr. x. 230 (1846), Subsect. *Thapsoideae,* Benth. l.c., sensu mutato Boiss. Flor. Or. iv. 299 (1879), a *V. pinnatifido,* Vahl, foliorum ambitu, inflorescentia densiore valde differt.

Planta tota plus minusve albo-tomentosa, pilis umbellato-ramosis sessilibus vel saepissime stipitatis instructa. *Caulis* erectus, inferne teres, glabrescens, superne leviter angulatus, dense albo-tomentosus. *Folia* radicalia oblonga vel elliptico-oblonga, usque ad 4 dm. longa et 9·5 cm. lata, crenata, caulina acute acuminata, irregulariter crenata, in pagina inferiore dense albo-tomentosa, in pagina superiore minus albo-tomentosa fere viridia vel luteo-viridia, inferiora ovata, basi cordata, 6·5 cm. longa et 3 cm. lata, vel in culto multo majora, usque ad 3·5 dm. longa, et 1·4 dm. lata, superiora fere orbicularia, amplexicaulia, 2·3 cm. diametro. *Flores* glomerati, sessiles, glomerulis in racemum 4 dm. longum vel in panicalam ramis 3 dm. longis dispositis; bracteae inferiores foliis superioribus similes, superiores sessiles, late ovatae, plus minusve acuminatae, circiter 1 cm. longae et 7 mm. latae, crenato-dentatae vel crenato-serratae, luteo-virides, venosae. *Calyx* fere ad basin in sepala 5 subaequalia divisus, sepalis anguste oblongis vel lanceolato-oblongis obtusis vel subacutis minute apiculatis 4–6 mm. longis 2–3 mm. latis, usque ad 2–3 mm. infra apicem dense albo-tomentosis, apicem versus viridibus glabrisque. *Corolla* lutea, circiter 2 cm. diametro, extra albo-tomentosa, intus glabra. *Stamina* filamentis inferne pilis albo-flavidis obtectis, antheris omnibus reniformibus. *Ovarium* ovoideum, 2·5 mm. altum, 2 mm. diametro, dense albo-tomentosum; stylus 7·5 mm. longus, glaber, superne leviter clavatus.

Bulgaria. District Rouscuck, near Shtrklevo (Strakliovo), 14.8.92, *S. Georgiev* (typus); between Shtrklevo and Ivanovo, on limestone rocks, 18.9.24, *D. Uopdanob & D. Jordanoff*; cultivated in the Herbarium Experimental Ground at Kew, 1926–27, from seeds collected by Uopdanob and Jordanoff, l.c., in flower 21.7.27 and 1.11.27, K. 71.

This very distinct species of *Verbascum* is of special interest as an endemic of the Danubian plain of North Bulgaria. This district is one of the poorest in plant endemics of the whole Balkan Peninsula, partly because the habitat conditions on the opposite side of the Danube are very similar, partly because of its flat uniformity, and partly because of its high degree of cultivation. It is, of course, possible that *V. luteo-viride* may be found in southern Roumania, but at present it is accepted as one of the most striking endemics in Bulgaria north of and excluding the Stara Planina.

Since the original description was published we have been fortunate in procuring viable seeds, by the kindness of Mr. B. Stefanoff of Sofia, and these have enabled us to study the living plant at Kew. Under cultivation quite handsome plants can be obtained, much larger than the wild material at first described. A study of the living plants has resulted in some modifications of the original description—especially with regard to the size of the leaves and the branching of the inflorescence. The figure has been made from specimens cultivated at Kew as K. 71 (see above).—W. B. Turrill.

Fig. 1, portion of inflorescence, × ⅓; 2, inflorescence-branch, *natural size*; 3, foliage leaf, *natural size*; 4, bract, × 2; 5, calyx, *slightly enlarged*; 6, corolla spread open, *slightly enlarged*; 7, gynaeceum, × 3.

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Tabula 3135.

VERONICA EUXINA, *Turrill.*

Scrophulariaceae. Tribus Digitaleae.

V. euxina, *Turrill in Journ. Bot.* vol. lxiii. p. 161 (1925), *et in Bull. Soc. Bot. Bulg.* vol. ii. pp. 22, 24 (1928); *Hayek, Prodr. Flor. Penins. Balcan.* vol. ii. p. 158 (1929); a *V. spicata*, L., sensu stricto, caulibus foliisque dense glanduloso-pubescentibus, foliis inferioribus latioribus, omnibus sessilibus vel fere sessilibus, capsulis glabris differt.

Caules erecti vel ascendentes, usque ad 5 dm. alti, ima basi 3 mm. diametro, subteretes, omnino dense glanduloso-pubescentes. *Folia* late elliptica vel ovato-elliptica, apice obtusa, rotundata, vel subacuta, basi angustata saepe semiamplexicaulia, media 4–6 cm. longa, 2–3 cm. lata, margine crenata, pagina utraque dense glanduloso-pubescentia, costa nervisque in siccitate supra subimpressis subtus prominentibus, nervis lateralibus utrinque circiter 6, in folia superiora minora angustiora acuta gradatim transientia. *Inflorescentia* usque ad 1·2 dm. longa; spicae densae, multiflorae, solitariae, vel usque ad 5 aggregatae; bracteae angustissime ellipticae, apice acutae, 1·5 mm. longae, 0·5 mm. latae, margine longe ciliatae, haud glandulosae; pedicelli 0·5 mm. longi. *Sepala* 4, glabra, margine conspicue albo-ciliata excepta, haud glandulosa, 2 adaxialia ovata, 1·5 mm. longa, 2 abaxialia lineari-elliptica, 2 mm. longa. *Petala* 4, 3·5 mm. longa, abaxiale lineare, adaxiale ovatum, lateralia lineari-oblonga. *Filamenta* 2·5 mm. longa; antherae vix 1 mm. longae. *Ovarium* compresso-subsphaericum, glabrum; stylus 4 mm. longus, glaber. *Capsula* compresso-subsphaerica, apice leviter truncata, haud emarginata, 3 mm. longa, 3 mm. diametro, glabra, stylo saepe persistente. *Semina* plana vel subplana, ambitu oblonga vel subrotundata, circiter 0·75 mm. longa, luteo-brunnea.

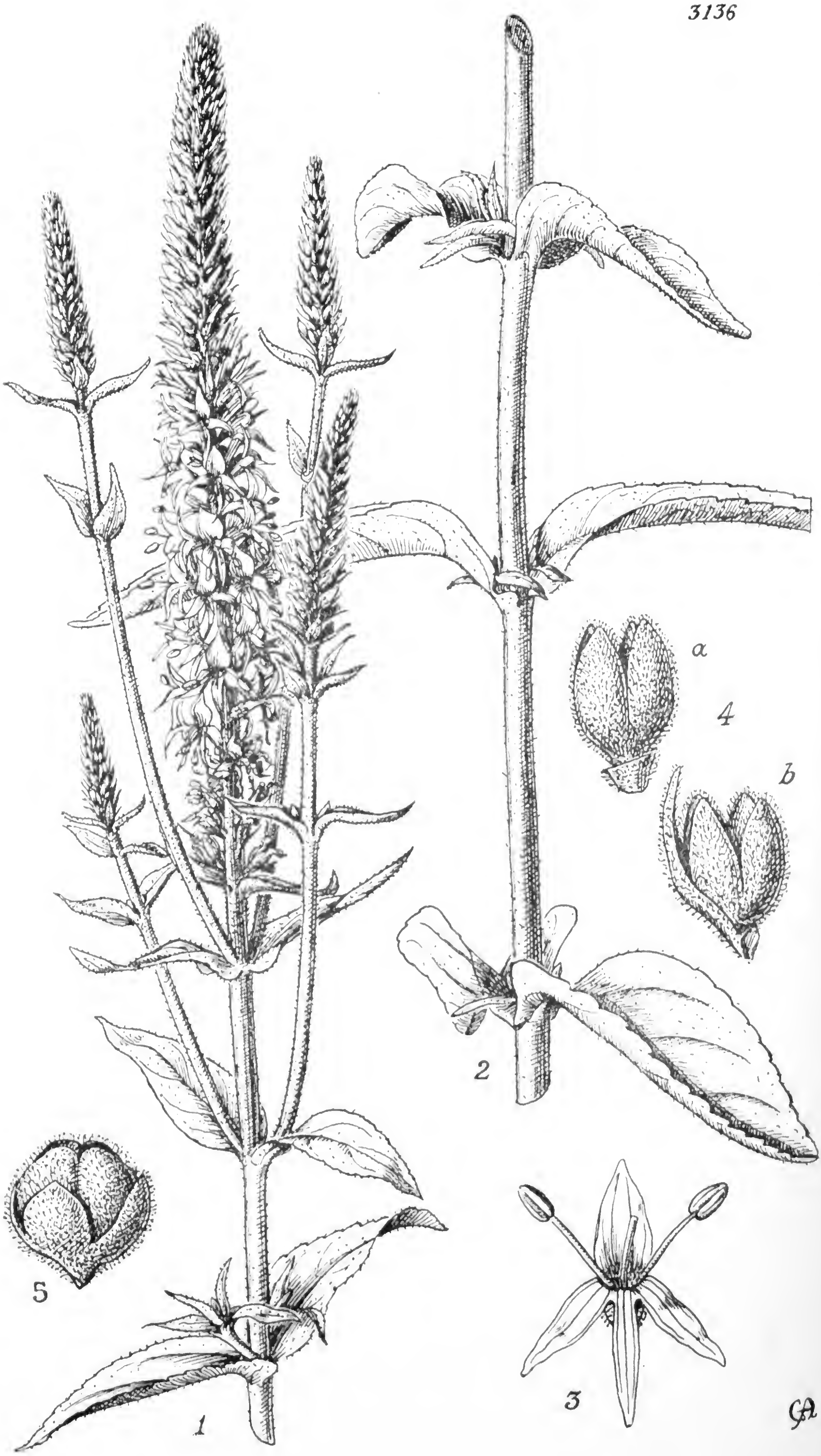
Bulgaria. Hills south of Varna, in flower June 1924, *Gilliat-Smith*, 671, 730, 752, 753, 879 (fruit); hills south of Varna, in flower and fruit, 8.8.26, *Turrill*, 1590.

Dobruja. Tultscha, Steppe bei Malkodz, 20.6.72, *Sintenis*, 227 (form with narrower leaves).

This species is one of several allied to the Linnean *V. spicata*. In eastern Bulgaria it grows in grassy places between shiblyak brushwood (see Turrill, *Plant-Life of the Balkan Peninsula*, pp. 152 *seq.*,

Oxford, 1929) associated with *V. orchidea*, Crantz. From the latter species it remains quite distinct, and in the wild habitat is easily distinguished by the less erect habit, darker duller green and marked glandulosity. Both species have been cultivated, from Varna material, for four years in the Herbarium Experimental Ground at Kew and have retained their distinctive characters. The figure has been prepared from cultivated material obtained from the only known Bulgarian locality near Varna.—W. B. Turrill.

Figs. 1 and 2, plant, *natural size*; 3, flower, × 5; 4, calyx, and calyx and bract, × 5; 5, fruits, × 5.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Tabula 3136.

VERONICA ORCHIDEA, *Crantz.*

Scrophulariaceae. Tribus Digitaleae.

V. orchidea, *Crantz Stirp. Austr.* Fasc. iv. p. 333 (1769); *Turrill in Journ. Bot.* vol. lxiii. p. 160 (1925), *et in Bull. Soc. Bot. Bulg.* vol. ii. p. 22 (1928); a *V. spicata*, L., caulibus calycibusque glanduloso pubescentibus recedit.

Herba perennis. *Rhizoma* breve, plus minusve horizontale, leviter incrassatum. *Caules* erecti, simplices, teretes, usque ad 9 dm. alti sed saepissime breviores, puberuli. *Folia* in planta juveni oblongo-ovata, apice rotundata, basi in petiolum abrupte contracta, usque ad 9 cm. longa, petiolo 2 cm. longo excluso, et 4·5 cm. lata; folia caulina in planta florifera lanceolata, elliptico- vel oblongo-lanceolata, acuta vel subacuta, usque ad 7 cm. longa et 3 cm. lata; inferiora abrupte vel subgradatim in petiolum contracta; superiora minores; omnia margine crenata vel rarissime integra, plus minusve puberula vel in pagina superiore lucida glabra vel fere glabra, haud glandulosa, costa nervisque lateralibus in pagina superiore vix prominentibus in inferiore prominentibus. *Inflorescentia* multum ramosa, ramis densius puberulis et superne glandulosis, spicis elongatis, multifloris; bracteae lanceolatae vel superiores lineares. *Calycis segmenta* elliptico-oblonga, obtusa vel subacuta, 2 mm. longa, 1·25 mm. lata, dense glandulosa. *Corolla* atroviolacea, 7 mm. longa, lobis 4–5 mm. longis, 2·5 mm. (adaxiale)–0·5 mm. (abaxiale) latis, contortis. *Stamina* 6 mm. longa, antheris 2 mm. longis inclusis. *Gynaeceum* 6·25 mm. altum; stylus glaber; ovarium 1 mm. altum, pubescens. *Capsulae* glanduloso-pubescentes, 2·25 mm. longae. *Semina* complanato-ellipsoidea, 0·5 mm. longa.—*V. spicata*, L., subsp. *orchidea*, Hayek in Hegi Ill. Fl. Mit. Eur. vol. vi. pars i. p. 46 (1915), et in Prodr. Flor. Penins. Balcan. vol. ii. p. 157 (1929).

Europe. N. Italy, Austria, Hungary, Banat, Galicia, Germany, Czecho-Slovakia, Roumania, Croatia, S. Russia, Albania, Bulgaria, Dobruja, Serbia, Istria.

This microspecies of the *V. spicata* group of speedwells has been cultivated at Kew for some years from seeds collected on the hills south of Varna, eastern Bulgaria, where it grows in grassy places

between shiblyak, associated with *V. euxina*. Under cultivation it retains its characteristic features and makes a plant of considerable horticultural value. In its general distribution it is essentially Pannonian-Caucasian so far as the available material allows us to judge. Morphologically the relatively long and narrow often twisted corolla-lobes of a dark violet-blue colour are very distinctive, and the shortness of the hairs makes the living plant appear glabrous till a lens is applied. Both *V. orchidea* and *V. euxina* normally over-winter as hemicryptophytes.—W. B. Turrill.

Fig. 1, upper portion of flowering plant, *natural size*; 2, lower portion of plant, *natural size*; 3, flower, × 3; 4, calyx, and calyx with bract, × 5; 5, fruit, × 5.

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Tabula 3137.

FAGUS ORIENTALIS, *Lipsky.*

Fagaceae. Tribus Fageae.

F. orientalis, *Lipsky in Acta Hort. Petrop.* vol. xiv. p. 300 (1897); *Stefanoff in Oesterr. Bot. Zeitschr.* vol. lxx. p. 111 (1921); *Stoyanoff et Stefanoff, op. cit.* vol. lxxii. p. 86 (1923); *Turrill in Kew Bull.* 1926, p. 102, *et Plant-Life of the Balkan Peninsula*, p. 139 (1929); *Stoyanoff in Jahrb. d. Univer. Sofia. Landwirtsch. Fakultät.* vol. v. pp. 345–394 (1927), *et in Mag. Bot. Lap.* vol. xxv. p. 131 (1927); a *F. silvatica*, L., foliorum nervis utrinque saepissime 9–11, floribus masculis perigoniis late et breviter campanulatis lobis brevioribus late ovatis, fructus involucri laciniis majoribus inferioribus foliaceis differt.

Arbor alta, cortice cinereo. *Folia* elliptica, oblongo-, ovato-, vel obovato-elliptica, apice acuta subacuta vel leviter attenuata, basi rotundata vel plus minusve cuneata, lamina usque ad 12·5 cm. longa et 7·5 cm. lata, saepissime minore, venis lateralibus utrinque saepissime 9–11 in pagina inferiora prominentibus adpresse sericeis; petiolus circiter 1 cm. longus. *Flores masculi:* perigonia late et breviter campanulata, 3 mm. longa, lobis late ovatis 1·5 cm. longis 1·25 cm. latis; stamina 9–12, 6 mm. longa; antherae 1·25 mm. longae. *Fructus* involucri laciniis majoribus dissimilibus, inferioribus foliaceis viridibus multinerviis 1 cm. longis et usque ad 3 mm. latis interdum in fructus pediccllo sitis; intermediis subsimilibus sed tenuioribus et acutioribus, supremis subulatis; pedicellus 2–7 cm. longus, adpresse sericeus.

Bulgaria. In silvis monte Strandje, Jul. 1920, *Stoyanoff et Stefanoff* (forma macrophylla); in silvis ad rivum Kamtschia, 9.7.22, *Stoyanoff et Stefanoff*; south of the Aladza Monastery, north of Varna, 8.6.25, *B. Gilliat-Smith*, 1189; Central Rodope, in valley between Boju and Daridere, c. 400 m., 17–18.6.26, *Turrill*, 1450, 1482, 1483, 1646.

Crimea. Woods of the Tchatir-Dagh, 30.9.46, no collector; in descensu a monte Karabi-Jaila usque ad p. Kuczuk-Usen, 22.5.05, *N. A. Busch*; forest on the mountain Ai Petri, 13.7.25, *Zizime*.

Asia Minor. Near the roadside from Brusa on Mt. Olympus, about 3000–4000 ft., 30.8.24, *C. W. James and Sir Henry Miers, F.R.S.*; Mt. Ida, Troas, Tschai-Dere prope Kareikos, 24.7.83, *Sintenis*, 581 (?);

Paphlagonia, Wilajet Kastambuli, Kure-Nahas, in silvis ad Topschi-Chan, 9.9.92, *Sintenis*, 5113; Paphlagonia, Küre, between Kastamuni and Ineboli, 1400 m., on the northern slope of Kush-Dagh, in mixed forest with *Taxus*, *Abies Bornmuelleriana*, *Carpinus*, *Fraxinus*, etc., 5.8.25, *H. Czeczott*; Phrygia, Tchabanne-Dagh, à l'Est de Guédis, vers 1300 mètres, 19.7.57, *Balansa*, 1141.

Caucasus. Kusary, distr. Ruba, prov. Baku, 31.7.26, *Kariagin*; Ossetia, in silvis prope Alagir, 4 u. 7.98, *B. Marcowicz*; Terek, circa Shelesnowodsk, 28.8.98, *F. Akinfiew*, 438; Balkaria Dukh-Sou, in mixed beech and birch copse, on the mountain above Dykhskaya block-house, 1900 m., 18.7.27, *E. and N. Busch*; Karska region, district of Ardagan, 20.8.14, *E. T. Kikodse*; 6 versts from the village of Djoubia in the Black Sea Government, 1913, *Mdme. M. Lavrouve*; in mountain gorges near Batum, *Massalsky*.

Syria. Monts Amanus: Kusliji Dagh, 5000–6500 ft., 8.08, *M. Haradjian*, 2568.

Persia. Sylv. Ghilan, *Aucher-Eloy*, 5325.

The oriental beech has its main distribution in the Caucasus and northern Asia Minor where it forms considerable forests. It was first recorded in Europe from the Strandja mountains in eastern Bulgaria, later near Dolen-Ciflik in the eastern Stara Planina, still later north of Varna, and then in the Central Rodopes, north of Daridere. In 1927 Stoyanoff recorded it for many localities in the eastern parts of the Stara Planina, near Cape Emine and the village of Gjozeken. In the Balkan Peninsula the common beech (*F. silvatica*, L.) grows generally at higher altitudes (commonly above 1000 m.), and the oriental beech only in the eastern parts and at lower altitudes. Geographically their areas overlap in the Central Rodopes, and intermediates undoubtedly occur there (*Turrill*, 1431, 1472, 1713, in Herb. Kew). The writer suggested in 1926 that the beech recorded for the northern Dobruja might be *F. orientalis*, and this suggestion has since been confirmed by G. H. Grinţescu (*Bul. Grăd. Bot. Cluj.* vol. vii. p. 58: 1928). In the Dobruja the oriental beech is said to occur especially at Luncaviţa (distr. of Tulcea), where it forms a small forest of 200–250 individuals. Accounts of the oriental beech forest in the Central Rodopes have already been published (Stoyanoff 1927, Turrill 1929).

The beech or beeches of the Crimea are still in dispute. E. Wulff and T. Zyrina (*Oesterr. Bot. Zeitschr.* vol. lxxiii. p. 276: 1924) conclude that both *F. silvatica* and *F. orientalis* occur in the Crimea. Wulff, however, in Karsten u. Schenck, *Vegetationsbilder*, vol. xvii. t. 3b, says "Die Buchenwälder in der Krim werden von einer Form, die der *Fagus orientalis* Lipsky sehr ähnlich ist, gebildet." It is understood that further recent investigations on the Crimean beeches have been made, but no publication dealing with the results has been traced. The few Crimean specimens at Kew are insufficient to decide the range of characters found in the genus in the Crimea, but they appear

indistinguishable from the more abundant Caucasian material, and are here quoted as *F. orientalis*.

The distribution of *F. silvatica* is given, fairly accurately, by Lämmermayr in *Die Pflanzenareale*, I. ii. Karte 17 (1926), and for *F. orientalis*, incompletely, in Karte 18.—W. B. Turrill.

Fig. 1, foliage branch, *natural size*; 2, flowering branch, *natural size*; 3, young infructescence, *natural size*; 4, bracts from cupule, × 2; 5, male flower, × 3; 6, fruits, *natural size*.

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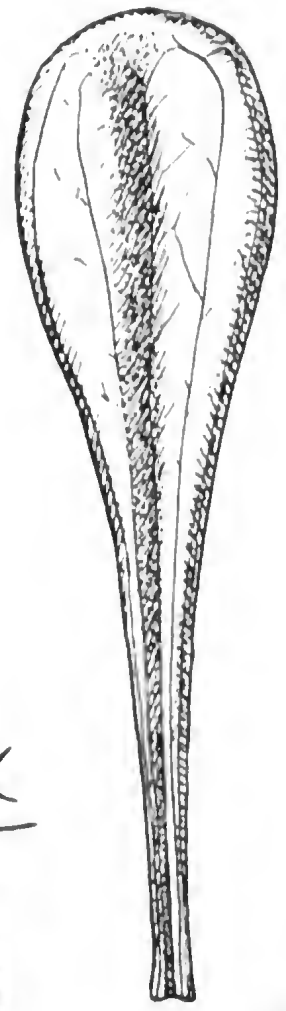

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Tabula 3138.

OTHONNA EUPHORBIOIDES, *Hutchinson.*

Compositae. Tribus Senecioneae.

O. euphorbioides, *Hutchinson in Ann. S. Afr. Mus.* vol. ix. p. 412, fig. 15 (1917); species insignis habitu *Euphorbiae*, foliis multo reductis, pedunculis bifureatis demum spinescentibus distinctissima.

Caules robusti, erassi, breves, duri, pedunculis bifureatis persistentibus spinosi, cortice laevi glabro obtecti. *Folia* reducta, pauca, circum bases pedunculorum subvertieillata, anguste oblanceolata, vel spatulato-oblanceolata, 1–1·3 cm. longa, 2–3 mm. lata, crassa et probabiliter carnosa, glabra, e pulvino cano-tomentoso orta. *Pedunculi* rigidi, superne plerumque bifureati, ad 2·5 cm. longi, glabri. *Capitula* minima, turbinato-campanulata, discoidea, circiter 5 mm. diametro. *Involucrum* 3 mm. longum, 5-lobatum, lobis ovato-triangularibus subacutis 1 mm. longis glabris. *Flores radii* breviter ligulati; corolla pappo brevior, apice bifida. *Achaenia* brevia, 1 mm. longa, crassa, glabra. *Pappus* copiosissimus, albus, plerumque 2·5 mm. longus, minute barbellatus. *Flores disci* steriles; corollae tubus 2 mm. longus, glaber, lobi oblongi, obtusi, 1 mm. longi. *Achaenia* angusta, elongata, glabra, 1·25 mm. longa. *Pappus* minus copiosus, ceterum ut in floribus radii.

South Africa. Little Namaqualand: Khamiesberg; in clefts of rocks on upper north-west slopes of Sneeuwkop, *Pearson & Pillans*, 5795; south-east slopes above Modderfontein, *Pearson & Pillans*, 5858; Beacon Hill, north-west of Leliefontein, 1680 m., *Pearson*, 6326.

Among the many weird forms of African plants this is perhaps one of the most remarkable. In habit it resembles very closely some species of *Euphorbia* and of Crassulaceae. The peduncles are bifureate and become hard and spinescent, a very remarkable feature in the Compositae. According to Pearson it forms a cushion-plant in the Khamiesberg.—J. Hutchinson.

Fig. 1, portion of plant, *natural size*; 2, leaf, × 5; 3, flower-heads, × 5; 4, flower, × 12; 5, stamen, × 30; 6, style, × 30.

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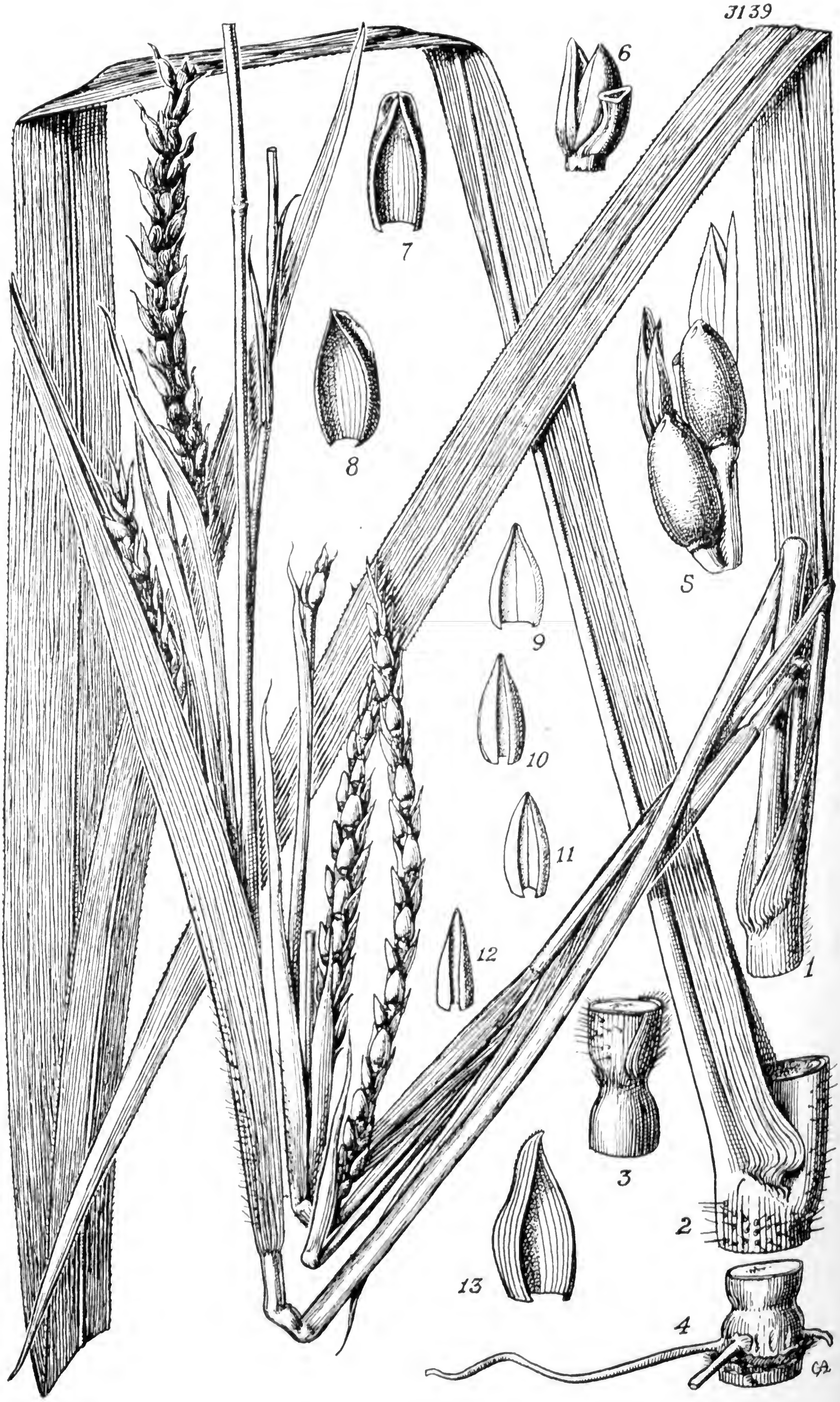

Tabula 3139.

ROTTBOELLIA PURPURASCENS, *Robyns.*

Gramineae. Tribus Andropogoneae.

R. purpurascens, *Robyns, Flor. Agrost. Congo Belge*, pars i. p. 66 (1929), *et Bull. Jard. Bot. Brux.* vol. viii. p. 214 (1930); a *R. exaltata*, Linn.f., culmis crassioribus, vaginis foliorum valde tuberculato-setulosis, racemis leviter compressis, et spiculae sessilis gluma inferiore apice truncata satis distinguenda.

Gramen annuum. *Culmi* erecti, ad 1·5 m. alti, robusti, teretes, sed internodiis facie folia spectante late canaliculatis vel applanatis, superne ramosi, glabri, purpurascentes, nodis plus minusve appresse pubescentibus. *Foliorum vaginae* teretes, striatae, setis deciduis basi valde tuberculatis dense indutae; ligulae brevissimae, truncatae, glabrae; lamiuae lineares, multi-plicatae vel planae, ad 55 (raro 70) cm. longae, 4–19 mm. latae, ad apicem acutissimam sensim attenuatae, glabrae, plus minusve purpurascentes, marginibus scabris, costa subtus prominente. *Racemi* solitarii, spiciformes, cylindrici, rigidiusculi, leviter curvati et compressi, spiculis sessilibus stramineis exceptis pallide virides, ad 13 cm. longi, 5 mm. diametro, glabri; articuli 4–4·5 mm. longi, facie interiore concavi, inferne complanati, apice excavati, sectione triangulares, pedicello spiculae pedicellatae e basi plus minusve altc lateraliter aduati; pedicelli articulis paulo breviores et latiores, complanati, facie interiore leviter concavi. *Spiculae sessiles* 5·5 mm. longae, callo brevi lato laevi incluso, elliptico-oblongae, glabrae. *Glumae* 4·5 mm. longae, 2 mm. latae; inferior coriacea, crassa, elliptico-oblonga, truncata, leviter emarginata ad minute mucronata, minutc scabridula, usque 16-nervis; superior cymbiformis, inferiori similis, carina superne anguste alata. *Anthoecium inferius* ♂; lemma ovatum, acutum, glabrum, hyalinum, 3-nerve, circiter 3·5 mm. longum, 2 mm. latum; palca oblongo-lanceolata, acuta, glabra, hyalina, 2-nervis, lemmati aequilonga, 1·5 mm. lata. *Anthoecium superius* ♀; lemma cymbiforme, hyalinum, uninerve, 3·5 mm. longum, 1·5 mm. latum; palea lanceolata, subacuta, hyalina, obscure 2-nervis, lemmati acquilonga, 1·3 mm. lata. *Caryopsis* rubro-brunnea, oblonga, 3 mm. longa, 1 mm. lata. *Spiculae pedicellatae* sessilibus majores et magis compressae, versus apicem racemi sensim magis imperfectae, gluma inferiore excepta spiculis sessilibus similes. *Gluma inferior*

ovato-lanceolata, acuta, membranacea, uno margine dimidium versus medium reduplicato, 6–7 mm. longa, 2·8 mm. lata. *Anthoecia* ♂, neutra vel partibus interioribus non evolutis valde imperfecta—*Rottboellia compressa*, Vanderyst in Bull. Agric. Congo Belge, vol. ix. p. 236 (1918), non Linn. *f*.

Tropical Africa. Belgian Congo: Kinshasa, *Vanderyst*, 6095 bis, 6407.

This grass was first described by Vanderyst as *Rottboellia compressa*, a name which had already been used by the younger Linnaeus for another plant, *Hemarthria compressa*, (Linn.f.) R.Br. Although its congener, *R. exaltata*, Linn.f., is a useful fodder grass, its own value in this connection is not known. It is a much coarser grass than *R. exaltata*, with an abundance of hispid hairs which Vanderyst suggests may make it definitely dangerous for cattle.

Up to the present, it has been recorded only from the lower Kasaï region of the Belgian Congo and around Leopoldville. According to Robyns, vernacular names for this grass in the neighbourhood of Leopoldville are Toanga-Malag and Sembi-Boiki.—F. Ballard.

Fig. 1, upper part of a plant with flowering culms; 2, one of the larger lower leaves; 3, a node; 4, one of lowest nodes with stilt roots; 5, part of a raceme; 6, sessile spikelet in $\frac{3}{4}$ back view, showing joint of rhachis; 7, lower glume from within; 8, upper glume from within; 9, lemma of lower floret from within; 10, palea of lower floret from within; 11, lemma of upper floret from within; 12, palea of upper floret from within; 13, lower glume of pedicelled spikelet. *Figs.* 1–4, *natural size*; *figs.* 5–13, × 6.

3140

Tabula 3140.

CHAMAERAPHIS HORDEACEA, *R.Br.*

Gramineae. Tribus Paniceae.

C. hordeacea, *R.Br. Prodr. Flor. Nov. Holl.* p. 193 (1810); affinis *Pseudoraphi paradoxae*, (R.Br.) Pilger, a qua pedicello spiculae ramulo aristiformi adnato et ramulo cum spicula maturitate disarticulato differt.

Gramen perenne e rhizomate horizontali glabro. *Culmi* erecti, ad 60 cm. alti, graciles, nodis ipsis atque infra plus minusve pubescentes, ceterum glabri, multinodes. *Foliorum vaginae* compressae, infimae pubescentes, superiores glabrescentes; *ligulae* rotundato-truncatae, scariosae; *laminae* lineares, apice late rotundatae ad 10 cm. longae, 2–4 mm. latae, basi setis tuberculatis sparsis exceptis glabrae. *Panicula* densa, spiciformis, ad 10 cm. longa (aristis inclusis), 6 mm. lata; axis valde complanatus, marginibus scabris; ramuli distichi, sursum sensim attenuati et aristam scabridulam formantes, ad 7·5 cm. longi, basi spiculam singulam gerentes; pedicelli 3–4 mm. longi, deorsum attenuati basi acutissimi, ramulo lateraliter adnati, plus minusve pubescentes. *Spiculae* ambitu lineari-oblongae, 8–10 mm. longae, 1–1·5 mm. latae. *Glumae* valde inaequales; inferior minuta, decidua, 0·5 mm. longa, 1·8 mm. lata, hyalina; superior lanceolato-oblonga, apice anguste truncata, carinis scaberulis, membranacea, 11-nervis, 8–10 mm. longa, 1·5–1·8 mm. lata. *Anthoecium inferius* ♂; *lemma* glumae superiori simile, ad 8 mm. longum, 1·5 mm. latum, 11-nerve, apice obtusum vel subacutum; *palea* lanceolata, 2-nervis, tenuiter hyalina, ad 8 mm. longa, 1·3 mm. lata. *Antherae* 5·5 mm. longae. *Anthoecium superius* pseudo-hermaphroditum, staminibus abortivis, ambitu lanceolato-oblongum, acutum; *lemma* et *palea* hyalina; *antherae* vestigiales, filamentis longis, filiformibus, anthoecium superantibus.—*Setosa erecta*, Ewart et Cookson in Ewart et Davies, Flor. North. Terr. p. 33, tt. 2, 3 (1917); *S. hordeacea*, Ewart in Proc. Roy. Soc. Vict. N.S. vol. xxxii. p. 204 (1920).

Australia. Northern Territories: Islands in the Gulf of Carpentaria ("h" and "l"), *R. Brown*, 6128; MacArthur River, *G. F. Hill*, 705.

The present plant was the basis of Robert Brown's genus *Chamaeraphis*. Later on, Poiret extended the conception of the genus by

adding three more Australian plants which Brown had included in *Panicum*. The spikelets in *Chamaeraphis hordeacea* occur singly on the axis of a spikelike raceme, whereas in the added species the spikelets are arranged in open panicles. Griffith, forty years later, proposed a new genus, *Pseudoraphis*, for those species of *Chamaeraphis* which had been added since Robert Brown's day.

In 1917, Ewart and Cookson, who were evidently unacquainted with the work of Robert Brown, redescribed *Chamaeraphis hordeacea* as a new genus and species, *Setosa erecta*. Subsequently, Ewart made the combination *Setosa hordeacea* (R.Br.), retaining the new generic name because of the differences existing between the original plant and the other species of *Chamaeraphis* (i.e. *Pseudoraphis*, Griff.). Bentham, in his Flora Australiensis, did not accept Griffith's genus, which thus had become somewhat overlooked. It is clear that Ewart's amended name is invalid, since the plant concerned is the original species of the genus *Chamaeraphis*, and Robert Brown's original generic name must therefore be retained for it.

One of the Australian species of *Pseudoraphis*, *P. paradoxa*, (R.Br.) Pilger, bears a great resemblance to *Chamaeraphis hordeacea*, since the panicle is a reduced one in which the individual branches bear only one or two spikelets. In a number of cases the solitary spikelet is borne low down on the branch near to its insertion, though there is never any partial fusion between the pedicel and the branch as in *Chamaeraphis*. The details of the spikelets are very similar in both plants and it is apparent that the two are closely allied. Thus, the Asiatic paniculate species of *Pseudoraphis* lead on quite naturally by a process of reduction through the Australian *P. paradoxa* to *Chamaeraphis hordeacea*.

The fusion of the pedicel with the base of the branch, though incomplete, cannot logically be regarded as a further stage in this reduction, whilst the disarticulation of the branch with the spikelet attached, so that the former functions as an awn, can also scarcely be connected with this retrogressive tendency. These two characters are connected with a progressive specialization and result in the production of an "awned" spikelet of a peculiar kind. Such are the grounds for treating *Chamaeraphis* as a monotypic genus. While it is, in many ways, convenient thus to separate *C. hordeacea* from *Pseudoraphis*, Poiret's extended conception of *Chamaeraphis* might possibly result in a more natural grouping.—F. BALLARD.

FIG. 1, part of a tuft with flowering culms, *natural size*; 2, disarticulated spikelet with attached "awn," × 2; 3, lower glume; 4, upper glume from within; 5, lemma of male floret from within; 6, palea of male floret with stamens enclosed; 7, lemma of fertile floret from within; 8, palea of fertile floret from within; 9, fertile floret with barren stamens cut off below; 10, young fertile floret. *Figs.* 3–9, × 6; *fig.* 10, × 20.

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Tabula 3141.

SETARIA HAARERI, *Stapf et Hubbard.*

Gramineae. Tribus Paniceae.

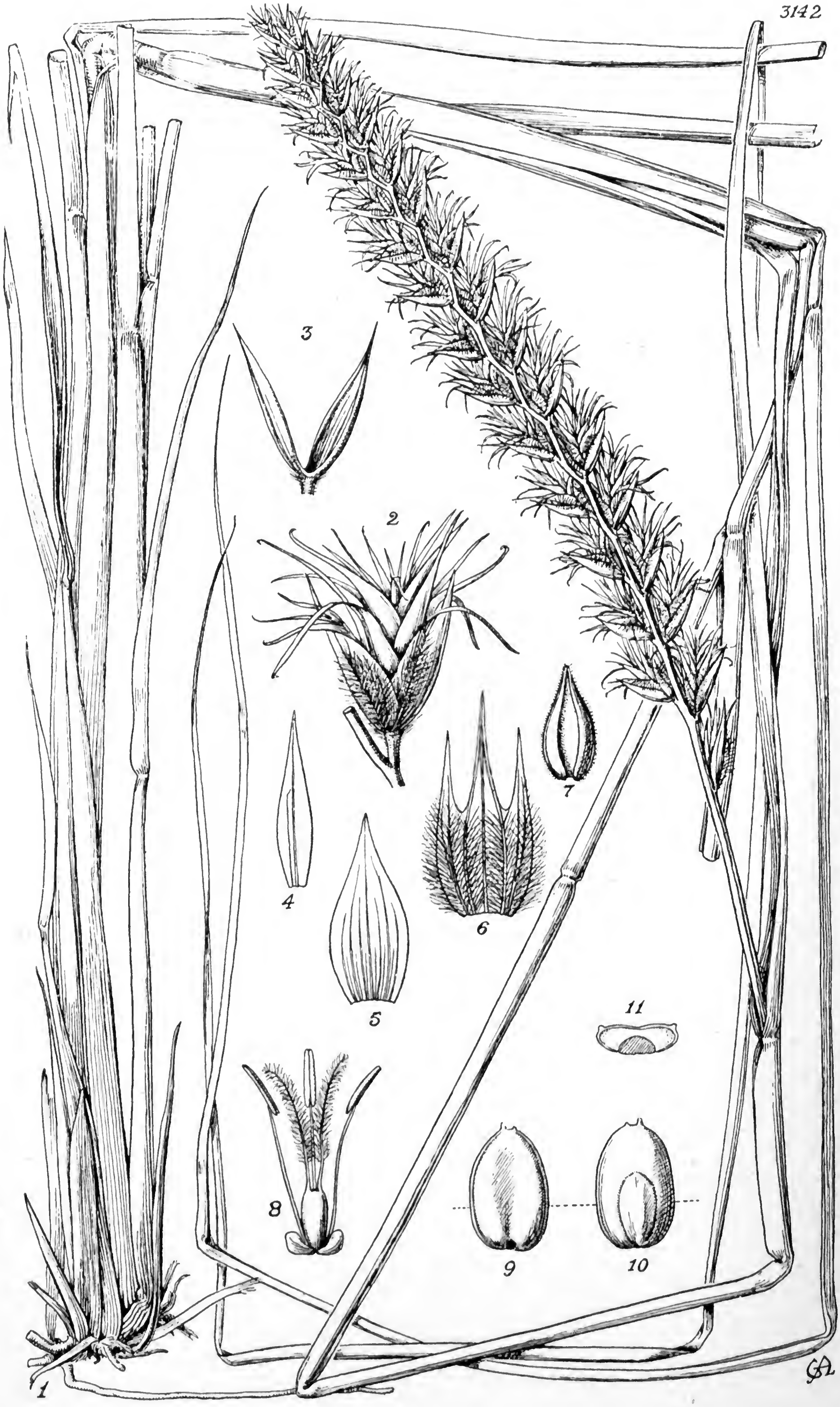
S. Haareri, *Stapf et Hubbard in Prain, Flor. Trop. Afr.* vol. ix. p. 834, ined.; a *S. longiseta*, P. Beauv., habitu minore, laminis basi sagittatis, spiculis majoribus differt.

Gramen perenne. *Culmi* erecti vel ascendentes, ad 1 m. alti, graciles, scabridi et interdum infra inflorescentiam pubescentes, infra nodos plus minusve pubescentes, ceterum glabri, 4–5-nodes, pedunculo ad 15 cm. longo. *Foliorum vaginae* compressae, glabrae vel leviter pubescentes; *ligulae* ad fimbriam ciliorum reductae; *laminae* e basi profunde sagittata lineares, lobis subulato-acuminatis ad 1·8 cm. longis, sensim attenuatae, apice longe et tenuiter setaceae, ad 30 cm. longae, 6–12 mm. latae, pubescentes, pilis basi paulo tuberculatis, marginibus scabris. *Panicula* linearis ad lanceolato-oblonga, 15–25 cm. longa, 1·3–5 cm. lata; axis striatus, sulcatus, scaberulus; ramuli solitarii ad quaterni, suberecti, scaberuli, inferiores et intermedii 1·8–5 cm. longi; spiculae omnes solitariae vel basi ramulorum in fasciculos breviter pedunculatos trifloros dispositae; rami et ramuli seta terminati, praeterea seta nonnunquam spiculam subtendente; setae graciles, scaberulae, plerumque 0·6–1·2 cm. longae; pedicelli brevissimi, apice dilatati. *Spiculae* ovato- ad elliptico-oblongae, subacutae vel hiantes, a latere visae leviter obliquae, a dorso visae acutae vel apiculatae, fere 3 mm. longae, 1·5 mm. latae, viridescentes vel purpurascentes. *Glumae* membranaceae, marginibus hyalinis; inferior late elliptico-oblonga, obtusa et plerumque apiculata, fere 1·5 mm. longa, 5–6-nervis; superior inferiori similis sed anthoecio superiori aequilonga, 7–8-nervis. *Anthoecium inferius* ♂; lemma ambitu spiculae dorso visae simile, 5–7-nerve. *Palea* ovato-oblonga, lemmati aequilonga, carinis anguste marginatis. *Antherae* 2 mm. longae. *Anthoecium superius* ♀, ambitu ovato-oblongum, acutum, mucronatum. *Lemma* et *palea* coriacea, tenuiter transverse rugosa.

Tanganyika Territory. Pare District: Kiruru, 750 m., *Haarer*, 1279. Moshi District: Arusha Chini, in shade, 750 m., *Haarer*, 1188.

This species is a very distinct member of the section *Panicatrix*, being at once separable from its congeners by its pronouncedly sagittate leaves. The spikelets also are larger and plumper than those of the other members of the section.—F. BALLARD.

FIG. 1, part of a plant with a flowering culm, *natural size*; 2, a spikelet with subtending bristle; 3, lower glume; 4, upper glume; 5, lemma of lower floret seen from within; 6, palea of lower floret seen from within; 7 and 8, upper floret seen from the back and in three-quarter profile. *Figs.* 2–8, × 10.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Tabula 3142.

ASTREBLA SQUARROSA, *C. E. Hubbard.*

Gramineae. Tribus Chlorideae.

A. squarrosa, *C. E. Hubbard in Kew Bull.* 1928, p. 257; affinis *A. lappaceae*, (Lindl.) Domin, sed foliis etuberculatis, racemis latioribus, spieulis majoribus, lobis lemmatum inter se similibus tenuiter aeuminatis differt.

Gramen perenne, eaespitosum, foliorum vaginis numerosis persistentibus. *Culmi* e rhizomate brevi, primo ereeti, deinde aseendentes, glabri, plus minusve graciles, ad 1·5 m. alti, ad 7-nodes. *Folia* glabra; *vaginae* solidae, laeves; *ligulae* valde truneatae, ad 0·5 mm. longae, eiliatae; *laminae* lineares e basi angusta scnsim attenuatae, acutissimae, ad 40 cm. longae vel ultra, 3–6 mm. latae, laeves vel pagina superiore et marginibus asperulae. *Racemi* solitarii, spieiformes, eomplanati, 7–18 em. longi, eum setis 1·5–3 cm. lati. *Rhachis* 1–1·25 mm. lata, dorso tenuiter striata, dense scaberula; pedieelli 1·5–2·5 mm. longi, appressi, dense seaberuli. *Spiculae* arcte imbrieatae, ovato-oblongae ad late elliptieo-oblongae, 8–11 mm. longae, 4–8 mm. latae (setis exclusis), vel spicula infima ad 2·5 cm. longa. *Gluma inferior* linearilanceolata vel lanceolata, acuta vel aeuminata, 5–10 mm. longa (illa spieulae infimae exeepta) glabra, 2–3-nervis. *Gluma superior* elliptico-ovata vel elliptica, acuta vel acuminata, 6·5–11 mm. longa (illa spiculae infimae excepta), marginibus scariosis, 7–12-nervis. *Anthoecia* 6–9, arcte imbricata, sursum deerescentia, 3–4 infima perfecta, cetera sterilia, supremum ad valvam integram reduetum. *Lemma* anthoecii infimi 12–15 mm. longum, lobis exclusis late oblongo-ellipticum vel fere quadratum, 4·5–6·5 mm. longum, 4·5–5·5 mm. latum, 5–7-nerve, dense et longe serieeo-villosum; lobi inter se similes, rigidi, tenaces, aequilongi vel intermedius lateralibus longior, primo erecti, demum reflexi vel interdum uneinati; lobi laterales subulati, 5–8 mm. longi, lobus intermedius e basi lata sensim angustatus apiee setiformis, 6–10 mm. longus. *Palea* elliptica, acuminata, 6–7 mm. longa, carinis dense ciliatis. *Antherae* 1–2·5 mm. longae. *Caryopsis* elliptica, dorsaliter compressa, 2·5–3 mm. longa, 1·6–2 mm. lata, brunnea.—*A. triticoides* var. *lappacea*, Benth. Fl. Austral. vol. vii. p. 603 (1878), quoad specim. et descr.; et *A. lappacea*, Domin in Biblioth. Bot. vol. lxxxv. p. 372 (1915), quoad ic. et specim.; non *Danthonia lappacea*,

Lindl. *A. triticoides*, F. M. Bailey, Syn. Queensl. Fl. p. 660 (1883) ? ; Cat. Queensl. Pl. p. 57 (1890) ? *A. pectinata* var. *triticoides*, F. M. Bailey in Queensl. Dept. Agric. Bot. Bull. no. xiii. p. 15 (1896).

Northern Australia. Sturt's Creek and Hooker's Creek, *Mueller*.

Queensland. Between Cloncurry and Camooweal, McKinlay Ranges and Buckley River, June–Dec. 1889, *Burton* ; Muttaburra, north of Longreach, April 1919, *White* ; Iffley Station, *Gulliver* ; Darr River, near Longreach, *Burgh-Birch* ; Longreach, April 1913, *Bick* (type) ; Flinders River, Aug. 1926, *White* ; Georgetown, *Green* ; Prairie, Raglan County, *Chrisholm* ; Suttor River, *Mueller* ; without precise locality, *Bowman*.

New South Wales. Between Darling River and Cooper's Creek, *Neilson*.

The present grass is one of four species of an endemic Australian genus, all of which, known as " Mitchell Grasses," form a dominant feature of the drier parts of the continent. As a source of fodder they are unrivalled, since their deep-rooting systems render them very resistant to drought, while their growth after rain is particularly rapid. Though not ranking as the best of these four grasses, our species is yet highly prized in eastern Australia, particularly in Queensland, where it is known as " Bull or Wheat-eared Mitchell Grass."

Its distribution, judging from the dried material in the Herbarium at Kew, is restricted to areas in which the annual rainfall ranges from 10 to 20 inches, or rarely up to 30 inches.

The genus has been revised by C. E. Hubbard in Kew Bull. 1928, p. 257, where more detailed information as to the somewhat complicated synonymy of the species may be obtained.—F. Ballard.

Fig. 1, part of a tuft with a flowering culm, *natural size* ; 2, a spikelet, × 3 ; 3, an empty spikelet, × 3 ; 4, lower glume, × 3 ; 5, upper glume, × 3 ; 6, lowest lemma seen from the back, × 3 ; 7, palea seen from within, × 3 ; 8, perfect flower, × 6 ; 9 and 10, caryopsis in back and front view, × 6 ; 11, caryopsis in cross section, × 6.

3143

Tabula 3143.

RANDIA URANTHERA, *C. E. C. Fischer.*

Rubiaceae. Tribus Gardenieae.

R. uranthera, *C. E. C. Fischer in Kew Bull.* 1929, p. 314; species *R. sootepensi*, Craib, affinis, foliis floribusque majoribus, antheris longioribus caudatis differt.

Arbor circiter 6 m. alta. *Folia* coriacea, lineari- vel elliptico-lanceolata, longe acuminata, basi acuta, usque ad 18 cm. longa et 5·75 cm. lata, glabra; petioli robusti, usque ad 1 cm. longi; stipulae triangulares, acutae, 3 mm. longae. *Pedunculi* in axillis superioribus fasciculati, brevissimi; flores apice pedunculorum sessiles, bini; bracteolae 2, late ovatae, acutae. *Receptaculum* teres, usque ad 1 cm. longum, 3 mm. diametro. *Calyx* extra breviter appresso-hirsutus, intus pilis appressis rigidis rufis dense indutus; tubus 4–5 mm. longus; lobi triangulares, cuspidati, 2·5 mm. longi. *Corolla* glabra; tubus 6–7 cm. longus, basi 2 mm. diametro, superne sensim dilatatus, apicem versus abrupte infundibularis, fauce ultra 1 cm. diametro; lobi 5, oblongi, usque ad 2·5 cm. longi, 1·5 cm. lati. *Antherae* subsessiles, 2·3 cm. longae, apice exsertae, basin versus in caudam acutam sensim attenuatae. *Ovarium* apice applanatum; stylus filiformis; stigma fusiforme, 1·2 cm. longum, semi-exsertum.

Burma. Tavoy: Ba Wa Forest Reserve, *C. E. Parkinson,* 8108 (Coll. Forester *Ba Pe*).

A handsome species. The stem is dark grey and the flowers, which were found in February, are white and fragrant. It differs from *R. sootepensis*, Craib, mainly by the longer corollas and the long-tailed large anthers.—C. E. C. Fischer.

Fig. 1, twig in leaf and flower, × ⅔; 2, corolla opened out to show anthers and style, *natural size*; 3, receptacle and calyx, × 1¾; 4, anther, lateral and ventral aspects, × 2.

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Tabula 3144.

SYMPLOCOS SUKOEI, *C. E. C. Fischer.*

Symplocaceae.

S. Sukoei, *C. E. C. Fischer in Kew Bull.* 1929, p. 315; species *S. Maingayi*, Benth., affinis, ramulis et inflorescentia cinereo-puberulis, foliis majoribus, corollis maturis extra fere glabris, tubo staminali longiore differt.

Arbor usque ad 22 m. alta. *Folia* elliptico-oblonga vel elliptico-obovata, basi attenuata, usque ad 19 cm. longa, 8 cm. lata, chartacea, subtus costa nervisque minuta puberula, caeterum glabra. *Cymae* axillares, pauciflorae; rhachis usque ad 2 cm. longa, fusco vel cinereo-tomentosa; pedicelli brevissimi; bractcolae minutae, ensiformes, cinereo-tomentosae. *Receptaculum* 3·4 mm. longum, cinereo-tomentosum. *Calyx* carnosus, extra cinereo-tomentosus; tubus 2 mm. longus; lobi 5, hemisphaerici, 1 mm. longi, cinereo-ciliati. *Corolla* carnosa; tubus cylindricus, usque ad 2·2 cm. longus; lobi 5, ligulati, usque ad 1·75 cm. longi. *Tubus staminalis* fauce corollae insertus, cylindricus, 1 cm. longus; antherae numerosae. *Ovarium* receptaculo immersum, apice conicum breviter extrusum, dense cinereo-pilosum, 3 loculare; stylus filiformis, tubum staminalem 2·5 mm. superans.

Burma. Mergui: Maliwun, Nalechaung, *C. E. Parkinson*, 7776 (Coll. Forester *Sukoe*).

The trunk is grey with white patches. The corolla is white and the staminal tube yellow, the flowers are sweetly scented. The species falls in the section *Cordyloblaste*.—C. E. C. Fischer.

Fig. 1, twig in leaf and flower, × ⅔; 2, flower, sectional view, × 1½; 3, stamina tube, lower part cut away, × 6.

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Tabula 3145.

COTONEASTER NITIDIFOLIA, *Marquand.*

Rosaceae. Subfamilia Pomoideae.

C. (Orthopetalum) nitidifolia, *Marquand*; species nova ex affinitate *C. foveolatae*, Rehd. et Wils., sed foliis supra glabris, in statu vivo nitentibus, fructibus parvis globosis saturate rubris differt.

Frutex erectus. *Rami annotini* elongati, recti, patentes. *Cortex* laevis, glabrescens, rubro-brunneus. *Rami hornotini steriles* terminales, primum dense albo-tomentosi, mox glabri. *Ramuli floriferi* plures, laterales, breves, patentes vel penduli. *Folia* lanceolato-ovata, acuminata, basi cuneata, 4·5–6 cm. longa, 1·5–2·5 cm. lata, tenues, supra glabra, in statu vivo pernitentia, pallide virides, subtus parce pubescentes; nervi laterales obliqui, utrinque circiter 6–8, supra, ut costa, valde impressi; petioli 2–3 mm. longi, tomentosi. *Stipulae* subulatae, ad 7 mm. longae, tomentosae, rubrae. *Cymae* parvae, 3–9-florae, primum albo-tomentosae; pedunculi pedicellique brevcs; bracteae subulatae, 3–4 mm. longae, pubescentes, rubrae. *Flores* penduli. *Calyx* 4 mm. diametro, tomentosus; lobi erecti, deltoidei, acuti, 2 mm. longi, 1·5–2 mm. lati. *Petala* erecta, subelliptica, 3–4 mm. longa, 1·5–2 mm. lata, basi cuneata, integra vel apice sub-erosa, apice albescentia, basi rosea, utrinque glabra. *Receptaculum* vix 2 mm. diametro. *Stamina* circiter 16, 2 mm. longa; filamenta subulata, inter se acquilonga, apice incurvata; antherae roseae. *Carpidia* 2, apice villosa; styli 2 mm. longi. *Fructus* parvus, oblatus, circiter 5 mm. diametro, fusco-ruber. *Pyrenae* duae, lobis incurvatis calycis obtectae.

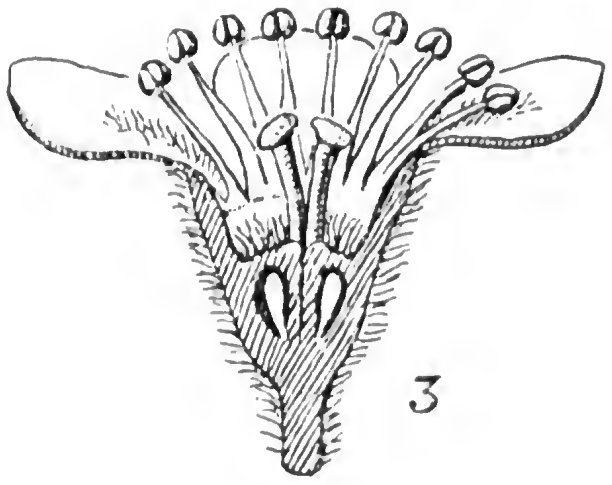
Yunnan. Flowering and fruiting specimens from the same shrub, cultivated in the Royal Botanic Gardens, Kew, October 1929 and June 1930, Kew No. 526/1924, *Forrest* 24072 (seed no.).

Cotoneaster nitidifolia is one of the most striking species of Sect. *Orthopetalum*. It is in cultivation at the Royal Botanic Gardens, Kew, where it was received in 1924 from Mr. J. C. Williams, of Caerhays Castle, Cornwall, under Forrest's No. 24072, but that number is represented in the Herbarium of the Royal Botanic Garden, Edinburgh, by an immature specimen of a species of *Prunus*, described in Mr. Forrest's Field Notes as a "shrub of 12–20 ft. Flowers ? immature.

In open thickets by streams, Shweli-Salwin divide, lat. 25° N., long. 98° 50′ E., alt. 9–10,000 ft. April 1924." A specimen of Forrest's No. 24632, received from the Royal Botanic Garden, Edinburgh, belongs to this species. It seems therefore not unlikely that the numbers have been changed in horticulture. The collector's note on No. 24632 runs "Shrub of 5–10 ft. Fruits crimson. In thickets by streams on the Shweli-Salwin divide, 8–9000 ft. June 1924."

C. nitidifolia fruited for the first time at Kew in 1929. The small dark red fruits are rather sparingly produced and quite distinct from those of *C. foveolata*, Rehd. & Wils., from which species it is also readily separable by the very shining, pale, almost yellowish green upper surface of the leaves.—C. V. B. Marquand.

Fig. 1, portion of a branch of last year's growth, with lateral flowering branchlets, *natural size*; 2, a leaf, showing upper surface, *natural size*; 3, longitudinal section of the flower, × 6; 4, fruit, × 6.



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Tabula 3146.

COTONEASTER COOPERI, *Marquand.*

Rosaceae. Subfamilia Pomoideae.

C. (Chaenopetalum) Cooperi, *Marquand*; speeies nova ex affinitate *C. affinis*, Lindl., a qua foliis angustioribus laneeolatis aeuminatis, infloreseentiis glabreseentibus, floribus minoribus, fruetibus majoribus turbinatis differt.

Frutex altus. *Rami annotini* elongati, areuati, internodiis longis. *Cortex* fuseo-brunneus. *Rami hornotini steriles* terminales et laterales, primum albo-tomentosi, mox glabri. *Ramuli hornotini floriferi* plures, laterales, ereeti vel patentes. *Folia* elliptico-laneeolata, breviter aeuminata, basi euneata, 5–7 em. longa, 1·5–2 em. lata, supra glabra, subtus primum albo-tomentosa, mox glabreseentia, glauca, leviter papillosa; petioli 5–7 mm. longi, primum pubeseentes. *Stipulae* subulatae, 3–4 mm. longae, glabrae, rufescentes. *Cymae* multiflorae, 3–4 em. diametro, primum paree pubeseentes, mox glabreseentes; peduneulus elongatus; pedicelli breves; braeteae minutae, deciduae. *Flores* parvi. *Calyx* 2–2·5 mm. diametro, glabresccns; lobi late triangulares, aeuti, vix 1 mm. longi. *Petala* patentia, late ovata vel suborbicularia, 2·5–3 mm. lata, integra, alba, intus pubeseentia. *Receptaculum* 1·5 mm. diametro. *Stamina* 16–20, vix 2 mm. longa; filamenta inter se aequilonga; antherae pallide purpureae. *Carpidia* 2, apice villosa; styli 1·5 mm. longi. *Fructus* turbinatus, 1 cm. longus, 8 mm. diametro, atro-purpureus. *Pyrenae* duae, 4–5 mm. longae, in apiee fructus inter lobos incurvatos ealyeis conspicuae.

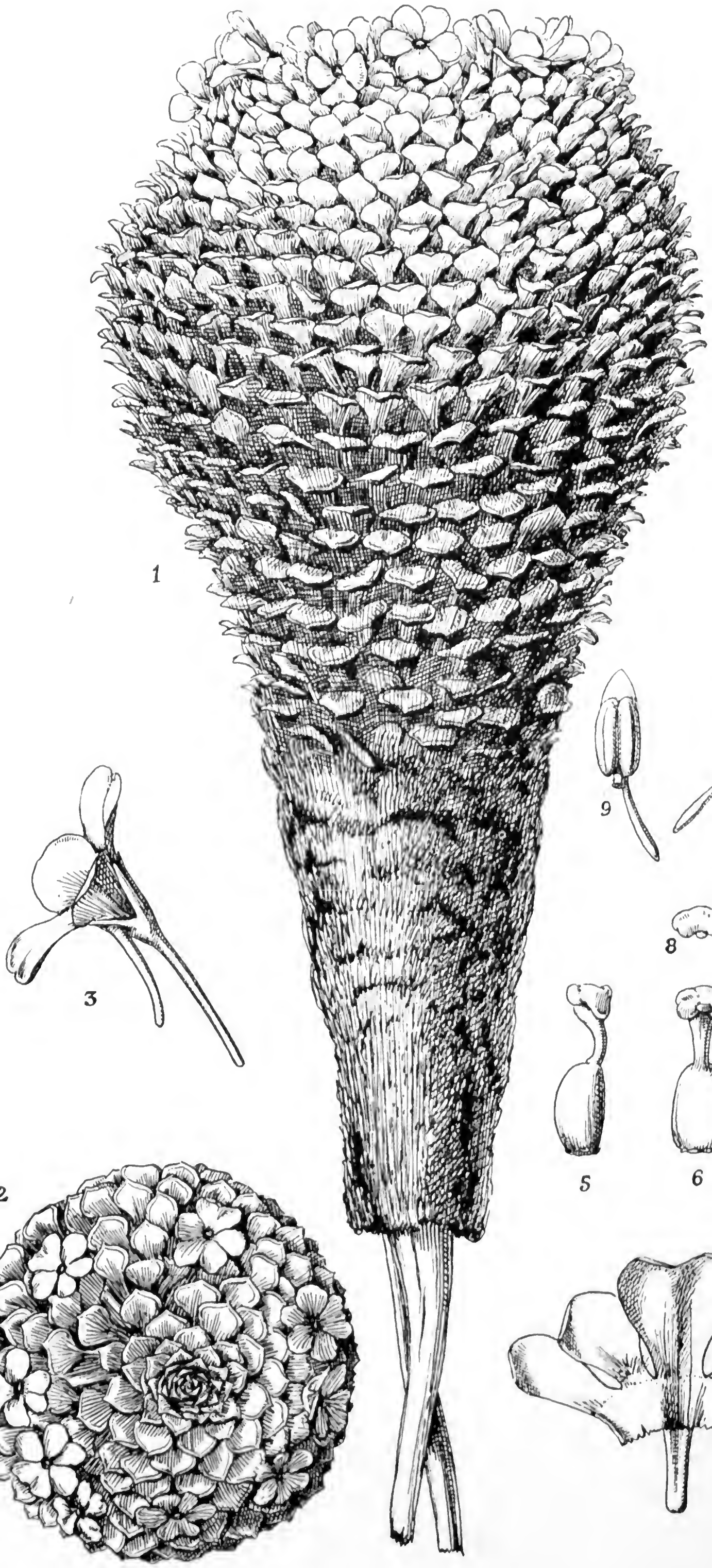
Bhutan. Flowering spccimens, cultivated in Royal Botanic Gardens, Kew, May 1924, *Cooper*, 3311 (type); fruiting specimen, Botanic Garden, Glasnevin, Oct. 1929, *Cooper*, 3311.

Cotoneaster Cooperi is a rather handsome shrub, very distinct from its nearest ally both in the infloreseence and the leaves. The barren stems much resemble a species of *Salix*. No wild specimens are known of Cooper's No. 3311, but a fruiting specimen of Cooper's No. 3315 in Herb. Edin., collected at Timpu, 8000 ft. alt., on Aug. 5, 1914, certainly belongs to this species.

The species has been in cultivation in this country for at least eight

years, the Kew plant having been received in 1922 from the Hon. Vicary Gibbs, Aldenham House, Herts. It was soon recognised as a new species, but publication was withheld until the fruit was known. This was first produced at Glasnevin, whence specimens were received in 1929 from Mr. Besant.—C. V. B. MARQUAND.

FIG. 1, end of a branch of last year's growth, showing about one-half of the flowering branchlets with the young terminal growth of the present year ; 2, mature leaf from a plant in the fruiting stage ; 3, longitudinal section of the flower ; 4, fruit, showing the incurved calyx-lobes not completely covering the apices of the pyrenes. *Figs.* 1, 2, 4, *natural size* ; *fig.* 3, × 5.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Tabula 3147.

VIOLA CORONIFERA, *W. Becker.*

Violaceae. Tribus Violeae.

V. coronifera, *W. Becker in Kew Bull.* 1928, p. 137; species inter ceteras sect. *Andinium*, W. Becker, ob calcar longum valde distincta.

Herba perennis, rhizomate verticali crasso lignoso; caulis 7–9 cm. altus, densissime praesertim inferne foliis vetustis siccatis nigrescentibus foliatus, in medio 5–6 cm. latus, formam clavatam vel ovoideam apice rosularem praebens. *Folia* longe petiolata, circiter 2 cm. longa petiolis inclusis, juniora dilute viridia; lamina orbiculari-spathulata, circiter 5–6 mm. longa atque lata, margine albo-cartilagineo, apice subacuminata et in mucronulum albo-cartilagineum transiens, in petiolum circiter 1·5 cm. longum subabrupte angustata; margo cartilagineus, vix 0·5 mm. latus, nec denticulatus nec ciliatus, neque versus folii apicem angustatus. *Flores* subconspicui, numerosi, 1·2 cm. lati, laete flavi vel aurantiaci, apice plantae coronam formantes, folia rosulata vix superantes. *Sepala* lanceolata, circiter 8 mm. longa, trinervia, pallidissime viridia, margine hyalina. *Petala* 7–9 mm. longa; superiora oblique oblongo-obovata, unguiculata; lateralia obovata, apice subtruncata, basi distincte barbata; petalum infimum late obcordatum, apice emarginatum, basi horreolum pollinis non pilosum gerens, longe calcaratum; calcar circiter 1 cm. longum, deorsum recurvatum, apice sulcatum. *Stamina* ciliata. *Ovarium* subovoideum; stylus basi vix geniculatus, clavatus, apice breviter erecto-rostellatus et crista infundibuliformi tamen in fronte aperta circumdatus.

Argentina. Lat. 38°–41° S., Cerro Colohuincul, between San Martin de los Andes and Lago Huechulafquen, 2250 m., December 1926, *H. F. Comber*, 881; Vega Lolog, 840 m., December 1926, *H. F. Comber*, 854.

Mr. Comber writes that this species grows in stones, gravel and sand; the specimens figured were found on a bare, windy, mountain top.—N. Y. Sandwith.

Fig. 1, whole plant; 2, apical leaf-rosette and flowers; 3, flower, lateral view; 4, flower opened at back, showing shape and insertion of petals; 5–7, ovary and style, side, front and back views; 8, style-crest; 9–11, an anterior stamen, inner, lateral and outer views. *Figs.* 1 and 2, *natural size*; 3 and 4, × 2; 5–11, × 5.

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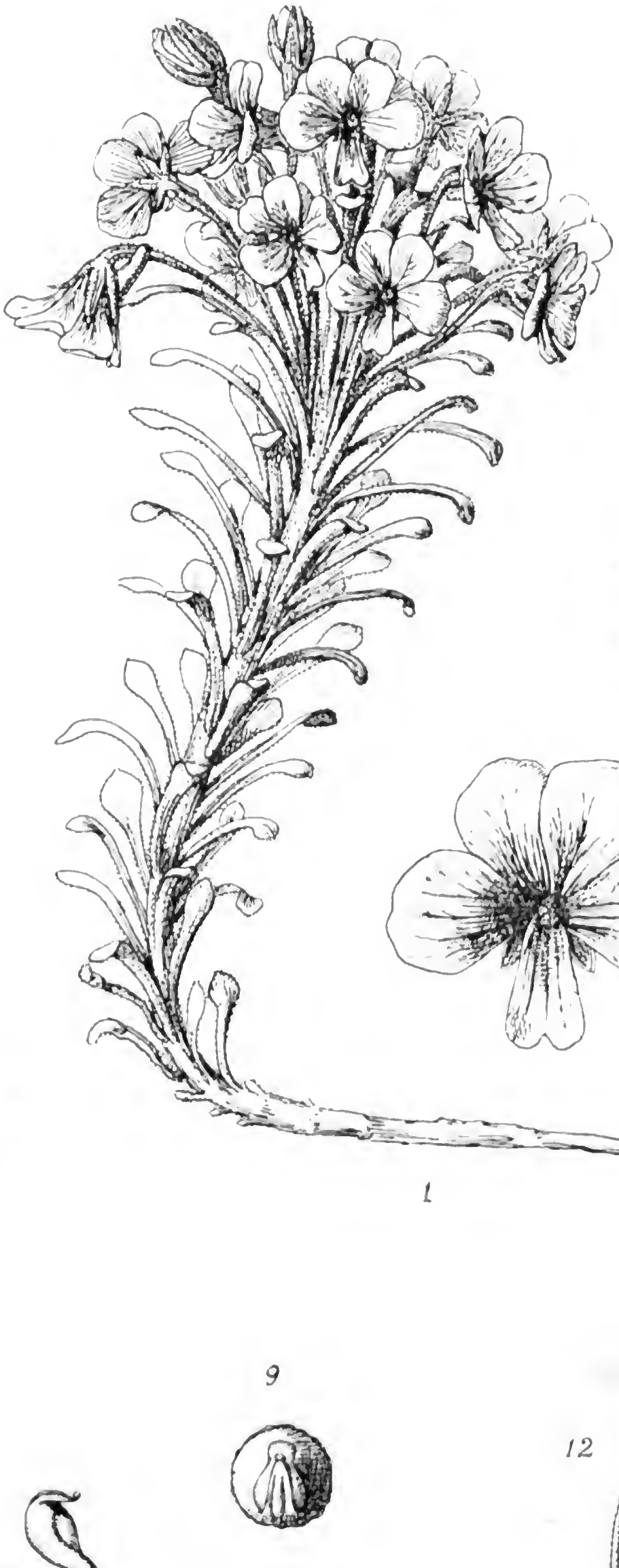

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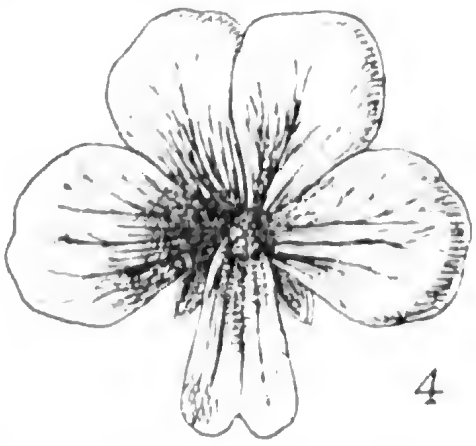

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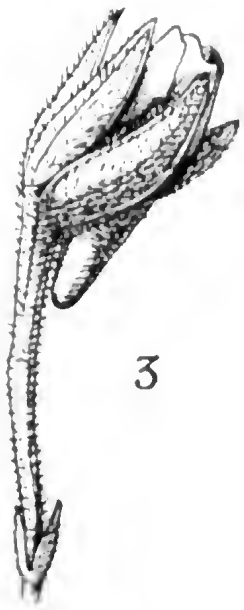

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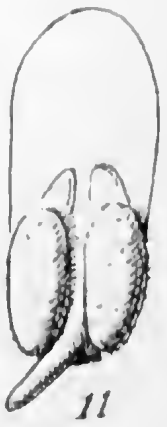

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Tabula 3148.

VIOLA ESCONDIDAËNSIS, *W. Becker.*

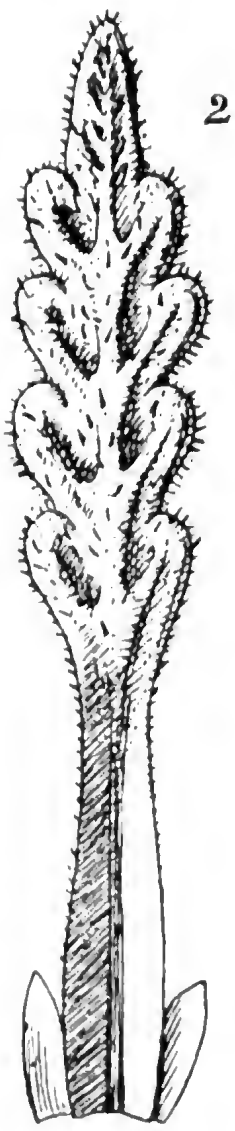
Violaceae. Tribus Violeae.

V. escondidaënsis, *W. Becker in Kew Bull.* 1928, p. 138; species *V. sacculus*, Skottsb., affinis, indumento albido-hispido, foliis pedunculisque longioribus distinguitur.

Herba perennis, pallide viridis, plus minusve dense albido-hispida; rhizoma subterraneum, ramosum, in caules circiter 8–10 cm. altos suberectos subdense foliatos transiens. *Folia* superiora circiter 2 cm. longa, inferiora sensim breviora, petiolo 1·5–2 mm. lato, tum lamina a petiolo vix distinguenda elongato-spathulata atque apiculata 3–4 mm. lata, integerrima, crassiuscula, supra sublaevia atque glabrescentia, subtus distincte saepe dense albido-hispida; stipulae non visae. *Flores* versus apicem caulium axillares, longe pedunculati, teste lectore pallide virides, violaceo-lineati; pedunculi ad 2 cm. longi, plus minusve dense hispidi, basi infima brevissime bracteolati. *Sepala* oblongo-lanceolata, 4–6 mm. longa, dense albido-hispida vel glabra, margine hyalina. *Petala* omnia dense longitudinaliter nervata, nervis versus apicem saepius ramosis; superiora spathulata, 7 mm. longa, 6 mm. lata, versus basim usque ad 3 mm. latitudinem angustata, basi violaceo-maculata; lateralia late spathulata, 8 mm. longa, 7 mm. lata, versus basim usque ad 2·5 mm. latitudinem angustata, basi pilis paucis ornata; petalum infimum calcari recurvo 3 mm. longo, elongato-obcordatum, apice profunde emarginatum, violaceo-lineatum, versus basim aurantiaco- atque flavo-maculatum et horreolum pollinis bifariam longe et dense pilosum gerens. *Stamina* breviter pilosa; connectivi processus aurantiacus, basi dilatatus et hyalinus. *Ovarium* globuloso-conoideum; stylus basi geniculatus, valde clavatus, apice deruptedeplanatus et breviter acuteque rostellatus, lobulis binis angustis retroversis subdivaricatis adhaerentibus munitus.

Argentina. Territory of Neuquen, lat. 38°–41° S., Valle Escondida, 1925–6, *H. F. Comber*, 241.—N. Y. Sandwith.

Fig. 1, whole plant except for base of rhizome, *natural size*; 2, leaf; 3, unopened flower with peduncle and bracteoles, lateral view; 4, front view of flower; 5, flower in profile; 6–8, ovary and stylo; 9, top of stylo; 10–12, stamens. *Figs.* 2–5, × 2; 6–12, *much enlarged.*



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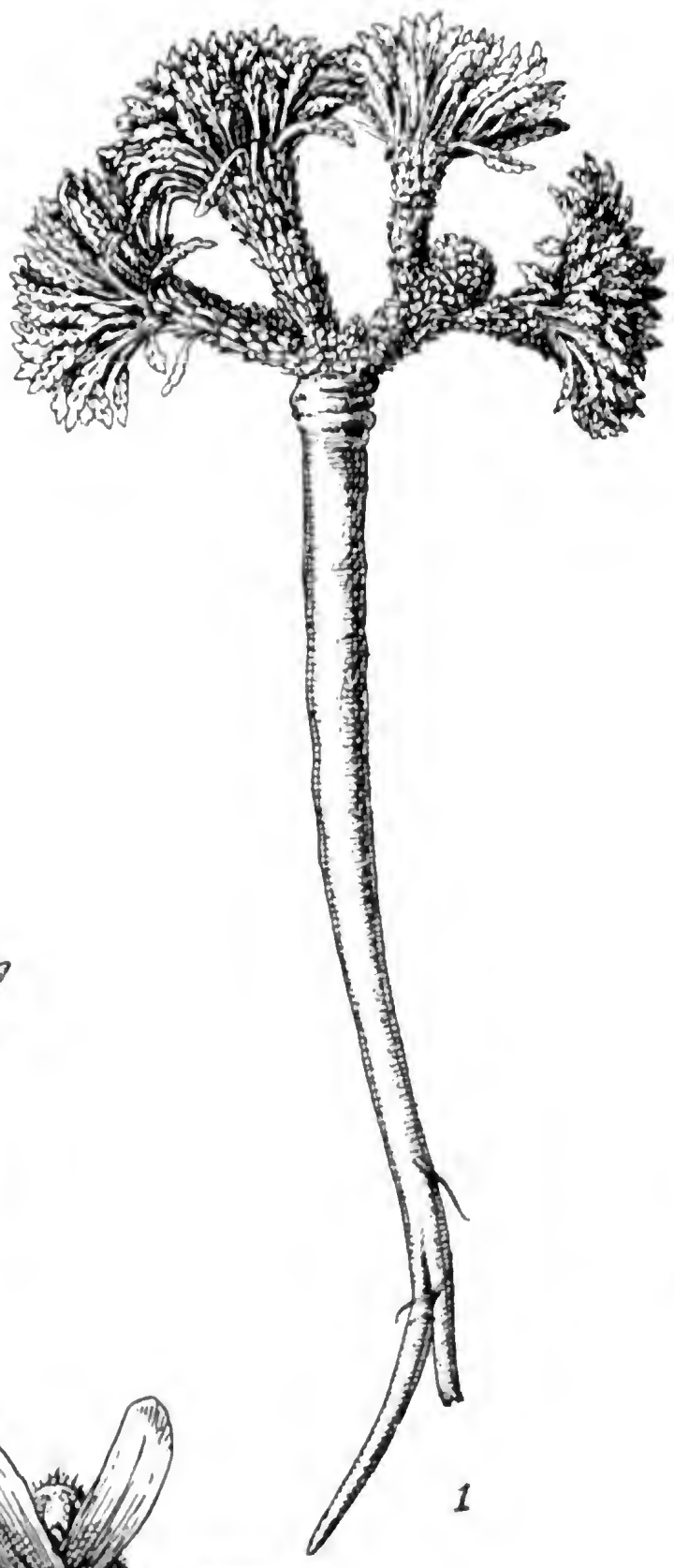

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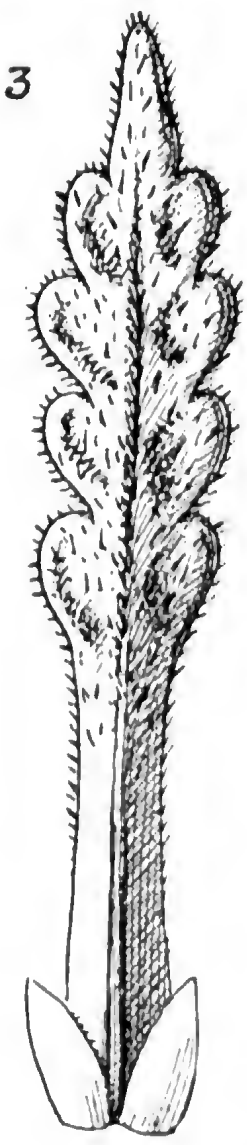

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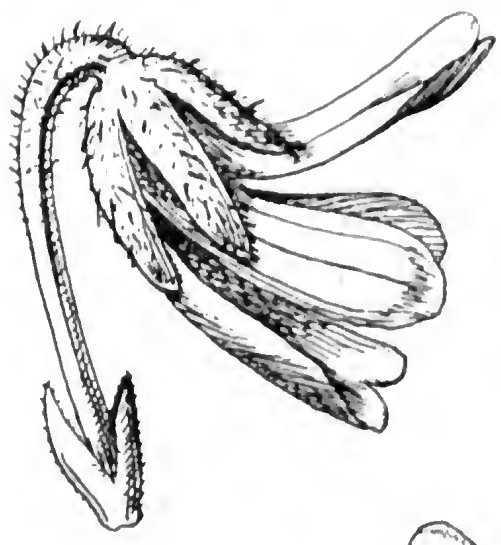

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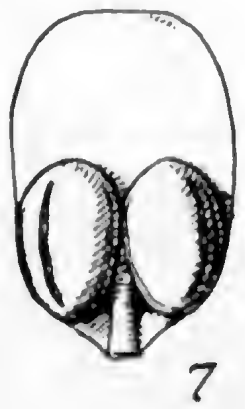

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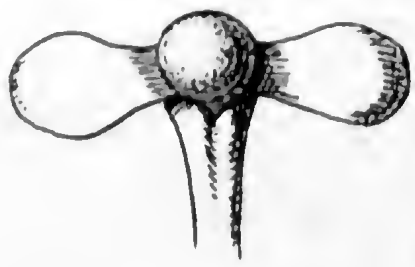

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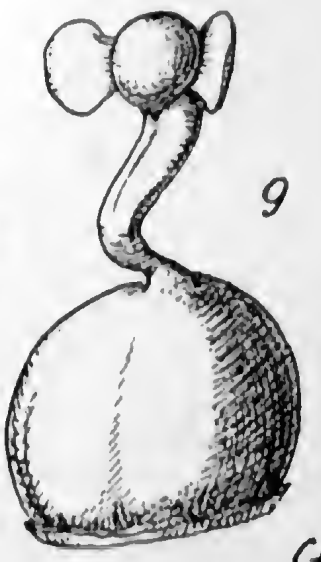

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Tabula 3149.

VIOLA HILLII, *W. Becker.*

Violaceae. Tribus Violeae.

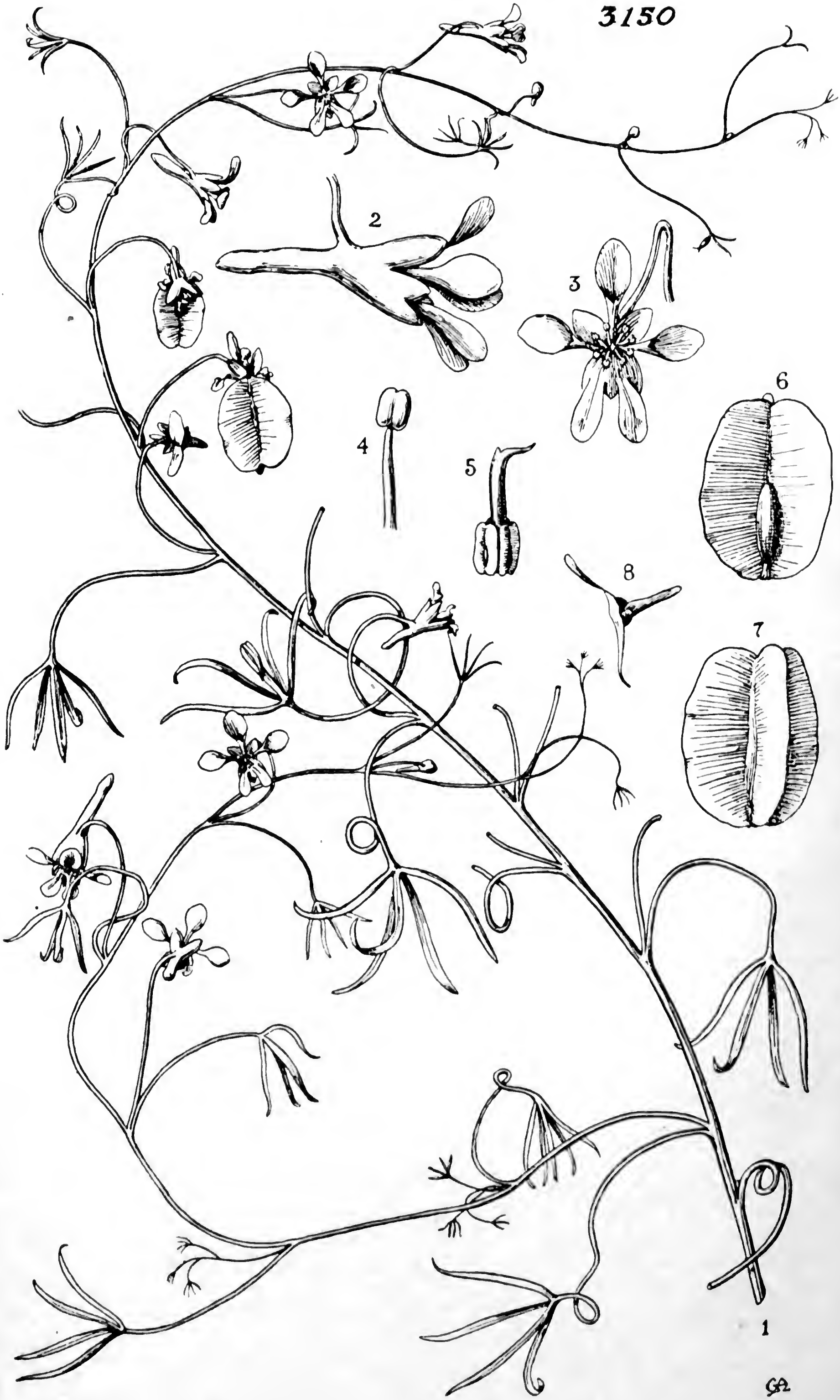
V. Hillii, *W. Becker in Kew Bull.* 1928, p. 134; species ab omnibus speciebus sect. *Andinium*, W. Becker, remota.

Herba perennis; rhizoma crassum, verticale, lignosum, circiter 10 cm. longum, circiter 5 mm. crassum, parte summa breviter 2–4-partitum et reliquiis foliorum demortuorum obtectum; rosulae parvae, circiter 1·5 cm. latae, foliis erectis angustis formatae. *Folia* lineari-oblonga, circiter 8 mm. longa, utrinque pilosula, crassiuscula, supra subfoveolata; lamina 4–5 mm. longa, circiter 1 mm. lata, insigne 4–5-repando-crenata; stipulae rudimentariae. *Flores* flavi, vix 5 mm. longi, breviter pedunculati, basi bracteolati; bracteolae oblongae, subciliatae; pedunculi retrorsum hispidi, circiter 6 mm. longi. *Sepala* oblonga, acutiuscula, pilosula. *Petala* superiora atque lateralia anguste oblonga, longe trinervia; petalum infimum obcordato-triangulare, valde dilatatum, plane emarginatum, brevissime calcaratum. *Ovarium* globosum, distincte longinervium; stylus basi distincte geniculatus, subhorizontaliter rostellatus, apice utrinque lobulo rotundiusculo breviter stipitato ornatus.

Boundary of Peru and Bolivia. On red sandstone hills between Moho and Vilque Chico, north-east of Lake Titicaca, 4050–4200 m., February 1903, *A. W. Hill*, 28.—N. Y. Sandwith.

Fig. 1, whole plant; 2 and 3, leaf; 4, flower, in side view, with peduncle and bracteoles; 5, flower, front view; 6, flower, ¾ front view; 7, anther, from within; 8, top of style; 9, ovary and style; 10, peduncle with fruit. *All enlarged, except* 1, *which is of natural size.*

3150



.. also Rev. Mus. de Plata, 32, 23 (1929).
" Lorentziana, 2, [illegible] (1934).

Tabula 3150.

MAGALLANA PORIFOLIA, *Cav.*

Tropaeolaceae.

M. porifolia, *Cav. Ic. et Descr. Pl.* vol. iv. p. 51, t. 374 (1797); species unica.

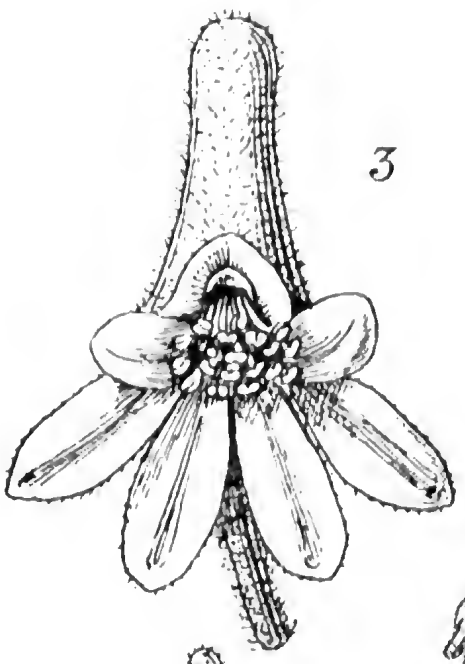
Herba perennis, glabra, radice carnosa, caulibus repentibus vel scandentibus 1–3-pedalibus filiformibus gracillimis flexuosis atque contortis. *Folia* alterna, peltato-digitata, 2–5-partita, laciniis linearibus integerrimis gracillimis, apice acutis saepius falcatis, basi brevissime connatis, vulgo 0·8–2 cm. longis, 0·5–1·2 mm. latis, 1–3-nervis, sub lente plus minusve dense porifera; petiolus vulgo 2–4 cm. longus. *Flores* axillares, solitarii, teste lectore luteo-virides; pedunculi 1·5–2·5 cm. longi. *Calyx* bilabiatus, 5-lobus, lobis 2 anticis superioribus fere liberis, divaricatis, ellipticis, 5–6 mm. longis, 2·5 mm. latis, lobis 3 posticis in labium apice tridentatum coalitis, partibus liberis triangularibus acutis circiter 2 mm. longis ad 2·5 mm. latis inferne in calcar siccitate violascens ad 1 cm. longum sensim attenuatis. *Petala* 5, laciniis calycinis alternantia; 3 antica, pedunculi tortione superiora, unguiculata, circiter 8 mm. longa, lamina obovato-elliptica ad 3 mm. lata; 2 postica anguste obovato-spathulata, paullo breviora. *Stamina* 8, hypogyna, ad 4 mm. longa, postica paullo breviora. *Ovarium* glabrum, 1·5 mm. longum, latitudine vix 1 mm. superans, 3-loculare, trilobulatum (unum nonnunquam abortivum) loculis dorso 3-alatis; ovula in loculis solitaria, ab angulo interno apice pendula; stylus ad 2 mm. longus, apice trilobato-stigmatosus, lobis 2 anticis brevissimis in mucronem crassiusculum rectum connatis, lobo postico patenti-divaricato dimidium styli fere aequans. *Fructus* carpello unico evoluto, insigne late trialatus, alis venosis atque maculis siccitate violaceis notatis, cum alis ad 1·5 cm. longus, ad 1·2 cm. latus.

Argentina. Territory of Neuquen: Cerro Lotena, Zapala, 240 m., August 1925, *H. F. Comber*, 39.

This interesting plant is widely spread over Patagonia, growing in sandy places, where it climbs over small bushes. Although the genus was well described and figured by Cavanilles, Bentham and Hooker (Gen. Plant. i. 274) were incredulous of the existence of any ally of the isolated genus *Tropaeolum* with so curious a fruit, and seeing in the

figure a superficial resemblance to *Tropaeolum pentaphyllum*, Lam., they decided that Cavanilles had added a fruit from some totally different plant to his drawing of a depauperate specimen of *T. pentaphyllum*. This erroneous and, in view of Cavanilles' reputation, unjustifiable conclusion was accepted by Buchenau in his monograph of the Tropaeolaceae in Engler, Pflanzenreich, Abt. iv. 131 : p. 30 (1902) ; but in the meantime the genus *Magallana* had been fully reinstated as a very well-marked genus by Spegazzini in Plant. Nov. Nonn. Amer. Austr. pp. 6–8 (1883). The specific epithet *porifolia*, referring to the pores in the leaf-segments, has been repeatedly misspelt *porrifolia*, " leek-leaf."—N. Y. SANDWITH.

FIG. 1, plant, *natural size* ; 2, ovary and style ; 3, front view of flower ; 4, stamen ; 5, flower in profile ; 6–8, fruit. *Figs.* 2–8 *enlarged.*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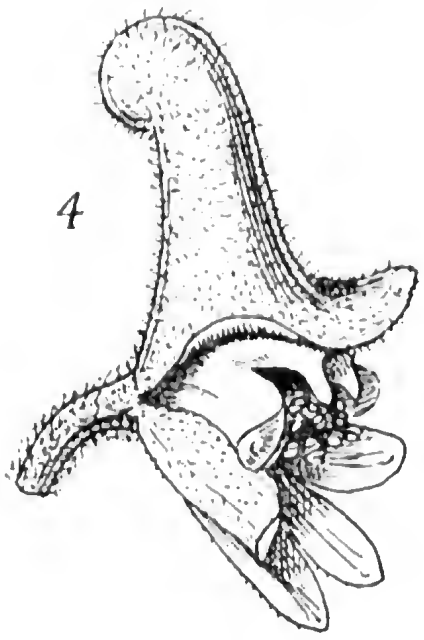
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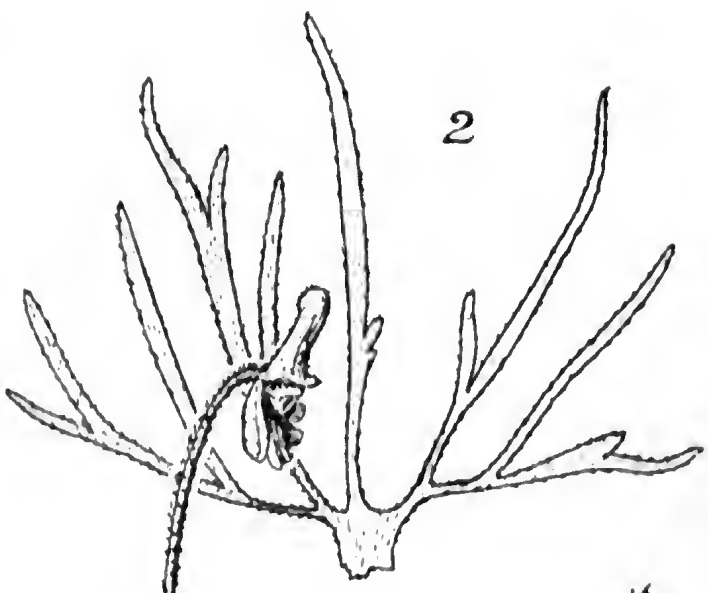
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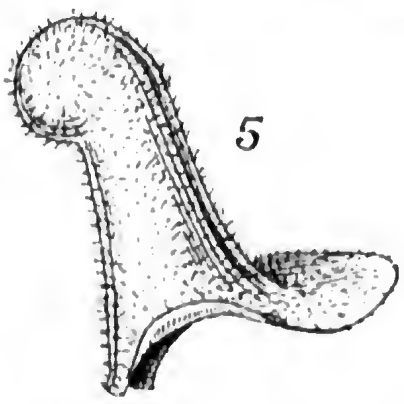
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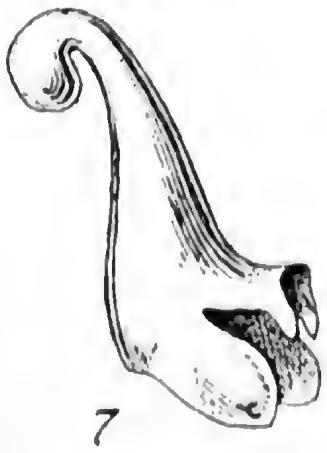
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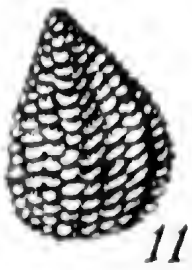
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Tabula 3151.

DELPHINIUM ACUTILOBUM, *Turrill.*

Ranunculaceae. Tribus Helleboreae.

D. acutilobum, *Turrill in Kew Bull.* 1929, p. 223 ; a *D. Thirkeano,* Boiss., petali lobis mediis divaricatim productis elongato-triangularibus subacutis differt.

Herba erecta, caulibus rigidis divaricatim ramosissimis inferne adpresse et breviter hirtis superne patule denseque velutinis glandulosis, ramulis ultimis unifloris plus minusve 2 cm. longis. *Folia* palmatim tri- vel multipartita, adpresse puberula, laciniis linearibus vel oblanceolato-linearibus. *Bracteae* saepissime integrae, lanceolatae, acutae, 2–3 mm. longae, hispidulae ; bracteolae bracteis similes sed minores, a flore remotae. *Sepala abaxialia lateraliaque* oblonga, apice rotundata, 7 mm. longa, 2–3 mm. lata, nervis 5–6 gracilibus viridibus hispidulis instructa. *Sepalum adaxiale* saccatum, extra hirsutulum. "*Petalum*" *calcaratum* 1·5 cm. longum, glabrum, quinquelobatum, calcaris apice clavato circinato-revoluto ; lobus superior leviter retusus ; lobi medii divaricatim producti, elongato-triangulares, subacuti ; lobi inferiores membranacei, elongato-rotundati. *Stamina* inaequalia, filamentis obspathulatis leviter pubescentibus. *Carpellum* unicum, glabrum, vix 3 mm. longum, vix compressum. *Folliculus* subcompressus, oblongo-obovoideus, basi attenuatus, apice abrupte rostratus, 1·1 cm. longus, glaber, nitens. *Semina* squamis longiusculis distinctis densissime obtecta.

N. Persia. Near Yam, Tabriz District, 21.8.1927, *Gilliat-Smith,* 2086 ; Yam, mid-July 1928, *Gilliat-Smith,* 2365 ; Yam, end of July 1928, *Gilliat-Smith,* 2388.

The Subgenus *Consolida,* "Tribus" *Involuta,* to which, following the classification of Huth in Engl. Bot. Jahrb. vol. xx. p. 337 (1895), this species belongs, contains a small number of known species, all of them with an oriental distribution. The shape of the "petal" and the nature of the indumentum of the stem are the best diagnostic characters ; the features distinguishing this plant from other species of the same "tribe" have been described previously (Kew Bull. 1929, p. 223).

Since the publication of the original description, additional material has been received from Mr. Gilliat-Smith, and the technical characters, confessedly rather " critical," suggested as sufficient to distinguish the species from others of the " tribe," are well developed in the better material collected in 1928. In addition the plant has been cultivated from seed in the Herbarium Ground at Kew, and the characters have been shown to be reproduced under conditions very different from those of the Yam district. The plant does not flourish in the English climate, and like many other N. Persian species is difficult to bring to the flowering condition before the damp, cold, and fogs of autumn damage or kill the specimens.—W. B. Turrill.

Fig. 1, upper portion of plant; 2, cauline leaf; 3, 4, flower, front and side views; 5, adaxial sepal; 6, lateral sepal from within; 7, " petal "; 8, stamen; 9, carpel, longitudinal section; 10, follicle; 11, seed. *Fig.* 1, × ⅔; *fig.* 2, *natural size*; *figs.* 3–7, × 2; *figs.* 8 and 10, × 3; *figs.* 9 and 11, × 6.

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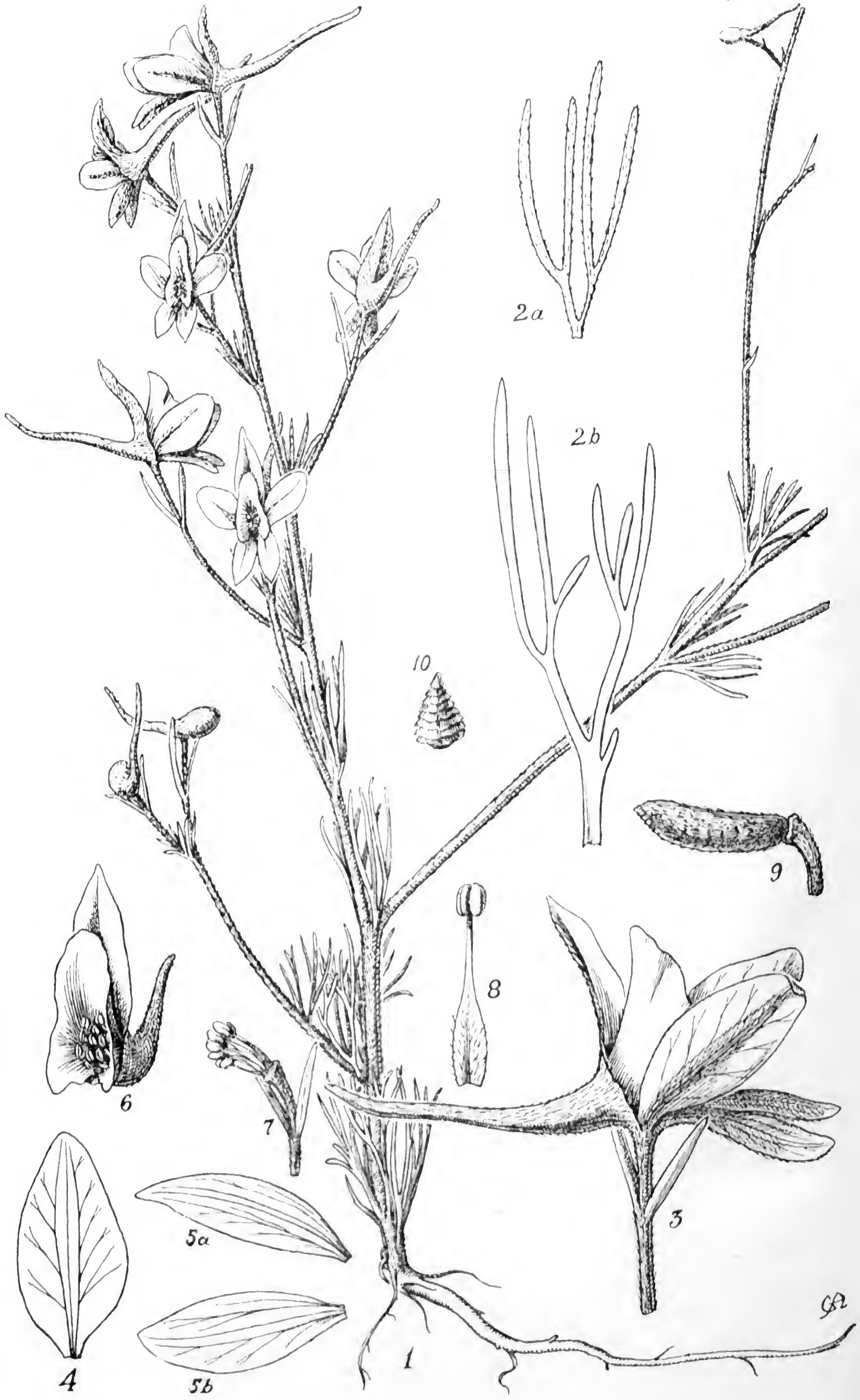


Tabula 3152.

DELPHINIUM MACEDONICUM, *Halácsy et Charrel.*

Ranunculaceae. Tribus Helleboreae.

D. macedonicum, *Halácsy et Charrel in Oesterr. Bot. Zeitschr.* vol. xli. p. 374 (1891); *et in Abd-ur-Rahman Nadji Effendi, Empire Ottoman Géogr. Bot., Faits nouv. relatifs à la prov. Salonique,* p. 8 (1892); a *D. olopetalo,* Boiss., " petalo " clongato obscure trilobato differt.

Herba annua, usque ad 3 dm. alta, plus minusve ramosa, caulibus ramisque adpresse pubescentibus. *Folia* multipartita, pubescentia vel glabrescentia, 1·5–2·7 cm. longa, laciniis linearibus acutis. *Inflorescentia* 4–10 cm. longa, 3–9-flora; bracteae inferiores tripartitae, superiores integrae, lineares; pedicelli 1·3–3 cm. longi; bracteolae lineares, acutae, 0·5–0·9 mm. longae, a flore 1–5 mm. remotae. *Sepala* caerulea, extus adpresse pubescentia; sepala abaxialia lanceolata, acuta, 1·4 cm. longa, 5 mm. lata, interdum leviter inaequalia; lateralia ovata, apice subrotundata, 1·4 cm. longa, 8 mm. lata; adaxiale 1·3 cm. longum, 4·5 mm. latum, calcari 1·6–2 cm. longo. " *Petalum* " obscure trilobatum, lobis lateralibus deorsum curvatis, 1·2 cm. longum, 1·3 cm. latum, caerulco-violaceum. *Stamina* circiter 17; filamenta 4–6 mm. longa, in parte inferiore 2·5–4·5 mm. longa 1·5 mm. lata leviter pubescente plana; antherae 1·25 mm. longae, luteae. *Carpellum* cylindricum, 4·75 mm. longum, dense adpresse pubescente-strigosum; stylus in floribus vetustis elongatus. *Fructus* cylindricus, 1·3 cm. longus, adpresse strigosus. *Semina* oblique obconica, 1·3 mm. longa, exacte lamellata.—*D. holopetalum,* Griseb. Spic. Flor. rumel. et bithyn. vol. i. p. 319 (1843). *D. holopetalum,* Huth in Engl. Bot. Jahrb. vol. xx. p. 381 (1895), partim. *D. paphlagonicum,* Huth in Bull. Herb. Boiss. vol. i. p. 328 (1893). *D. armeniacum,* Stapf ex Huth in Engl. Bot. Jahrb. vol. xx. p. 380 (1895). *Consolida olopetala,* var. *paphlagonica,* Hayek, Prodr. Flor. penins. Balcan. vol. i. p. 313 (1924). *Consolida macedonica,* Soo in Oesterr. Bot. Zeitschr. vol. lxxi. p. 245 (1922).

Thrace. Xanthie (Souné Mahalla), rocky hill slopes, 90 m., 11.7.1930, *H. G. Tedd,* 476.

Anatolia. Soulouserai, in apricis, 1000 m., 4.8.1889, *J. Bornmüller,* 970. Paphlagonia: Wilajet Kastambuli, Tassia, in montosis, 7.1892, *P. Sintenis,* 4547.

ARMENIA. Gumusehkane: Koesoedagh, 18.7.1889, *P. Sintenis*, 1320; Sipikordagh, in declivibus, 30.7.1890, *P. Sintenis*, 3177.

This very beautiful species of larkspur has a complicated synonymy the elucidation of which has been made more difficult by the absence from Kew of the type of *Delphinium macedonicum* and of Frivaldsky's specimen referred to *D. holopetalum* by Grisebach and to *D. olopetalum* and (later) to *D. tomentosum* by Boissier. Fortunately specimens which must be accepted as types of *D. olopetalum*, Boiss., and *D. armeniacum*, Stapf ex Huth, are preserved at Kew.

The botanical history of *D. macedonicum* is as follows. In 1841 Boissier's description of *D. olopetalum* appeared. This was based on a specimen of Aucher-Eloy's "absque numero in Coll. Musaei Parisiensis, cum *D. tomentoso* mixtum, è Persiâ probabiliter." A specimen in the Kew Herbarium under *Aucher-Eloy*, No. 77, agrees well with Boissier's description. The only locality given on the label is "Persia." It should also be mentioned that *Aucher-Eloy*, No. 77—referred by Boissier (Flor. Or. vol. i. p. 80: 1867) to *D. oliganthum*—is, indeed, one of the types of this species. Since the Kew specimen of No. 77 is not *D. oliganthum*, as is evident from a comparison of it with the original description and with Haussknecht's Syrian material, which is also quoted by Boissier, it would appear that at least two species were distributed under this number. The supposed connection of the plant here figured with *D. olopetalum* dates from a remark of Boissier attached to the description of Aucher-Eloy's Persian material: "eandem speciem in Macedonia a cl. Frivaldsky lectam sub nomine *D. pubescentis* habeo."

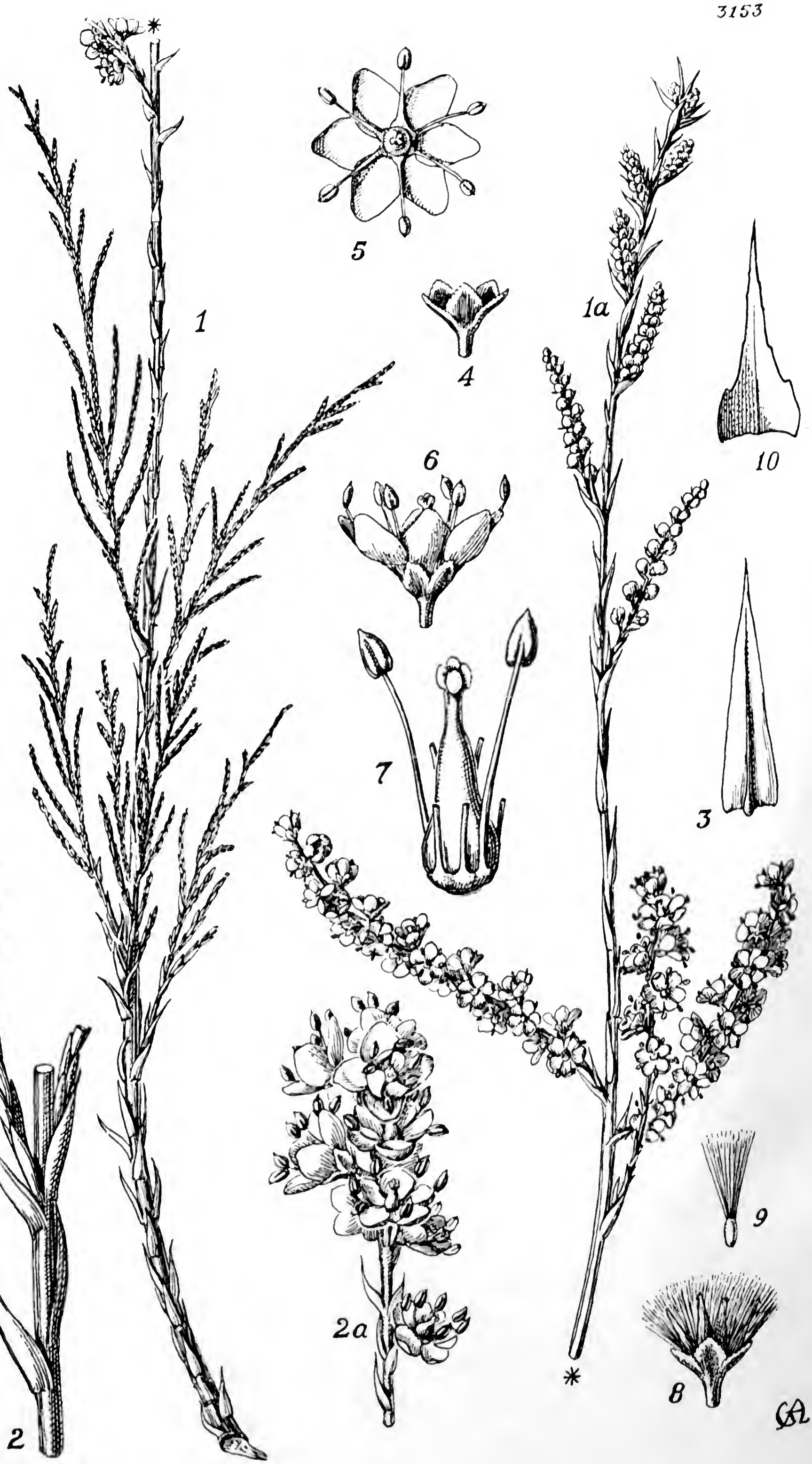
In the first part of the Spic. Flor. rumel. et bithyn. p. 319 (1843), Grisebach published a description of Frivaldsky's plant under the name *D. holopetalum*, Boiss. He notes, however, that the petal shape does not agree with that given in Boissier's description (of Aucher-Eloy's plant). Later, in Flor. Or. vol. i. p. 80 (1867), Boissier refers Frivaldsky's specimen to *D. tomentosum*, Auch. in Boiss. ex parte (i.e. so far as the Syrian plant is concerned). In 1891 (Bot. Zeitschr. vol. xli. p. 374) Charrel (Abd-ur-Rahman Nadji Effendi) published, as a nomen nudum, *Delphinium macedonicum*, Halácsy et Charrel, with the remark "ab Aucher et Boissier cum planta asiatica confusum." There can be little doubt that the confusion referred to is that involving Frivaldsky's specimen mentioned above, and any possible doubt is removed in a later publication, Empire Ottoman Géogr. Bot., Faits nouv. relatifs à la prov. Salonique, p. 8 (1892), in which the following appears: "Delphinium *macedonicum* Halácsy et Nadji, nec tomentosum Boissier. Plante magnifique, bicolore, à fleurs unilatérales de la plus haute élégance, confondue à tort par Boissier avec la plante asiatique et, fide von Halácsy !, différente. Kiel-tépé. 700 m." The late Prof. Wettstein of Vienna kindly sent on loan to Kew Nadji's specimen of *D. macedonicum* from Kiel-tépé. This agrees with Tedd's material as figured here, except that the petals are, in the dried condition,

straw-coloured, tinged near the apex and sometimes also near the base with blue violet, and the leaves more strongly pubescent.

We are thus able to trace back the connection between the name *D. macedonicum* and Grisebach's description of Frivaldsky's material, and it is proposed that the name be applied in this sense. The remaining synonyms given above require no further comment.

The general shape of the "petal" appears to be a well-fixed and useful taxonomic character and is particularly valuable in separating *D. macedonicum* from *D. olopetalum*. The only morphological features which call for comment as showing a certain degree of fluctuation in *D. macedonicum*, as the species is here accepted, are flower size and the position of the bracteoles. The Asia Minor specimens have slightly smaller flowers, including slightly shorter spurs, than those from Thrace and Armenia. In *Sintenis*, No. 4547 (the type of *D. paphlagonicum*, Huth), the bracteoles are, as Huth describes them, "a flore paulum remotis." In the other specimens quoted they are situated on the pedicel up to about 5 mm. below the calyx. However, in the Armenian specimens there is sufficient fluctuation to include all the other variants of this character.—W. B. Turrill.

Fig. 1, a small plant; 2a, 2b, leaves; 3, flower, lateral view; 4, lateral sepal, inner surface; 5a, 5b, abaxial sepals, inner surface; 6, flower with abaxial and lateral sepals removed; 7, flower with perianth removed; 8, stamen; 9, young fruit; 10, seed. *Fig.* 1, *natural size*; *figs.* 2–7 and 9, × 2; *figs.* 8 and 10, × 6.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Tabula 3153.

TAMARIX HAMPEANA, *Boiss. et Heldr.*, var. **AEGAEA**, *Turrill.*

Tamaricaceae.

T. Hampeana, *Boiss. et Heldr. in Boiss. Diagn.* Ser. I, No. x. p. 8 (1849), var. **aegaea**, *Turrill*; var. nov. floribus saepissime pentameris vel hexameris, stylis plerumque 3–4 exceptis, bracteis e basi triangulari- vel oblongo-lanceolata longe acuminatis distincta.

Frutex 2–2·5 m. altus, glaber. *Caules* teretes, cortice brunneo. *Folia* vetusta sessilia, triangularia, acute et saepissime longe acuminata, 6 mm. longa, basi 4 mm. lata; juniora adpresse imbricata vel leviter patentia, lineari-lanceolata, acuta vel acuminata, basi saepe subcordata, 3–5 mm. longa, 0·5–1 mm. lata, glauco-viridia. *Racemi* sceus ramos hornotinos vel annotinos paniculam subspiciformem longam formantes, multiflori, 2–5 cm. longi, pedunculis 0·3–0·7 cm. longis instructi; bracteae e basi triangulari- vel oblongo-lanceolata longe acuminatae, 2·5–3 mm. longae, sessiles; pedicelli 1–1·5 mm. longi. *Sepala* 5 (vel 6), ovata, subobtusa, 1·5 mm. longa, 1 mm. lata, dorso viridia, margine albo-membranacea crenulata. *Petala* 5–6 (vel rarissime 7), alba, patula vel erecto-patula, elliptica vel oblonga, apice rotundata vel leviter emarginata, basi saepe leviter cuneata, 2·5 mm. longa, 1·5–1·75 mm. lata. *Stamina* 5–9; filamenta graeilia, basi vix dilatata, 4 mm. longa, in disco inserta id est mesodiseica; antherae ambitu ovatae, apiculatae, purpureo-rubrae. *Ovarium* elongato-conicum; styli 3–4 (rarissime 5), obovato-spathulati, 1 mm. longi, omnes basi cohaerentes, interdum 2 plus minusve coaliti. *Capsula* saepissime 4-valvis, 5 mm. longa. *Semina* oblongo-cylindrica, 0·7 mm. longa, coma 3 mm. longa.

W. Thrace. Bouloustra (Bulustra), 1.6.30 (flowers and buds), *H. G. Tedd*, 230A (type of variety). Also No. 230C, from eastern shore of Lake Boru, sands at water's edge, 6.6.1931 (fruits); No. 250, from Buyuk Osmanli, 1.6.1930 (flowers and fruits).

The difficulties of a taxonomic study of the genus *Tamarix* are greater than appear from published accounts, because of the lack of stability of the characters considered as diagnostic by most authors. Thus we find that in some species the number of sepals, petals, stamens, and

styles frequently varies in the same raceme. The shape of the leaves is easily modified by position and age. Even the disk characters have been over-emphasized and in epilophicous species the degree of bi-lobing fluctuates. The occurrence of the racemes on the present or past year's wood is not always easy to determine, and does not appear always to be constant, as in the species a variety of which is here described. Indeed, in the material of our new variety it is difficult to say what is old and what is new wood.

T. Hampeana was described by Boissier who quotes specimens from Phalerum, collected by Spruner and Heldreich, and from " Argolis ad Astros " collected by himself. In his Diagnoses it is placed in the section *Oligadenia*, but in the Flora Orientalis (1867) this section is not accepted and the species is placed in Sect. *Vernales* § 1. Anisandrae (vol. i. p. 767), thus following the classification of Bunge (Tent. Gen. Tamar., Dorpat, 1852). Bunge divides the species into three varieties which he names α *Phalerea*, from Greece, β *Marmorissae*, from W. Asia Minor, and γ *Syriaca* from Syria. Boissier, in the Flora Orientalis, makes *T. syriaca* a distinct species, and has two varieties (*smyrnaea* and *composita*, both from Asia Minor, and the former doubtfully the equivalent of Bunge's var. *marmorissae*) in addition to the Greek type. The next published account relevant to our subject is that of Niedenzu (Ind. Sect. Lyc. Reg. Hos. Brunsberg. 1895), who keeps *T. syriaca* distinct and separates as two distinct species plants collected by Pichler and Haussknecht in Greece and distributed as *T. Hampeana*. One of the proposed species, *T. phalerea*, is reduced to *T. Hampeana* both by Halácsy (Consp. Flor. Graec. vol. i. p. 563 : 1900) and by Hayek (Prodr. Flor. penins. Balcan. vol. i. p. 520: 1925). The other, *T. Haussknechtiana*, is the subject of a note by Halácsy (l.c. 564), who says the plant is unknown to him, but is accepted as a species by Hayek (l.c. p. 521), under the name *T. Haussknechtii*. After making a close study of the excellent material available at Kew, I believe that *T. Hampeana* must be accepted as a species in a sufficiently wide sense to include both *T. phalerea* and *T. Hampeana* as these plants are represented by specimens at Kew collected by Pichler and Haussknecht, and acceptable, from localities and dates, as equivalent to the types of Niedenzu in the strict sense. How far varietal names should be used is a matter of immediate convenience or need. In addition to fluctuating characters, it is obvious, from numerous dissections, that different combinations of characters with a probably genetic basis occur in plants both from Greece proper and from other Aegean countries.

The var. *aegaea* is especially remarkable for the shape of the bracts, whose broader base passes more or less abruptly or, sometimes, gradually into a long tapering acumen, the whole bract exceeding in length the axillary pedicel. The sepals, petals, and stamens, especially the last, vary in number, though most often they are pentamerous or hexamerous. Boissier, in his original description of the species, gives the sepal number as 4, the petal number as 4, and the stamen number as 6 to 8. This is most often correct for specimens from Attica, but even in these the parts

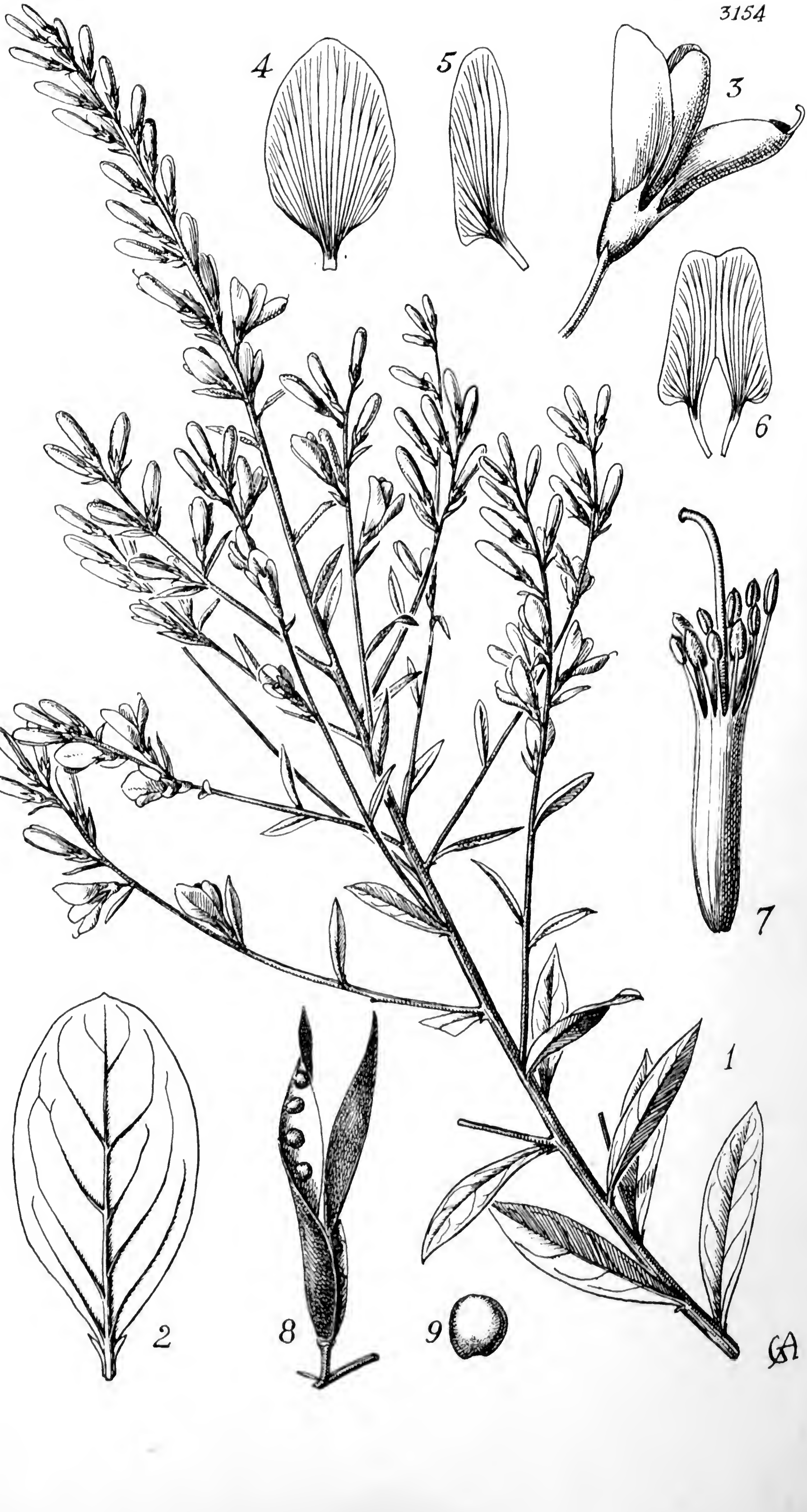
are not absolutely constant in number. Bunge (l.c.) allows the same range of variation in numbers of the floral parts within the species as is recognized here.

In addition to the type material quoted above, a specimen collected, according to the label, "in rivularibus ad Thessalonicam" by Adamović, vi. 1903, and preserved at Kew, has to be included in the var. *aegaea*.

A factor in preventing the var. *aegaea* from being considered as a species distinct from *T. Hampeana* is the presence in Tedd's 1930 collection of specimens Nos. 230 and 230B, from Porto-Lagos, 21.4.30, "common on the edge of lagoon (brackish) and in marsh land of coastal districts," which are decidedly nearer to the original *T. Hampeana* than the specimens accepted as syntypes of the new variety. Thus the Porto-Lagos specimen has the racemes definitely arising on the old wood, and the bracts are subobtuse and not long acuminate.—W. B. Turrill.

Figs. 1, 1a, flowering branch, *natural size*; 2, vegetative portion of branch, × 3; 2a, an unusually short inflorescence, × 3; 3, intermediate leaf, × 3; 4, calyx, × 4; 5, flower from above, × 4; 6, flower from the side, × 4; 7, androecium (with parts of some stamens removed) and gynoecium, × 10; 8, fruit, × 4; 9, seed, × 4; 10, bract, × 10.

3154



Tabula 3154.

GENISTA TINCTORIA, *L.*, var. VIRGATA, *Koch.*

Leguminosae. Tribus Genisteae.

G. tinctoria, *L. Sp. Pl.* p. 710 (1753), var. **virgata,** *Koch in Röhlings Deutschl. Flor.* vol. v. p. 90 (1839); *Hayek, Prodr. Flor. penins. Balcan.* vol. i. p. 914 (1926); a planta Linnaeanea statura majore, panicula valde ramosa, foliis saepe majoribus latioribusque, stipulis persistentibus differt.

Frutex inermis, erectus, usque ad 2 m. altus, valde ramosus, ramis virgatis superne plus minusve adpresse vel subadpresse pilosis deinde glabrescentibus longitudinaliter striatis. *Folia* omnia spiralia; laminae semper simplices, lanceolatae, lanceolato-ellipticae, vel ellipticae, apice acutae, subacutae, vel (in foliis latioribus) obtusae, basin versus angustatae, 1·5–5 cm. longae, 0·4–2·5 cm. latae, pagina utraque leviter pilosae vel fere glabrae, nervis subprominentibus; petiolus nullus; basis persistens valde trinervis, 1–3 mm. longa, 1–2 mm. lata, saepissime leviter pilosa; stipulae persistentes, acuminato-subulatae, fere spinescentes, 2–3 mm. longae. *Inflorescentia* paniculam magnam pyramidalem formans; racemi laterales usque ad 26 versus ramorum apices collocati, 7–13 cm. longi, 6–20-flori; racemus terminalis 0·6–2 dm. longus, 13–35-florus; flores in bractearum axillis solitarii, pedicello 1–2·5 mm. longo suffulti; folia superiora in bracteas lineari-lanceolatas acutas vel acuminatas pedetentim minores gradatim transientia; bracteolae angustissime lineari-lanceolatae, 2 mm. longae, pedicelli apice positae. *Calyx* 6 mm. longus, margine et hinc inde etiam in superficie subpilosus, dentibus adaxialibus lanceolato-triangularibus valde divergentibus 3 mm. longis, tribus abaxialibus 2·75 mm. longis angustioribus. *Corolla* flava; vexillum late ovatum, 1·5 cm. longum, 9 mm. latum, apice rotundatum concavum, basi subito contractum, glaberrimum; alae 1·5 cm. longae, glabrae; carina 1·5 cm. longa, ad summum subsericea. *Stamina* 10, monadelphia; antherae 5 majores 2 vel fere 2 mm. longae, 5 alternae minores vix 1 mm. longae, omnes minutissime apiculatae. *Ovarium* anguste cylindricum, 5 mm. longum, glabrum; stylus cum stigmate capitato 7 mm. longus. *Legumen* 1·5–4 cm. longum, 4–6 mm. latum, glabrum, brunneum vel atro-brunneum. *Semina* compressa, ambitu elliptica, 3·5 mm. longa, 2·5 mm. lata, atro-brunnea.—*Genistoides elata,* Moench, Meth. p. 133

(1794). *Genista virgata*, Willd. Berl. Baumz. ed. 2, p. 159 (1811), non Lam.; Bornmüller in Engl. Bot. Jahrb. vol. lix. p. 462 (1925). *G. gracilis*, Poir. Encycl. Suppl. vol. ii. p. 715 (1811). *G. sibirica*, Reichb. Flor. Germ. Excurs. p. 519 (1832), non L. *G. elata*, Wender. in Linnaea, vol. xv. Litt.-Ber. p. 100 (1841). *G. elatior*, Koch, Syn. ed. 2, p. 441 (1843); Boiss. Flor. Or. vol. ii. p. 44 (1872); Vel. Flor. Bulg. p. 122 (1891). *G. anxantica*, Griseb. Spic. Flor. rumel. et bithyn. vol. i. p. 3 (1843), non Ten. *G. frutescens*, Schloss. et Vuk. Syll. p. 124 (1857). *G. tinctoria*, L., var. *elatior*, Reichb. Icon. vol. xxii. p. 22, t. 2088, fig. III (1903); Stoy. et Stef. in Ann. archiv. Minist. de l'Agric. Bulg. vol. iii. p. 13 (1922), et Flor. Bulg. vol. ii. p. 618 (1925). *G. tinctoria*, L., var. *elata*, Aschers. et Graebn. Syn. Mitteleur. Flor. vol. vi. pars 2, p. 261 (1907).

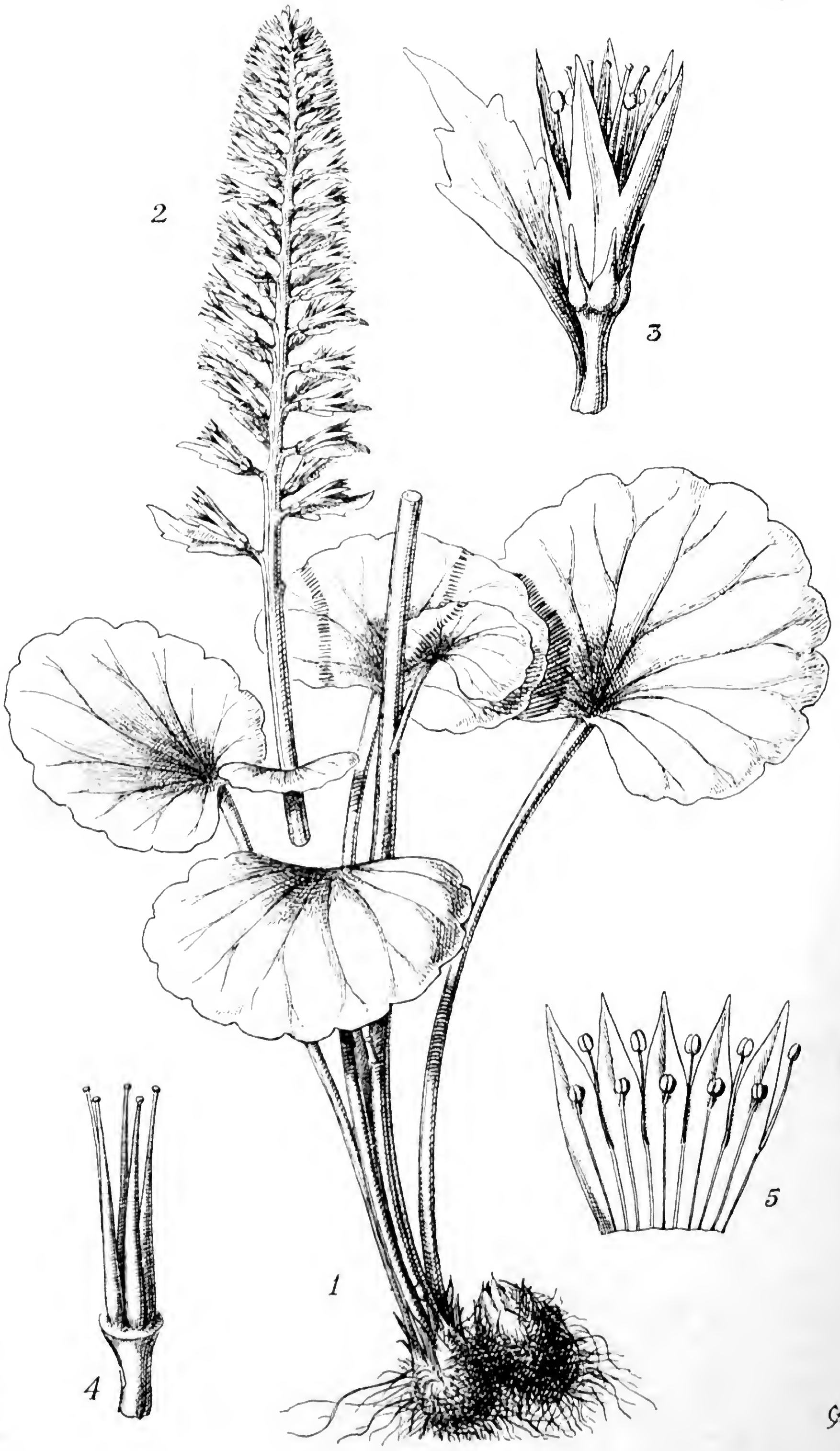
Bulgaria. Hills north of Varna, cultivated in the Herbarium Ground, Kew, seeds collected by *B. Gilliat-Smith* in 1924, specimens preserved as K. 82.

Genista tinctoria, in the broad sense in which it is accepted by most modern authors, is both highly polymorphic and decidedly plastic. With our present imperfect knowledge of this species, opinions as to the classification of its variations are bound to differ. The plant here figured and described is accepted as a variety and not as a species because the series of herbarium specimens available indicate that the differential characters are not associated in constant combinations, and that the geographical distribution does not isolate groups of individuals, with the character combinations given, from other varieties. Moreover, it is doubtful if plants to which the trivials *virgata*, *elata*, or *elatior* are respectively applied by modern authors are always equivalent. The variety *virgata* appears to be spread in Central and South-Eastern Europe, and to be particularly characteristic of the northern and central parts of the Balkan Peninsula. Its most noteworthy features are the tall, erect habit and numerous slender twigs—characters not well shown in many herbarium specimens. Experience of plants grown from seed collected in Eastern Bulgaria, and cultivated for five years in the Herbarium Ground at Kew, has also shown that habit and inflorescence branching are modifiable to a certain extent under altered environmental conditions. It is only specimens grown in good soil and well spaced out which reach their maximum development both of stems and of panicles.

Attention should be called to two interesting morphological features. At Kew, within the series of about a dozen plants which have been grown to maturity, a considerable range of leaf-shape and size occurs. In two or three of the plants such leaf differences occur, on different shoots of the same individual, as to warrant the use of the term "heterophylly" when comparing the lanceolate leaves of some shoots with the elliptic ones of others. The androecium shows another morphological feature, which has been ignored by many authors, though figured for

G. tinctoria by H. Müller (see Knuth, Handbook of Flower Pollination, Engl. edit., vol. ii. p. 265 : 1908). The free parts of all the 10 filaments are approximately equal in length, but the anthers are of two distinct sizes. Five are smaller, ovate in outline, and alternating in position with five which are twice their length and oblong-linear in outline. Both kinds of anthers carry pollen-grains which appear to be viable. The different sizes of the anthers are easily seen both before and after the shedding of the pollen. Bentham and Hooker, Gen. Pl. vol. i. p. 439 (1865), refer to the character of the alternate stamens having larger anthers in their description of the tribe.—W. B. Turrill.

Fig. 1, upper part of flowering branch, × ⅔; 2, one of the lower leaves, *natural size*; 3, flower, lateral view, × 2; 4, vexillum, × 2; 5, one of the alae, × 2; 6, carina, opened out, × 2; 7, androecium with pistil inside, × 4; 8, legume, *natural size*; 9, seed, × 2.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Tabula 3155.

COTYLEDON LASSITHIENSIS, *Hayek.*

Crassulaceae.

C. lassithiensis, *Hayek, Prodr. Flor. penins. Balcan.* vol. i. p. 632 (1925); a *C. pendulino,* Batt., bracteis argute serratis differt.

Herba erecta, 3·5 dm. alta, glabra. *Caulis* floriferus teres, 3 mm. diametro basi (vel radice ?) carnosa valde tuberosa. *Folia* basalia 4; lamina orbiculata, cordata, 6·5–8 cm. diametro, breviter grosse crenata; petiolus 1–1·1 dm. longus; folia caulina 3, remota, truncata, petiolo 1–2 cm. longo instructa. *Racemus* 1 dm. longus, floribus 50–60 praeditus; bracteae inferiores ovato-lanceolatae, mediae et superiores lanceolatae circiter 1·1 cm. longae, omnes pedicellis alte adnatae argute serratae; pedicelli 2–3 mm. longi. *Sepala* lanceolata, acuminata, 4 mm. longa, 1·5 mm. lata. *Corolla* cylindrico-tubulosa, 1–1·1 cm. longa, lutescens, ad medium fissa, lobis lanceolatis acuminatis 6 mm. longis 2 mm. latis. *Stamina* longiora 4·5 mm., breviora 2 mm. longa. *Carpella* anguste cylindrica, ovario 7 mm. longo, stylo 2 mm. longo, stigmate capitato.—*Umbilicus lassithiensis,* Gandoger, Flor. Cret. p. 40 (1916).

Crete. Lassithi: ad rupes et muros coenobii Kronstallenia, *Gandoger,* 2093; in praeruptis ad Hagios Constantinos, *Gandoger,* 2309; montium Aloida, *Gandoger,* 2386; Lazaro, *Gandoger,* 2683.

Thrace. Atmadjali, among moss on rock face, 150 m., 21.5.30, *H. G. Tedd,* 320.

The specimen figured is the last of those quoted above, and has been identified from description only. Since Gandoger's original description is somewhat meagre and Hayek (l.c.) does not say that he has seen the type material, it is advisable to state that the description of our plant agrees with those published by Gandoger and Hayek in such important characters as the leaf shape, long dense raceme, lobing of the corolla, and above all in the shape and acute serration of the bracts. The phrase "flores subsessiles" can, however, only be applied to the Thracian specimen in a relative sense.

The interesting geographical distribution which follows for the species as tentatively accepted is similar to that known for other plants.

Gandoger's material, as the trivial given by him indicates, came from the Lassithi Mountains in eastern Crete.

The present writer (Plant-Life of the Balkan Peninsula, pp. 330–337 : 1929) has given many examples of plants whose distribution " jumps the Aegean " from Crete to Thrace. It is stated that the list given " is sufficient to prove the existence of a route or routes of dispersal resulting in a north and south distribution, which, it must be noted, is not continued south to or from the African continent." The now discontinuous distribution of *Cotyledon lassithiensis*, and of many other species, across the Aegean—north and south, or east and west—is well explained as a relict " of a more continuous distribution when the Aegean was a land area."

Taxonomically *C. lassithiensis* seems quite distinct from its allies. The acutely serrated bracts distinguish it from *C. Umbilicus-veneris*, L., and *C. horizontalis*, Guss., *C. intermedius*, (Boiss.) Stefanoff, and *C. pendulinus*, (DC.) Batt. Hayek's key-character " corolla calyce 4–5-plo longior " is an exaggeration so far as our material is concerned. The vexed question whether or not the genus *Cotyledon*, L., should be split into *Cotyledon* sensu stricto, *Umbilicus*, *Rosularia*, etc., cannot be discussed here, and it must suffice to say that, for those who accept *Umbilicus* as a valid genus, the correct name of *C. lassithiensis* is *Umbilicus lassithiensis*, Gandoger.—W. B. Turrill.

Fig. 1, lower part of plant, × ⅔ ; 2, inflorescence, × ⅔ ; 3, flower and subtending bract, × 3 ; 4, gynoecium, × 3 ; 5, corolla, laid open, showing stamens, × 3.

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Tabula 3156.

ONOPORDON TAURICUM, *Willd.*

Compositae. Tribus Cynareae.

O. tauricum, *Willd. Sp. Pl.* vol. iii. p. 1687 (1804); *Boiss. Flor. Or.* vol. iii. p. 559 (1875); *Rouy, Revision du Genre Onopordon*, p. 14, t. xiii. (1896); ab *O. eriocephalo*, Rouy, capitulis majoribus glabrescentibus glandulosis, involucri phyllis inaequalibus spinoso-acuminatis distinguitur.

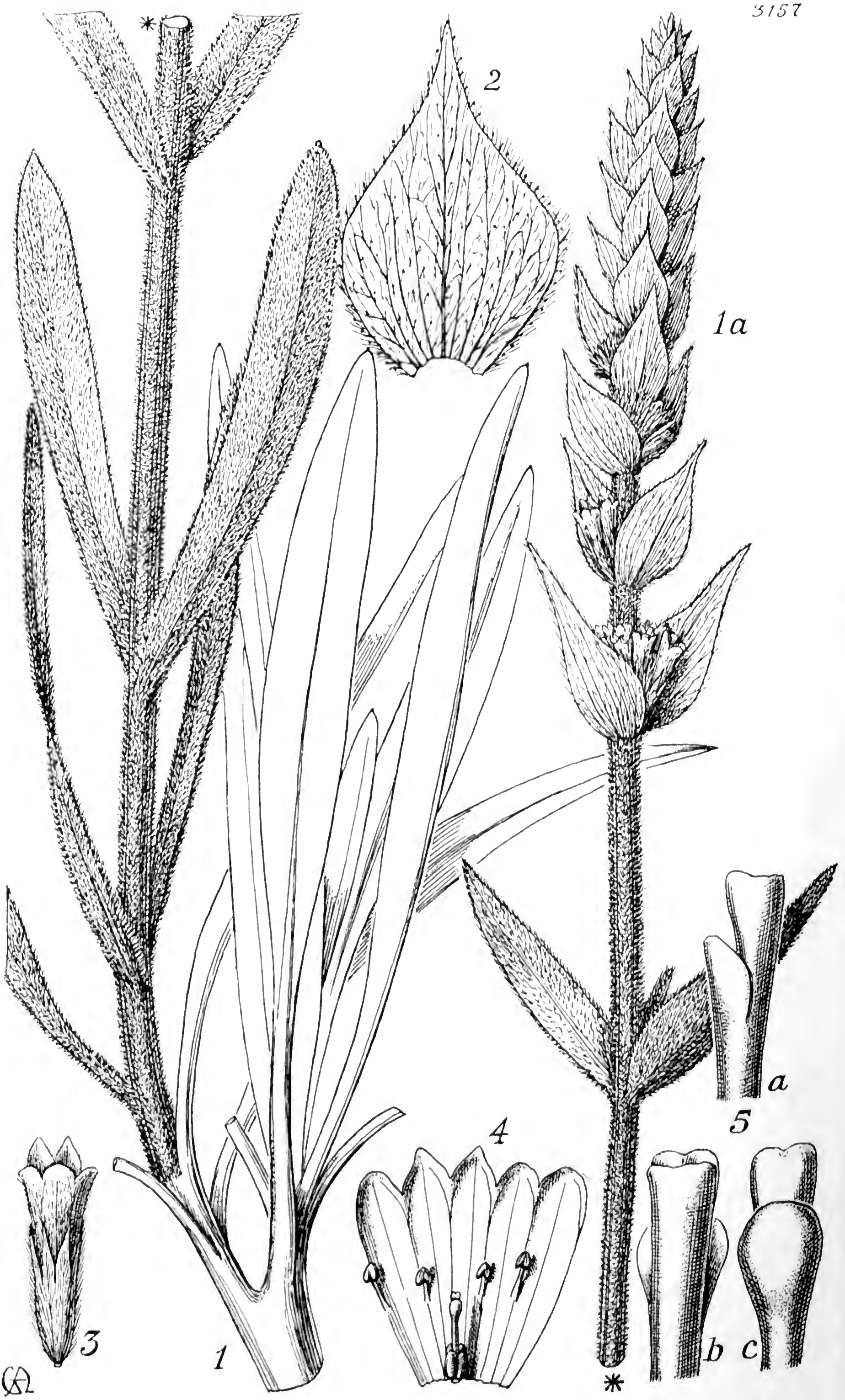
Herba biennis, viridis, usque ad 2·5 m. alta. *Caules* erecti, valde ramosi, glanduloso-viscidi, 2–3 alis 0·5–1·5 cm. longis lobatis spinosis marginati. *Folia* oblongo-lanceolata, grosse et irregulariter lobata, margine spinosa, apice gradatim acuminato-spinosa, costa valde prominente, nervis lateralibus marginem versus anastomosantibus in pagina superiore vix conspicuis in inferiore prominentibus. *Capitula* globosa, 5–7 cm. diametro; involucri phylla inaequalia, virentia vel purpurascentia dense glanduloso-viscida, foliis superioribus in phylla externa lanceolata spinoso-acuminata plus minusve gradatim transientibus; phylla media 2·5 cm. longa, 4 mm. lata, externa ultimo reflexa vel patenti-reflexa. *Flosculi* numerosissimi, involucri phyllis longiores. *Corolla* 2·7 cm. longa, glabra, purpurea, tubi parte angustata inferiore 1·5 cm. longa, lobis linearibus 5 mm. longis. *Antherae* circiter 1 cm. longae, appendice terminali subulata 1·5 mm. longa. *Cypselae* compresso-tetragonae, ambitu oblanceolatae, 5 mm. longae, 2·75 mm. latae, atro-brunneae, transverse rugosae; pappus caducus, albo-fulvus, nitens, 1 cm. longus, sctis scabris in annulum concretis.—*O. elatum*, Sibth. et Sm. Prodr. vol. ii. p. 156 (1813), et Flor. Graec. vol. ix. t. 833 (1837). *O. virens*, DC. Flor. Fr. vol. v. p. 456 (1815).

Bulgaria. Grown in the Herbarium Ground, Kew, from seeds collected on the hills north of Varna, 9.8.26, by *B. Gilliat-Smith* and *W. B. Turrill*. Flowered at Kew, 31.7.28 and 3.10.28.

The specimen figured in our plate is from one of a considerable number of plants grown in the Herbarium Ground at Kew from seed collected on the hills immediately north of Varna in eastern Bulgaria. Under cultivation this thistle grows much taller and more luxuriantly than in its natural habitats in Bulgaria, but always, in our experience, retains its biennial habit and produces abundance of good seed.

As its trivial suggests, the species was first described from Crimean specimens. It is now known to have a wide distribution through Italy, South and Central Russia, Slavonia, Crete, Greece, the Cyclades, Macedonia, Thrace, Serbia, Bulgaria, Dobruja, Roumania, Bosnia, N. Asia Minor, and Chios. Its occurrence in the western Mediterranean as a native plant is doubtful. It is naturalized in southern France and is recorded by some authors for Aragon, though the records from Spain are probably due entirely to the acceptance of *O. corymbosum*, Willk., and *O. humile*, Loscos, as synonyms, varieties, or subspecies of *O. tauricum* (see, for example, Rouy, l.c.). Boissier, and following him Rouy, makes two varieties in addition to the type. It is doubtful if these are more than habitat forms.—W. B. Turrill.

Fig. 1, upper part of plant, × $\frac{1}{5}$; 2, leaf, *natural size*; 3, inflorescence, *natural size*; 4, flower (except ovary), × 2; 5, androecium, spread open, × 4; 6, pollen grain, *much enlarged*; 7, pappus, × 2; 8, cypselas, × 2.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Tabula 3157.

SIDERITIS SCARDICA, *Griseb.*

Labiatae. Tribus Stachydeae.

S. scardica, *Griseb. Spic. Flor. rumel. et bithyn.* vol. ii. p. 144 (1844); *Boiss. Flor. Or.* vol. iv. p. 710 (1879); *Wettstein in Bibl. Bot.* Heft 26, p. 85 (1892); *Halácsy, Consp. Flor. Graec.* vol. ii. p. 498 (1902); *Stoyanoff i Stefanoff, Flor. na Balg.* vol. ii. p. 933 (1925); *Hayek, Prodr. Flor. penins. Balcan.* vol. ii. p. 257 (1929); species a *S. euboea*, Heldr., foliis bracteisque longioribus, spica latiore facile distinguenda.

Herba perennis, basi suffruticosa, dense albo-lanata. *Caulis* usque ad 4 dm. altus, inferne sublignosus dense foliosus, simplex vel leviter ramosus. *Folia caulina* oblongo-linearia, apice obtusa, brevissime mucronulata, 7–12 mm. lata, inferiora, 7·5–8·5 cm. longa basi in petiolum 3–4 cm. longum angustata, superiora sessilia 3·5–4·5 cm. longa, margine integerrima vel leviter crenata. *Verticillastri* 4–10-flori in spicam breviter cylindricam densam usque ad 1·4 dm. longam 2–3 cm. diametro congesti, interdum 1–2 infimi 1–3 cm. remoti; bracteae late cordato-ovatae, gradatim attenuatae, patentes vel leviter recurvae, pallide virides, reticulato-venosae, pubescentes et glandulosae, margine longe sericeo-ciliatae. *Calyx* tubulosus, 9 mm. longus, longe sericeo-pubescens, dentibus 5 fere aequalibus lanceolatis acutis 3–3·5 mm. longis. *Corolla* flava, extus sericeo-pubescens, 1·3–1·5 cm. longa, tubo sursum gradatim ampliato ima basi 1·75 mm. fauce 5 mm. diametro, labio superiore vix 2 mm. bifido, inferiore leviter trilobo, lobis subaequalibus. *Stamina* inclusa, longiora 3 mm. breviora 2 mm. longa. *Stylus* 4 mm. longus, ramis stigmaticis inaequalibus truncatis 1·5 et 0·75 mm. longis inclusis, ramo inferiore dilatato superiorem amplectente.—*S. florida*, Boiss. et Heldr. in Boiss. Diagn. Ser. II. vol. iv. p. 31 (1859); Heldr. Nutzpfl. p. 34 (1862).

Thessaly. M. Olympi Thessal. reg. sylvat. pr. coenobium Hag. Dionysii, 20–23.7.1851, *Heldreich*, 2517; in reg. infer. m. Olympi Thessaliae, 1230 m., 7–8.1857, *Orphanides*, 539; Mt. Olympus, Hag. Dionysius, 30.7.1891, *Sintenis et Bornmueller*, 1429; in subalpinis mt. Olympus, 7.1905, *Adamović*; in monte Olympo Thessaliae, in valle Xerolakki ultra Naum spilia usque, substrato calceo, 1100–1500 m., 1.7.1928, *Dibowski*. In regione media mt. Pelion supra urbem Volo, 29.7.1893, *Leonis* (var. *pelia* Hal.).

MACEDONIA. In Scardo: pratis montanis m. Ljubatrin sparsim in angusta regione alt. 920 m. *Grisebach.*

THRACE. Near Xanthie, *Tedd*, 64; Tchal Dagh, 25.6.31, 700 m., rocky treeless slopes, north-east side of the mountain, *Tedd*, 691.

BULGARIA. Mt. Pirin (sensu lato), sold in packets for tea in Sofia.

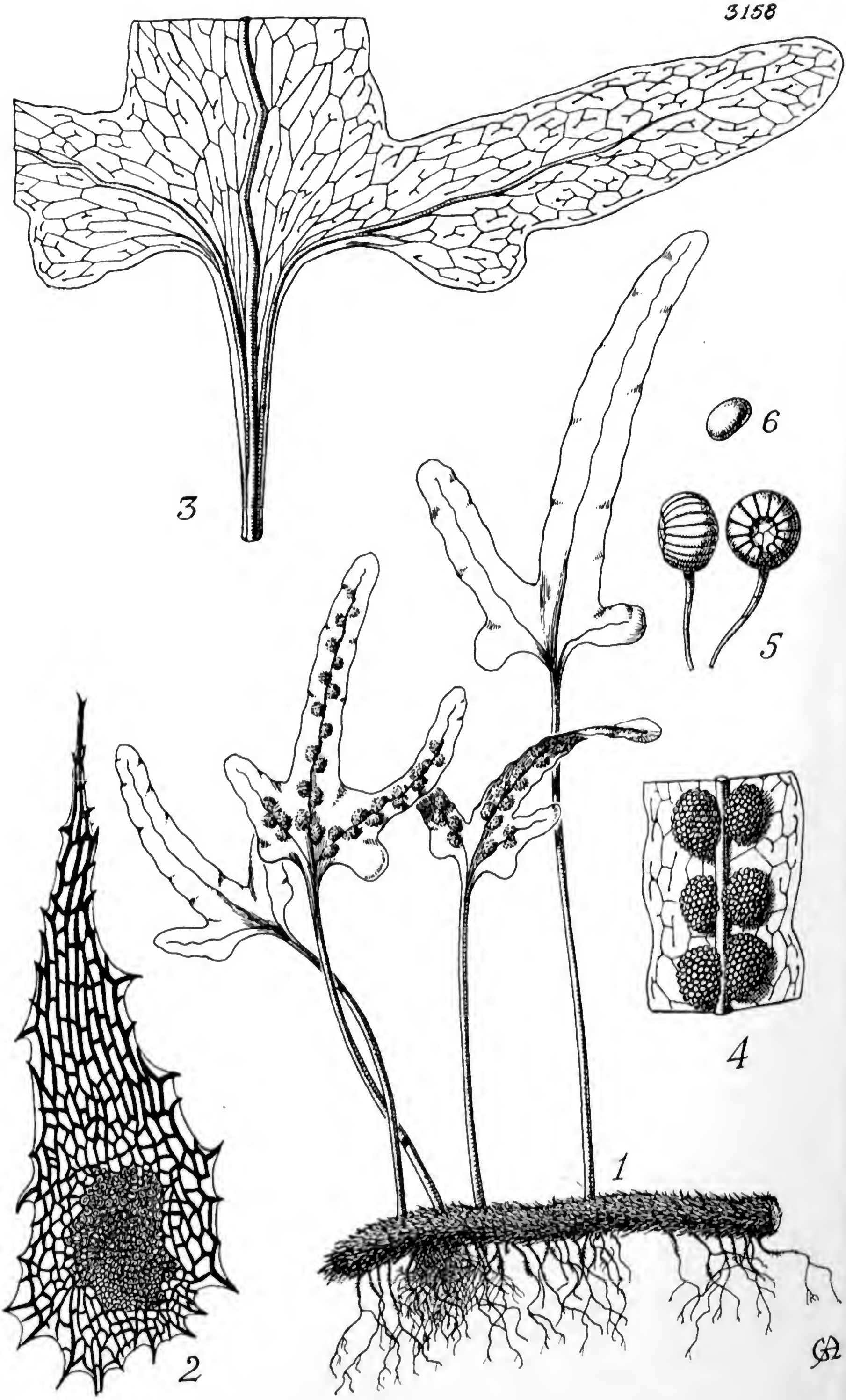
In addition to the specimens (all in the Herbarium at Kew) quoted above, the species has been recorded from Mt. Ossa and Godaman in Thessaly, from Mirčevica Planina, Čeganska Planina, Batecina, Huma, Dobro Pole, Čaušovo, prope Ueskub and Jakupica in Macedonia, from Korab in Albania, and from Ali-Botuš, the Central Rhodopes, and the Belasitsa (as var. *pelia*) in Bulgaria.

In the countries around the Aegean Sea there is a group of species of *Sideritis* all of which are closely related one to another. These include the plant here figured, *S. euboea*, Heldr. [known only from the upper region of Mt. Dirphys (Delphi) and Mt. Xerovuni in the island of Euboea], *S. syriaca*, L. (from Crete), *S. Roeseri*, Boiss. et Heldr. (from Greece, Thessaly, Epirus and Albania), *S. theezans*, Boiss. et Heldr. (from Greece), *S. taurica*, M. Bieb. (from Asia Minor eastwards to the Caucasus and Crimea), and *S. sipylea*, Boiss. (from Asia Minor). These together with *S. sicula*, Ucria (from Italy and Sicily), may well furnish another example of hamagenesis (*vide* Turrill, Plant-Life of the Balkan Peninsula, p. 361 : 1929).

Sideritis scardica is collected in considerable quantity in Bulgarian Macedonia and used for making an infusion which is drunk as "tea." The dried inflorescences are sold in packets in Sofia under the name "Pirinski tchaj," i.e. "Pirin tea." Markgraf (In Albaniens Bergen, p. 40 : 1930) records a similar use for this species, and for *S. Roeseri*, Boiss. et Heldr., under the Albanian names çaj malet ("mountain tea") or çaj shqyptare ("Albanian tea"). Heldreich (l.c.) refers to our species (under the name *S. florida*) and to other species of the group as yielding material for tea-making. The best results are obtained from Pirin tea when the dried inflorescences are boiled in four or five times their bulk of water for about fifteen minutes. The yellow-brown liquid is then decanted and drunk hot, preferably without the addition of milk.

The variety *pelia*, from Mt. Pelion and (according to Urumoff) from the Belasitsa, is rather a distinct-looking plant and may prove worthy of specific rank when more material is available for examination. Tedd's plant, No. 64, has bracts not or scarcely longer than the flowers. This is probably an abnormal state due to late-flowering or some other cause.—W. B. TURRILL.

FIGS. 1, 1A, lower and upper parts of flowering shoot, *natural size*; 2, bract, × 2; 3, flower, × 2; 4, flower, laid open, × 2; 5, a, b, c, lateral, adaxial and abaxial views respectively of stigma, × 18.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Tabula 3158.

NEOCHEIROPTERIS WALTONI, *Ching*.

Polypodiaceae.

N. Waltoni, *Ching*; species nova, affinis *N. palmatopedatae*, (Baker) Christ, a qua statura minore frondibusque hastato-trilobis differt.

Rhizoma late repens validum pennae anserinae crassitie, nigrum, squamis clathratis nigris versus apicem patulis ceterum subimbricatis denticulatis e basi latissima lanceolatis longe acuminatis densissime vestitum. *Folia* seriata, sparsa vel subfasciculata, stipite nudo tenui flexuoso pallide stramineo anguloso 4–6 cm. longo basi vix 1 mm. diametro; lamina 4–7 cm. longa, basi 2–3 cm. lata, ambitu hastata, 3- vel rarissime 5-lobata, lobo centrali 3–6 cm. longo 5–8 mm. lato lanceolato apice rotundato vel obtuso, duobus lateralibus multo brevioribus fere erectis basi dilatato-cordatis, margine plus minusve leviter repando-undulato, costa principali subtus prominente supra inconspicua, nonnunquam leviter impressa, nervis occultis sed luce transeunte distinctis abunde anastomosantibus, areolis inter costam et marginem 2–3-seriatis plus minusve pentagonis nervulos clavatos liberos indivisos vel raro furcatos plerumque costam spectantes includentibus, textura herbacea, utraque pagina pallide viridi, pagina superiore glaberrima inferiore in planta juvenili paleis iis rhizomatis sed minoribus cuspidatisque laxe obtecta. *Sori* magni, superficiales, costales, basales majores suboblongi, supremi rotundati, plerumque sese tangentes, brunnei, juveniles paleis peltatis nigris tecti. *Sporangia* longe pedunculata, globosa, annulo brunneo latissimo completo.—*Polypodium hastatum*, Hemsl. in Journ. Linn. Soc., Bot. vol. xxxv. p. 206 (1902), non Thunb. *Polypodium clathratum*, var. *lobatum*, Takeda in Notes Roy. Bot. Gard. Edinb. vol. viii. p. 282 (1915).

Tibet. Kyichu Valley, 15 miles east of Lhasa, August 1904, *Capt. H. J. Walton* (type). Lhasa, 3450 m., 18 Sept. 1904, *L. O. Waddell*.

A critical examination of the material now at hand shows at once the proper systematic position of the present species. The genus *Neocheiropteris*, Christ, has hitherto been regarded as a monotypic one,

represented by *N. palmatopedata* from Yunnan, lately known also from West Szechwan and Kweichow. The new species differs from its relative chiefly by its decidedly smaller dimensions and hastately trilobed frond.—R. C. Ching.

Fig. 1, plant, *natural size*; 2, ramentum from rhizome, × 27; 3, part of a frond, showing venation, × 3; 4, part of lower surface of a frond, with sori, × 3; 5, sporangia, *much enlarged*; 6, spore, *much enlarged*.


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Tabula 3159.

SLOANEA ELEGANS, *Chun*.

Elaeocarpaceae. Tribus Elaeocarpeae.

S. elegans, *Chun*; species nova affinis *S. dasycarpae*, (Benth.) Hemsl., quae foliis multo majoribus oblongis coriaceis serratis valde venosis, floribus majoribus sepalis orbicularibus, capsulis majoribus valvis crassioribus distinguitur; affinis etiam *S. Chingii*, Hu, cujus tamen capsulae in pedunculo communi umbellatim sunt dispositae.

Arbor 7–8 m. alta. *Innovationes* dense pubescentes, cito glabrae. *Gemmae* dense sericeo-pilosae, pallide fulvae. *Ramuli* graciles, leviter angulati, cinereo-brunnei, pilis brevibus pallidis patulis plus minusve pubescentes. *Folia* decidua, petiolata, lanceolata, oblanceolata vel elliptico-lanceolata, in basin acutam vel subobtusam longe attenuata in apice graciliter longe vel breviter acuminata, raro acuta, 6–11 cm. longa, 1·5–3 cm. lata, margine integro subirregulariter undulato, chartacea, utraque pagina statu juniore minute puberula, cito glabra pilis caespitosis in venarum axillis subtus nonnunquam persistentibus exceptis, pagina superiore surde viridi costa immersa venis lateralibus indistinctis, pagina inferiore pallide viridi, costa venisque lateralibus gracilibus sed conspicuis, venis lateralibus 7–8 irregularibus adscendentibus anastomosantibus sparse reticulatis; petiolus gracilis, subteres, apice leviter dilatatus, 1–2 cm. longus, plus minusve sordide puberulus. *Pedunculi* in ramis hornotinis orti, in axillis foliorum inferiorum solitarii, 2·5–4 cm. longi, graciles, teretes, adscendenti-patentes, recti, sordide puberuli. *Flores* 1·8–2 cm. diametro. *Sepala* 5, ovata usque deltoideo-ovata, acuta, 4–5 mm. longa, 3–4 mm. lata, utraque pagina tenuiter sericeo-pubescentia. *Petala* 5, leviter imbricata, 10–12 mm. longa, latitudine valde inaequalia, oblique cuneata, apice truncata erosa vel in lobos lineari-oblongos irregulariter lacerata, utraque pagina puberula, longitudinaliter 8–14-nervia. *Stamina* pernumerosa (circiter 80), conferta, 6–7 mm. longa, interiora subbreviora, pilis brevibus patentibus sparse strigosa; antherae 2·5 mm. longae, introrsae, rimis terminalibus dehiscentes, apice prominenter apiculatae, thecis subinaequalibus; filamenta 3·5–4·5 mm. longa, filiformia. *Discus* circiter 5 mm. diametro, lenticulari-discoideus, dense minute foveolatus, obscure puberulus. *Ovarium* circiter 3 mm. altum, conico-ovoideum, dense fulvo-sericeo-pilosum; stylus exsertus, subulatus, circiter 6 mm.

longus, basin versus hispidulus, superne glaber ; stigma minutum, punctiforme. *Capsulae* solitariae, pedunculis gracilibus plus minusve puberulis 2·5–4 cm. longis ovoideo-globosae, circiter 1·8 cm. longae ac paullo minus diametro, 4–5-valves, valvis styli fissi residuo, saepe coronatis, tenuiter lignosis, intus pallide fulgido-luteis, margine purpureo-rubris, extra spinis brevibus mollibus barbellatis circiter 2 mm. longis facile deciduis dense vestitis. *Semina* in quaque capsula 1–3, ellipsoidea, circiter 12 mm. longa et 6 mm. lata, nitide purpureo-nigra, tribus partibus arillo tenui carnoso aurantiaco-miniato inclusis.—W. Y. Chun.

South China. Kwangtung : Kook Kiang District, Lung-Tou Shan, roadside near temple, tree 8 m. high, in flower, 3 April 1930, *Ko*, 50302 (type) ; same locality, at edge of wood, side of ravine, tree 7 m. high, in fruit, 1 Sept. 1930, *Ko*, 50796.

Fig. 1, flowering branch, with young leaves, *natural size* ; 2, leaf, lower surface, *natural size* ; 3, flower, × 2 ; 4, flower, with perianth and half of the stamens removed, showing pistil, × 2 ; 5, stamen, × 6 ; 6, capsule, after dehiscence, × 2 ; 7, bristle from capsule, × 15 ; 8, seed, with aril, × 2.


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Tabula 3160.

ACER SYCOPSEOIDES, *Chun.*

Aceraceae.

A. sycopseoides, *Chun*; species nova ab omnibus speciebus adhuc descriptis remota.

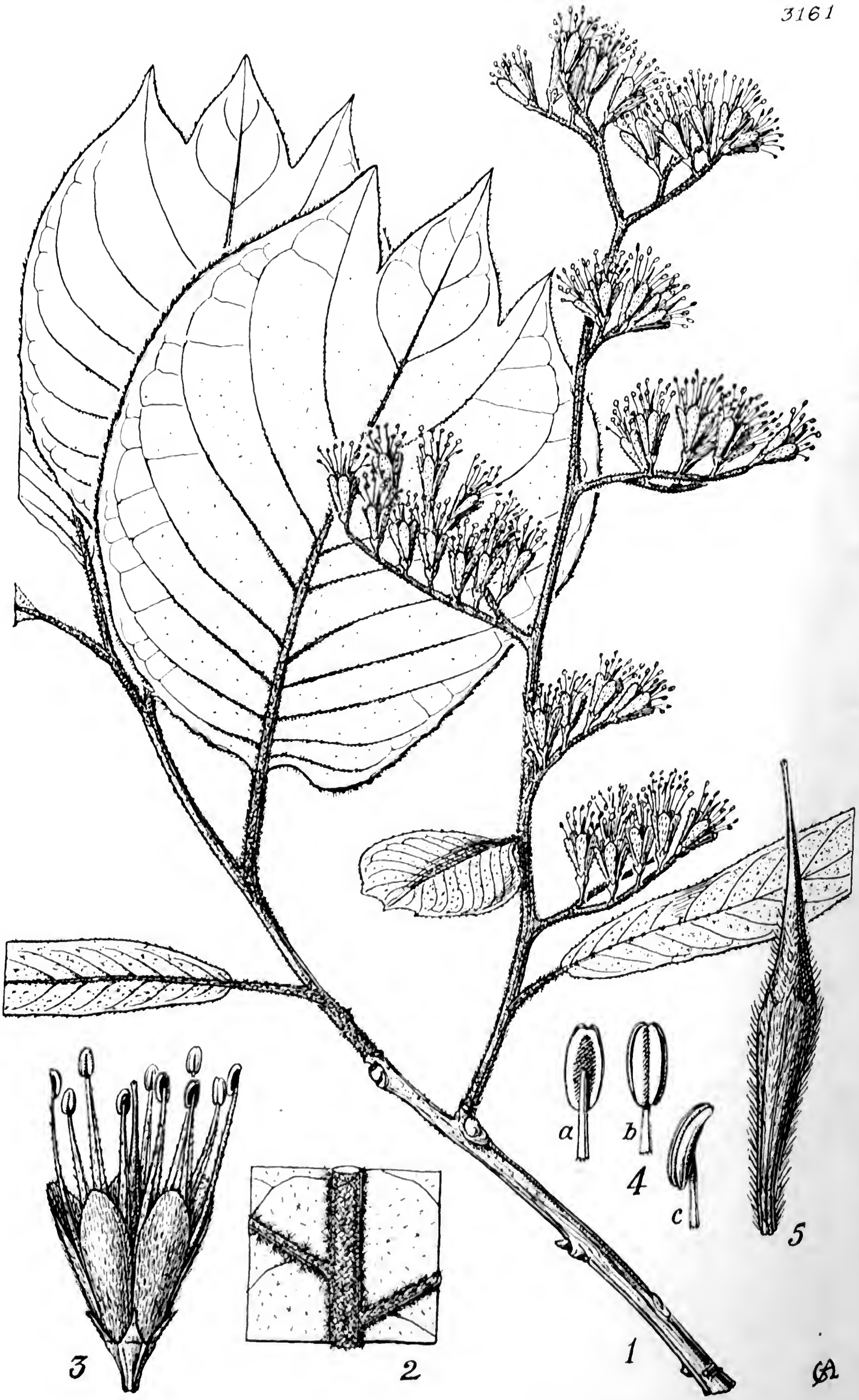
Arbor 6 m. alta. *Cortex* cinereo-albus. *Ramuli* teretes, dense fulvo-tomentosi, annotini glabri vel glabrescentes purpureo-brunnei; ramuli vetustiores sparse minute lenticellati. *Folia* persistentia, etiam novella jam coriacea, longi- vel brevi-petiolata, 3-nervia, 5–8 cm. longa, 2·5–4 cm. lata, ovata, oblongo-ovata vel obovata, basi rotundata, apice obtuse acuminata, margine valde revoluta integra vel supra laminae medium utrinque lobulo unico angulari obtuso praedita in quem solet excurrere vena lateralis basalis, pagina superiore statu juniore plus minusve tomentosa demum glabra, surde viridia, statu vivo subbullata, siccitate minute dense reticulata, pagina inferiore glauca, minute foveolata, dense sericeo-puberula, secundum venas longe sericeo-pilosa; costa venaeque laterales graciles, supra impressae, subtus prominentes, a petiolo robusto paullo supra basin laminae abrupte discedentes, venis secundariis gracilibus brevibus indistinctis, paribus 2 vel 3 superioribus prope costae apicem ramificantibus exceptis, omnibus irregulariter anastomosantibus; petioli robusti, teretes, leviter sulcati, longitudine variabiles, primum dense fulvo-tomentosi, dein glabrescentes; petioli foliorum superiorum circiter 1 cm. longi, inferiorum usque 2·5 cm. longi. *Infructescentia* corymbiformis, terminalis, foliis brevior, oligocarpa, rhachi pedunculis pedicellisque dense fulvo-tomentosis; pedicelli 4–5 mm. longi. *Samara* demum glabra, circiter 1·8 cm. longa; nuculus elliptico-oblongus, turgidus, haud angularis, tenuiter reticulatus, 5 mm. longus, 3 mm. latus; ala adscendenti-patens, 7–8 mm. lata.

South China. Kwangsi; Tia Lian Shan, N. Luchen, elevation about 540 m., medium-sized tree, in woods, rare, 25 May 1928, *Ching*, 5336.

A remarkably distinct species having leaves reminiscent of those of some species of *Sycopsis*. The comparatively small, thickly coriaceous,

more or less angular leaves glaucous beneath, the densely tomentose branchlets, and the small samara with ascending spreading wings, constitute a unique combination of distinctive characters which readily separates this from all described species.—W. Y. Chun.

Fig. 1, upper part of a branch, in the fruiting condition, *natural size*; 2, lower surface of leaf, *natural size*; 3, fruit, × 2.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Tabula 3161.

PTEROSTYRAX LEVEILLEI, (*Fedde*) *Chun*.

Styracaceae.

P. Leveillei, (*Fedde*) *Chun*, comb. nov. ; species *P. hispido*, Sieb. et Zucc., affinis, foliis tricuspidatis, floribus sublongioribus, sepalis anguste lanceolatis nec deltoideo-ovatis, petalis late ellipticis, fructibus aliter formatis distincta.

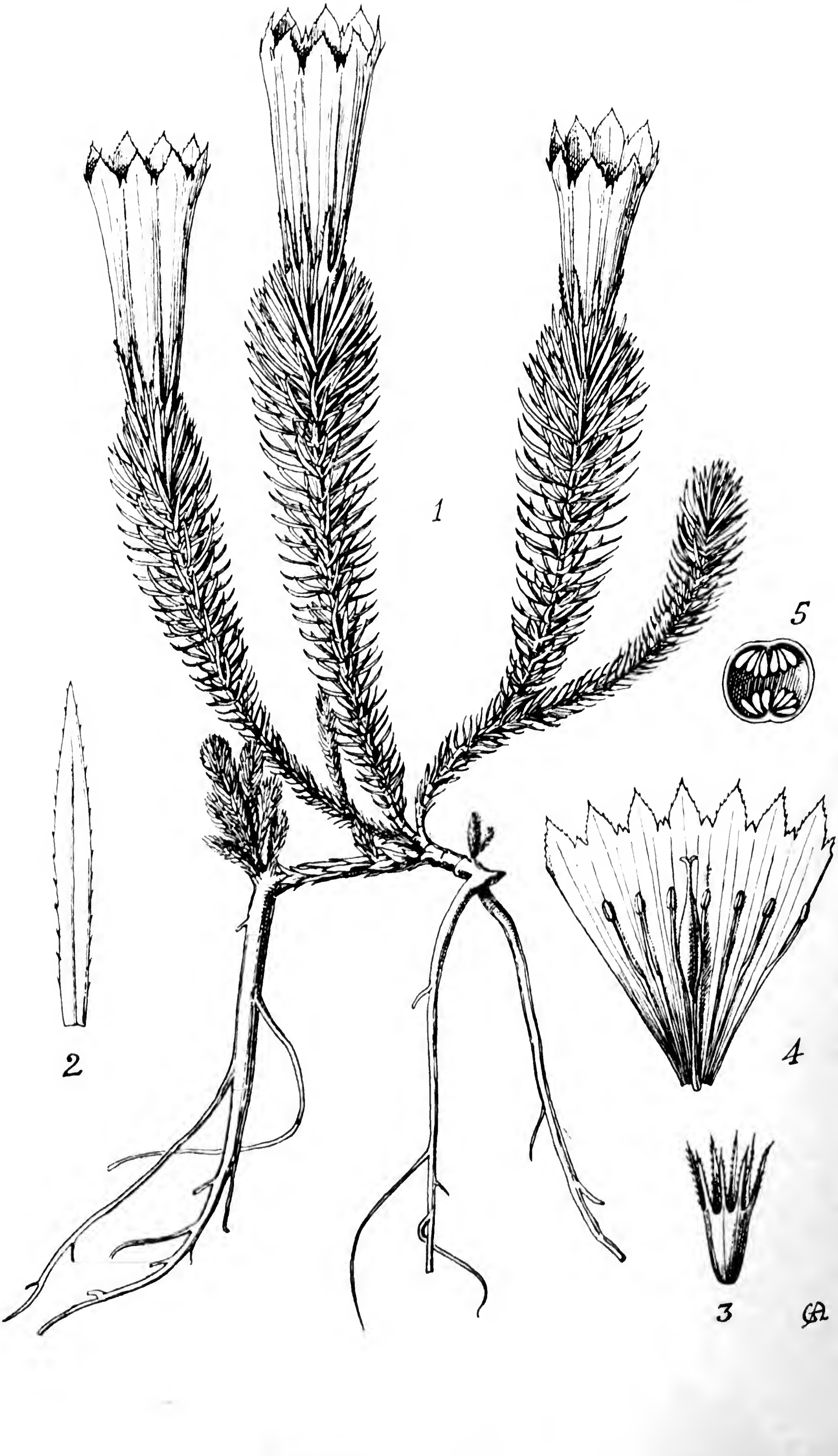
Arbor 9 m. alta, trunco cortice cinereo aspero praedito. *Ramuli* subteretes, statu juniore pilis stellatis parvis fulvo-tomentelli et paucioribus majoribus breviter hirsuti, annotini glabrescentes, brunnescentes. *Folia* chartacea, 6–11 cm. longa, 3–6 cm. lata, forma variabilia, plerumque elliptico-oblonga usque ovato- vel obovato-oblonga, basi cuneata usque subrotundata atque in petiolum anguste decurrentia, apice tricuspidata lobis triangularibus acutis vel breviter acuminatis calloso-mucronatis, margine minute calloso-denticulata, pagina superiore pallide viridi primum dense stellato-pilosa demum glabrata, pagina inferiore multo pallidiore plus minusve glauca secundum costam venasque pilis stellatis flavescentibus tomentella ac subhirsuta ceterum pilis stellatis minute cinereo-tomentella indumento hoc arcte adpresso pilis stellatis majoribus hinc inde inspersis ; venae laterales 6–11, adscendentes, subparallelae, superiores singulae ad apices loborum lateralium excurrentes, inferiores prope marginem anastomosantes, omnes cum costa subtus prominentes, venulis sparsis subparallelis ; petiolus semiteres, supra canaliculatus, 1–2 cm. longus, juventute dense stellato-tomentellus, tandem pubescens. *Paniculae* multiflorae, anguste pyramidales, circiter 12 cm. longae, ex axillis foliorum delapsorum superiorum ramuli annotini ortae, rhachi ramulis pedicellis calyce pilis stellatis flavescentibus subhirsuto-tomentellis, ramulis sparsis brevibus vix 3 cm. longis secundifloris ; pedicelli 1–2 mm. longi, infra calycem articulati ; bracteae bracteolaeque caducae. *Flores* 12–14 mm. longi, albidi. *Calycis tubus* 2 mm. altus, infundibuliformi-campanulatus, ovario adnatus, margine truncatus 5-costatus, costis cum lobis alternantibus ; lobi 5, distincti, anguste triangulares, acuminati, vix 1 mm. longi, textura petalis homogenei, leviter pilosi. *Petala* 5, basi subcohaerentia vel libera, utraque pagina dense albido-pilosa, elliptico-spathulata, apice obtusa vel acutiuscula, 6 mm. longa, 2 mm. lata. *Stamina* 10, exserta, inaequilonga, 5 longiora 8–9 mm. longa ; filamenta tenuia applanata, utrinque sparse pilosa,

superne libera, sursum sensim angustata, inferne in tubum brevem connata ; antherae parvae, anguste oblongae, tandem arcuato-reflexae. *Ovarium* pro majore parte inferum, parte libera conica dense cinereo-pilosa in stylum sensim dilatata ; stylus longus, cylindrico-subulatus, staminibus brevior, parte inferiore dense pilosa, apicem versus glaber ; stigma truncatum vel obsolete trilobum. *Fructus* (immaturus) cylindrico-fusiformis, supra medium leviter constrictus, stylo incluso 3–3·5 cm. longus, parte inferiore (id est infera) obscure 5-costata, dimidium fructus aequante, pilis patule adscendentibus flavis dense sericeo-villosa.—*Styrax Leveillei*, Fedde ex Léveillé, Flore du Kouy-Tcheou, p. 407 (1915). *Styrax Cavaleriei*, Léveillé in Fedde, Repert. Sp. Nov. vol. ix. p. 447 (1911), non *S. Cavaleriei*, Léveillé, op. cit. vol. iv. p. 331 (1907). *Pterostyrax hispidus*, W. W. Sm. in Notes Roy. Bot. Gard. Edinb. vol. xii. p. 238 (1920), non Sieb. et Zucc. *Pterostyrax Cavaleriei*, Guillaumin in Bull. Soc. Bot. France, 1923, vol. lxx. p. 886 (1924).

South China. Kweichow : Pin-Fa road to Tou-Yun, rare, May 1905, *J. Cavalerie*, 2992 (type). Kwangsi : Bin Long, Miao Shan, north of Luchen, border of Kweichow, 1200 m., in open wood along stream, very rare, 14 June 1928, *Ching*, 5962.

In inflorescence and fruit this species is clearly allied to *Pterostyrax hispidus*, Sieb. et Zucc., rather than to *P. corymbosus* as stated by Guillaumin. Besides the characters mentioned in the diagnosis, *P. hispidus* may be further distinguished by the calyx-lobes being continuous with the calyx-tube ; in the present species as well as in *P. corymbosus*, the calyx-lobes are abruptly differentiated from the truncate calyx-tube, the sepals having the consistency and texture of the corolla, a character of diagnostic value hitherto unnoticed.—W. Y. Chun.

Fig. 1, flowering branch, *natural size* ; 2, lower surface of leaf, × 4 ; 3, flower, × 4 ; 4, anthers, × 10 (a, seen from outside, b, from inside, c, lateral view) ; 5, young fruit, × 2.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Tabula 3162.

GENTIANA SETULIFOLIA, *Marquand.*

Gentianaceae. Tribus Swertieae.

G. setulifolia, *Marquand in Kew Bull.* 1928, p. 56 ; affinis *G. heptaphyllae,* Balf.f. et Forrest, sed foliis angustioribus, calycisque lobis margine setis multo longioribus cinctis differt.

Herba perennis, nonnihil serpens. *Stolones* cataphylla hyalina ovata acuta 3–4 mm. longa gerentes. *Rami steriles* plurimi, breves. *Rami floriferi* erecti, scabri, 10–15 cm. longi, internodiis 2–4 mm. longis. *Folia rosularum* desunt. *Folia caulina* verticillata, 7 pro verticillo, sessilia, patentia, linearia, acuminata, e basi ad apicem ramorum gradatim majora, usque ad 9 mm. longa, 0·5–1 mm. lata, margine subulato-setosa ; folia verticillorum superiorum calycem occultantes. *Flores* magni, solitarii, terminales, sessiles. *Calyx* purpurascens ; tubus 7–9 mm. longus, 5–6 mm. diametro ; lobi 7–8, lineari-acuminati, 6–8 mm. longi, 0·5–0·7 mm. lati, margine setosi, sinu lato obtuso. *Corolla* campanulato-infundibuliformis, caerulea ; tubus albidus, caeruleo-vittatus, 4–4·5 cm. longus, 1·5 cm. diametro ; lobi 7–8 (rarius 6), ovati, acuminati vel brevissime cuspidati, 5 mm. longi, 4 mm. lati, margine minute erosi ; plicae breves, laciniatae. *Stamina* 7–8, circa 2·5 cm. longa ; antherae oblongae, 3–3·5 mm. longae. *Ovarium* stipitatum. *Semina* matura non visa.

S.E. Tibet. Valley of the Seinghku, near the frontier of Burma, lat. 28° 10′ N., long. 97° 20′ E., 3600–3900 m., 13 Oct. 1926, *F. Kingdon Ward* (with No. 7385) (type) ; valley of the Seinghku, on granite slabs in shelter under cliffs, but in the open, 3000 m., *F. Kingdon Ward,* 7485.

This species, which belongs to the verticillate-leaved series of Sect. *Frigida,* is unique in the genus in having cilia on the margins of the leaves and calyx-lobes. The number of leaves in a whorl and the number of parts in the corolla are never absolutely constant in the species of Series *Verticillatae,* but vary within narrow limits.

The previously known species of this Series are natives of Western and North-Western China and the adjoining portions of Eastern Tibet, so that the discovery of *G. setulifolia* has extended the known range of

the Series considerably further southwards. The district where this plant grows has been very little explored botanically, and is of special phytogeographical interest in connecting the floras of the Eastern Himalaya and South-West China.

Captain Kingdon Ward unfortunately was unable to obtain ripe seed in 1926, but he informs me that he collected living roots on a subsequent expedition from which he has just returned. This fine species was not previously known in cultivation.

Duplicate specimens comprising part of the original gathering have been sent to the Herbarium of the Royal Botanic Garden, Edinburgh.—C. V. B. MARQUAND.

FIG. 1, portion of plant, *natural size*; 2, leaf, × 5; 3, calyx, *natural size*; 4, corolla opened out and seen from the interior, *natural size*; 5, transverse section of ovary, × 5.

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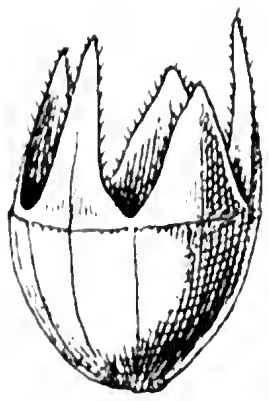

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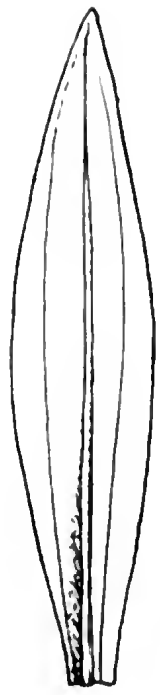

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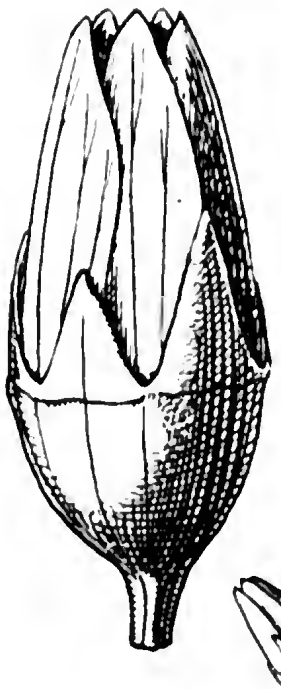

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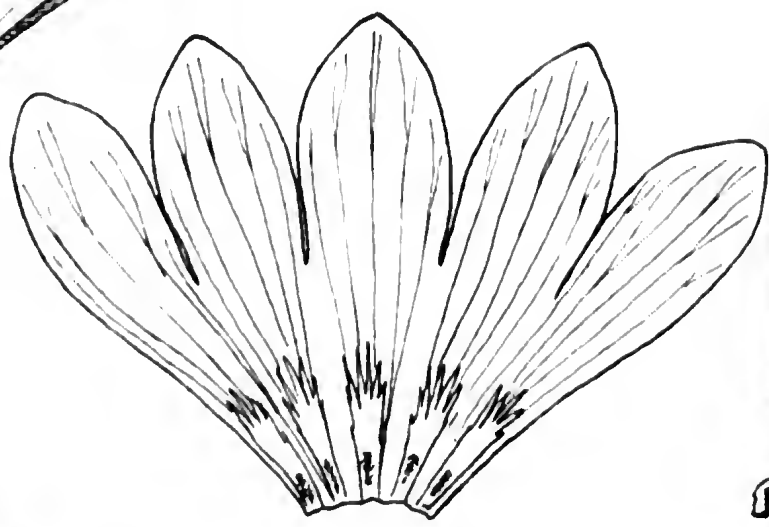

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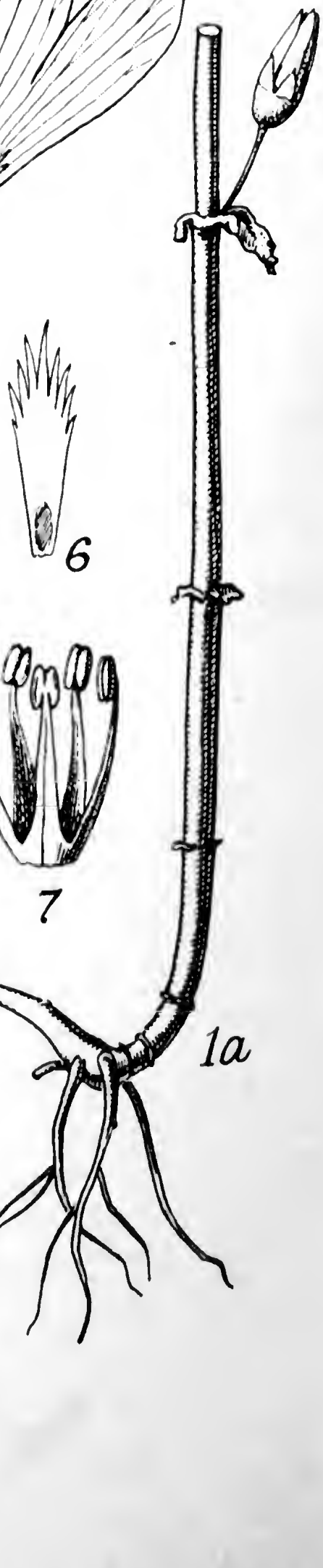

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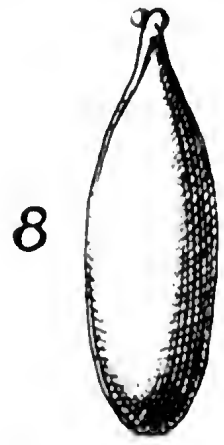

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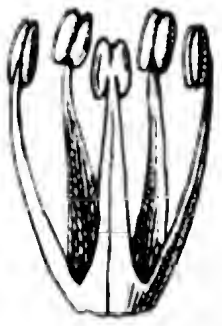

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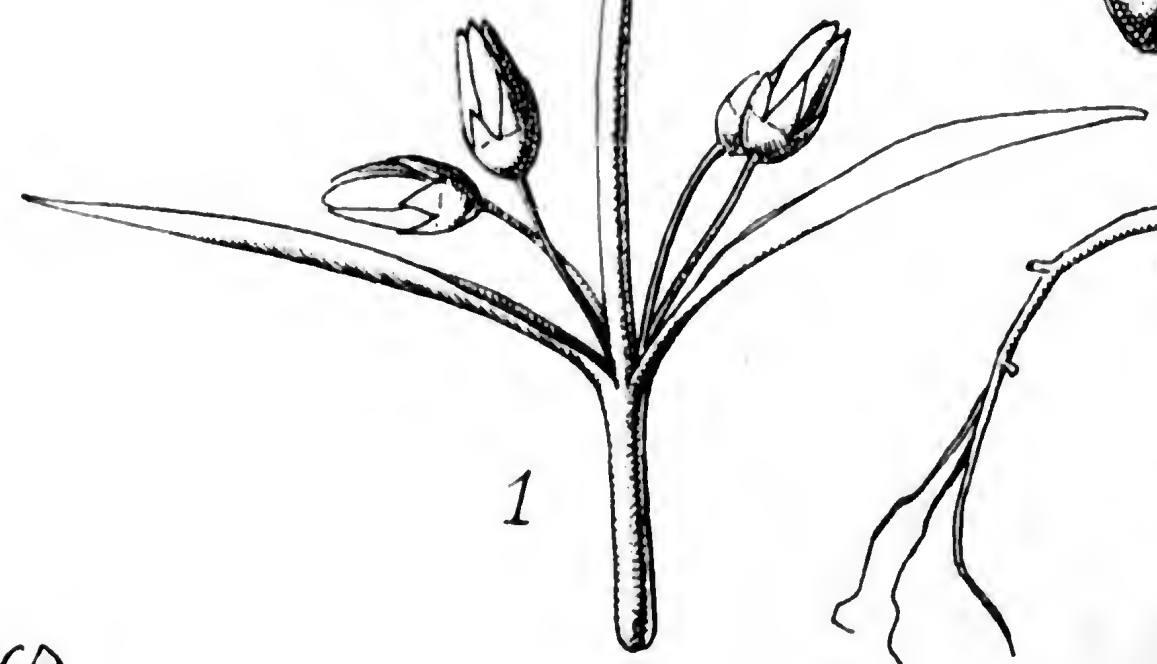

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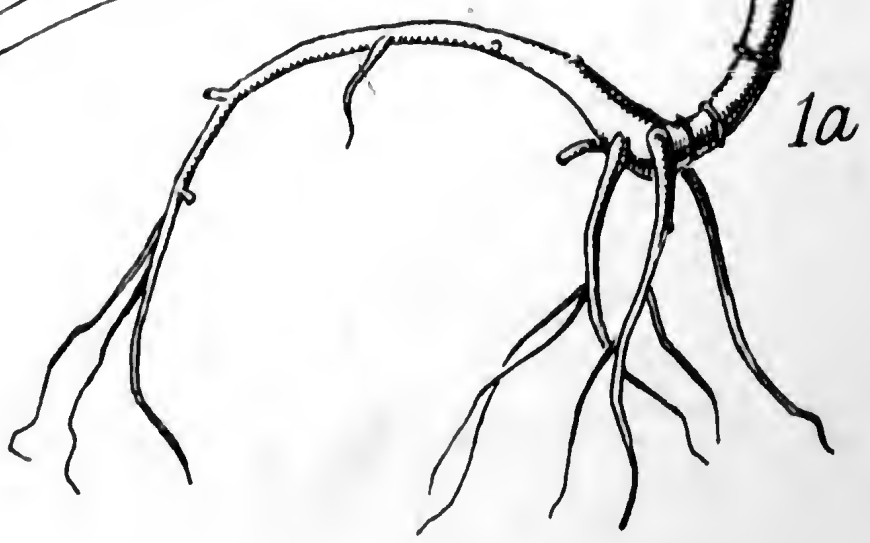

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Tabula 3163.

KINGDON-WARDIA CODONOPSIDOIDES, *Marquand.*

Gentianaceae. Tribus Swertieae.

K. codonopsidoides, *Marquand in Journ. Linn. Soc., Bot.* vol. xlviii. p. 207 (1929); species unica.

Herba annua. *Caulis* erectus, inferne tortilis, 25–35 cm. altus. *Folia* basalia nulla, caulina opposita, sessilia, lanceolato-oblonga, 3–4 cm. longa, 0·7–1 cm. lata, subacuta. *Pedunculi* axillares, 2–3 cm. longi, flores 2–3 breviter pedicellatos gerentes. *Calyx* tubuloso-campanulatus, usque medium quinquefidus, lobis inaequalibus, subglaber; tubus 3–4 mm. longus; lobi 5, inaequales, subulato-deltoidei, 2·5–4·5 mm. longi, 4–6 mm. lati, saepius duo majores et tres minores. *Corolla* tubuloso-campanulata, 8–10 mm. longa, 4–5 mm. diametro, circiter ad quartam partem lobata, pallide purpurea; tubus basin versus foveolis 5 glandulosis superne ciliato-fimbriatis infra lobos sitis praeditus; lobi 5, aequales, ovati, 3–4 mm. longi, 2·5–3 mm. lati, subacuti, integri. *Stamina* 5, corollae basi affixa, 6–7 mm. longa; filamenta subulata, inferne in annulum 1 mm. longum connata, ceterum libera; antherae oblongae, 1 mm. longae. *Ovarium* stamina superans; stigma subsessile. *Capsula* ignota.

S.E. Tibet. Pa La (Tra La), in colonies under juniper or *Picea* trees, on the edge of the meadow in damp shady situations, 3600 m., 26 Sept. 1924, *F. Kingdon Ward,* 6205 (type). Previously found in 1882 by " Dr. King's collector " in Tibet, without precise locality.

The genus occupies a somewhat intermediate position between *Gentiana* and *Swertia,* differing from the former in the presence of a fimbriate foveola towards the base of the corolla below each corolla-lobe, and from the latter in the conspicuous calyx-tube surmounted by triangular lobes as well as in the well-marked corolla-tube. From *Jaeschkea* it is readily distinguished by the position of the stamens, which arise from the base of the corolla instead of from the sinus between the lobes.

It is possible that this species may be less rare than might be inferred

from the fact that the only two specimens known to exist are in the Kew Herbarium, since large areas of this part of Tibet are still unexplored botanically.—C. V. B. Marquand.

Figs. 1, 1a, upper and lower portions of plant, *natural size*; 2, leaf, *natural size*; 3, young flower; 4, calyx; 5, corolla, opened out to show fimbriate foveolae and drops of nectar; 6, foveola, × 6; 7, androecium; 8, gynoecium. *Figs.* 3, 4, 5, 7, 8, × 3.


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Tabula 3164.

BUDDLEJA GYNANDRA, *Marquand.*

Loganiaceae. Tribus Eulogancieae.

B. gynandra, *Marquand in Kew Bull.* 1930, p. 184 ; species distinctissima staminibus ovario nec corollae affixis.

Frutex. Rami subteretes, gracilcs, primum tomentosi. *Folia* opposita, lanceolata vel ovato-lanceolata, acuminata, basi attenuata, ad 13 cm. longa, 3·5 cm. lata, integra vel interdum paullum sinuata, novella utrinque stellato-tomentosa, adulta supra glabrescentia, subtus parce tomentella ; petioli 5–8 mm. longi. *Stipulae* in annulum redactae. *Thyrsi* caulem et ramulos laterales terminantes, compositi ramis lateralibus circiter 4 ascendentibus pro rata longiusculis, laxi ; cymae 5–7-florae ; bractcae lineares, superiores 6–8 mm. longae, inferiores majores foliaceae. *Flores* ochroleuci, fragrantes, pedicellis tomentosis. *Calyx* ad tertiam partem lobatus ; lobi 4, subobtusi, deltoidei. *Corolla* extra parce stellato-tomentosa ; tubus 4–5 mm. longus, circiter 1 mm. diametro, intus parce pubescens ; lobi 4, obovato-spathulati, integri, circiter 2 mm. longi, 1·5 mm. lati. *Stamina* 4, in latere ovarii inserta, circiter 1·5 mm. longa ; filamenta inferne adnata, parte superiore libera gracili antheris subdeltoideis subbreviore. *Ovarium* tomentosum, stylo staminibus duplo longiore, stigmate clavato. *Fructus* non visus.

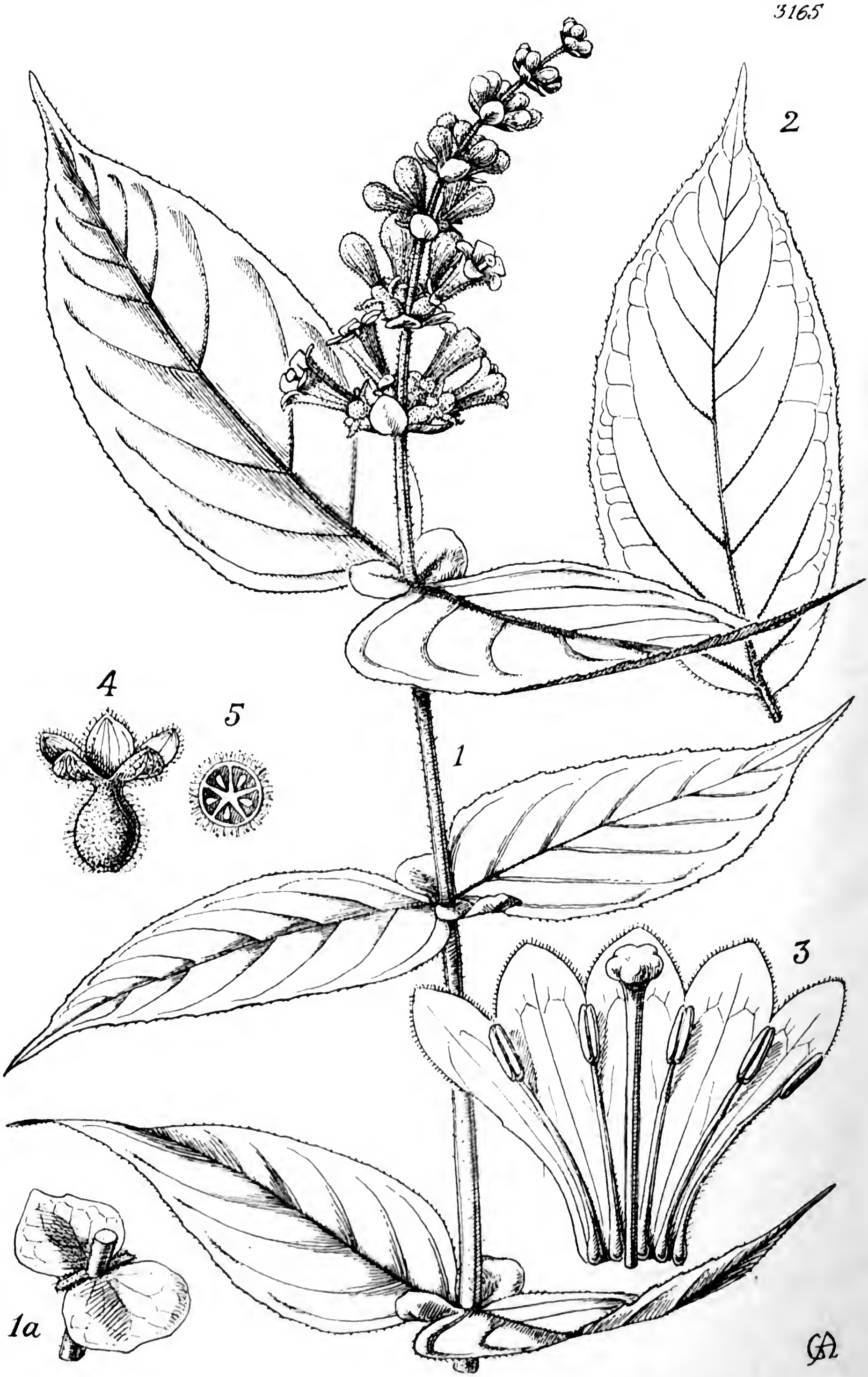
Tonkin. Langson, in rocky places, 27 Jan. 1886, *B. Balansa*, 930.

This interesting species, on which a monotypic Series of the genus (§ *Gynandrae*) has been established, is very distinct from all the other members of the genus in the position of the androecium. When the corolla-tube is separated by dissection of the flower, the stamens are found to adhere to the gynoecium, not being attached to the corolla-tube as they are in all Asiatic species of *Buddleja*. Only a single collecting of this remarkable plant is known to exist, but it is not a little strange that it should have escaped the notice of all systematists for nearly fifty years. The type sheet, which is in the Kew Herbarium, bears a label, "*Buddleja asiatica* Lour. determinavit Kränzlin," in that botanist's handwriting, and this may account for the fact that the

plant was overlooked until 1930, when a critical study of the Asiatic species of the genus was published by the author.

Some systematists might possibly consider this plant to belong to a new genus, but as it is only an extreme condition of a series ranging from those species in which the stamens are inserted near the mouth of the corolla-tube to those where the point of insertion is near the base of the latter, it seems preferable to retain it in the genus *Buddleja*.—C. V. B. MARQUAND.

FIG. 1, upper part of flowering branch, *natural size*; 2, flower, × 6; 3, androecium and gynoecium, × 6.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Tabula 3165.

LEYCESTERIA CROCOTHYRSOS, *Airy-Shaw.*

Caprifoliaceae.

L. (Euleycesteria) crocothyrsos, *Airy-Shaw*; species nova, ab omnibus congeneribus corolla aurantiaca basi valde 5-saccata distinctissima; a *L. formosa*, Wall., cui quam ceteris forsan propior, stipulis magnis, stylo pubescente statim distinguenda; inter species stipulatas, a *L. glaucophylla*, (Hook. f. et Thoms.) Hook. f., pseudo-verticillis 6-floris, et a *L. stipulata*, (Hook. f. et Thoms.) Fritsch, foliis subtus haud lanuginosis, stylo pubescente diversa.

Frutex parvus, laxus, statura ignota. *Rami annotini* ignoti. *Rami hornotini* fistulosi, teretes, usque 4 dm. longi (inflorescentia terminali inclusa), circiter 4 mm. diametro, sparse breviter glanduloso-pilosi vel glabrescentes, basi perulis scariosis late triangularibus usque lanceolatis 3–10 mm. longis raro apice foliaceis circiter 2 cm. longis cincti; internodia circiter 8 cm. longa. *Folia* iis *L. formosae* similia, ovata usque oblonga raro fere ovato-lanceolata, basi rotundata vel vix angustata, apice acuminata conspicue caudata, usque 12·5 cm. longa (cauda circiter 2 cm. longa inclusa), 5 cm. lata, margine (basi caudaque exceptis) leviter et subremote dentata dentibus glanduloso-apiculatis, sparse ciliata, pagina superiore olivacea pilis persparsis circiter 1 mm. longis praedita, costa densiuscule breviter pubescente, nervis glabris, pagina inferiore glaucescente tota minutissime pubescente (costa manifestius), nervis utrinque circiter sex; petioli brevissimi, 3–5 mm. longi, plerumque anguste alati, pubescentes praecipue supra pilis plus minus aureis. *Stipulae* interpetiolares maximae, latissime reniformes vel suborbiculares, usque 2 cm. latae et 1 cm. longae, basi utrinque petiolis foliorum breviter adnatae, margine integrae vel indistincte crenulatae, supra olivaceae, subtus glaucescentes. *Inflorescentia* terminalis, elongata, plus minus pendula, usque 12·5 cm. longa, rhachide dense glanduloso-villoso-pubescente. *Flores* sessiles in pseudo-verticillis 6-floris (cymulis binis trifloris) dispositi; pseudo-verticilli circiter 7, omnes bracteis binis late ovatis acuminatis vel acutis integris basi subcordatis vel angustatis usque 2 cm. longis et 1 cm. latis tenuiter membranaceis glabrescentibus dilute purpurascentibus margine dense glanduloso-ciliatis suffulti, bracteolis in quoque verticillo 4 bracteis similibus sed subduplo minoribus. *Receptaculum* ovoideum, apice

subattenuatum, densissime glanduloso-villoso-hispidum, circiter 5 mm. longum, 3 mm. diametro. *Calycis segmenta* breviter connata, maiuscula, aequalia, ovato-oblonga, subacuta, circiter 5 mm. longa et 3 mm. lata, herbacea, margine glanduloso-ciliata, extra sparse breviter pilosa, intus glabra. *Corolla* actinomorpha, laete aurantiaca (teste lectore), alabastro late clavata circiter 1·5 cm. longa; tubus sub anthesi late infundibuliformis, circiter 1·5 cm. longus, fauce 1·5 cm. diametro, basi truncato-intrusa in sacculos nectariferos 5 sepalis alternantes conspicue gibboso-ampliatus, 4–5 mm. latus, extra dense glanduloso-pilosus, intus ad staminum filamenta et ad nervos 5 praecipuos glanduloso-pilosus ceterum glaber; lobi imbricati, patentes, ovato-triangulares, obtusi vel rotundati, circiter 5 mm. longi et lati, extra plus minus glanduloso-pilosi, intus glabri. *Staminum* filamenta corollae tubo usque ad basin adnata, circiter 1·3–1·4 cm. longa, dense barbata, parte sexta suprema libera, ipso apice ovoideo-tumidula, dein acuta; antherae oblongae, utrinque obtusae, 3–4 mm. longae, 1–1·5 mm. latae. *Stylus* in alabastro circiter 1 cm., sub anthesi usque 1·7 cm. longus, satis validus, parte tertia suprema glabra, ceterum dense pubescens; stigma magnum, capitatum, lobatum, circiter 3 mm. diametro. *Ovarium* quinqueloculare, multiovulatum. *Fructus* non visi.

Assam. Delei Valley, 28° 20′ N., 96° 37′ E., 1800 m., growing on the steep sheltered gneiss face, in dense thickets, 8 May 1928, *F. Kingdon Ward*, 8180. "A small lax shrub. Flowers bright orange."

The genus *Leycesteria*, Wall., was subdivided by Fritsch (in Engl. & Prantl, Pflanzenfam. vol. iv. pt. 4, p. 169 : 1891) into two sections, *Euleycesteria*, Fritsch, and *Pentapyxis*, (Hook. f.) Fritsch, based upon the absence or presence respectively of pith in the stems, the usual absence or presence of stipules, and the zygomorphy or comparative actinomorphy of the corolla. Though Fritsch was undoubtedly right in reducing *Pentapyxis* to *Leycesteria*, his two subdivisions are scarcely satisfactory in the light of further investigation. The following arrangement is therefore proposed. (See *Kew Bull.* 1932, p. 161.)

Subgenus I. **EULEYCESTERIA** (*Fritsch* pro sect., emend.), subgen. nov. Ovary 5-locular, glandular-pubescent. Flowers in sixes, rarely in pairs. Bracts more or less broadly ovate, longer than the ovary.—Type-species: *L. formosa*, Wall.

* Section i. **Fistularia,** sect. nov. Pubescence of lower surface of leaves consisting of sparse, straight, more or less adpressed hairs. Branches subherbaceous, markedly fistular.—Type-species: *L. formosa*, Wall.

Series 1. **Formosae,** ser. nov. Stipules absent. Corolla white or pinkish, slightly enlarged above the conical base into inconspicuous nectaries; style glabrous.—Type-species: *L. formosa*, Wall.

Series 2. **Crocothyrsae,** ser. nov. Stipules present. Corolla bright orange-yellow, much dilated at the truncate base into 5 very prominent nectariferous sacs; style pubescent.—Type-species: *L. crocothyrsos*, Airy-Shaw.

** Section ii. **Pentapyxis,** (*Hook. f.*) *Fritsch*, emend. Pubescence of lower surface of leaves consisting of sparse or lanuginose, more or less crisped or erect hairs, with apparently bulbous bases. Branches not herbaceous. Corolla as in Series 1.—Type-species: *L. stipulata*, (Hook. f. et Thoms.) Fritsch.

Series 3. **Stipulatae,** ser. nov. Plant densely lanuginose. Branches solid. Inflorescence of several 6-flowered false whorls. Style glabrous.—Type-species: *L. stipulata*, (Hook. f. et Thoms.) Fritsch.

Series 4. **Glaucophyllae,** ser. nov. Plant pubescent. Branches fistular. Inflorescence of at most two 2-flowered false whorls. Style pubescent.—Type-species: *L. glaucophylla*, (Hook. f. et Thoms.) Hook. f.

Subgenus II. **PARALESTERA,** subgen. nov. Ovary 8-locular, glabrous. Flowers in pairs. Bracts very small, subulate, shorter than the ovary. Corolla as in Series 1, 3 and 4. Style glabrous. Pubescence as in Section i.—Type-species: *L. gracilis*, (Kurz) Airy-Shaw.

The orange colour of the corollas of *L. crocothyrsos* is unique in the genus; they appear also to be larger than those of any other species, and the basal nectariferous sacs are very marked. The stipules, which are not developed in the other species of Sect. *Fistularia*, approach in size those of *L. stipulata*, (Hook. f. et Thoms.) Fritsch (Sect. *Pentapyxis*). The character of a hairy style is shared only with *L. glaucophylla*, (Hook. f. et Thoms.) Hook. f. (Sect. *Pentapyxis*).

L. crocothyrsos appears to be extremely restricted in its distribution, and it is difficult to suggest whether it is more probably a "young" or a "relict" species. In its vegetative characters and inflorescence it approaches *L. formosa*, Wall., but this affinity can scarcely be regarded as a close one.—H. K. Airy-Shaw.

Fig. 1, upper part of flowering branch; 1a, node, showing stipules and bases of petioles; 2, leaf, lower surface; 3, corolla, opened out to show stamens and style; 4, ovary and calyx; 5, ovary, transverse section. *Figs.* 1, 2, × ⅔; *fig.* 1a, *natural size*; *figs.* 3, 4, 5, × 2.

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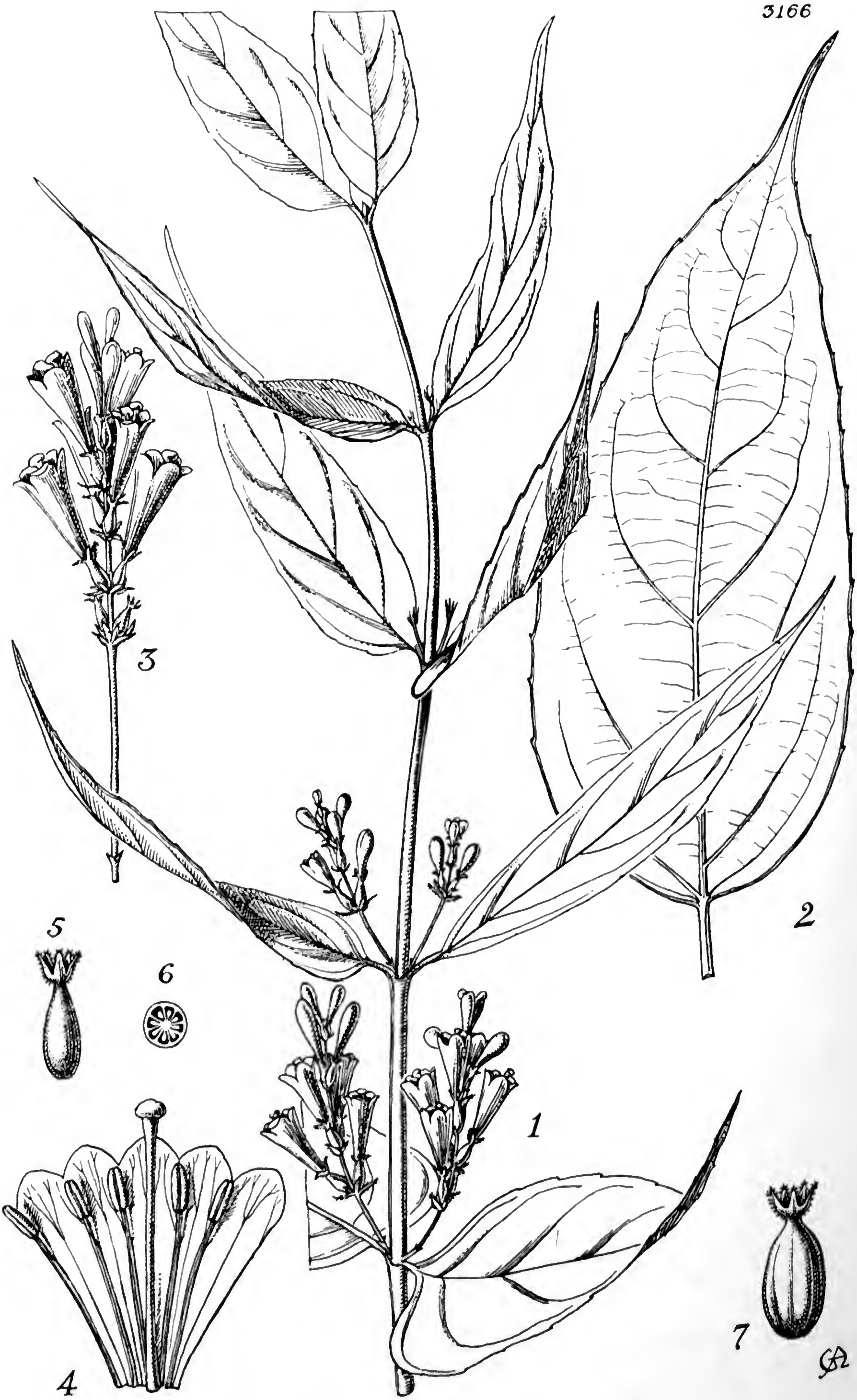

Tabula 3166.

LEYCESTERIA GRACILIS, (*Kurz*) *Airy-Shaw*.

Caprifoliaceae.

L. (Paralestera) gracilis, (*Kurz*) *Airy-Shaw*, comb. nov.; ovario 7–8-loculari, bracteis bracteolisque ovario brevioribus, floribus praeter calycis lobos glanduloso-ciliatos glaberrimis in genere unica; floribus praeterea in inflorescentias gracilcs foliis multo breviores decussatim dispositis porro distinguenda.

Frutex glaber, gracilis, subscandens, 1–3-metralis. *Rami* subsimplices, inde a basi fere arcuati, teretes, graciles, subherbacei, fistulosi, in specciminibus exstantibus raro usquc 5 mm. diametro, nodis haud constrictis; internodia 7–11 cm. longa. *Folia* ovato-lanceolata usque oblongo-lanceolata, basi (raro levissime angustata) rotundata usque subtruncata (raro subcordata), apice acuminato-caudata, acuta, usque 17·5 cm. longa, 8 cm. lata, margine levissime et remotc glanduloso-dentata, rarissime (in speciminibus sinensibus) fere integra, pagina superiore surde viridia, glaberrima, pagina inferiore conspicue glauca, glaberrima vel costa basin versus pilis sparsis praedita, nervis utrinque circiter quinque; petioli usque 1·8 cm. longi, supra sulcati, basi in annulum connati. *Inflorescentiae* axillares, oppositae, vel raro terminales, graciles, erecto-patentes, usque 7 cm. longae (pedunculo 1–3 cm. longo incluso), foliis multo breviores, simplices, bracteis binis ad ipsam basin vel paullo supra basin transversim positis (raro etiam pari altero paullo superiore decussato) siccis deltoideis carinatis acuto-acuminatis basi connatis circiter 1–2 mm. (rarissime usque 5 mm.) longis semper praeditae. *Flores* sessiles, per paria usque sex decussata dispositi, internodiis 5–9 mm. longis sejuncti. *Bractea* sub quoque flore unica, herbacea, subulata usque ovato-lanceolata, 3–4 mm. (raro usque 6 mm.) longa, brevissime sparsiuscule ciliata, apice acuta saepe acuminata, basi 1 mm. lata cum bractea floris alterius brevissime connata, angulo recto a rhachide patens. *Bracteolae* sub quoque flore binae, oppositae, bracteis simillimae sed tantum 2–3 mm. longae, subglanduloso-ciliatae. *Receptaculum* scssile, anguste ovoideum usque ellipsoideum, sub anthesi 4–5 mm. longum, 1–2 mm. diametro, glaberrimum, apice attenuato-constrictum. *Calyx* ex apice receptaculi abrupte ortus, 2–3 mm. longus; segmenta inferne in cupulam apertam breviter connata, superne libera, patula, subulata, subacuta, sparse glanduloso-ciliata, sinubus rotundatis. *Corolla* albida, infundibuliformis, circiter 1·5 cm. longa, glabra, basi fere 2 mm. diametro gibbis 5 oblongis circiter 1 mm. longis vix prominulis praedita, fauce 5–8 mm.

diametro, limbi lobis ovatis erectis vel vix patulis 3–4 mm. longis et latis rotundatis. *Staminum* filamenta glaberrima, paullo sub sinubus corollae limbi inserta, sed manifeste corollae usque ad basin adnata, parte libera circiter 2 mm. longa ; antherae oblongae, utrinque obtusae, circiter 2 mm. longae. *Stylus* exsertus, circiter 12 mm. longus, glaberrimus ; stigma magnum, capitatum, lobatum, 1–2 mm. diametro. *Bacca* ovoideo-ellipsoidea, usque 8 mm. longa et 4 mm. diametro, glaberrima, calyce persistente coronata.—*Lonicera gracilis*, Kurz in Journ. As. Soc. Beng. vol. xxxix. part 2, p. 77 (1870). *Lonicera glaucophylla*, [? Lindley] in Gard. Chron. & Agric. Gaz. [vol. xviii.] p. 700 partim, fig. 2 sinistr., non dextr. (1858), non Hook. f. et Thoms. in Journ. Linn. Soc. vol. ii. p. 165 (1858). *Leycesteria glaucophylla*, Hook. f. ex C. B. Clarke in Hook. f., Fl. Brit. Ind. vol. iii. p. 16 (1880), pro parte.

Sikkim. Yoksun [near base of Kinchinjunga, alt. 1500 m.], 1857, *T. Thomson*. Simonbong, [*Anderson* in] *Herb. S. Kurz* (type). Labah, Dumsong, 1800 m., March 1875, *Gamble*, 3073A : " Very pretty small shrub ; fruits blue." Chota Rimitti, Darjeeling, 2100 m., Nov. 1879, *Gamble*, 7451. Labah Ridge, 2100 m., Dec. 1904, *H. H. Haines*, BB 2002.

Bhutan. Without definite locality, *Booth* in *Herb. Nuttall.*

Yunnan, W. On hills to west of Tengyueh, amongst scrub, lat. 25° N., 1800 m., June 1912, *Forrest*, 8261 : " Shrub of 3–6 ft., in fruit." Open situations in thickets on western flank of Shweli–Salwin Divide, lat. 25° 20′ N., 2100–2400 m., Nov. 1912, *Forrest*, 9377 : " Shrub of 3–9 ft. Flowers white." Amongst scrub by streams on the Shweli–Salwin Divide, lat. 25° 10′ N., 2400 m., July 1918, *Forrest*, 17527 : " Shrub of 4–7 ft. Flowers white, flushed rose exterior." Open situations by streams on the Shweli–Salwin Divide, lat. 25° 45′ N., long. 98° 50′ E., 2400 m., Nov. 1924, *Forrest*, 26032 : " Shrub of 6–9 ft. Branches arched almost from base. Flowers white."

Yunnan, S.E. South of Red River from Manmei, 1800 m., *Henry*, 9767 : " Shrub, 10 ft. ; white flowers."

This species (long known erroneously under the name of *L. glaucophylla*, Hook. f.) occupies a rather isolated position in the genus. It is chiefly remarkable for the tendency to pleiomery of the gynoecium. The inflorescence presents a strikingly different appearance from those of the other species, being virtually glabrous, with extremely short bracts and bracteoles and the flowers arranged in pairs. *L. glaucophylla*, (Hook. f. et Thoms.) Hook. f., is also notable for this last character, but has otherwise no close affinity with the present species.—H. K. Airy-Shaw.

Fig. 1, upper part of flowering branch, × ⅔ ; 2, leaf, lower surface, × ⅔ ; 3, inflorescence, *natural size* ; 4, corolla, opened out to show stamens and style ; 5, ovary and calyx ; 6, ovary, transverse section ; 7, fruit, with persistent calyx. *Figs.* 4, 5, 6, 7, × 2.

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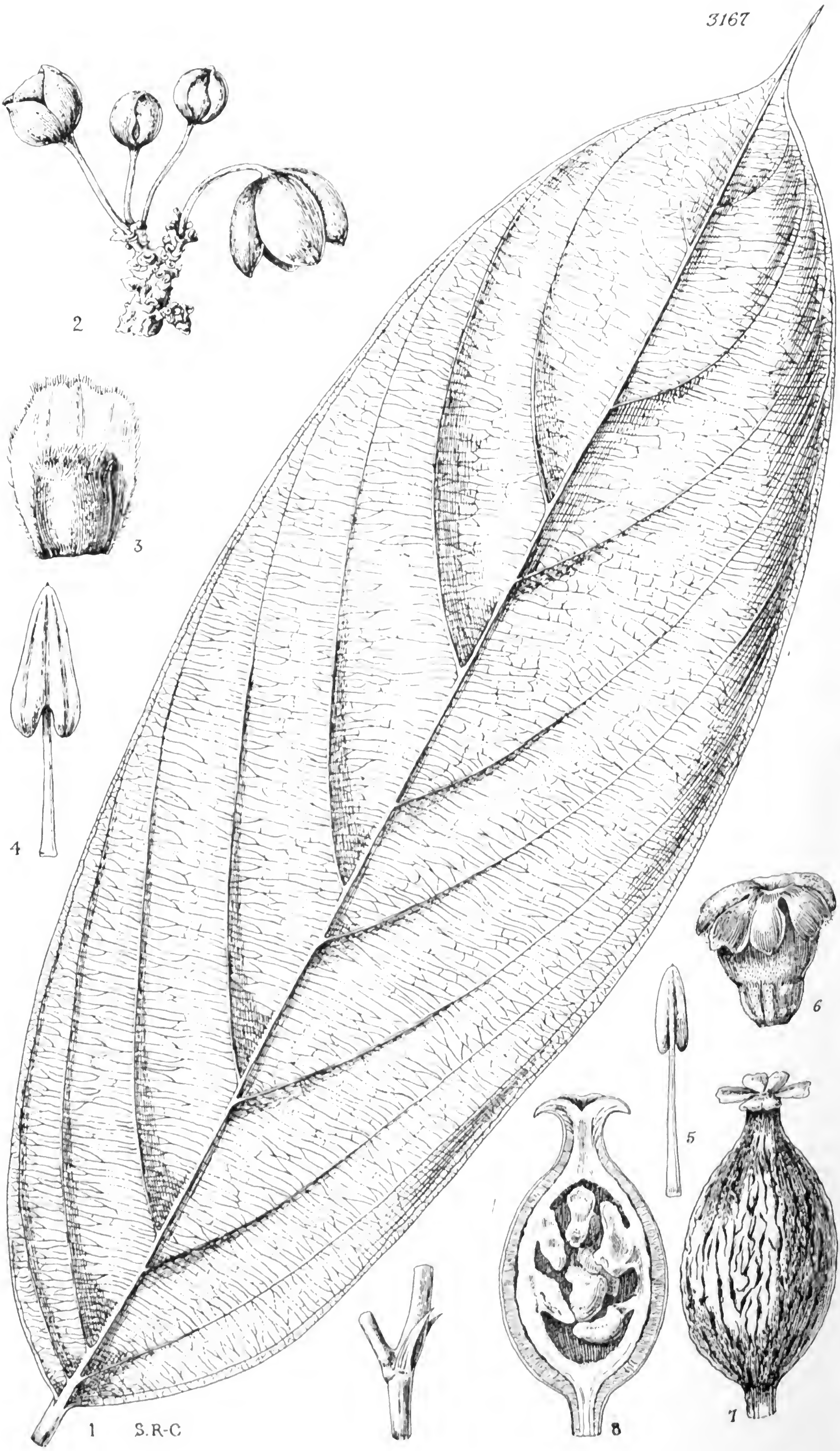

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Tabula 3167.

TARAKTOGENOS CALOPHYLLA, *Ridley.*

Flacourtiaceae. Tribus Pangieae.

T. calophylla, *Ridley*; species nova, *T. Kurzii*, King, affinis, a qua foliis maximis, floribus e trunco exortis differt.

Frutex 3 m. altus, caule simplici. *Ramuli* angulati, profunde sulcati, puberuli, apices versus circiter 2·5 mm. diametro, cortice pallido. *Folia* oblonga vel elliptico-oblonga, abrupte cuspidata, cuspide acute acuminato 2·5 cm. longo basi 5–6 mm. lato medio 2–2·5 mm. lato, basi inaequilateralia, latere altero obtuso altero rotundato, vel subcuneata, 30–35 cm. longa, 9–13 cm. lata, coriacea, costa in apicem cuspidis producta, utrinque praecipue subtus elevata, nervis lateralibus utroque latere costae 8 supra prominulis subtus prominentibus, nervis tertiariis transversis copiosis parallelis conspicuis, rete venularum utrinque elevato manifesto; petioli 1–2 cm. longi. *Racemi* crassi, pauciflori, bracteis persistentibus ovatis coriaceis tecti; pedicelli graciles, 1·5 cm. longi, puberuli. *Flores* ♂:—*Sepala* 4, ovata, 8 mm. longa, puberula, coriacea. *Petala* 5, subaequalia, oblonga, squama singula basali crassa rotundata hirsuta. *Stamina* 21; filamenta 5 mm. longa, glabra; antherae lineares, basi retusae. *Flores* ♀:—*Sepala* longiora patentia vel deflexa, oblonga, 1 cm. longa. *Petala* minora, rotundata. *Ovarium* basi angustatum, superne inerassatum, costatum, velutinum; stigmata 4, late oblonga, 3–4-loba. *Staminodia* pauca, breviora, filamentis gracilibus, antheris abortivis. *Bacca* fusiformis, versus apicem et basin angustata, 4 cm. longa, 2 cm. lata (in siccitate). *Semina* circiter 13.

Sarawak. Kuching, unbranched shrub 20 feet high, polygamo-dioecious, *Haviland*, 1795 (type), *Haviland and Hose*, 3241.

I know no other species at all like this. It is a shrub with the largest leaves in the genus, and the flowers in short racemes on the stem.—H. N. Ridley.

Fig. 1, leaf, showing upper surface, and node with stipules, × ⅔; 2, ♂ inflorescence, *natural size*; 3, petal, seen from within, × 4; 4, stamen from outside, × 4; 5, staminode, × 8; 6, pistil, × 2½; 7, fruit, *natural size*; 8, fruit, longitudinal section, *natural size*.

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Tabula 3168.

PARAPHYADANTHE SUFFRUTICOSA, *Milne-Redhead.*

Flacourtiaceae. Tribus Oncobeae.

P. suffruticosa, *Milne-Redhead*; species nova a *P. flagelliflora*, Mildbr., et *P. coriacea*, Mildbr., fasciculis florum in axillis foliorum nec in caulibus propriis ortis distincta; a *P. lophocarpa*, (Oliv.) Gilg, foliis subsessilibus basi cordatis recedit.

Suffrutex deciduus, rhizomate crasso lignoso, caulibus multis erectis simplicibus vel pauciramosis usque 90 cm. longis, cortice longitudinaliter costato brunneo. *Folia* subsessilia, stipulata, elliptica usque ovato-oblonga, nonnunquam subobliqua, apice brevissime obtuse cuspidata, basi cordata sinu 2–8 mm. alto, 13–26 cm. longa, 7·5–16 cm. lata, integra sed verosimiliter subundulata; costa et nervi laterales utrinque prominentes; nervi laterales utrinque 6–10, e basi patente vel patula versus marginem arcuantes, medii 1·3–2·8 cm. intra marginem anastomosantes; nervi tertiarii e lateralibus patule orti, quaternarii et ultimi rete conspicuum formantes; folia juvenilia utrinque valde glutinoso-nitenia, perjuvenilia dense tuberculata; stipulae subulatae, circiter 2 mm. longae, caducae. *Flores* alii masculi alii hermaphroditi, hi saepe majores, in axillis foliorum delapsorum 3–6-fasciculati; pedicelli 1·5–6 cm. longi, bracteis singulis minutis triangularibus suffulti, praesertim juventute dense purpurco-glandulosi. *Flores* ♂:—*Sepala* 3, imbricata, valde concava, late elliptica, 12 mm. longa, 9 mm. lata (statu explanato), parte in alabastro externa glandulosa. *Petala* 8, oblongo-elliptica, margine irregulariter undulato, circiter 2 cm. longa, 1 cm. lata, alba, basin versus aureo-venosa. *Stamina* circiter 50, 9–11 mm. longa; filamenta subfiliformia, 2–4 mm. longa; antherae dithecae, basifixae, 6–8 mm. longae, vix 1 mm. latae, secus totam longitudinem fissae sed apice tantum porum dehiscentiae formantes. *Flores* ♀:—*Sepala* et *stamina* iis floris ♂ similia. *Petala* etiam similia, sed aetate aucta usque 3 cm. longa et 1·3 cm. lata. *Ovarium* ovoideum, circiter 7 mm. longum et 5 mm. diametro, longitudinaliter costatum, paullulo tuberculatum, apicem versus parce ac inconspicue puberulum, uniloculare; placentae 5–7, ovulis numerosis; stylus 4 mm. longus, vix 1 mm. diametro, superne modo cornus copiae expansus margine quinqueplicato unde stigma primo visu peltatum videtur. *Capsulae*

circa basin caulium ortae, magnae, subcarnosae, immaturae laeves, virides, obovoideae vel subglobosae, obscure longitudinaliter costatae, maturae usque 12 cm. diametro, pericarpii muro lacunis vacuis 5–7 placentis alternantibus instructo, tandem per medias lacunas vacuas loculicide dehiscentes ; valvae post dehiscentiam basi connatae, apice plus minusve connatae ; pedicelli capsularum usque 5 cm. longi, 7 mm. diametro. *Semina* subglobosa, angulata, dense tuberculata, 7·5 mm. diametro ; testa crustacea, circiter 1 mm. crassa ; tegmen brunneum, membranaceum ; endospermium copiosum, 6 mm. longum, 5·3 mm. diametro ; embryo 5·3 mm. longum, cotyledonibus ellipticis 2·6 mm. longis apice strato endospermii 1 mm. crasso a tegmine disjunctis ; radicula cylindrica, 2·7 mm. longa, 1 mm. diametro, apice valde depresso-conica tegmen attingens.

Northern Rhodesia. Solwezi District ; in dry dambo (grassland) at Solwezi Boma, before burning, mature leaves and unripe fruit, 10 June 1930, *Milne-Redhead*, 470 ; in open *Brachystegia* woodland between R. Mumbezhi and R. Lumwana, to the west of Solwezi Boma, flowers and young leaves, 16 Sept. 1930, *Milne-Redhead*, 1133 (typus) ; in dambo at Solwezi Boma after burning, young shoots and mature fruit, 24 Sept. 1930, *Milne-Redhead*, 1133A. Also seen near R. Mutanda, west of Solwezi Boma, in open *Brachystegia* woodland. Vernacular name " Munkolokolo " (Chikaonde).

The genus *Paraphyadanthe*, described by Mildbraed in Notizbl. Bot. Gart. Berl. vol. vii. p. 402 (1920), was based on specimens collected by him in the Cameroons, representing two new species, namely *P. flagelliflora*, Mildbr., and *P. coriacea*, Mildbr. A third species, *P. lophocarpa*, (Oliv.) Gilg, also a native of the Cameroons, was doubtfully transferred to the genus from *Oncoba* by Gilg in 1925. The genus differs from *Oncoba* and its segregated genera in the flowers arising on short shoots, and in the apical dehiscence of the anthers.

P. coriacea, Mildbr., is described as being an arborescent shrub, and *P. lophocarpa*, (Oliv.) Gilg, is a tree up to 12 m. in height, while *P. flagelliflora*, Mildbr., is a small tree bearing its flowers on procumbent terrestrial shoots, 10 m. long or more, arising from the base of the trunk. The subject of this plate, however, is a subshrub less than 1 m. high, apparently adapted to withstand savannah conditions. The numerous erect shoots, arising from a woody rootstock, seldom escape destruction when the annual grass fires sweep the country at the end of the dry season. Before the start of the rains, however, buds at the base of the burnt-off shoots have come into growth, and not only is the plant in full flower but the new leafy shoots are rapidly developing. The fruit, when first seen early in June, was fully grown but had not dehisced. It was deep green, smooth, and almost spherical, and was resting among the fallen leaves which surrounded the leafless shoots. When seen in September, after the grass fires, the fruit was dry and had dehisced, but apart from slight external scorching, it was entirely

undamaged, and the seeds, having fallen out, were scattered on the bare soil around the plant. When the one-year-old shoots escape destruction, the flowers occur on short shoots in the axils of the fallen leaves all up the stem.—E. MILNE-REDHEAD.

FIG. 1, portion of flowering stem showing young leaves, *natural size*; 2, leaf, *natural size*; 3, hermaphrodite flower, cut longitudinally, × 1½; 4 a, b, anthers, × 4; 5, fruit, with portion of pericarp removed to show seeds, × ⅔; 6, seed, × 2.


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Tabula 3169.

DALBERGIELLA NYASAE, *E. G. Baker.*

Leguminosae. Tribus Dalbergieae.

D. nyasae, *E. G. Baker, Leg. Trop. Afr.* p. 535 (1929); a *D. Welwitschii*, (Baker) E. G. Baker, foliolis paucioribus, magis coriaceis, leguminum pilis plumosis differt.

Arbor parva, circiter 5 m. alta, decidua, ramis diffusis. *Ramuli* cortice plumbeo vel cinereo tecti. *Folia* imparipinnata, 14–24 cm. longa; petioli usque 3 cm. longi, primum brunneo-tomentosi, demum puberuli; rhachides 10–17 cm. longi, primum brunneo-tomentosi, demum puberuli; foliola subopposita, 6–10-juga, petiolulata, oblonga vel elliptica, parum inaequilateralia costa subcentrali, apice obtusa vel rotundata, basi late cuneata vel rotundata, petiolulis 1–2 mm. longis brunneo-tomentosis, margine revoluta, 1·5–3·5 cm. longa, 1–1·8 cm. lata, coriacea, supra glabra, nitidula, subtus margine et nervis leviter puberulis exceptis glabra; costa et nervi laterales supra prominuli, subtus valde conspicui; foliola immatura discoloria, utrinque puberula; stipulae lineares, circiter 2 mm. longae, dense brunneo-tomentosae, persistentes. *Inflorescentiae* densiflorae, anguste paniculatae vel subracemosae, 12–28 cm. longae, rhachidibus bracteis pedunculis pedicellisque brunneo-tomentosis. *Calyx* usque 6 mm. longus, brunneo-tomentosus, dente inferiore paulo longiore, duobus superioribus in lobum latum connatis. *Vexillum* late suborbiculare, circiter 8 mm. diametro, ungue 3 mm. longo; alae obovatae, longe unguiculatae, 5 mm. longae, 2·5 mm. latae, ungue 5 mm. longo; carina alis subsimilis. *Stamina* diadelpha, vexillari libro, 7–8 mm. longa; antherae 0·5 mm. diametro. *Ovarium* lineare, tomentosum, 4-ovulatum; stylus simplex, glaber, circiter 4 mm. longus, stigmate terminali. *Legumen* (immaturum) late oblongum, sutura dorsali plus minusve recta vel leviter curvata, sutura ventrali magis curvata quasi emarginata sinu unico circa medium latissimo (sed haud rotundato) praedita, ovulo unico fertili sinus angulo affixo, sinu semine maturescente sensim paullo profundiore facto, apice late acutum, basi cuneatum, omnino planum, 7–9 cm. longum, 2–3 cm. latum, firme papyraceum, diaphanum, viride vel rubescenti-viride, sutura ventrali pilis insignibus densissimis pallide fulvis valde plumosis irregulariter undulatis 3 mm.

longis vestitum, sutura dorsali pilis similibus multo brevioribus vestitum, pagina utraque pilis simplicibus pubescente pilis majoribus bifurcatis stellatisque inspersis.

NYASALAND. Lukoma, Lake Nyasa [Likoma Island, E. of Lake Nyasa], Aug. 1887, *Wm. Bellingham*, sine numero. (Typus in Herb. Mus. Brit.)

NORTHERN RHODESIA. Chilanga District: several trees near King Edward's Copper Mine, Native Reserve Country, 11 Sept. 1929, *Mrs. Sandwith*, 4. Trees with few leaves and loaded with rather sweet-scented flowers. Mazabuka District: in *Acacia* grassland at Mazabuka, 6 Oct. 1930, *Milne-Redhead*, 1209. Small tree up to 5 m. high, with young leaves and unripe soft greenish fruits; a few mature leaves also obtained. Vernacular names "Kafundula" (Chila), "Mwambanongo" (Chitonga).

The genus *Dalbergiella*, E. G. Baker, was founded on *Ostryocarpus*? *Welwitschii*, Baker in Oliv. Fl. Trop. Afr. vol. ii. p. 240 (1871). This and *D. nyasae*, which have obtuse or rounded leaflets, appear to be closely related. The third species, *D. Gossweileri*, E. G. Baker, differs in having acuminate leaflets. Both *D. Gossweileri* and *D. Welwitschii* are described as scandent shrubs, whereas *D. nyasae* is a small tree attaining a height of about 5 metres.

It is surprising that this interesting tree, which is very conspicuous when in flower and fruit, and is by no means uncommon, should not have been collected in Northern Rhodesia before the year 1929, when Mrs. Sandwith obtained good flowering material from the Chilanga District. The writer collected it in fruit in Oct. 1930, during a short stay at Mazabuka, where it was common, growing with *Lonchocarpus Menyharthii*, Schinz, and *L. Capassa*, Rolfe. The fruits of *Dalbergiella nyasae* were hitherto unknown, and are here described and figured for the first time. In general shape and texture they are similar to those of *D. Welwitschii*, but are remarkable in being fringed with plumose hairs. In the figure of *D. Welwitschii* given in Journ. Bot. June 1928, Suppl. I. p. 129, the seed is inadvertently shown as though it were attached to the dorsal suture.

There is some doubt as to the exact position of the type-locality, given by Bellingham as "Lukoma, Lake Nyasa." It is probably what is now known as Likoma Island, situated towards the eastern shore of Lake Nyasa, but belonging to Nyasaland, although there is a possibility that Lukoma Bay, situated in Tanganyika Territory to the north of the island, was the locality concerned.—E. MILNE-REDHEAD.

FIG. 1, leafy branch; 2, part of flowering branch; 3, a, b, flower, anterior and lateral views; 4, calyx, cut open; 5, a, b, vexillum, lateral and posterior views; 6, ala, from inside; 7, petal of carina, from inside; 8, androecium; 8a, 8b, anthers, exterior and lateral views; 9, pistil; 10, legumes; 11, portion of posterior margin of legume; 12, marginal hair of the same. *Figs.* 1, 2, 10, *natural size*; *figs.* 3–8, 9, 11, × 3; *figs.* 8a, 8b, × 12; *fig.* 12, × 20.

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Tabula 3170.

CANTHIUM GUEINZII, *Sond.*

Rubiaceae. Tribus Vanguerieae.

C. Gueinzii, *Sond. in Linnaea*, vol. xxiii. p. 54 (1850); *et in Harv. et Sond., Fl. Cap.* vol. iii. p. 16 (1864–65); a *C. hispido*, Benth., ramorum indumento multo densiore breviore nec laxe strigoso-villoso nec persistente facile distinguenda.

Frutex scandens, ramis angulo recto insertis, ramulis junioribus subteretibus, ferrugineo-tomentosis usque hispido-tomentosis, demum glabrescentibus vel leviter pubescentibus. *Folia* oblonga usque oblongo-elliptica vel obovata vel ovata, apice acute longe acuminata, basi subcordata usque satis profunde cordata, 4·5–9 cm. longa, 2–4·5 cm. lata, supra glabrescentia, subtus costa et nervis lateralibus (utrinsecus 7–9) praesertim pubescentia; petioli circiter 5 mm. longi. *Stipulae* mox caducae, triangulari-ovatae, apice longe acuminatae, 7–9 mm. longae, intus glabrae, extra pubescentes. *Cymae* axillares, dichotomae, multiflorae, congestae, pedunculis tomentellis circiter 1–1·5 cm. longis, pedicellis tomentello-pubescentibus gracilibus 5–7 mm. longis. *Calyx* late campanulatus, 5-denticulatus, 1·5 mm. longus, denticulis margine setosis. *Corolla* alba vel luteo-alba, 5-loba, alabastro circiter 6 mm. longa, apice rotundata; tubus cylindrico-turbinatus, circiter 3·5 mm. longus, fauce villosus; lobi oblongi, circiter 2·5 mm. longi, apice subacuti, sub anthesi reflexi. *Ovarium* 2-loculare; stylus longe exsertus, 6 mm. longus, stigmate capitato-mitriformi 1·5 mm. longo. *Fructus* drupaceus, didymus vel subglobosus, 2-locularis vel abortu 1-locularis, loculis 5–8 mm. diametro.—*Plectronia Gueinzii*, (Sond.) Sim, For. Fl. Cape Col. p. 241 (1907); Sim, Native Timbers S. Afr. p. 223 (1921); Marloth, Dict. Fl. S. Afr. p. 129 (1917); Wood, Fl. Natal, p. 62 (1907), et in Trans. S. Afr. Phil. Soc. vol. xviii. p. 164 (1908). *Keetia transvaalensis*, Phillips, Gen. S. Afr. Fl. Pl. p. 587 (1926), et in Bothalia, vol. ii. p. 368 (1927).

Tropical Africa. Uganda: Mt. Elgon, Bumoni, 1800 m., 23 March 1924, *Snowden*, 861; Ruwenzori, Wimi Forest, 2400 m., June, *Scott Elliot*, 7913. Kenya Colony: Embu, 1650–1950 m., *Battiscombe*, 20; Limuru, 2100 m., 21 June 1918, *Snowden*, 634; Kisumu, 2100 m., Feb. 1915, *Dümmer*, 1685; Aberdare Mts., 1500–1800 m., *Moon*, 752.

Tanganyika Territory: N. of Lake Nyasa, higher plateau, *Thomson*, s.n.; near Ufiume Mt., 1650 m., 21 Jan. 1928, *Burtt*, 1229; forest, Kinyassi Scarp, Kondoa District, 1800 m., 7 Jan. 1928, *Burtt*, 960. Nyasaland: Plains of Zomba, 750–900 m., *Whyte*, 90, et s.n.; Shiré Highlands, *Buchanan*, s.n. Portuguese East Africa: Mt. Pene, 2100 m., Oct., *Swynnerton*, 6101.

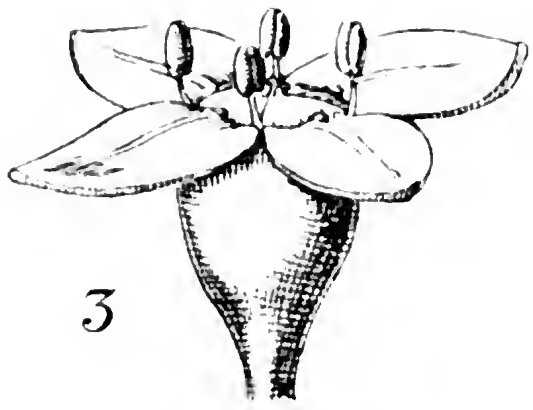
South Africa. Transvaal: Houtbosch, *Rehmann*, 6471, *Nelson*, 432; Barberton, 1050–1500 m., Sept. 1889, *Galpin*, 519. Natal: Durban, *Gueinzius*, s.n. (type), *Gerrard*, 535; Inanda, *Wood*, 305; Dumisa, 540 m., 28 Oct. 1908, *Rudatis*, 435a; Zululand, *Wylie in Herb. Wood*, 8550.

The masses of creamy or yellowish-white flowers produced by this liane, and its wide distribution as a member of a genus the species of which are relatively local in occurrence, constitute its main claims to distinction. It is, however, of no less interest from the purely taxonomic point of view, on account of its close alliance with other species, notably *C. hispidum*, Benth., and *C. sylvaticum*, Hiern, and one or two others at present undescribed. This group of species is widely distributed over the whole of Tropical Africa, and the individual species overlap to a considerable extent. In the regions of overlap, it is often extremely difficult to assign a herbarium specimen to one or other of these species, though perfectly distinct examples of each occur in the same locality. Typical *C. Gueinzii* is readily distinguished from all other species by the reddish tomentum of the young branchlets and by the tertiary nerves being impressed in the glabrous upper surface of the mature leaves.

The *locus classicus* is Durban, where the plant was collected by Dr. Gueinzius. Since then it has been collected many times, and its range throughout the eastern half of tropical and subtropical Africa must now be almost completely known.

In South Africa *C. Gueinzii* is known popularly as "Monkey Rope," a name aptly indicating its widely scrambling habit. The Zulus know it as "um-Nyizi," and in Tropical Africa numerous native names have been recorded for it which, however, do not appear to be specific.—A. A. Bullock.

Fig. 1, portion of branch, showing two flowering branchlets, × ⅔; 2, flower, × 4; 3, part of corolla, thrown open and showing insertion of a stamen, × 4; 4, longitudinal section of ovary showing the calyx and disk, × 12; 5, transverse section of the same, × 12; 6, stigma, × 8; 7, infructescence, × ⅔; 8, transverse section of fruit, × 2.



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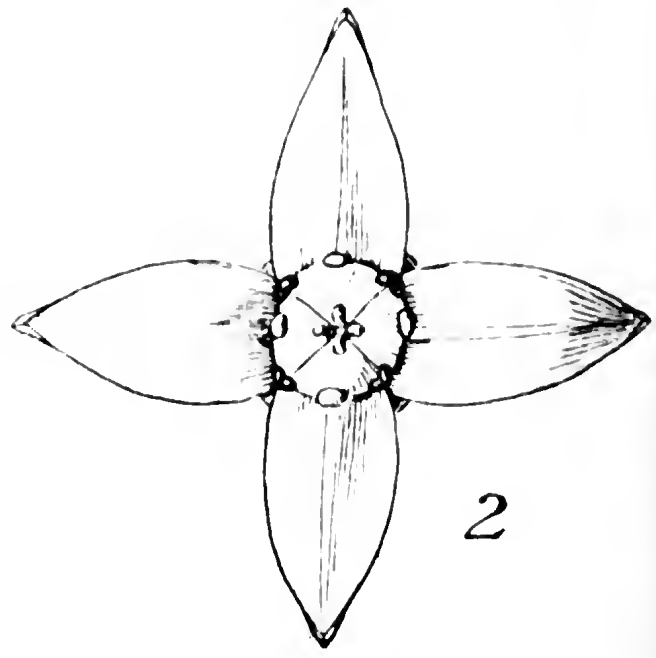

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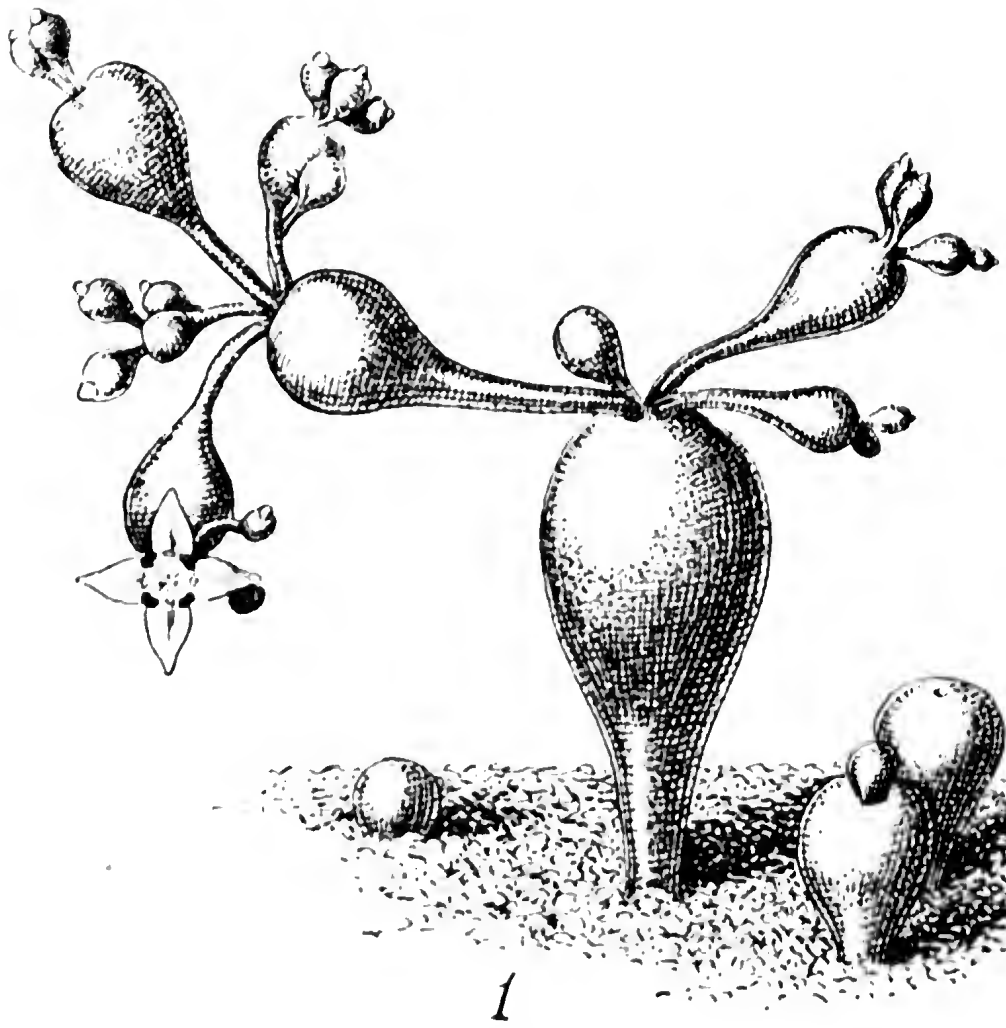

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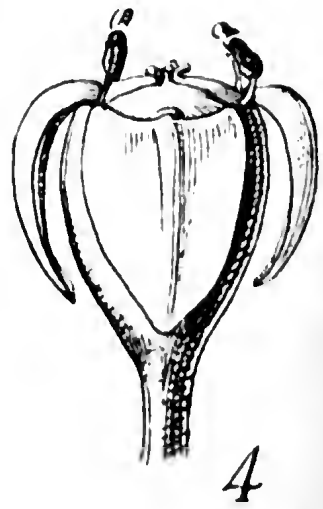

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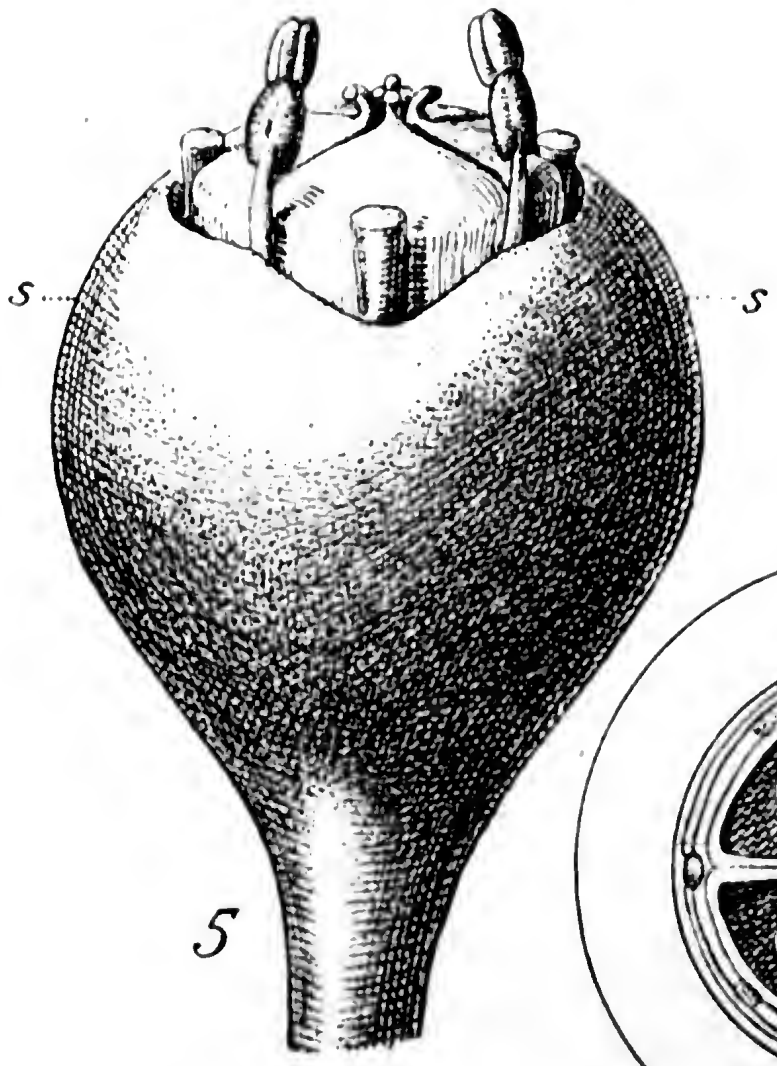

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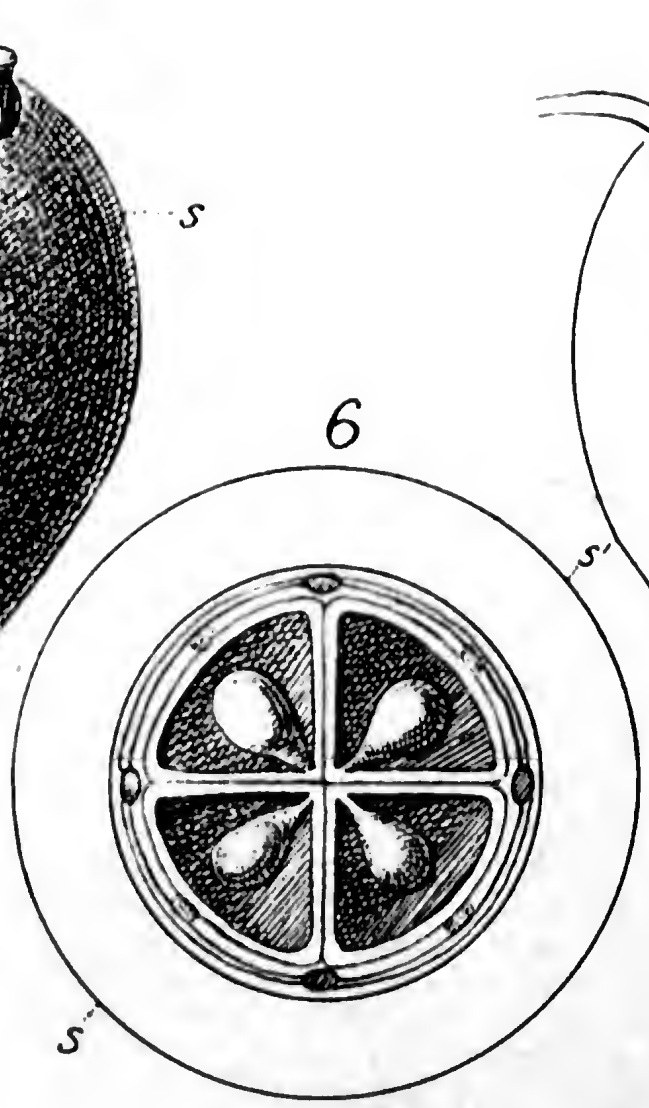

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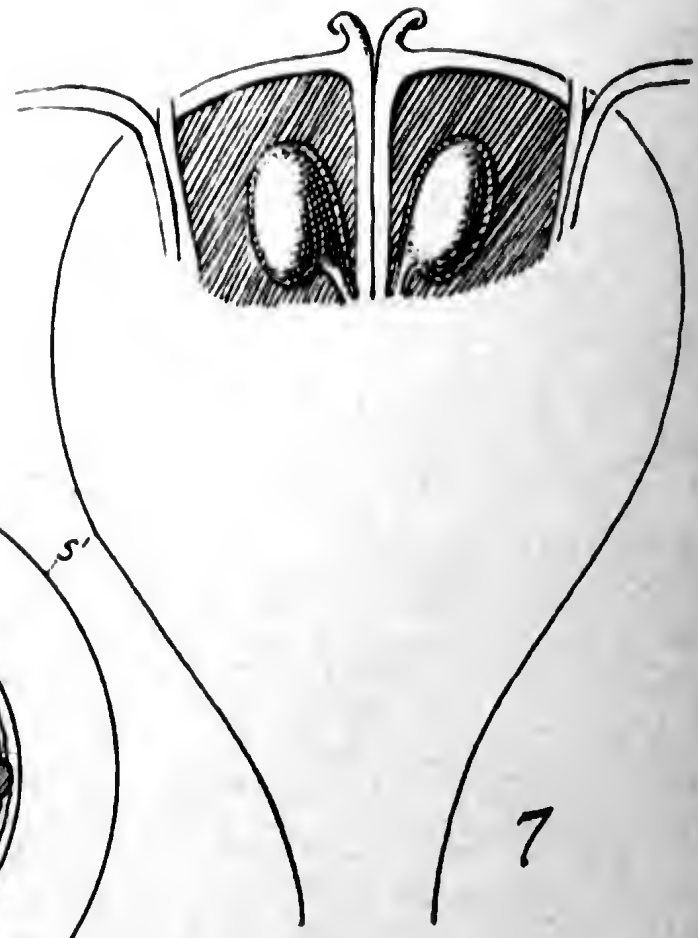

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Tabula 3171.

RHOPALOTA APHYLLA, *N. E. Brown.*

Crassulaceae. Subfamilia Crassuloideae.

Rhopalota, *N. E. Brown in Cactus & Succ. Journ.* vol. iii. p. 7 (1931); a *Crassula*, L., caulibus aphyllis, glandulis carpella superantibus, carpellis apice truncato-convexis uniovulatis recedit.

Herba perennis, succulenta, aphylla, aquatica, caule ramulisque clavatis. *Flores* in quoque ramulo singuli, terminales, tetrameri, raro trimeri, omnino isomeri. *Calycis lobi* brevissimi, multo latiores quam longiores, crenas 4 efformantes. *Petala* cum calycis lobis alternantia, primum patentia, tandem ad superficiem calycis reflexa. *Stamina* cum petalis alternantia, erecta, apices carpellorum superantia. *Glandulae* conspicuae, petalis oppositae, apices carpellorum superantes. *Carpella* in tubo calycis sive in apice ramuli clavati immersa, sed superiora et libera, a latere visa subcuneatim subquadrata, apice truncato-convexa, transverse secta trigona, angulo interiore stylo minutissimo terminata. *Ovula* in carpella singula.

R. aphylla, *N. E. Brown*, l.c., species unica adhuc nota.

Stirps glabra, viridis, omnino aphylla, haud 2·5 cm. alta. *Caulis* singulus, erectus, clavatus, 6–10 mm. longus, superne subpyriformis 3 mm. crassus, apice ostiolo minuto centrali praeditus, unde exorti rami patentissimi 1–5, cauli similes sed saepius minores, quoque ramo similiter flores 1–5 circiter 3 mm. diametro pariente. *Calycis lobi* 0·5 mm. longi vel breviores. *Petala* 1·5 mm. longa, 1 mm. lata, ovata, acuta, alba vel rosea, crassiuscula, minute coruscantia. *Stamina* circiter 0·5 mm. longa; antherae rubrae, marcescendo nigrescentes; pollen flavum. *Glandulae* in alabastro clavatae, superne applanatae inverse subdeltoidcae, tandem subcylindricae truncatae, brunneo-aurantiacae. *Carpella* in medio flore plana, viridia; styli minuti.—*Crassula aphylla*, Schonl. et E. G. Baker in Journ. Bot. 1898, p. 371; Schonl. in Ann. Bolus Herb. vol. ii. p. 54, t. 3, f. 7 (1916).

South Africa. Clanwilliam Division: Boontjes River, *Schlechter*, 8665 (not 8664 as is wrongly quoted by Schonland, as that number belongs to *Pharnaceum pusillum*, Schlechter); top of the Tafelberg, in the Cederberg Range, *Mrs. Levyns*.

This very remarkable and very small Crassulaceous plant was originally discovered by R. Schlechter in 1896, and was described as *Crassula aphylla* from dried material by Schonland and E. G. Baker in 1898. Recently the species has been found again by Mrs. M. R. Levyns, who brought living plants of it to Kew, where they flowered in May 1931. The description given above was drawn up from this living material. The figure published by Schonland in 1916 was prepared from dried material and represents a piece of a totally different and leafy plant mixed with the *Rhopalota*. This mixture was doubtless responsible for Schonland's statement that *Crassula aphylla* sometimes has leaves, and it is quite probable that it was from this leafy plant that he may have obtained carpels bearing 2–4 ovules. All the carpels of two living flowers that I dissected had but one ovule in each.

Apart from its odd appearance, *R. aphylla* is remarkable as being a succulent plant that is aquatic. Mrs. Levyns' account of it is as follows : " The Kew specimens came from the summit of the Tafelberg, the second peak in height (6500 ft.) in the Cederberg Range, Clanwilliam District. The top of the Tafelberg is composed of horizontally placed sandstone, which is much fissured. At the bottom of these fissures rock-pools occur and the Crassula grows in these pools. When we visited the mountain in September the pools were fringed with ice, and snow lay in sheltered places. The Crassulas were about 9 inches under water ; some were just beginning to produce flower-buds. The Tafelberg, of course, is frequently covered with S.E. clouds during the summer months, but I must confess that I was surprised to hear that the water was still to be found in these pools at the end of summer. I assume that the flowers are produced when the pools are relatively dry, but I have no information on this point. It flowered with me when growing on damp sand." At Kew the sand in which the plant is growing stands in a shallow pan full of water, so that the soil is kept saturated.

This quaint little plant differs from *Crassula* by being leafless, by the glands rising above the top of the carpels instead of being seated at their base, by the carpels being truncate at the apex instead of tapering into a short style, and by having only one ovule in each carpel. In the undissected flower only the transversely oblong apex of the glands is visible.

The generic name is derived from the Greek, ῥοπαλωτός, clublike, in allusion to the shape of the stem and branches.—N. E. Brown.

Fig. 1, an entire flowering plant and three young plants, × 3 ; 2, flower from above, × 9 ; 3, flower (immersed in swollen upper part of a stem segment), side view, × 9 ; 4, old flower, showing the reflexed petals, × 9 ; 5, flower, with petals removed, × 27 ; 6, the same, transverse section, × 27 ; 7, flower, longitudinal section, × 27.

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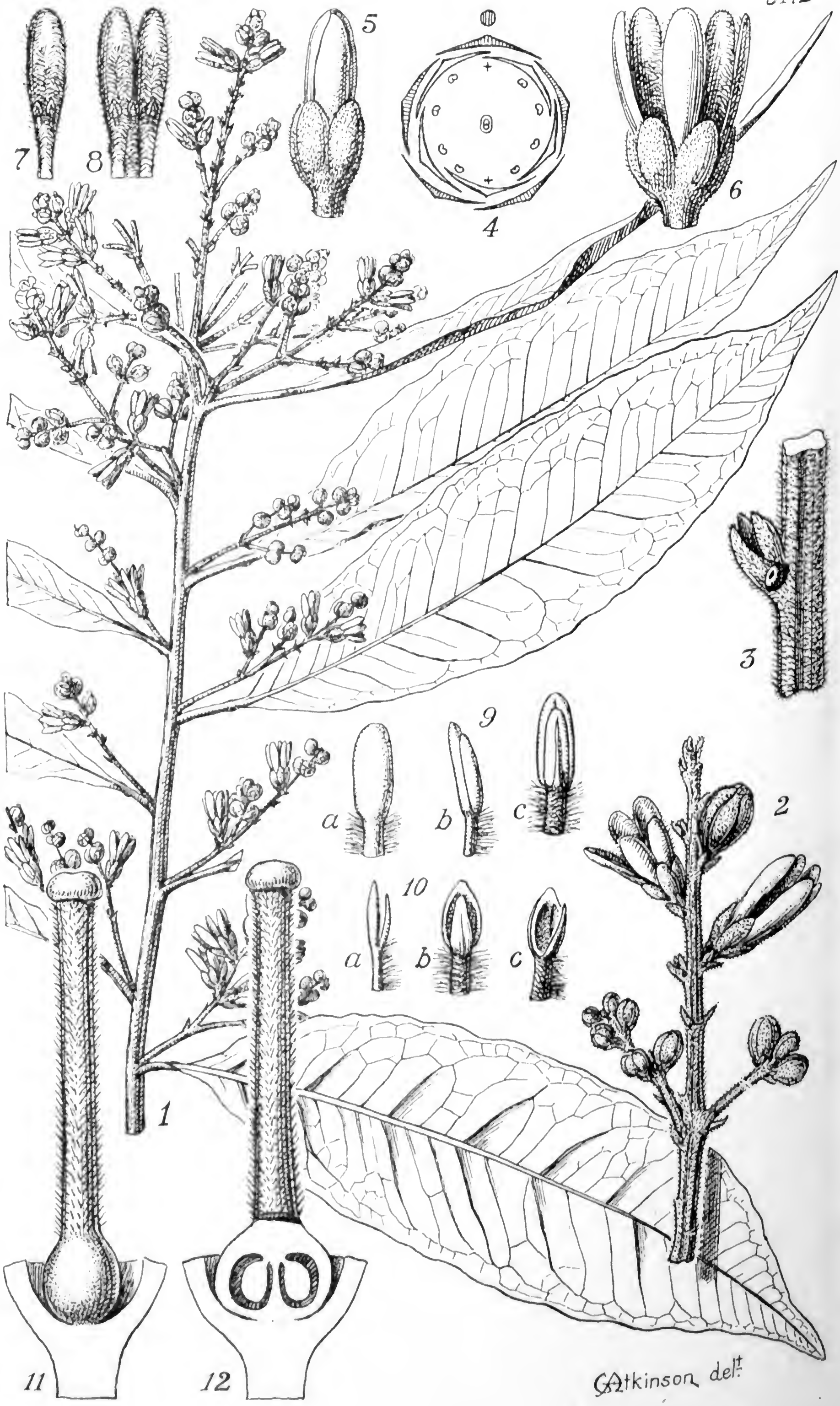

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Tabula 3172.

BARNHARTIA FLORIBUNDA, *Gleason.*

Polygalaceae.

Barnhartia, *Gleason in Bull. Torr. Bot. Club,* vol. liii. p. 297 (1926); affinis *Diclidantherae,* Mart., a qua floribus subzygomorphis, petalo quinto libero ceteris 4 inferne per paria connatis, staminibus 8, ovario biloculari recedit.

B. floribunda, *Gleason, l.c.,* species unica.

Frutex alte scandens, nonnunquam per summas arbores pervagans; ramuli hornotini dense minute pubescentes, annotini glabrescentes, internodiis 1–3 cm. longis. *Folia* alterna, anguste elliptico-oblonga vel lanceolata, in apicem rotundatum breviter apiculatum sensim acuminata, basi cuneata, 9–14 cm. longa, 2·2–5 cm. lata, integra, tenuiter coriacea, glabra vel juvcntute utrinque secus costam puberula, supra nitida, subtus nitidula, nervis primariis utroque costae latere circiter 10–12 a margine satis longe anastomosantibus, his cum nervis ceteris venulisque utrinquc elevatis atque conspicue reticulatis; petiolus pubescens, demum glabrescens, 5–10 mm. longus, apice utroque margine nectario circulari parvo instructus. *Racemi* compositi, simul terminales et axillarcs, paniculam multifloram terminalem pyramidalem inferne foliatam efformantes, ubique dense pubescentes; pars terminalis aphylla 4–7 cm. longa, rhachi obtuse angulata sulcata; inflorescentiae axillares 1–3 (revera singulae, ramis basalibus singulis vel binis adjectis); pedunculi proprii 0·5–1·5 cm. longi; bracteae cum bracteolis valde concavae, superiores minores deltoideo-ovatae, inferiores triangulari-subulatae, 1·5–2 mm. longae, basi utrinque glandula singula tumida nigrescente orificio circulari instructa; bracteolae deltoideo-ovatae, obtusae, ad 0·8 mm. longae; pedicelli 1–2 mm. longi. *Flores* perigyni, toro extra dense pubescente intus carnoso glabro 0·75 mm. alto. *Sepala* quincuncialia, ascendentia, elliptico-oblonga, apice rotundata, 3–3·5 mm. longa, 1·6–2 mm. lata, extra dense pubescentia, intus tomentella. *Petala* imbricata, ascendentia, statu vivo cremea, siccitate brunneo-rubra usque purpurascentia, linearispathulata, apice rotundata, 6–6·5 mm. longa ungue 2 mm. longo

incluso, 1·3–1·5 mm. lata, grosse albo-ciliata, extra lamina glabra ungue albo-piloso basi excepta, intus albo-pilosa basi ac apice exceptis; petalum anticum superne patulum, supra unguem stamina 2 gerens; utriusque lateris petala lateralia et postica filamento staminis cum iis alternantis conjuncta, praeterea stamina singula medio gerentia. *Stamina* 8 (posticum et anticum deficientia) 2 mm. supra basin inserta; filamenta circiter 0·5 mm. longa, intra valde pilosa, extra glabra; antherae oblongae, adhuc clausae circiter 1 mm. longae, post dehiscentiam 0·6 mm. longae; lobuli interiores thecarum exterioribus breviores; antherae ab apice inter lobulos exteriores et interiores deorsum dehiscentes, muro lobulorum interiorum secedente. *Pistillum* e fundo tori ortum; ovarium compresso-subglobosum, inconspicue subdidymum, 0·8–0·9 mm. longum, 1·2 mm. latum, 0·7 mm. crassum, carnosum, glabrum, nitidum; stylus tandem 3·5–4 mm. longus, rectus, breviter hispidus; stigma discoideo-capitatum, 0·7 mm. diametro, rima mediana indistincte bilobulatum. *Fructus* ignotus.

British Guiana. Demerara River: Malali, about 5° 35′ N., *De La Cruz*, 2727. Essequibo River: Moraballi Creek, above Bartica, in mixed forest, fl. Oct., *Sandwith*, 507. A giant bush-rope. Calyx greenish-white; corolla cream-coloured, whitish woolly within. Upper Mazaruni River: Kamakusa, about 59° 50′ W., *De La Cruz*, 2852.

Brazil. Amazonas: Fonteboa, in humid virgin forest, fl. Nov., *Ducke*, 22332. A tall stout climbing shrub. Flowers white, foetid.

The genus *Barnhartia* was placed by Gleason (1926) beside *Diclidanthera*, to which undoubtedly it is closely related. *Diclidanthera* had had a chequered history: originally referred by Martius to the family Ebenaceae, it was afterwards transferred by Reichenbach to the Styracaceae, and unaccountably removed by Miers to the Hamamelidaceae. It was generally treated as an anomalous genus of Styracaceae until 1907, when Perkins excluded it from that family, but without suggesting a better position for it. Finally in 1924 Gilg (Engl. & Gilg, Syll. ed. 9–10, 323) proposed a new family, Diclidantheraceae, for its reception, placing this immediately after Ebenaceae.

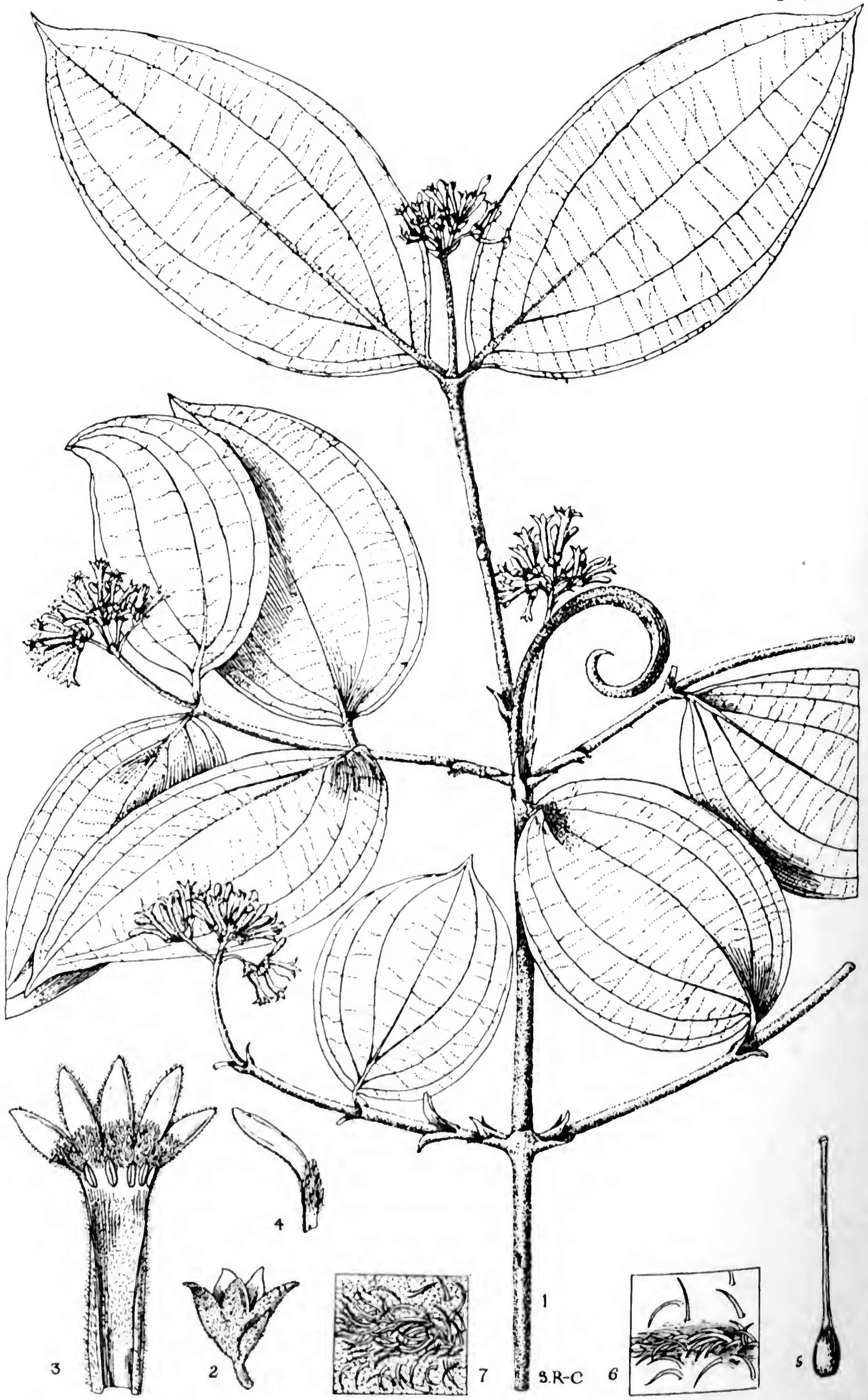
Comparison of *Barnhartia* with Chodat's summary of the characters of Polygalaceae (Nat. Pflanzenfam. vol. iii. 4, p. 323), however, shows no single point of disagreement. We may add that nectaries similar to those occurring on the bracts in *Diclidanthera* and *Barnhartia* are found in the same position in at least six genera of Polygalaceae; that the facies of *Diclidanthera* and *Barnhartia* is very much the same as that of various woody climbers belonging to that family; and that the floral diagram of *Barnhartia* closely resembles that of *Polygala* (see fig. 4). There can be little doubt, accordingly, that the Diclidantheraceae should be included in the Polygalaceae. It is significant that *Diclidanthera* was associated by Martius (Fl. Bras. vol. vii. p. 16: 1856) with *Moutabea*, a genus long since assigned to the Polygalaceae, and that he then suggested that the true affinity of both genera was

with that family. The discovery of *Barnhartia* affords a striking confirmation of the correctness of his view.

A detailed account of *Diclidanthera* and *Barnhartia* will appear elsewhere. In the meantime the precise position of these genera within the Polygalaceae is left open.—T. A. SPRAGUE, N. Y. SANDWITH.

FIG. 1, upper part of flowering branch, *natural size*; 2, an axillary inflorescence, × 2; 3, rhachis of inflorescence with bract, two bracteoles, and nectary, × 7; 4, flower diagram, the position of the suppressed anterior and posterior stamens indicated by crosses; 5, flower-bud, × 3; 6, flower, × 3; 7, anterior petal, × 3; 8, paired petals, united by intervening stamen, × 3; 9, stamens before dehiscence: a, b, c, exterior, lateral and interior views, × 14; 10, a, b, c, stamens after dehiscence, × 14.

3173



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Tabula 3173.

STRYCHNOS DIABOLI, *Sandwith.*

Loganiaceae. Tribus Strychneae.

S. (§ **Longiflorae**) **diaboli,** *Sandwith in Kew Bull.* 1931, p. 486; species nova, inter *S. tomentosam,* Benth., atque *S. triplinerviam,* Mart., ponenda; ab illa foliis latioribus subtus haud dense lanatis, inflorescentiis densis, laciniis calycinis angustis, floribus multo brevioribus, staminibus inclusis, ab hac foliis haud coriaceis, indumento utriusque foliorum paginae, venatione, floribus brevioribus, staminibus inclusis differt.

Frutex altissime scandens, ramulis teretibus dense tomentosis, summis novellis fulvis ad 12 cm. longis ad 2 mm. diametro; cirrhi grisei vel grisco-fulvi, dense tomentosi, circiter 9 cm. longi. *Folia* in ramulis novellis per paria 1–3 disposita; cataphylla basi ramulorum conspicua, acuminata, concava, 4–5 mm. longa; internodia 2–5 cm. longa; lamina late ovata vel ovato-elliptica, nonnunquam fere suborbicularis, apice vulgo obtusa vel rotundata atque breviter (2–8 mm.) acute cuspidata, in exemplis subellipticis attenuata acuminata, in exemplis suborbicularibus rotundata vix cuspidata, basi obtusa, nonnunquam obliqua uno latere rotundato, vel cuneata, 4·5–12 cm. longa, 3–7·5 cm. lata, tenuiter chartacea, supra siccitate obscure olivacea vel purpurascentia, dense regulariter molliter pilosula, subtus pilis brevibus fulvis dense molliter velutino-pubescentia haud lanata, pilis quam in pagina superiore haud multo densioribus, venatione ut in *S. tomentosa* saepius septuplinervia, nervis binis intimis a costa in medio folio circiter 0·7 ad fere 2 cm. distantibus, intermediis his paullo magis approximatis, extimis prope marginem vel cum margine conjunctis, nervis secundariis subhorizontalibus subparallelis sinuatis subtus cum rete venularum prominentibus; petiolus fulvo-tomentosus, 2–6 mm. longus. *Inflorescentiae* ramulos terminantes, congeste corymboso-thyrsoideae, densiflorae, 2–4 cm. diametro, ubique indumento ramulorum fulvo-tomentoso praeditae; pedunculus primarius 0·7–3 cm. longus; rami primarii 1–9 mm. longi, apice ramosi cymis compluribus arcte stipatis; bracteae imae lanceolatae, 4–6 mm. longae, circiter 1·5 mm. latae, superiores bracteolaeque ovato-lanceolatae vel ovatae, 1·5–2 mm. longae, circiter 1 mm. latae. *Flores* pentameri, vix ad 1 mm. pedicellati, albi, sed siccitate fauce excepta omnino fulvi. *Calyx* laciniis

lanceolatis 2 mm. longis vix ad 1 mm. latis extra fulvo-tomentosis intus glabris. *Corolla* extra indumento simili fulvo-tomentoso praedita, pilis ut in *S. triplinervia* brevibus homogeneis patulis, nec ut in *S. tomentosa* pilorum serie altera conspicua longiore patente; tubus 8 mm. longus, 1·5 mm. diametro, intus apice basique glaber, ceterum adpresse pilosus; lobi lanceolati, acuti, 3–3·5 mm. longi, 1–1·25 mm. lati, flore aperto patentes, extra indumento tubi, intus basi lana densa conspicua nivea induti, ceterum pulverulento-tomentelli. *Antherae* subsessiles, fauce sub lana insertae, inclusae nec cernendae, oblongae, 1 mm. paullo excedentes. *Ovarium* glabrum, ovoideum, circiter 1 mm. altum, ad 0·75 mm. diametro; stylus glaber, cum stigmate capitato circiter 8 mm. longus. *Fructus* non visus.

British Guiana. In dense forest, Moraballi Creek, Essequibo River, 24 Aug. 1929, *Sandwith*, 109.—Bush-rope with tendrils. Branchlets dark-rusty. Flowers white, whitish woolly at the throat. Vernacular name "Black Devil-Doer."

The name "Devil-Doer" is given by the Arawak Indians of British Guiana to numerous species of *Strychnos* found in the Colony, on account of their poisonous properties. Three species were collected in perfect flowering condition by members of the Oxford University Expedition to British Guiana in 1929: one of these, *S. tomentosa* (t. 3175), is a rediscovery; a second, *S. Melinoniana* (t. 3174), is a first record for the Colony; while the present species is described here for the first time. Duplicates of *S. diaboli* are distributed to the Herbaria of New York, Rio de Janeiro, Utrecht, Berlin, Paris, Washington, Stockholm, Leningrad, and Geneva. The "Devil-Doers" are giant bush-ropes climbing to the forest canopy, where the flowering branches sprawl over a wide area, beneath which the forest-floor is littered with their fallen corollas.—N. Y. Sandwith.

Fig. 1, flowering branch, × ⅔; 2, calyx, showing one of the bracteoles, × 4; 3, corolla laid open, showing insertion of stamens, × 4; 4, part of corolla from within, showing lanate base of lobe, × 4; 5, pistil, × 4; 6, upper surface of leaf, × 22·5; 7, lower surface of leaf, × 22·5.

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Tabula 3174.

STRYCHNOS MELINONIANA, *Baill.*

Loganiaceae. Tribus Strychneae.

S. (§ **Intermediae**) **Melinoniana,** *Baill. in Bull. Soc. Linn. Par.* vol. i. p. 256 (1880); *Sandwith in Kew Bull.* 1931, p. 487; inter species hujus sectionis hucusque cognitas foliis magnis, laciniis calycinis rotundatis vel obtusis, lobis corollae ubique densissime albo-lanatis, ovario dimidio superiore piloso distinguenda.

Frutex altissime scandens, ramulis summis teretibus glaberrimis cinereis vel purpurascentibus ad 2·5 mm. diametro; internodia 2–10 cm. longa; cirrhi glabri, 4–7 cm. longi. *Folia* in eodem frutice lanceolata ad ovata, apice attenuata acuta vel nonnunquam acuminata, basi cuncata, 7·5–20 cm. longa, 3·5–10 cm. lata, coriacea, utrinque nitida, glaberrima, supra siccitate pallide olivacea vel brunnescentia, subtus saepius glaucescentia, quinquenervia usque conspicue quintuplinervia, jugo intimo a costa prope medium folium 1·5–3 cm. distante, nervis secundariis regulariter subhorizontalibus parallelisque, his cum venulis utrinque praesertim subtus valde reticulatis; petiolus glaber, nigrescens, 5–11 mm. longus. *Inflorescentiae* axillares, racemoso-thyrsoideae, saepe a basi ramosae, cymis apice ramulorum brevium congestis, 1–4 cm. longae, 1–2·5 cm. latae, ubique dense minute hirtellae, vel inferne glabrescentes nigrescentes; bracteae primariae ovatae, obtusae, concavo-cymbiformes, ad 2 mm. longae, rarius ovato-lanceolatae, ad 3 mm. longae; bracteae cymarum propriae imbricatae: bracteolae rotundato-ovatae, obtusae, vix ad 1·5 mm. longae, circiter 1·2 mm. latae, extra hirtellae, conspicue ciliatae. *Flores* pentameri, albi, suaveolentissimi. *Calyx* extra hirtellus, laciniis valde imbricatis ciliatis semiorbicularibus rotundatis vel late ovatis obtusis 1 mm. longis fere ad 1·5 mm. latis. *Corolla* extra basi glabra excepta pulverulento-tomentella; tubus cylindricus vel fere subcampanulatus, 3–3·75 mm. longus, applanatus, ad 3 mm. latus, intus basi glabra excepta albo-pilosus; lobi flore aperto patentes, demum reflexi, tubo longiores, lanceolati, acuti, 4–5 mm. longi, basi ad 1·2 mm. lati, intus ubique per totam longitudinem sed praesertim in medio densissime albo-lanati. *Stamina* flore aperto exserta, fauce inter bases loborum inserta, filamentis conspicuis glabris 2–2·5 mm. longis; antherae oblongae, 1·2 mm. longae. *Ovarium* ovoideo-subglobosum, 1 mm. altum, 1 mm. diametro, dimidio superiore valde albo-pilosum;

stylus inferne pilosus, ceterum glaber, cum stigmate capitato 3·5–6 mm. longus. *Fructus* immaturus viridis, obovoideus, apiculatus, ad 11 mm. longus, ad 8 mm. diametro.

British Guiana. Moraballi Creek, Essequibo River, 26 Sept. 1929, *Sandwith*, 342. Bush-rope with hard hook-like tendrils in mora-morabukea forest. Flowers white, white-woolly within, strongly and sweetly scented of *Philadelphus*. Moraballi Creek, in mixed forest, 5 Oct. 1929, *Sandwith*, 377. Young fruit green. Vernacular name "White Devil-Doer."

French Guiana. Without locality, *Mélinon* (Herb. Paris.).

The original description of *S. Melinoniana*, Baill., was based on material without flowers, and is somewhat misleading, the leaves being described as three-nerved at the base, and the sepals as acute. When the fine flowering material collected by the Oxford Expedition in British Guiana, upon which the above description is based, was compared with the type of *S. Melinoniana* in the Paris Herbarium, they were found to agree remarkably well. The sepals of the type were, in fact, rounded or obtuse, and could not reasonably be described as acute. An important feature of this species is the great variability in the venation of the leaves which, on the same plant, may be quinquenerved or very conspicuously quintuplinerved, the inner pair of nerves arising a long distance above the base. This breaks down one character that has been used for separating the closely allied *S. Solererederi*, Gilg, of French Guiana, which was also described without flowers. The type collection (*Mélinon*, 430) of *S. Solererederi* has been examined in the Paris Herbarium, and it is certainly remarkably close to *S. Melinoniana*; but it may be retained for the present as a distinct species on the ground of the narrower, more acute sepals and the glabrous apex of the very young fruit.

The leaves of *S. Melinoniana* resemble also those of *S. Mitscherlichii*, Rich. Schomb., and *S. smilacina*, Benth., in the section *Longiflorae*. *S. cogens*, Benth., which was described without flowers, differs in the indumentum of the branchlets and the veins of the lower surface of the leaves, which have a much finer and more intricate reticulation. Of other possibly allied species described without flowers, *S. panurensis*, Sprague et Sandwith, differs in the narrow, somewhat acute calyx-lobes and the glabrous ovary; while *S. gigantea*, Barb. Rodr., has more acuminate leaves, more rounded at the base, their secondary nerves ascending, instead of subhorizontal, and far less regular and parallel.

It is satisfactory to be able to emend and complete the description of *S. Melinoniana*, after an examination of the type, and to distribute flowering material to many Herbaria (New York, Rio de Janeiro, Utrecht, Berlin, Paris, Washington, Stockholm, Leningrad, Geneva, Vienna, Chicago).—N. Y. Sandwith.

Fig. 1, flowering branch, with tendrils, × ⅔; 2, inflorescence, × 2; 3, flower, × 4; 4, interior of corolla, with stamens, × 4; 5, pistil, × 6; 6, fruit, × 2.

3175

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Tabula 3175.

STRYCHNOS TOMENTOSA, *Benth.*

Loganiaceae. Tribus Strychneae.

S. (§ **Longiflorae**) **tomentosa,** *Benth. in Journ. Linn. Soc., Bot.* vol. i. p. 104 (1857); *Progel in Mart. Fl. Bras.* vol. vi. pars i. p. 271 (1868); *S. toxiferae*, Rob. Schomb. ex Benth. affinis, ramulis pubescentibus nec patenti-hirsutis, foliis supra pubescentibus subtus dense lanato-tomentosis, laciniis calycinis ovatis brevibus differt.

Frutex altissime scandens, ramulis summis novellis pilis fulvis adpressis pubescentibus; cirrhi juniores dense pubescentes. *Folia* ovata usque elliptica vel oblonga, apice acuta, obtusa atque mucronata, vel rotundato-truncata atque breviter cuspidata, basi obtusa vel rotundata, 2–8 cm. longa, 1–3·6 cm. lata, membranacea, opaca, supra siccitate olivaceo-nigrescentia pilis brevibus haud densis pubescentia, subtus fulvo-viridia dense molliter lanato-tomentosa, quintuplinervia vel saepius septuplinervia, nervis in medio folio fere aequidistantibus supra impressis subtus prominentibus venulis satis conspicue reticulatis; petiolus fulvo-pubescens, ad 5 mm. longus. *Inflorescentiae* ramulos terminantes, satis laxe corymboso-thyrsoideae atque pauciflorae, ad 4·5 cm. diametro, ubique adpresse fulvo-pubescentes; pedunculus primarius vulgo 2–3 cm. longus. *Flores* pentameri; laterales cymae cuiusque conspicuc ad 5 mm. pedicellati, siccitate limbo intus albo excepto ferruginei. *Calyx* laciniis ovatis acuminatis ad 2·5 mm. longis ad 1·5 mm. latis, extra fulvo-pubescentibus intus glabris. *Corollae* tubus ad 1·4 cm. longus, 1·5–2 mm. latus, extra dense patule vel subadpresse fulvo-pilosulus, praeterea serie pilorum longorum patente conspicua praeditus, intus superne dense lanatus inferne glaber, apice supra lobos in coronam 1 mm. altam apice densissime albo-lanatam productus; lobi lanceolati, patentes vel reflexi, extra indumento tubi praediti, intus breviter albo-lanati, pulverulenti, basin versus siccitate saepe purpurascentes. *Stamina* sub lana coronae affixa, e fauce conspicue exserta, filamentis glabris 0·75 mm. longis; antherae late ovato-oblongae, 0·6 mm. longae, 0·5 mm. latae. *Ovarium* glabrum, subglobosum, ad 1 mm. altum; stylus glaber, longe exsertus, ad 1·6 cm. longus. *Fructus* ignotus.—*S. rhexioides*, Klotzsch in Rich. Schomb. Reisen, vol. iii. p. 1144 (1848), nomen.

British Guiana. Moraballi Creek, Essequibo River, 25 Oct. 1929, *Sandwith*, 524: a bush-rope with tendrils, in mixed forest on hill; leaves soft and tomentose (pale greenish in the fresh state) beneath; corolla-tube green with spreading rusty hairs; limb a beautiful pure white within, brownish-sericeous on the back. Roraima, 1843, *Schomburgk*, 723 (1095B), in Herb Kew., Cantab., Paris. Rich. Schomburgk (l.c.) gives the locality as "stony wooded slopes near Pirara."

This rare and beautiful species had apparently not been collected, since Schomburgk met with it, until its rediscovery in 1929. As Schomburgk's specimen in the Kew Herbarium is very poor, the fine material gathered by the Oxford University Expedition to British Guiana is particularly welcome. Specimens have been distributed to the Herbaria at New York, Rio de Janeiro, Utrecht, Berlin, Paris, Washington, Stockholm, Geneva, and Leningrad.—N. Y. Sandwith.

Fig. 1, flowering branch, × ⅔; 2, calyx, showing one of the bracteoles, × 4; 3, corolla laid open, showing corona and stamens, × 4; 4, part of corolla from within, showing insertion of corona-lobe, × 4; 5, pistil, × 4; 6, upper surface of leaf, × 30; 7, lower surface of leaf, × 30.

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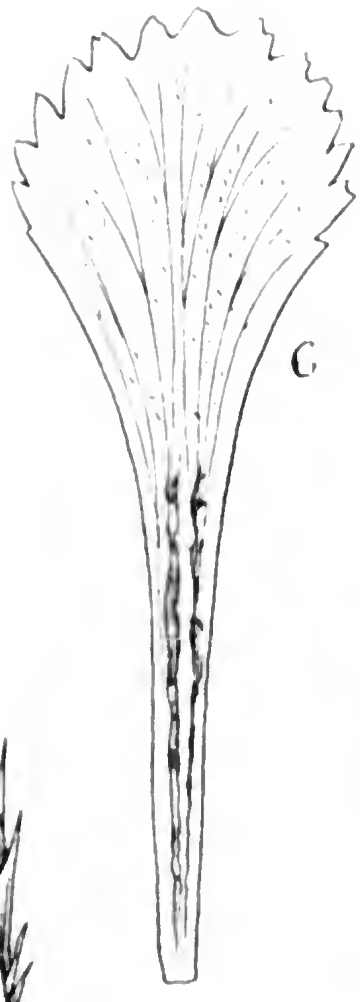

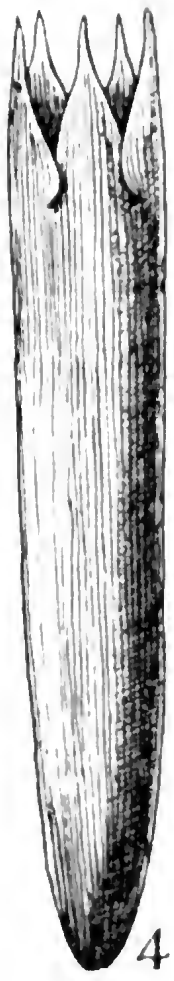

S.R-C.

Tabula 3176.

DIANTHUS RUPICOLA, *Biv.*

Caryophyllaceae. Tribus Sileneae.

D. rupicola, *Biv. Sic. Pl. cent. prima,* p. 31, t. 1 (1806); *Presl, Flor. Sicula,* vol. i. p. 145 (1826); *Pojero, Flor. Sicula,* vol. i. pars 1, p. 163 (1888); *Fiori et Paoletti, Flor. Anal. Ital.* vol. i. p. 377 (1898) (*rupicolus*), fig. 1226 (1899); a *D. arboreo,* L., foliis lanceolato-linearibus vel angustissime oblanceolatis valde acutis fere planis facile distinguitur.

Suffrutex glaberrimus, viridi-glaucus, inferne lignosus, superne herbaceus, usque ad 5·5 dm. altus, valde ramosus, ramis dense caespitosis firmis erectis vel e rupibus dependentibus inferne teretibus superne subtetragonis. *Folia* numerosa, lanceolato-linearia vel angustissime oblanceolata, valde acuta, inferne angustata, usque ad 6 cm. longa et 7 mm. lata, coriacea, vix carnosa, supra enervia, infra leviter subconvexa et carinata, caulina remotiuscula; vagina 2–3 mm. longa et lata. *Flores* 4–23, dense fasciculati, sacpissime in ramulis binis superne bracteatis congesti; bracteae 6–10-jugae, imbricatae, infimae lineares, cuspidatae, sequentes gradatim majores, oblongo-ovatae, abrupte cuspidatae, multinerviae, margine membranaceae et ciliolatae. *Calyx* cylindricus, tubo 2–2·5 cm. longo longitudinaliter tenuiter sulcato-nervato saepe plus minusve purpureo, dentibus lanceolatis acute acuminatis 4 mm. longis 1·5 mm. latis 10–11-nerviis saepissime aliquantulum ciliolatis. *Petala* 3·5 cm. longa, lamina late obovata vel obovato-triangulari 1·1 cm. longa 1 cm. lata leviter et irregulariter inciso-denticulata pallide purpureo-rosea vel albida inferne in pagina superiore leviter pubescente. *Antherae* 2 mm. longae. *Ovarium* cylindricum, leviter sulcatum, 9 mm. longum, 2 mm. diametro; styli 2 cm. longi. *Capsula* cylindrica, 2 cm. longa, valvis patentibus. *Semina* fere plana, ambitu elliptica utrinque rotundata vel acuta.—*D. Bisignani,* Ten. Cat. Orto bot. Princ. di Bisign. p. 13 (1805), nomen nudum, et Flor. Nap. vol. i. p. 228, t. 39 (1811–15), descr.; Reichb. Pl. Crit. vol. vi. t. dxci. p. 810 (1828); Bot. Reg. vol. xxiv. (new series, vol. xi.) t. 29 (1838); Gussone, Flor. Sic. Syn. vol. i. p. 478 (1842); F. N. Williams in Journ. Linn. Soc., Bot. vol. xxix. p. 362 (1893). *D. suffruticosus,* Willd. Enum. Hort. Berol. p. 466 (1809)? *D. involucratus*

Poir. in Lam. Encycl. suppl. vol. iv. p. 132 (1816) ? *D. arborescens*, Hoffmgg. Verz. Pflanzenkult. p. 56 (1824) ?

ITALY. "Calabria," *Tenore*; Calabria, ad rupes maritimas prope Scillam, 2.6.1877, *Biondi*.

SICILY. Sine loc., 1828, *Jan.*; sine loc., 1830, *Gussone*; rochers calcaires à S. María del Gesù près Palerme, 29.8.1834, *A. Richard*; in rupium fissuris ad littora maris, Termini, 7.7.1840, *Herb. Heldreich*; Palermo, 9.4.1845, *Herb. R. C. Alexander Prior*; rochers à Taormine, 26.7.1846, *Cosson*; sine loc. et coll., 1847; Palermo, 1847, *Todaro*; ex rupibus praeruptis Siciliae, juxta Panormum (monte Pelegrino), 11.1853, *J. Ball*; in rupibus calcareis, Palermo, *Herb. Churchill*; Palermo, *Parlatore*; ad rupes calcareis Misilmeri, 25.7.1855, *E. et A. Huet du Pavillon*; in rupibus calcareis, Palermo a S. Ciro, *Todaro*, 1333; in rupibus calcareis erectis sub Taormina, 100–200 m., 30.6.1877, *Huter, Porta et Rigo*, ex itinere italico III., 459; in rupibus calcar. marit. M. Pellegrino, 10.1879, *Lo Jacono in F. Schultz, herb. norm.* 749; in rupibus calcareis reg. inferioris, Palermo, 8.1898, *H. Ross*, 113; Taormina, in rupibus montium solo calc., 14.7.1898, *G. Rigo*, 479; Panormum (Palermo), in rupibus montis Pellegrino, alt. 50–300 m., solo calcareo, 14.9.1912, *A. Vaccari in Flor. Ital. Exsicc.* ser. II. 1831.

CRETE. Cape Maleka, *P. L. Giuseppi* (cult. in hort. "Trevose, Felixstowe," 26.9.1930).

The species here figured is of very considerable phytogeographical interest. It was placed, with ten other species, in the Sect. *Suffruticosi*, Subsect. *Tubulosi* by F. N. Williams (l.c.). The species of the subsection are, with one exception (*D. rigidus*, Bieb. from S.E. Russia), inhabitants of the Mediterranean basin, chiefly of its eastern parts. Williams's classification has been somewhat modified by more recent research, but the relationship of *D. rupicola* with *D. fruticosus*, L. and *D. arboreus*, L. can scarcely be doubted. *D. fruticosus* is known with certainty only from rocks in the island of Seriphos, in the western Cyclades, above the town of the same name. Sibthorp (Flor. Graec. Prodr. vol. i. p. 289 : 1806; et Flor. Graec. t. 407 : 1825) records it "in insulae Seriphi rupibus, at rarissime. In insula Creta." Sibthorp's plant is correctly named (see Shaw and Turrill in Kew Bull. 1926, p. 126), but no confirmation of its occurrence in Crete has been obtained. Heldreich (Flor. Cephal. p. 24 : 1882) records it from near Asso in Cephalonia, but again confirmation is lacking as no specimen has been seen. Halácsy (Consp. Flor. Graec. Suppl. p. 19 : 1908) adds the island Pholegandros, in the south-western Cyclades. *D. arboreus* has a wider distribution, being known from several islands of the Cyclades (Naxos, Paros, Cythnos, and Amorgos), from several localities in Crete, from Cerigo, from Messenia, from Karpathos, and from Kalymnos.

Turning now to the distribution of *D. rupicola*, it should be noted that the species has been known for a long time in cultivation. Tenore when he first recorded it, as *D. Bisignani*, did so as a garden plant of

unknown origin. Bivona, in his account of the species, quotes "Caryophyllus sylvestris vulgaris latifolius floribus conglobatis sive copulatis. *Cup. Hort. Cath.* p. 40" (1696) as a synonym, probably correctly. Bivona himself does not quote an exact Sicilian locality for *D. rupicola*. The difficulty of being certain that the names *D. suffruticosus*, *D. involucratus*, and *D. arborescens* are correctly referred to the synonymy of *D. rupicola* is partly due to their being based on garden material of unknown origin. Thanks, however, to the energy especially of Italian collectors the distribution of *D. rupicola*, Biv. (*D. Bisignani*, Ten.) can now be mapped with a fair degree of accuracy. It occurs sporadically on maritime rocks, igneous and calcareous, on the northern and eastern coasts of Sicily, in the Lipari and Egadian islands and in Lampedusa. On the Italian mainland it is found in several localities in Otranto, Basilicata, and Calabria. Munby (Cat. Plant. Algeria, ed. 2, p. 6: 1866) records it from Algeria, "prov. Alger r. r. (loc. Babor)," and Battandier and Trabut, Flor. de l'Algér. p. 144 (1888), give a short description and quote Munby's record without comment. In their Flor. Anal. et Synopt. p. 61 (1902), they record *D. Bisignani*, Ten., var. *hermaeënsis* for Tunis and do not refer to Munby. It is possible that all the North African material is *D. hermaeënsis*, Cosson, Ill. Flor. Atlant. vol. i. p. 121, t. 76 (1890), which from the description, figure, and solitary sheet at Kew appears to be a distinct, though allied species. Cosson records it from Cape Bon, near El Haouiria "juxta locum a civitate eversa (Hermæum) olim occupatum," and from the island of Djezeirct-Djamour (Zembra). Finally Dr. P. L. Giuseppi sent to Kew a specimen of *D. rupicola*, which he had growing in his garden at Trevose, Felixstowe, with the information that he grew it from seed collected by himself at Cape Malcka in western Crete. The special interest is that Cape Maleka (and perhaps other parts of the Akrotiri Peninsula) is a well-known locality for *D. arboreus*, that species having been collected there by Sieber, Heldreich, Baldacci, and Gandoger.

It thus appears that we have a small group of morphologically closely-allied species, showing in the main a distinct but essentially vicarious distribution:

D. fruticosus: W. Cyclades.
D. arboreus: Crete, S. Greece, Cyclades eastwards to islands off the coast of Asia Minor.
D. rupicola: Sicily and Sicilian islands, S. Italy, W. Crete.
D. hermaeënsis: Tunis (and ? Algeria).

It seems a reasonable conclusion that these have evolved from a common ancestor, morphological differences not being amalgamated into intraspecific polymorphism because of essential isolation of diverging stocks.

Several minor variations within *D. rupicola* have been recorded. Presl, l.c., has a variety *albiflorus*, with white flowers, from near Termini, Sicily. Gussone, l.c., names a variety *virescens*, with the description "foliis acutioribus virentibus angustioribus," and quotes for it many

Sicilian islands. Williams (l.c.) ranges, without descriptions, the following under *D. Bisignani*: (a) *glaucus* (presumably what he regards as the typical plant) ; (b) *viridescens*, Guss. (presumably = var. *virescens*, Guss.) ; (c) *albiflorus*, Presl ; and (d) *hermaeënsis*, Coss. (sp.).

W. B. Turrill.

Fig. 1, flowering branch, *natural size* ; 2, bracts, × 2 ; 3, a single bract, × 2 ; 4, calyx, × 2 ; 5, apex of calyx-lobe, × 20 ; 6, petal, × 2 ; 7, stamen, × 2 ; 8, pistil, × 2 ; 9, young seeds, × 10.

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S.R-C.

Tabula 3177.

RHAMNUS RHODOPEUS, *Vel.*

Rhamnaceae. Tribus Rhamneae.

R. rhodopeus, *Vel. Flor. Bulg.* p. 119 (1891), *et Suppl.* p. 63 (1898); *Stoyanoff in God. Sof. Univ.* vol. xv.–xvi. p. 107 (1921); *Bornmüller in Engl. Bot. Jahrb.* vol. lix. p. 459 (1925); *Hayek, Prodr. Flor. penins. Balcan.* vol. i. p. 612 (1925); *Bornmüller in Fedde, Repert.* vol. xxix. p. 37/341 (1931); a *R. tinctorio*, W. et K., foliis utrinque velutino-pubescentibus differt.

Frutex vel arbor parva, usque ad 4·6 m. alta, valde ramosa, ramulis primo dense pubescentibus deinde laevibus griseo-rubro-nigris apice saepissime spinescentibus. *Folia* late elliptica vel elliptico-obovata, apice rotundata vel obtusa, basi rotundata vel (subvar. *subcuneatus*, Bornm. l.c. p. 459 : 1925) cuneata, petiolo exeluso saepissime 1·5–3·3 cm. sed usque ad 3·8 cm. longa (*Tedd*, 585), 0·9–2·5 cm. lata, in pagina utraque plus minusve dense velutino-pubescentia, margine serrulato-crenulata, costa nervisque supra leviter impressis infra prominentibus, nervis lateralibus graeilibus utrinque 3–5 areuatis mox vel tarde in rete venosum dissolutis; petioli 0·3–1·4 cm. longi, breviter pubescentes. *Flores* axillares, fasciculati, ramulorum apices versus aggregati, tetrameri; pedicelli circiter 5 mm. longi, leviter papilloso-puberuli. *Receptaculum* (calycis tubus) obconicum, 1·25 mm. longum, glabrum. *Sepala* anguste elliptico-lanceolata, subacuta, 3 mm. longa, 1·25 mm. lata, trinervia, nervis lateralibus ad marginem arcuatis obscuris. *Petala* spathulato-linearia, emarginata, 1·5 mm. longa, 0·3 mm. lata. *Filamenta* subulata, 1·25 mm. longa; antherae 0·75 mm. longae. *Gynoecium* parvum, 1·25 mm. longum; stylus circiter ad medium bifidus. *Fructus* obovoideus, 3–4 mm. longus, niger.—*Rhamnus infectorius*, L., var. *pubescens*, Griseb. Spic. Flor. rumel. et bithyn. vol. i. p. 150 (1843). *R. tinctorius*, W. et K., var. *pubescens*, Degen et Dörfler in Denkschr. Math.-Naturw. Cl. K. Akad. Wiss. vol. lxiv. p. 717 (1897). *R. saxatilis*, Jacq., var. *rhodopeus*, Stoy. et Stef. Flor. Bulg. vol. ii. p. 740 (1925).

Bulgaria. In collinis ad Tekir, 9.6.1895 et 26.7.1897, *Stříbrný*; in dumetis submontanis mt. Rodope, 5.1906, *Adamović*.

Thrace. Mesta Valley, rocky side-valley off main river valley, on limestone, 17.5.1931, a tree, height about 15 ft., *Tedd*, 585.

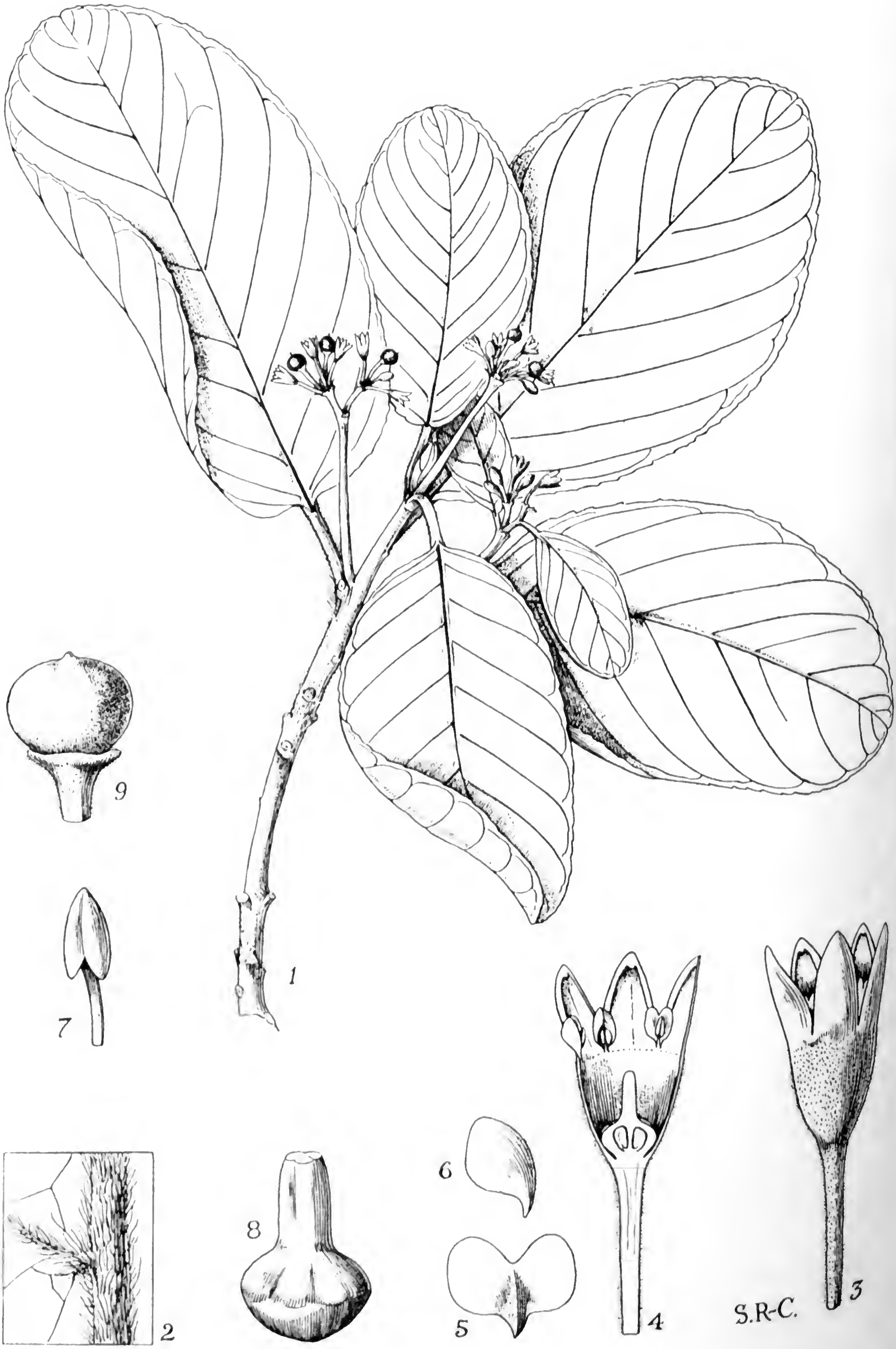
In addition to the above specimens, preserved in the Herbarium at Kew, the following records must be noted: Grisebach, l.c., gives "in fruticetis pr. Rusköi *Chersonesi thracici* sparsim alt. 6–800′ (substr. sax. aren.), rarius in sylva mixta m. Athûs alt. 1200′–2600′ (substr. marm.); in *Macedonia* (Friv.) Fl. Maj. Jun. M." Velenovský, in addition to Tekir, records the species from "in rupestribus calidis calcareis supra Stanimaka (Vel.)." This would be from the northern foot-hills of the Rodope and is Velenovský's type. Degen and Dörfler (l.c.) record it from "Macedonia centralis. In declivibus rupium inter Rošzdan et Allchar; 21 Jun." Stoyanoff, l.c. 1921, collected *R. rhodopeus* from near Gabrovo, on the northern foot-hills of the Belasica (Belasitsa) Planina.

Bornmüller, l.c. 1925, collected it in 1891 on Athos and in 1918–19 in various localities in North Macedonia (Southern Serbia or Vardar), in the districts of Veles, Drenovo, Demirkapu, and Lake Doiran. Lastly he records it, l.c. 1931, from the arid region of the high plain of Central Anatolia, in the district around Angora (Ankara).

It is of interest that *R. rhodopeus* has been reduced by different authors to varietal rank under at least three distinct species, *R. infectorius* (presumably of Visiani, non L., i.e. *R. intermedius*, Steud. et Hochst.), *R. tinctorius*, and *R. saxatilis*. The indumentum of the mature leaves is an important taxonomic character and, though somewhat variable according to age and habitat, distinguishes the species from all its Near Eastern relatives. Velenovský described the leaves as broadly elliptic and obovate-elliptic, obtuse, and shortly attenuated at the base. The size and especially the breadth of the leaves and the shape of the leaf-base vary very considerably. Bornmüller (1925) published the name subvar. *subcuneatus* for specimens collected near Drenovo and on the Marianska Planina, with narrower leaves (2–3 times as long as broad), whose cuneate base passes into a short petiole. However, there is such variation amongst leaves on the same specimen that extensive field-studies are essential before the taxonomic value of leaf-characters can be determined. The leaves in Tedd's Thracian material are larger than those in any other flowering specimens at Kew.

W. B. Turrill.

Fig. 1, flowering branch, *natural size*; 2, lower surface of leaf, × 10; 3, margin of upper surface, × 10; 4, flower, × 6; 5, longitudinal section of flower, × 6; 6, petal, adaxial view, × 12; 7, stamen, abaxial view, × 20; 8, pistil, × 20; 9, fruit, × 4.



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S.R-C.

Tabula 3178.

RHAMNUS RUPESTRIS, *Scop.*, var. RUMELIACUS, *Hayek.*

Rhamnaceae. Tribus Rhamneae.

R. rupestris, *Scop. Fl. Carniol.* ed. 2, vol. i. p. 164, t. 5 (1772), var. **rumeliacus,** *Hayek, Prodr. Flor. penins. Balcan.* vol. i. p. 1087 (1927); a planta Scopoliana partibus omnibus majoribus, foliis saepius subcordatis differt.

Frutex usque ad 3 m. altus, ramis vetustis cinereis glabris, junioribus atrorubro-brunneis leviter pilosis glabrescentibus. *Folia* elliptica, ovato- vel obovato-elliptica, apice rotundata vel subobtusa rarissime emarginata, basi subcordata vel truncata, usque 7 cm. longa (petiolo excluso) et 5 cm. lata, nervis lateralibus utrinque 8–11, costa nervisque supra sulcatis subtus prominentibus, in pagina superiore glabra, in pagina inferiore costa nervisque inferne praecipue pubescentia vel glabrescentia, margine inconspicue et irregulariter crenato-denticulata; petiolus 0·7–1·2 cm. longus, dense pubescens vel fere glaber. *Inflorescentiae* in foliorum superiorum axillis positae, 3–10 florae; pedunculus 0·5–4 cm. longus; bracteae rarissime foliaceae, saepissime lineares, circiter 1 mm. longae; pedicelli 3–4 mm. longi. *Calyx* subcampanulatus, 3·5 mm. longus, lobis 5 acutis ovato-triangularibus 2 mm. longis. *Petala* late obcordata, 1 mm. longa, 1·75 mm. lata. *Antherae* 0·75 mm. longae, filamentis subaequilongis. *Stylus* indivisus, 1 mm. longus. *Fructus* immaturus subglobosus.—*R. rumeliaceus,* Friv. in Flora, Jahrg. xviii. vol. i. p. 332 (1835).

Thrace. Xanthie-Shahin Road, 93 m., rock crevices, 10.6.1931, bush 4–6 ft. high, *H. G. Tedd,* 614.

Rhamnus rupestris was originally described from material collected in the neighbourhood of Gorizia by P. Wulfen. It is obvious that the description refers to the dwarf unarmed shrub, with relatively small leaves, which is characteristic of the Karst areas to the north and east of the Adriatic. Examination of the rich material of the species at Kew and consideration of the scattered literature force one to recognise a very polymorphic species. Variation is especially apparent in habit, leaf size and shape, and indumentum. The specimen here figured is at the other extreme of variation, in habit and leaf size, from Scopoli's

type. Frivaldszky (l.c.) described a *Rhamnus* from the Rodopes as *R. rumeliaceus*. His description is not a very full one, but the characters given agree with those shown by Tedd's material except for the words "*foliis . . . acutis.*" Hayek (l.c.) quotes Simonkai, Növém. Közl. vol. vi. p. 57 (1907), as the author of the variety *rumeliacus*, but Simonkai does not appear actually to have made the combination. It must remain for future detailed field-work to describe how far varietal names are desirable within this species, the more so that most collectors have given no details of the habit of the plants from which their specimens were taken. While Tedd's specimens have the leaf apices rounded, subobtuse, or, rarely, emarginate, it is probable that this is a fluctuating character, since other sheets of the species at Kew show a range from acute to rounded and emarginate. This is particularly well seen in material collected by Jávorka in northern Albania (M. Hekurave, in saxosis calc. ad faucem vallis Valbora ad pag. Margegaj, 450 m., 1.9.1918), and which is referred by the collector to " var. *rumeliacus*, (Friv.)."

The species, *R. rupestris*, as a whole, is distributed from northern Italy and Carniola through Istria, Croatia, Dalmatia, Bosnia, Hercegovina, Montenegro, Serbia, the Rodopes, N. Macedonia, Albania and Epirus, to Greece. An interesting account of the typical (northern) plant is given by Hegi, Illustr. Flor. Mittel-Eur. vol. v. part 1, p. 349 (1925). Hegi keeps the genera *Frangula* and *Rhamnus* distinct, and evidently intended to use the name *Frangula rupestris* (Scop.) Brongniart for the species under consideration. Actually the name *Rhamnus rupestris*, Scop. heads the description within the genus *Frangula*.—W. B. Turrill.

Fig. 1, flowering branch, *natural size*; 2, portion of lower surface of leaf, × 20; 3, flower, × 6; 4, longitudinal section of flower, × 6; 5, 6, petal, abaxial and lateral views, × 12; 7, stamen, adaxial view, × 20; 8, pistil, × 12; 9, fruit, × 4.

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Tabula 3179.

TEUCRIUM CRETICUM, *L.*

Labiatae. Tribus Ajugeae.

T. creticum, *L. Sp. Pl.* p. 563 (1753); *Sibth. et Smith, Flor. Graec. Prodr.* vol. i. p. 391 (1806); et *Flor. Graec.* t. 529 (1826); *DC. Prodr.* vol. xii. p. 576 (1848); *Unger et Kotschy, Die Insel Cypern*, p. 275 (1865); *Holmboe, Stud. Veg. Cypr.* p. 151 (1914); a *T. brevifolio*, Schreb., foliis linearibus vel elliptico-linearibus supra glabris vel glabrescentibus subtus dense albo-tomentosis, inflorescentiis saepe elongatis facile distinguitur.

Frutex erectus, ramosus, ramis elongatis, internodiis 1–7·5 cm. longis, juvenilibus dense albo-tomentosis, vetustis glabris. *Folia* sessilia, linearia vel elliptico-linearia, acuta, inferne angustata, usque ad 4·5 cm. (saepissime circiter 3 cm.) longa, usque ad 5 mm. (saepissime circiter 3·5 mm.) lata, marginibus revolutis, supra glabra vel glabrescentia, subtus dense albo-tomentosa, costa supra plus minusve impressa, subtus prominente. *Inflorescentia* 4–30 cm. longa, internodiis in anthesi 1–4 cm. longis, multiflora, in quaque superiore axilla floribus 1–3 rarissime pluribus; folia superiora in bracteas gradatim transientia; bracteae floribus aequales vel paullo longiores; pedunculus (1–3-florus) usque ad 5 mm. longus; pedicelli 1–3 mm. longi. *Calyx* campanulatus, 7 mm. longus, extra albo-tomentosus, dentibus subaequalibus ovato-triangularibus acuto-spinosis 2·5 mm. longis 2 mm. latis utrinque tomentosis. *Corolla* 1·4 cm. longa, pallide purpurea, tubo 4 mm. longo superne abaxialiter saccato, labello 5-lobato. *Filamenta* 8 et 9 mm. longa, glanduloso-hispidula. *Ovarium* dense albo-tomentosum; stylus 1 cm. longus. *Nuculae* 4 mm. longae, superne dense albo-tomentosae, inferne glabrescentes.—*T. hyssopifolium*, Schreb. Plant. verticill. unilab. gen. et sp. p. 28 (1774). *T. rosmarinifolium*, Lam. Encycl. vol. ii. p. 693 (1786); Boiss. Flor. Or. vol. iv. p. 806 (1879). *T. charamaniense*, Cav. Descr. p. 82 (1827).

Asia Minor. Village de Bouloukli, près de Mersina (Cilicie). Coteaux calcaires de la région chaude, 8.6.1855, *Balansa*, 526.

Cyprus. Frequens inter Panteleimon et Paleo Milo, 24.5.1862, *Kotschy*, 934; ad rupes pr. Bellapais, 27.5.1880, *Sintenis et Rigo*, 565; Houston's Kyrenia, 3.1902, *Lascelles*; Kyrenia, 6.1926, *Houston*.

Syria. Sine loc., 1845, *Pinard*; collines calcaires, Kherbet-Besré entre Saïda et Maktara, 14.6.1853, *Blanche*, 1598 (Reliquiae Mailleanae); sine loc., 9.10.1860, *Hooker and Hanbury*; Liban, *Gaillardot*. Monts Nusairy, env. de Massiaa, 610–760 m., 6.1910, *Haradjian*, 3431.

PALESTINE. "In deserto S. Joannis" et "Arimath.," *Sieber*; désert de St. Jean, *Aucher-Eloy*, 1587; Carmel, 4.1846, *Boissier*; Judaea, in montibus calc. ad Bab-el-Wad ditionis Latrun, 16.5.1897, *Bornmüller*, 1323. Mt. Carmel, rocky hill-sides, 9.5.1913, *Meyers*, B. 2818; "from the country round Jerusalem," 1919, *Campbell*.

It is unfortunate that Linnaeus, apparently through accepting Bauhin's *Polium angustifolium creticum* as a synonym, adopted the trivial *creticum* for this species. Halácsy, Consp. Flor. Graec. vol. ii. p. 470 (1902), says "indicatur a Linnaeo in Creta, ubi tamen sec. Boiss fl. or. iv. p. 806 non crescit." Hayek, Prodr. Flor. penins. Balcan. vol. ii. p. 242 (1929), describes the species, and gives Crete with a question mark. I have seen no Cretan material and no reliable record of the plant from Crete. The nomenclature has been further confused by Lamarck describing as *T. creticum*, Lam. non L., the congeneric but quite distinct species *T. brevifolium*, Schreb., which is not uncommon in Crete, though not endemic there. Lamarck's name for the plant here figured, *T. rosmarinifolium*, is adopted by Boissier, Nyman, and other authors as descriptively accurate and therefore preferable to Linnaeus's "nomen incongruum." Some of the figures quoted in the Index Londinensis under *Teucrium creticum* represent *T. creticum*, L. and others *T. creticum*, Lam. (*T. brevifolium*, Schreb.).

T. creticum, L. is essentially a plant of the countries bordering the eastern Mediterranean. It is not uncommon in parts of Cyprus, Syria, and Palestine, and extends north to Cilicia. According to Nyman, and also to Fiori and Paoletti (Flor. Anal. Ital. vol. iii. p. 11 : 1903), it occurs also in the island of Lampedusa to the south of Sicily. Sommier in his work, "Le isole pelagie Lampedusa, Linosa, Lampione e la loro flora" (Boll. Ort. Bot. Palermo, vol. v. Append. 1906, p. 132), states that it has been collected on Lampedusa by Gussone. Striking and undoubted instances of discontinuous distribution occur in the eastern Mediterranean area, but further confirmation of the accuracy of Gussone's record is much to be desired.

The plant flourishes especially in dry, rocky and stony places, particularly on calcareous hill-slopes. Holmboe (l.c. 280) records it, in Cyprus, as a constituent of the Shinia-Maquis, *i.e.* maquis or macchia, with *Pistacia Lentiscus* as a dominant shrub.

The leaves, with their glabrous or glabrescent, apparently rather dark green upper surfaces and tomentose under surfaces, bear a striking superficial resemblance to those of *Rosmarinus officinalis*. Structurally, the peculiar abaxial, erect, sac-like enlargement of the upper part of the rather short corolla-tube is the most interesting feature. Its function, if any, must be studied in living material.—W. B. TURRILL.

FIG. 1, 1a, flowering branch, *natural size*; 2, 3, flower, abaxial and lateral views, × 2; 4, corolla, laid open, showing stamens and pistil, × 2; 5, corolla, lateral view, × 2; 6, calyx and nutlets, from above, × 6; 7, transverse section of nutlets, × 6.

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Tabula 3180.

SCILLA ALBANICA, *Turrill.*

Liliaceae. Tribus Scilleae.

S. albanica, *Turrill in Kew Bull.* 1932, p. 197 ; a *S. messeniaca*, Boiss., bulbo elongato, floribus minoribus, ovario late obpyramidato differt.

Bulbus elongatus, 3·5 cm. longus, 1·1 cm. diametro, tunicis pallide brunneis instructus. *Folia* 3, synanthia, linearia, plana, apice breviter subabrupte acutata, basi longe attenuata, 10 cm. longa, 4–8 mm. lata, glabra, nervis 13–19. *Scapus* gracilis, glaber, 10·5 cm. longus, racemo ovato 12-floro, pedicellis erecto-patulis 3·5 mm. longis, bracteis minutissime deltoideis 0·5 mm. longis. *Perigonii phylla* subpatentia, oblongo-elliptica, apice subobtusa et papillosa, 5 mm. longa, 1·5–2 mm. lata, ut videtur caeruleo-violacea. *Filamenta* 3 mm. longa, apicem versus attenuata, basi vix dilatata, caeruleo-violacea ; antherae atro-violaceae, 1·5 mm. longae. *Ovarium* late trigono-obpyramidatum, 1·75 mm. longum, 1·75 mm. diametro ; stylus 2·5 mm. longus.

Albania. Oloman, rocks, 1900 m., 23.6.1930, *Giuseppi* 39.

The species, *S. messeniaca*, Boiss., with which *S. albanica* has been contrasted above, is known only from the Peloponnese (Messenia, Laconia, and Arcadia). The more widely spread *S. bifolia*, L.—with its varieties *nivalis* (Boiss.) Baker and *polyphylla*, Boiss.—is the only other species calling for comment here. *S. albanica* differs from *S. bifolia* in the shape of the bulb, the larger number of smaller flowers, the shorter pedicels, and the reduced number of ovules.

It should be remarked that three ovaries were dissected in drawing up the description. In one a single ovule was found, in the others no trace of ovules could be discovered.—W. B. Turrill.

Fig. 1, entire plant, *natural size* ; 2, portion of rhachis, with bracts and flower, × 4 ; 3, flower, seen from above, × 4 ; 4, transverse section of ovary, × 12.

S.R-C.

Tabula 3181.

ALLIUM BIDENTATUM, *Fisch.*

Liliaceae. Subfamilia Allioïdeae.

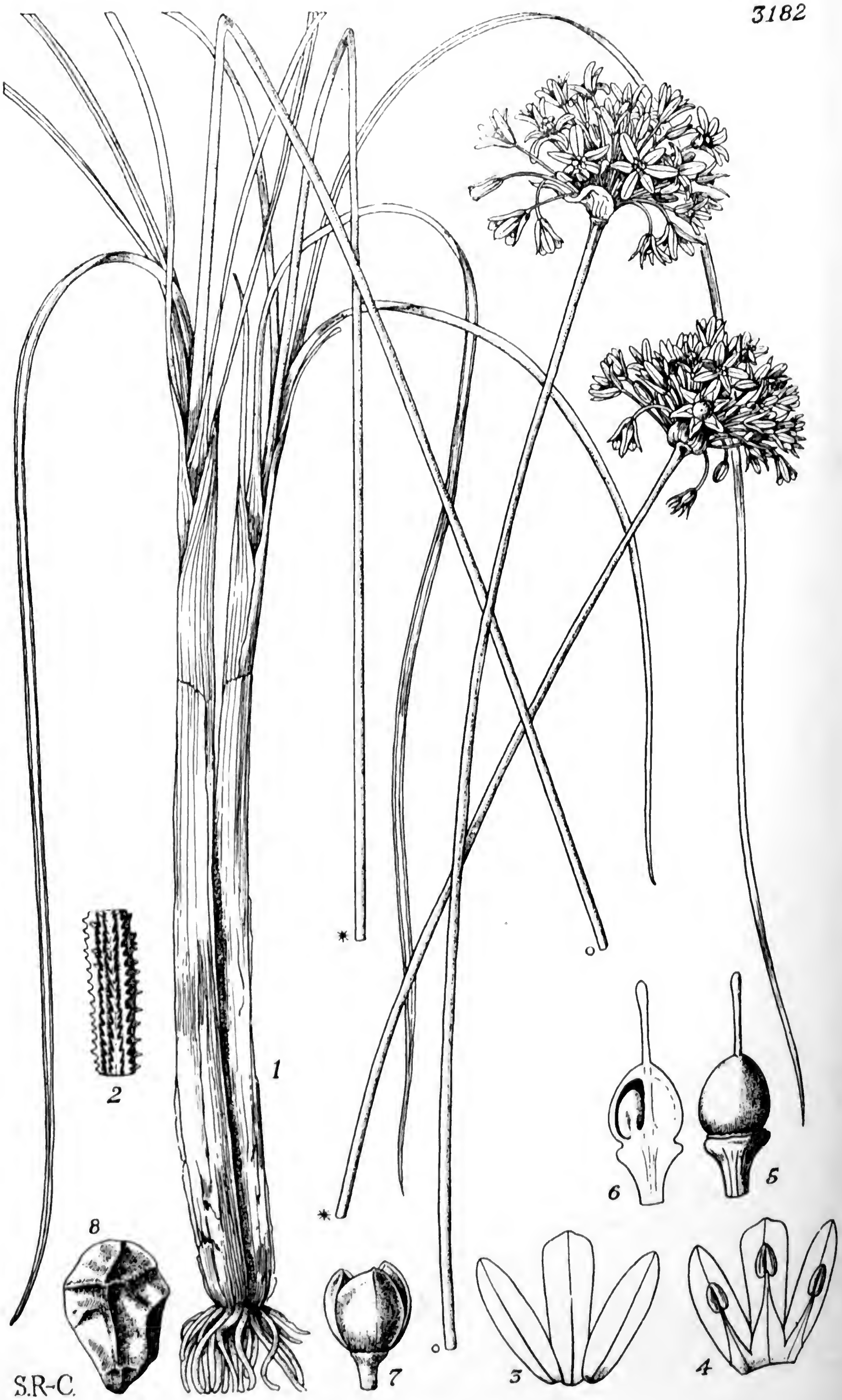
A. (**Rhiziridium**) **bidentatum**, *Fisch. apud Prokhanov in Prokhanov et Ikonnikov-Galitzky, Compte rendu prélim. expéd. Mongol. 1926*, in *Matér. Commiss. Etude Rép. Mongol. etc.*, vol. ii. p. 83 (1929), in adnot.; *et in Bull. Jard. Bot. Princ. URSS*, vol. xxix. p. 564, fig. v. (1930); *A. subangulato*, Regel, proximum, sed perianthii segmentis inaequilongis apice obtusiusculis, bulborum tunicis nunquam in fibras reticulatas solutis distinctum.

Herba perennis. *Rhizoma* non visum. *Radices* fasciculatae, circiter 1 mm. crassae. *Bulbi* aggregati, angustissimi, subcylindrici, 2–3 mm. crassi, foliorum vaginis fibroso- (haud reticulato-) solutis vestiti. *Folia* e quoque bulbo plerumque 3–4, angustissime plano-filiformia, scapo breviora vel raro ei subaequilonga, striatula, marginibus inferne saepe involuto-approximatis sub lente minutissime papilloso-scaberulis. *Scapus* usque 3·7 dm. altus, erectus, strictus, tenuiter angulatus, angulis laevibus. *Spatha* parva, hyalina, pedicellos sub anthesin vix aequans. *Umbella* capsulifera, hemisphaerica, pedicellis subaequilongis perianthium subaequantibus gracilibus laevibus. *Flores* siccitate rosei, vivi (teste Prokhanov) saturate purpurei. *Perianthii segmenta* inaequilonga: exteriora adscendentia, elliptica, subobtusa usque subacuta, minute apiculata, 4–5 mm. longa; interiora erecta, late elliptica vel ovato-elliptica, apice rotundato-obtusa, nonnunquam leviter erosa, minute apiculata, 6–7 mm. longa. *Filamenta* basi in annulum brevem connata, perianthii segmentis interioribus subbreviora: exteriora simplicia, subulato-filiformia, interiora anguste usque late obcuncata, superne sub cuspide antherifera truncata et denticulo vel quasi humerulo utrinque praedita; antherae oblongae. *Ovarium* ovoideum, circiter 2 mm. longum, stylo filiformi 3 mm. longo, stigmate simplici. *Capsula* obovoideo-globosa, circiter 3·5 mm. diametro, sub lente minutissime punctulata. *Semina* in quoque loculo gemina, trigono- vel tetragono-cuneiformia, circiter 2·5 mm. longa, 1 mm. diametro, nigra.—*A. tenuissimum*, Regel in Act. Hort. Petrop. vol. iii. [pars 2] p. 157 (1875), pro parte, non Linn. *A. polyrrhizum*, Turcz., γ *Potanini*, Regel in Act. Hort. Petrop. vol. x. p. 340 (1887). *A. omiostema*, Airy-Shaw in Notes Roy. Bot. Gard. Edinb. vol. xvi. p. 144 (1931).

Siberia. Transbaikalia : "Dahuria," *Fischer* (syntype ?) ; in campis apricis transbaicalensibus, 1833 [*Turczaninov*]; lacus Baical, pars borealis, *Radde* ; Nertschinsk, in Steppen, 1889, *F. Karo*, 120.
China. Chihli : Mt. Gulick, Kalgan, 11 Aug. 1921, *N. H. Cowdry*, 1889 ; high exposed rocks, Kalgan, Aug. 1921, *N. H. Cowdry*, 1982.

Przhevalsky's specimen from Kansu, cited by me (l.c. 145) under *Allium omiostema*, Airy-Shaw, is probably *A. dentigerum*, Prokhanov (Bull. Jard. Bot. Princ. URSS, vol. xxix. p. 563, fig. iv. : 1930), and may be syntype material : if so, I am unable to find sufficient distinctions to separate it specifically from *A. bidentatum*, Fischer. In the absence of definitely authenticated material, however, I am unwilling to make the reduction.—H. K. Airy-Shaw.

Fig. 1, flowering stem, *natural size* ; 2, base of flowering stem, *natural size* ; 3, habit, × ½ ; 4, outer perianth-segment, × 4 ; 5, inner perianth-segment, × 4 ; 6, perianth and stamens, from within, × 4 ; 7, pistil, × 6 ; 8, longitudinal section of pistil, × 6 ; 9, capsule, × 4 ; 10, seed, × 8.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Tabula 3182.

ALLIUM ZIMMERMANNIANUM, *Gilg.*

Liliaceae. Subfamilia Allioïdeae.

A. (Rhiziridium) Zimmermannianum, *Gilg in Engl. Bot. Jahrb.* vol. xxxiv. suppl. 75, p. 23 (1904); *Loesener in Beih. Bot. Centralbl.* vol. xxxvii. sect. 2, p. 99, tab. 2, fig. B–D (1919); *Airy-Shaw in Notes Roy. Bot. Gard. Edinb.* vol. xvi. p. 145 (1931); ab *A. anisopodio*, Ledeb., caulibus pedicellisque sub lente valde papilloso-scabris, floribus pulchre roseo-sanguincis distinguitur.

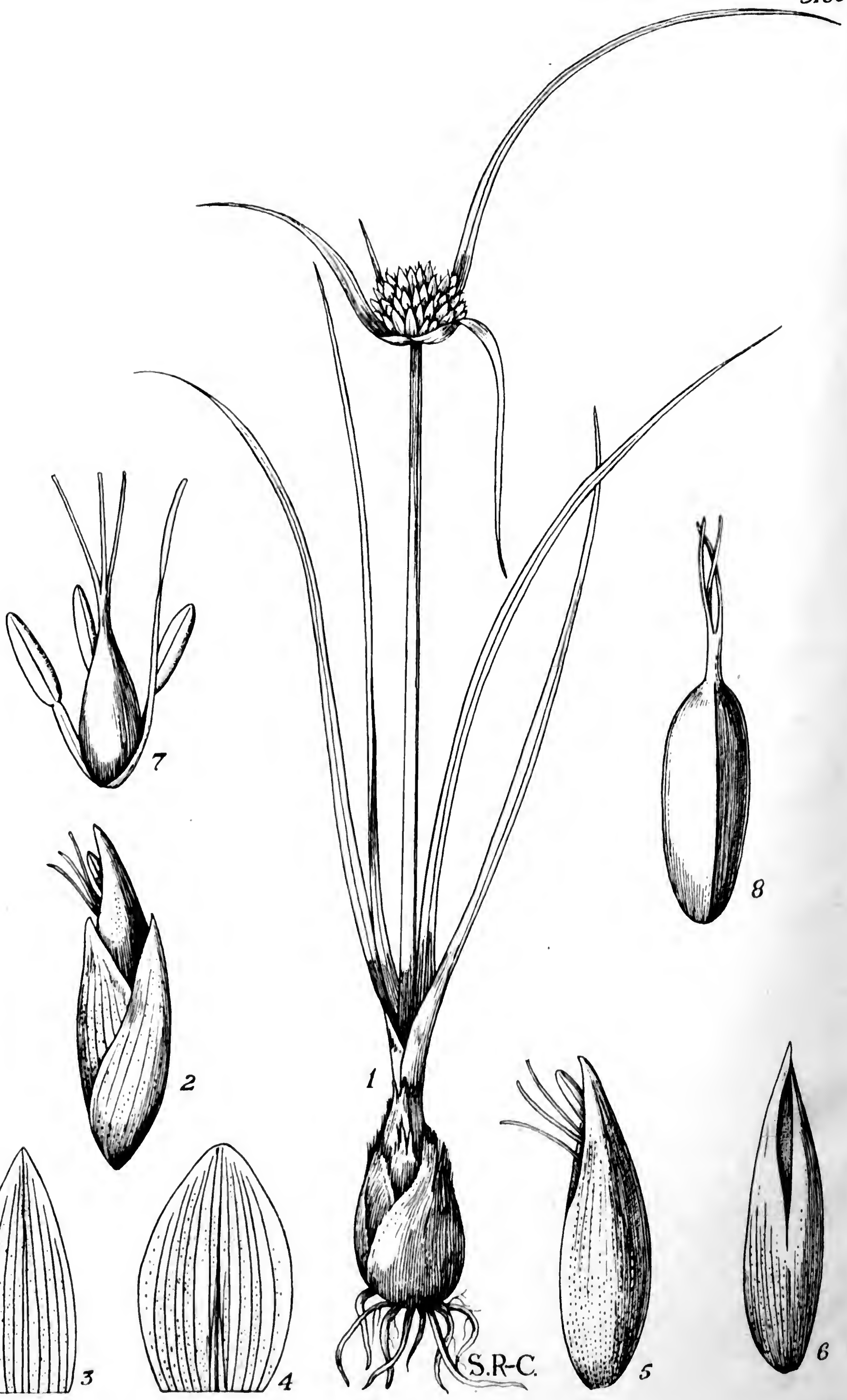
Herba perennis. *Rhizoma* circiter 4 mm. crassum. *Radices* fasciculati, vix 1 mm. crassi. *Bulbi* solitarii vel bini, angustissimi, caulis basi vix crassiores, foliorum vaginis hyalino-membranaceis parallelinerviis haud reticulatis inclusi. *Folia* linearia, angustissima, plana, circiter 1·5 mm. lata, scapo plerumque breviora, nervis marginibusque fere tota longitudine papilloso-scabra, inferne in vaginas circiter 12–14 cm. longas plus minus subito dilatata. *Scapus* erectus, usque 5 dm. altus, teres, elevato-pluristriatus, angulis (maxime superne) valde papilloso-scabris, apicem versus fuscescens, ipso apice subito ampliatus. *Spatha* 1-valva, ovata, plus minus acuminata, circiter 1·2 cm. longa, membranacea, albida. *Umbella* capsulifera, hemisphaerica usque subglobosa, multiflora, pedicellis plus minus aequilongis nigrescentibus ad instar limae per angulos papilloso-scabris. *Flores* saturate sanguineo-rosei. *Perianthii segmenta* subaequilonga, suberecta, nervo medio inferne prominente percursa, exteriora anguste elliptico-oblonga, subacuta usque subobtusa, circiter 4 mm. longa, interiora vix longiora, subcuneato-oblonga, apice obtusissima subito subtruncata, 4·5 mm. longa. *Stamina* subaequilonga, ima basi connata et perianthii segmentis adnata, exteriora late subulata, basi abruptiuscule expansa, circiter duas partes perianthii longitudinis aequantia, interiora late ovato-acuminata, 1–1·5 mm. lata, circiter tres partes perianthii aequantia; antherae ovato-oblongae. *Ovarium* globoso-ovoideum, circiter 1·5 mm. diametro, siccitate nigrum; stylus filiformis, subaequilongus, stigmate simplici. *Capsula* late obovoidea, obtusa, 2·5 mm. diametro, obscure 3-sulcata, sub lente minutissime foveolata, nigra.—*A. tenuissimum* γ *purpureum*, Regel in Act. Hort. Petrop. vol. x. p. 342 (1887) ?

China. Chihli: Kalgan, mountain side, 7 July 1921, *N. H. Cowdry*, 1625; Kalgan, high rock ledges, 29 July 1921, *N. H. Cowdry*, 1830: "Flowers crimson." Shensi: Wu-tai-shan, 1876, *W. Hancock* (Kew Distrib. no. 78).

This very beautiful and apparently rare species is a close ally of *Allium anisopodium*, Ledeb. and *A. tenuissimum*, L. Other species show the same type of scabridity on either the pedicels or the leaves (e.g. *A. Farreri*, Stearn, *A. anisopodium*, Ledeb.), but not to the same remarkable extent. Under a lens the pedicels look like a coarse file. *A. Zimmermannianum* was originally described from specimens collected by Nebel and by Zimmermann in the vicinity of Kiau-tschau, Shantung. Being now known from three provinces of northern China, it may be expected to occur in the intervening and adjacent provinces.

Loesener's figure, drawn apparently from a poor specimen in bud, is hardly recognizable.—H. K. Airy-Shaw.

Fig. 1, plant, *natural size*; 2, portion of pedicel, × 20; 3, perianth-leaves (two outer and one inner) from without, × 4; 4, the same, from within, showing stamens, × 4; 5, pistil, × 6; 6, longitudinal section of pistil, × 6; 7, capsule, × 4; 8, seed, × 8.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Tabula 3183.

ASCOPHOLIS GAMBLEI, *C. E. C. Fischer.*

Cyperaceae. Subfamilia Scirpoïdeae.

Ascopholis, *C. E. C. Fischer in Kew Bull.* 1931, p. 104; genus inter *Mariscum* et *Ascolepidem* medium; ab illo squamella utriculari evoluta, ab hoc caulis basi tumida, spiculis 1-floris, ab utroque gluma secunda spathiformi differt.

Spiculae anguste lanceolatae, uniflorae, floribus omnibus hermaphroditis. *Glumae* 2, oppositae, subhyalinae, inferiori vacua, altera florifera spathacea. *Rhachilla* supra glumas 2 vacuas disarticulans, tuberculo gibboso relicto. *Squamella* hypogyna utriculiformis, glumam excedans, subtus integra, supra longitudinaliter aperta florem includens. *Seta* 0 vel unica, brevis. *Stamina* 3; antherae lineares, paullo exsertae. *Stylus* cum ovario continuus, basi haud incrassatus, ramis stigmatosis 2 vel 3 filiformibus. *Nux* squamella inclusa, sessilis, anguste oblonga, plano-convexa vel obtuse subtrigona.—*Herbae*; caules solitarii, basi tumidi, squamis carnosis involuti. *Folia* angusta ad basi caulis conferta. *Spiculae* in spicas breves oblongas densissime confertae, terminales, intra bracteas lineares foliaceas valde inaequales sessiles.

A. Gamblei, *C. E. C. Fischer*, l.c. 105, species unica.

Herba erecta, glabra, radicibus fibrosis. *Caulis* solitarius, striatus, basi tumidus, vaginis inferne carnosis albis superne scariosis ferrugineo-punctatis 4–10 cm. longis involutus. *Folia* compluria, supra caulis basin turgidam conferta, filiformia vel anguste linearia, caulem aequantia vel superantia; vaginae membranaceae, ore truncatae. *Spicae* oblongae, circiter 1 cm. longae, 3 usque complures in capitulo denso subgloboso sessiles. *Bracteae* 4, lineares e basi lata, acuminatae, inaequales, minimae circiter 1 cm. longae, maximae circiter 7 cm. longae. *Spiculae* lineares, uniflorae, in rhachillam satis robustam spiraliter insertae, jam delapsae tuberculo parvo interdum marginato relicto. *Glumae* 2, oppositae, hyalinae, punctis ferrugineis plus minus maculatae, venosae; gluma inferior abaxialis, oblonga vel lanceolata, acuta, concava, carinata, 2·7–3 mm. longa, vacua; adaxialis spathiformis, 2·5–2·7 mm. longa, rotundata, parte inferiore 0·5–0·8 mm. longa tubulari. *Squamella* solitaria, utricularis, 3·5–3·8 mm. longa,

facie adaxiali circiter ad medium supra aperta, apice obtusa, venosa, pallide brunnea, punctis ferrugineis saepe maculata, florem includens. *Seta* 0 vel unica, abaxialis, capillaris, alba, levis, ovario multo brevior. *Stamina* 3, adaxialia ; antherae lineares, 1·2–1·5 mm. longae, paullo exsertae. *Stylus* cum ovario continuus, 0·75–1 mm. longus ; stigmata 2 vel 3, 1·1–5 mm. longa, glabra. *Nux* anguste oblonga, plano-convexa vel obtuse subtrigona, circiter 2·5 mm. longa, fusco-brunnea ; cellulae extimae minutae, obtuse hexagonae.

India. Madras Presidency at Ootacamund in the Nilgiri Hills, 2100 m., June 1884, *J. S. Gamble*, 14279.

The generic name *Ascopholis* is derived from ἀσκός, sack, and φολίς, scale, in allusion to the sack-like squamella.—C. E. C. Fischer.

Fig. 1, an entire plant, *natural size* ; 2, spikelet ; 3, lower glume ; 4, upper glume ; 5, flower enclosed in squamella ; 6, squamella, with flower removed, adaxial view ; 7, young flower, with seta ; 8, nut. *Figs.* 2–8, × 12.

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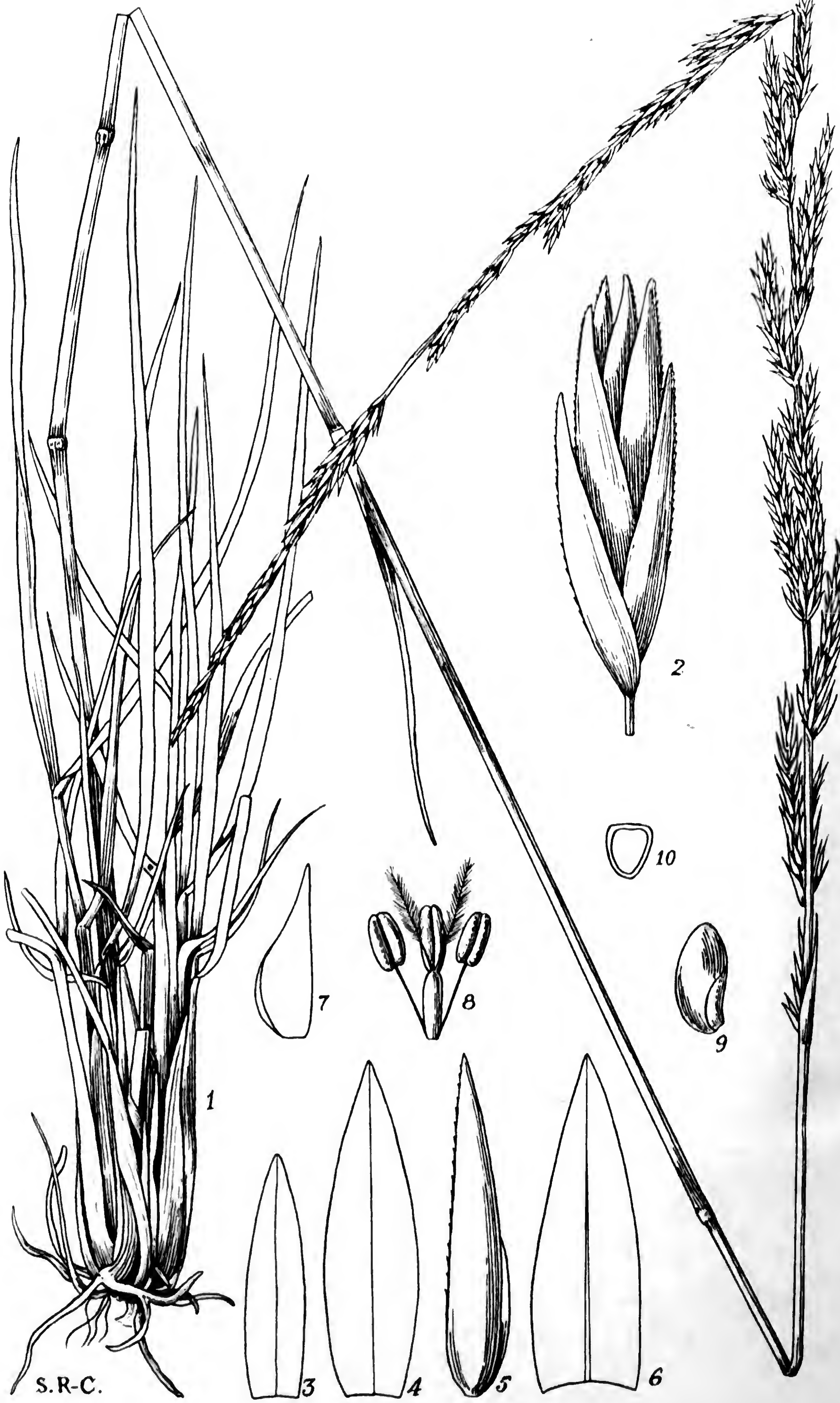

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Tabula 3184.

THELLUNGIA ADVENA, *Stapf.*

Gramineae. Tribus Eragrosteae.

T. advena, *Stapf ex Thell. in Viertelj. Nat. Ges. Zürich,* vol. lxiv. p. 814 (1919), nomen; *et ex Probst in Mitteil. Naturf. Ges. Solothurn,* 1914–19, Heft vi. Ber. xviii. p. 17, cum tab. (1920), nomen; *et in Kew Bull.* 1920, p. 98, fig. p. 99, descr.; species generis unica.

Gramen perenne, dense caespitosum, inflorescentia inclusa ad 1·2 m. altum; innovationes intravaginales, basi leviter bulboso-incrassatae. *Culmi* e rhizomate brevi erecti vel leviter geniculati, graciles, teretes, rigiduli, simplices, raro ramosi, 2–4-nodes, glabri laevesque. *Folia* pallide viridia vel glauca, glabra vel pilis paucis ore vaginarum induta; vaginae basales persistentes, inferne dilatatae, leviter compressae, pallidae vel flavae, coriaceae, laevissimae, nitentes, superiores internodiis breviores, teretes, arcte appressae, tenuissime striatae, laeves vel superne paulo scaberulae; ligula ad seriem ciliorum minutorum densorum redacta; laminae anguste lineares, in acumen longe attenuatae, 4–25 cm. longae, 2–4·5 mm. latae, planae vel convolutae, firmae, rigidae, supra et marginibus superne minute scaberulae, subtus laeves. *Panicula* demum e vagina superiore exserta, angustissima, densa vel inferne interrupta, spiciformis, 15–65 cm. longa, 0·4–0·8 cm. lata, erecta vel plerumque curvata et nutans, glabra, albido-viridis, raro purpureo-suffusa; rhachis gracilis, laevis; rami solitarii, usque basin dense spiculati, erecti, inferiores ad 4·5 cm. longi, internodiis usque 3 cm. longis sejuncti, superiores sensim breviores et approximati; pedicelli filiformes, ad 1·5 mm. longi. *Spiculae* solitariae vel binae, subsessiles vel brevissime pedicellatae, lateraliter compressae, dense imbricatae, muticae, anguste oblongae vel oblongae, 3–5 mm. longae, ad 1 mm. latae, 3–4-florae, nitentes, plerumque albido-virides; rhachilla flexuosa, supra glumas et inter anthoecia continua vel tarde disarticulata. *Glumae* lineari-lanceolatae vel lanceolato-oblongae, acutae vel obtusae, delicate membranaceae, uninerves vel inferior enervis, carinatae, carina scaberula; inferior 1·8–2·5 mm. longa; superior 2·8–3·5 mm. longa. *Lemmata* glumis subsimilia, explanata lanceolata, lanceolato-oblonga vel ovata, acuta vel obtusa, 4–2 mm. longa, membranacea, uninervia, supra dimidiam vel tertiam partem carinae scaberula. *Paleae* dorso curvatae, 2–1 mm. longae, bicarinatae, inter

carinas plicatae. *Antherae* oblongae, 0·3–0·5 mm. longae. *Caryopsis* oblique ovato-oblonga vel elliptico-oblonga, lateraliter compressa, 0·8–1 mm. longa, pallide brunnea ; pericarpium tenue, siccum semini appressum.—*Ectrosia ? mutica*, Hack. ex Probst in Mitteil. Naturf. Ges. Solothurn, 1911–14, Heft v. Ber. xvii. p. 169 (1914), nomen.

QUEENSLAND. Burke District : Mt. Emu Plains, 54 miles N. of Hughenden, 2.1931, *Hubbard and Winders*, 7487 ; Mt. Emu Plains Station, 64 miles N. of Hughenden, 2.1931, *Hubbard and Winders*, 7502. Kennedy District : without precise locality, *Daintree*. Leichhardt District : Clermont, 3.1927, *White*, 3446 ; between Emerald and Capella, 3.1931, *Hubbard*, 7942 ; Emerald, 3.1931, *Hubbard*, 7921 ; Malvern Downs, Emerald, 8.1929, *Finlay and Farquhar*, 20 ; Wandoan, 1930, *Belson* ; 2.1930, *Hubbard*, 4922. Warrego District : Victoria Downs, near Morven, 1930, *Lord*. Maranoa District : Mungallala, 420 m., 12.1930, *Hubbard and Winders*, 6031 ; between Amby and Eurella, 375 m., 1.1931, *Hubbard and Winders*, 6353 ; Mitchell, 330 m., 1.1931, *Hubbard and Winders*, 6302. Darling Downs District : Pickanjinnie, near Wallumbilla, 1930, *Belson* ; Macalister, 320 m., 1.1931, *Hubbard and Winders*, 6452 ; Dalby, 4.1916, *White*, K. 31.

NEW SOUTH WALES. Courallie County : Moree, 5.1914, *Carne* ; Gilgil Creek, near Moree, 3.1898, *Campbell*.

SWITZERLAND. Derendingen Mill, near Solothurn, on wool refuse, 1918, *Probst* (type).

In 1907 Dr. Probst, whilst investigating the adventive and ruderal flora of Solothurn in Switzerland, collected undeveloped specimens of this grass, which he listed as *Ectrosia ? mutica*, Hack., without description. Eleven years later good flowering material was found growing on wool refuse from the worsted mill at Derendingen, near Solothurn. It was from this material that *Thellungia advena* was described. The rich alien flora around the mill included many plants of Australian origin, and this led to the suggestion that Australia was the source of the new grass ; a supposition which has since been proved correct.

Whilst studying Queensland grasses in the Brisbane, Sydney and Melbourne Herbaria, specimens of *Thellungia advena* were observed in the covers of the genus *Sporobolus*. They were usually confused with *Sporobolus elongatus*, R. Br., to which they bear a superficial resemblance on account of their densely tufted habit and narrow spiciform panicle.

Thellungia advena is more or less confined to the belt of soils known as the Black Earths which extend from Northern N.S. Wales through the greater part of the Maranoa, Darling Downs, and Leichhardt Districts of Queensland to south of Charters Towers in North Kennedy District. These soils are mainly of basaltic origin. They vary somewhat in colour and texture, but are usually dark brown or black, and of a heavy nature. Pockets of similar soils occur north of Hughenden where *Thellungia advena* has also been collected. The vegetation

associated with the Black Earths is mainly Brigalow (*Acacia harpophylla*) scrub, alternating with savannah and Eucalyptus woodland. *Thellungia advena* is usually found as scattered tufts in open Brigalow scrub or on the margin of Brigalow scrub and Eucalyptus woodland where the vegetation is less dense. It is frequently abundant on savannah which has been heavily stocked. In such cases over-grazing has resulted in the less palatable *Thellungia advena* becoming the dominant grass. The average rainfall of the area in which it occurs, ranges from 22–28 inches, but the major portion of this falls during the summer months.

Both *Sporobolus* and *Eragrostis* are very closely allied to *Thellungia*. From the former it differs in having more than one floret in each spikelet, whilst the one-nerved lemmas alone serve to distinguish it from the latter.—C. E. Hubbard.

Fig. 1, complete plant, *natural size*; 2, spikelet, × 14; 3, lower glume; 4, upper glume; 5, floret, lateral view; 6, lemma; 7, palea, lateral view; 8, stamens and pistil; 9, caryopsis; 10, transverse section of caryopsis. *Figs.* 3–10, × 15.

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Tabula 3185.

PENNISETUM BASEDOWII, *Summerhayes et C. E. Hubbard.*

Gramineae. Tribus Paniceae.

P. Basedowii, *Summerhayes et C. E. Hubbard in Kew Bull.* 1926, p. 440; species affinis *P. villoso*, R. Br., sed annua, setis ciliatis, spiculis brevioribus, gluma superiore 9–11-nervi differt.

Gramen annuum. *Culmi* laxe caespitosi vel solitarii, erecti vel geniculati, usque 70 cm. alti, graciles vel validiusculi, subteretes vel plerumque uno latere sulcati, e nodis plurimis ramosi, ramis solitariis vel fasciculatis, 3–5-nodes, paniculam versus tenuiter striati scaberuli et pubescentes, ceterum glabri laevesque. *Foliorum* vaginae internodiis breviores, laxae, leviter compressae, carinatae, tenuiter striatae, glabrae laevesque vel superne scaberulae; ligulae truncatae, usque 0·5 mm. longae, dense ciliatae; laminae lineares, acutissimae, acutae vel raro subobtusae, apice leviter callosae, 5–40 cm. longae, 5–7 mm. latae, virides vel subglaucae, moderate firmae, glabrae, scaberulae vel marginibus et apicibus exceptis plerumque laeves. *Panicula* spiciformis, densa vel laxiuscula, cylindrica, erecta, 3–8 cm. longa, 3–6 cm. lata (setis inclusis), pallide straminea vel leviter purpureo-tincta; rhachis rigida, angulata, scaberula, angulis ciliolatis, fasciculorum basibus minutis subpatelliformibus laxe adspersa; fasciculi demum patentes, pedunculis usque 1·5 mm. longis pilis appressis densis brevissimis indutis; involucri setae numerosae, densae, ad basin liberae, pallidae vel apicibus purpureae, exteriores breviores, 0·5–18 mm. longae, strictae, filiformes, scaberulae, interiores saepe 3–4, 2–3·8 cm. longae, rigidae, basin versus triquetrae leviter dilatatae et scabrido-ciliolatae, superne filiformes et scaberulae. *Spiculae* solitariae, sessiles, lanceolatae vel anguste lanceolatae, acutissimae vel acuminatae, 6–7·3 mm. longae, pallidae vel uno latere purpureo-suffusae, glabrae, prominenter nervosae. *Gluma* inferior nulla vel minutissima, hyalina et enervis; superior explanata late lanceolata vel elliptico-lanceolata, acuminata, 5·5–6·8 mm. longa, membranacea, marginibus hyalinis, 9–11-nervis, nervis parallelis, apice scaberula. *Anthoecium inferum* ad lemma redactum: lemma spiculae acquilongum, explanatum late lanceolatum vel ovatum, acuminatum, membranaceum, 7–9-nerve, apice scaberulum; palea nulla. *Anthoecium superum* ♀, lanceolatum,

acuminatum, infero subaequilongum : lemma explanatum late lanceolatum vel ovatum, acuminatum, tenuiter crustaceum, marginibus membranaceis, minute obscureque rugulosum, 5-nerve, apice scaberulum ; palea lemma paullo brevior, apice minute bifida, scaberula. *Lodiculae* nullae. *Antherae* lineares, usque 0·7 mm. longae, apice glabrae. *Styli* basi breviter connati, superne liberi. *Caryopsis* oblonga, 2 mm. longa.

Western Australia. Northern Kimberleys : King Sound ; May River, 4.1916, *Basedow*, 13 (type).

Queensland. Cook District : Gilbert River, *Wildash*. Burke District : Nonda, between Hughenden and Cloncurry, in grassland on heavy dark-brown soil, 515 ft., 2.1930, *Hubbard and Winders*, 7207, 7252. Flinders River, 8.1916, *White*. Mitchell District : Wantalanya, 50 miles south of Winton, 1930, *Pollock*, 12. Muttaburra, 4.1919, *White*.

The discovery of this grass by Dr. Basedow has increased the number of indigenous Australian species of *Pennisetum* to three, the other two being *P. alopecuroides* (L.) Spreng. (*P. compressum*, R. Br.) and *P. arnhemicum*, F. Muell. The former differs in being a perennial grass with simple densely-tufted culms and long strongly-compressed basal leaf-sheaths, whilst the latter may be readily distinguished by its densely-plumose and shorter involucral bristles. *P. villosum*, R. Br., with which our plant is compared, is a species from the mountainous region of North-East Tropical Africa, which is now commonly naturalized in parts of the coastal districts of temperate and subtropical Australia.

The eastern stations for *P. Basedowii* are more than 1200 miles away from the type locality in Western Australia. On this account it is very probable that when the botanical composition of the grasslands of Northern Australia is investigated, additional stations for our species will be recorded linking up the two distant areas. In Queensland this species occurs mainly on Mitchell Grass downs, in association with *Astrebla lappacea*, *A. elymoides*, *A. squarrosa*, and species of *Panicum*, *Eriochloa*, *Dichanthium*, etc. It is one of a number of annual grasses which are prominent after the summer rains amongst the perennial Mitchell Grasses (*Astrebla* sp.).

As with many other species of *Pennisetum*, *P. Basedowii* is apparently protogynous.—C. E. Hubbard.

Fig. 1, entire plant, *natural size* ; 2, fascicle of bristles (reduced branches) surrounding a spikelet, × 2 ; 3, spikelet, lateral view, × 6 ; 4, lower glume, × 20 ; 5, upper glume, × 6 ; 6, lemma of lower floret, × 6 ; 7, lemma of upper floret, × 6 ; 8, palea of upper floret, × 6 ; 9, pistil, × 6.


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Tabula 3186.

ISOTOMA ANETHIFOLIA, *Summerhayes.*

Campanulaceae. Subfamilia Lobelioïdeae.

I. anethifolia, *Summerhayes in Kew Bull.* 1932, p. 318; affinis *I. axillari,* Lindl., a qua foliis angustioribus segmentis longioribus, floribus albis, corollae lobis anterioribus oblanceolatis latioribus, tubo circiter 1·4 cm. longo differt.

Herba perennis (?), erecta, usque 50 cm. alta, fere glabra. *Caules* multi, satis ramosi, teretes. *Folia* alterna, pinnatipartita, ambitu ellipticolanceolata, usque 8 cm. longa, parte media indivisa usque 2 mm. lata, segmentis valde inaequalibus, longioribus utrinsecus 3–4 distantibus linearibus usque 2 cm. longis et 1·5 mm. latis basin versus interdum dente brevi instructis, brevioribus usque dentiformibus. *Flores* ex axillis foliorum superiorum orti; pedicelli suberecti, usque 15 cm. longi. *Sepala* lineari-subulata, acuta, recurvata, 6–7 mm. longa, basi 1·5 mm. lata, inferne anguste alata alis plus minusve in dentem desinentibus. *Corolla* alba; tubus cylindricus, medio leviter constrictus, 1·3–1·5 cm. longus, 3 mm. diametro; lobi 2 posteriores oblongo-elliptici, acute acuminati, 1·2–1·5 cm. longi, 4–5 mm. lati, 3 anteriores oblanceolati, cuspidato-apiculati, 1·3–1·6 cm. longi, 6–9 mm. lati, intermedio basi callis duobus semicircularibus instructo. *Antherae* pubescentes, 2 inferiores apice seta singula recta instructae. *Stylus* inferne pubescens, superne glaber; stigma apice dilatatum, bilabiatum, annulo pilorum instructum; ovarium obconicum, circiter 5 mm. longum. *Capsula* obconica vel cylindrico-obconica, circiter 1 cm. longa; semina nigra, oblongo-cylindrica, 0·7 mm. longa.

Queensland. Stanthorpe, in crevices of granite rocks in open forest on an exposed mountain top, 990 m., 3.1930, *Hubbard,* 5693 (type); flowered at Royal Botanic Gardens, Kew, 6.1932, from seed of same.
New South Wales. Near Tenterfield, *C. Stuart.*

The flowers are white, with a faint mauve line down the centre of the anterior corolla-lobes. The calli at the base of the median anterior lobe are bright green.

This species was included by Bentham under *I. axillaris,* Lindl., in Flora Australiensis, but is easily distinguished by the characters given

in the diagnosis. It stands in the genus as the culmination of a morphological series showing increasing dissection of the leaves. At the opposite extreme is *I. Brownii*, G. Don, with entire linear leaves, next follow *I. pusilla*, Benth., and *I. scapigera*, G. Don, with slightly toothed leaves, and these are succeeded by *I. longiflora*, Presl, *I. petraea*, F. Muell., and finally *I. axillaris*, Lindl., in which the leaves are very similar to those in *I. anethifolia*. In the latter species, however, the lateral segments are longer and narrower, while the portion on each side of the midrib has been reduced in width until the central part is little wider than the lateral segments.

The species was collected by Mr. Hubbard on a rocky hill not far from Stanthorpe in Southern Queensland, where it was growing in the crevices of the large granite blocks scattered about the summit. The soil was very dry at the time of collecting, but the plants were covered with blossom and obviously flourishing. It was seen only at this locality but was exceedingly common there. The lower slopes of the hill bore the usual open type of Eucalyptus forest.

The species is known only from the neighbourhood of the Queensland-New South Wales border, there being a specimen in the Kew Herbarium, under the name of *I. axillaris*, Lindl., collected by C. Stuart near Tenterfield in northern New South Wales. It is possible that it may also occur farther south along the New England plateau.

V. S. SUMMERHAYES.

FIG. 1, upper part of flowering stem, *natural size*; 2, upper surface of leaf, × 27; 3, calyx-segment, from without, × 6; 4, mouth of lower lip of corolla, showing calli, × 4; 5, androecium, × 6; 6, upper part of androecium, and style, × 6; 7, style, × 4; 8, longitudinal section of ovary, × 4; 9, transverse section of ovary, × 6.

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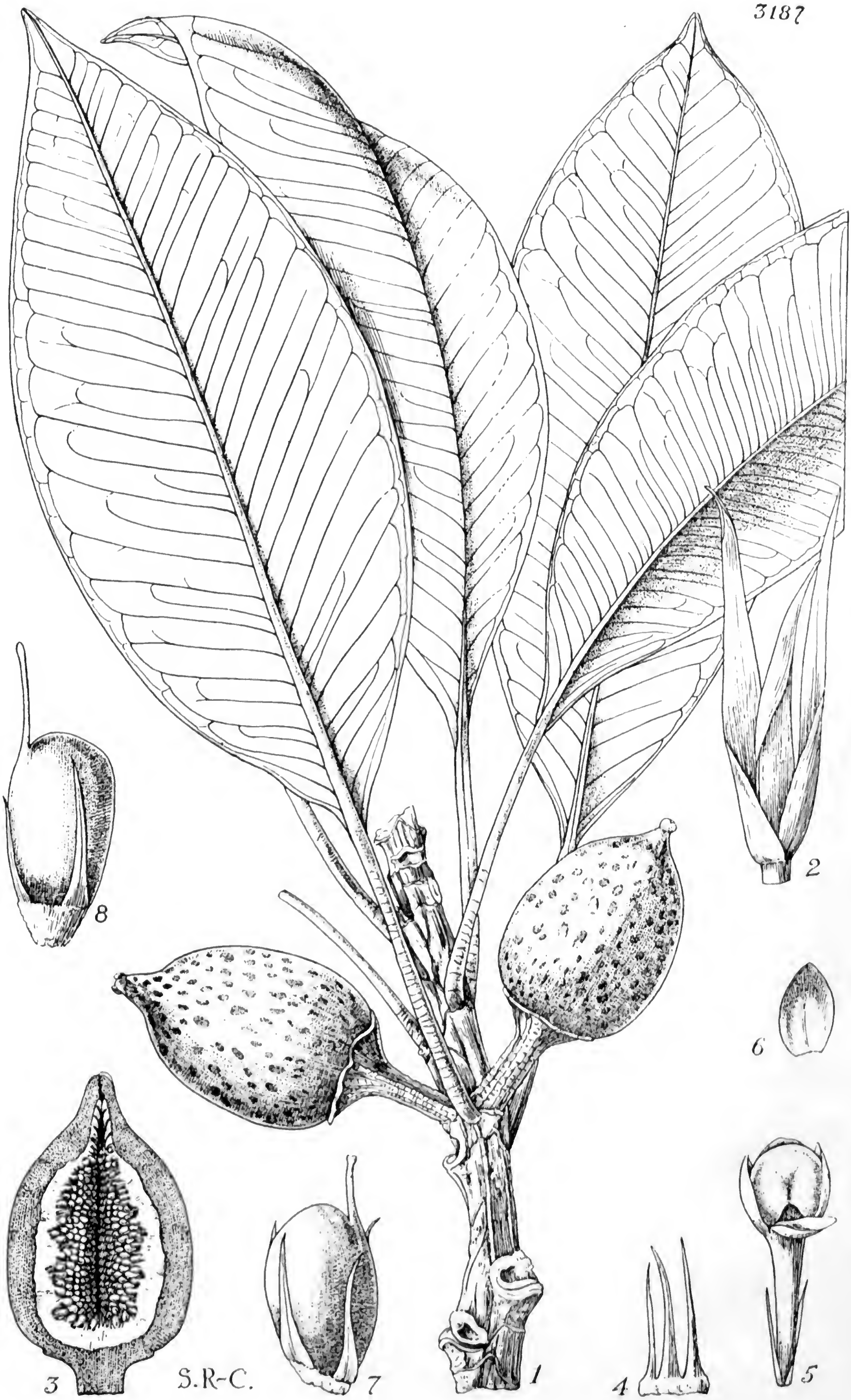

Tabula 3187.

FICUS WATKINSIANA, *F. M. Bailey.*

Moraceae. Tribus Ficeae.

F. Watkinsiana, *F. M. Bailey in Queensl. Dept. Agric., Bot. Bull.* no. ii. p. 18 (1891); *F. M. Bailey, Queensl. Fl.* p. 1472 (1902); *et Comprehens. Cat. Queensl. Pl.* p. 487, fig. 485 (1913); *Francis, Austral. Rain Forest Trees,* p. 69, fig. 32 (1929); *F. macrophyllae,* Desf. similis, sed foliis basi cuneatis oblongo-ovoideis, receptaculis apice in mamillam productis facile distinguenda.

Arbor magna, usque 50 m. alta, trunco usque 2 m. diametro basi obtuse carinato, cortice griseo leviter ruguloso. *Ramuli* crassi, glabri, cicatricibus foliorum et stipularum delapsorum valde notati. *Folia* alterna, longe petiolata, omnino glabra, elliptica, oblongo-elliptica vel elliptico-lanceolata, utrinque angustata, apice breviter obtuseque acuminata, basi cuneata, 8–20 cm. longa, 2–7 cm. lata, costa supra impressa subtus prominente, nervis lateralibus utrinsecus 11–16 parallelis e costa angulo 45–60° exeuntibus pro rata inconspicuis prominulis prope marginem in nervum submarginalem conjunctis, rete venularum indistincto, utrinque viridia; stipulae lanceolatae, acuminatae, concavae, usque 9·5 cm. longae, glabrae; petioli graciles, supra canaliculati, 4–7 cm. longi, inferne transverse costulati. *Receptacula* axillaria, singula vel bina, stipitata, oblongo-ovoidea, apice in mamillam producta, 2·5–4 cm. longa, 1·5–3 cm. diametro, lenticellis orbicularibus et ellipticis valde notata, bracteis basalibus in discum truncatum 1–1·7 cm. diametro basi receptaculi adnatum connatis. *Flores* ♂, ♀ et ♀ cecidiophori commixti; receptaculum intus inter flores squamis linearibus acutis membranaceis 2·5 mm. longis praeditum. *Flores* ♂ 1·5–3·5 mm. longe pedicellati, perianthii segmentis 4 ovatis subacutis circiter 1 mm. longis; stamen singulum, anthera reniformi, filamento brevi. *Flores* ♀ *cecidiophori* floribus ♀ similes sed pericarpio tenuiore, stylo breviore, stigmate parvo capitato. *Flores* ♀ sessiles, perianthii segmentis 4 e basi latiore linearibus acutis ovario brevioribus, ovario ellipsoideo 2·5 mm. longo, stylo infra-apicali cum stigmate obtuso 2 mm. longo.—*F. Bellingeri,* Moore et Betche, Handb. Fl. N.S. Wales, p. 81 (1893).

QUEENSLAND. Mooloolah, Aug. 1892, *Bailey*. Springbrook, slopes of Macpherson Range, near an old homestead, 900 m., 29 Sept. 1930, *Hubbard*, 5413.

According to Francis (l.c.) the species is distributed from Gympie in Queensland in the north, as far south as the Bellinger River in New South Wales. It is mostly found in rain forest near the coast, but also extends as far inland as the Bunya Mts., which are 100 miles from the sea. The specimen from which the drawing was prepared, was obtained from an isolated tree in the middle of a clearing in the rain forest on the north slopes of the Macpherson Range. For the general affinities of this species see under *F. glandifera*, Summerhayes (t. 3188). *F. Watkinsiana* may be distinguished among its allies by the elliptical, relatively narrow leaves, cuneate at the base, and by the rather long-stipitate and hard receptacles which have the ostiole placed on a nipple-like projection at the apex.—V. S. SUMMERHAYES.

FIG. 1, branch with leaves and receptacles, *natural size*; 2, stipules from terminal bud, × ⅔; 3, longitudinal section of a receptacle, *natural size*; 4, scales from the inside of the receptacle, × 8; 5, male flower, with one perianth-segment turned back to show the anther, × 8; 6, a perianth-lobe from the same, × 8; 7, galled female flower, × 8; 8, female flower, × 8.

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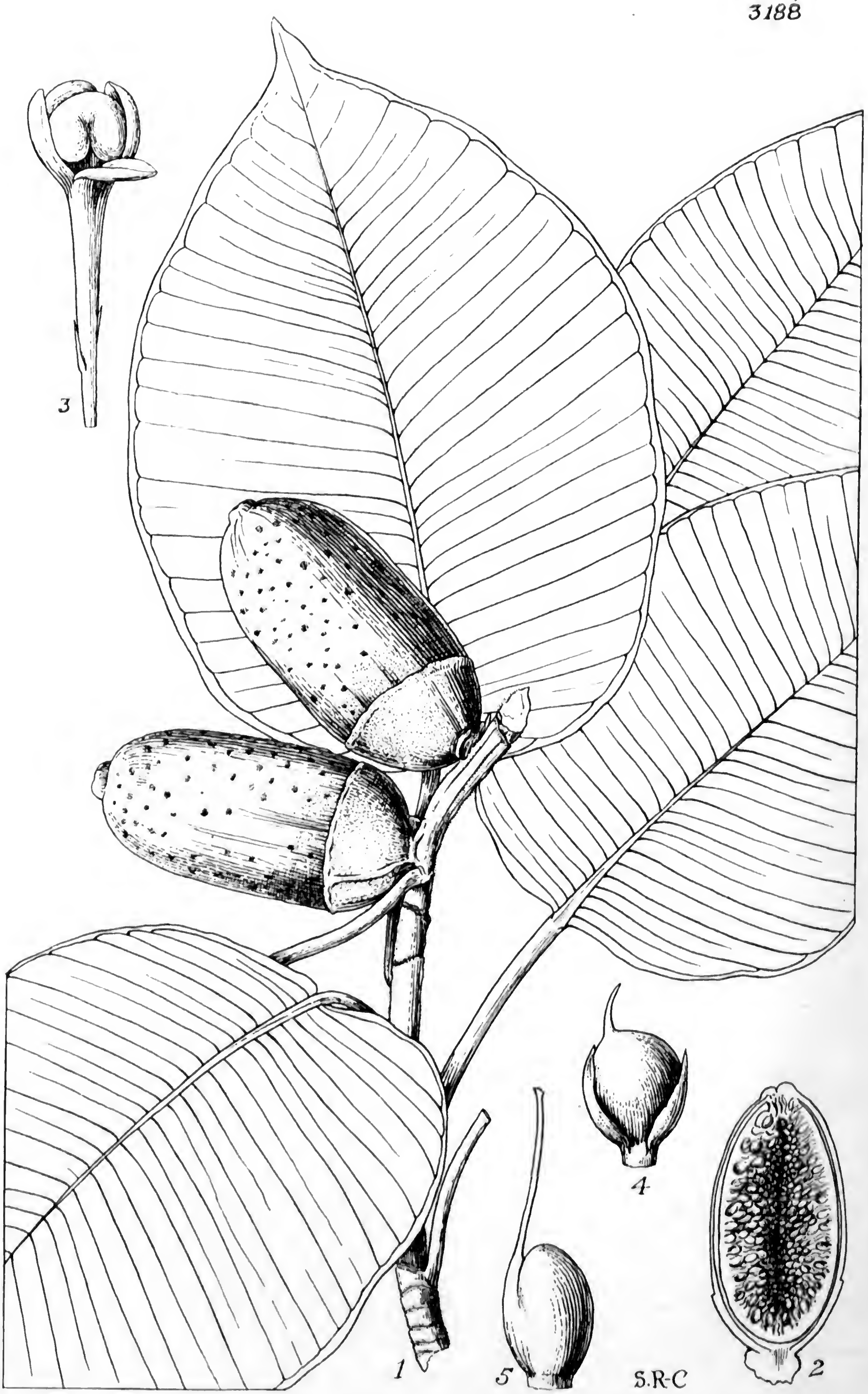

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Tabula 3188.

FICUS GLANDIFERA, *Summerhayes.*

Moraceae. Tribus Ficeae.

F. (§ **Urostigma**) **glandifera,** *Summerhayes in Journ. Arn. Arb.* vol. xiii. p. 99 (1932); affinis *F. cylindricae,* Warb., a qua foliis late ovatis petiolis brevioribus, receptaculis sessilibus, cupula magis evoluta differt.

Arbor magna, habitu *F. indicae,* L. similis. *Ramuli* crassi, juniores sparsiuscule pubescentes, demum glabrescentes, cortice brunneo obtecti, cicatricibus foliorum et stipularum delapsorum valde notati. *Folia* petiolata, late ovata, apice breviter acuminata, acuta, basi obtusissima vel saepius rotundata, 7–14 cm. longa, 4–8 cm. lata, costa supra impressa subtus prominente, nervis lateralibus utrinsecus 20–30 parallelis e costa angulo 70–80° exeuntibus utrinque distinctis supra prominulis nervo submarginali curvato conjunctis, nervis secondariis numerosis subparallelis crebris, rete venularum subtus distincto, coriacea, supra subnitentia, utrinque glabra; petiolus pro rata gracilis, supra leviter canaliculatus, 3–4·5 cm. longus, glaber; stipulae non visae, ut videtur caducae. *Receptacula* axillaria, singula vel gemina, sessilia vel subsessilia, oblongo-ellipsoidea, circiter 4·5 cm. longa, 2·5 cm. diametro, apice in mamillam 5 mm. diametro producta, ostiolo ipso leviter depresso bracteis haud manifestis, bracteis basalibus in cupulam circiter 1 cm. longam breviter pubescentem receptaculo adnatam connatis, receptacula ergo glandes *Querci* specierum simulantia; pedunculus usque 4 mm. longus, saepius brevissimus, 4 mm. diametro. *Flores* ♂, ♀ et ♀ cecidiophori commixti. *Flores* ♂ longipedicellati, pedicello bracteis duabus lanceolatis instructo; perianthii segmenta 4, libera, elliptica vel ovata, valde concava, vix 1 mm. longa, glabra, stamen singulum arcte includentia. *Flores* ♀ *cecidiophori* pedicellati vel rarius sessiles, perianthii segmentis eis florum ♂ similibus, ovario sessili, stylo brevi, stigmate clavato. *Flores* ♀ sessiles, ovario ovoideo 1·5 mm. longo, stylo infra-apicali 2·5 mm. longo, stigmate minuto.

New Hebrides. Tanna: Lenakel, 200 m., rain forest, common, 3 March 1928, *Kajewski,* 80. Aneityum: Anelgauhat Bay, sea level, rain forest, common, 21 Feb. 1929, *Kajewski,* 802 (type).

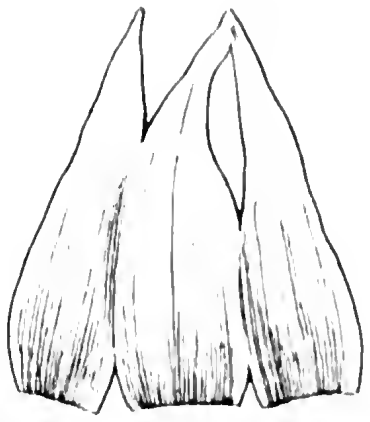
F. glandifera belongs to a group of species in Sect. *Urostigma*, possessing large leaves and fruits; the other members of the group are natives of Queensland. These species exhibit in various degrees two modifications: firstly, the prolongation of the ostiolar region into a proboscis-like structure and, secondly, the fusion of the basal bracts to form a kind of disk or collar. The former feature is best seen in *F. Watkinsiana*, F. M. Bailey (t. 3187) and *F. crassipes*, F. M. Bailey, but is less well developed, although clearly evident, in *F. glandifera*. The cupular development of the bracts, on the other hand, reaches its maximum for this group, perhaps indeed for the whole genus, in *F. glandifera*, in which species the receptacle bears a strong resemblance to an acorn. *F. cylindrica* and *F. crassipes* have a strongly-developed bracteal disk, and the same type of structure is also present in *F. Baileyana*, Domin and *F. Watkinsiana*, although to a less degree. This disk-like fusion of the bracts is found less strongly developed in many species of *Urostigma*.

In *F. glandifera* the receptacles are practically sessile, in which respect it approaches closely to *F. crassipes*, but the leaves and receptacles in that species otherwise show many points of difference. *F. cylindrica* has acorn-like fruits with short thick stalks, but the leaves are longer and relatively narrower than those of *F. glandifera*.

It will be seen that *F. glandifera* is known only from the southern islands of the New Hebrides archipelago. So far as can be ascertained the floras of the northern and southern islands differ considerably, so that it is possible that the species is restricted to the latter region.

V. S. SUMMERHAYES.

FIG. 1, branch, with leaves and receptacles, *natural size*; 2, longitudinal section of receptacle, *natural size*; 3, male flower, with one perianth-segment turned back to show the anther, × 15; 4, galled female flower, × 10; 5, female flower, × 15.



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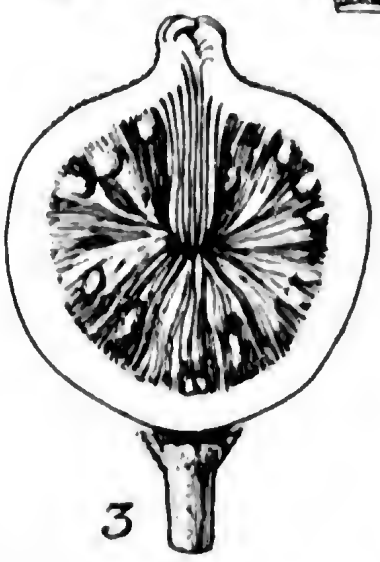

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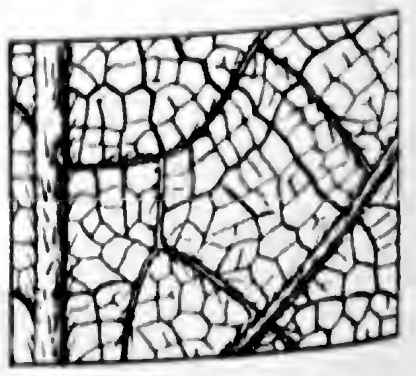

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Tabula 3189.

FICUS NASUTA, *Summerhayes.*

Moraceae. Tribus Ficeae.

F. (§ **Eusyce**) **nasuta,** *Summerhayes*; species nova affinis *F. laevi*, Bl. et *F. obtusae*, Hassk., ab hac foliis orbiculari-ovatis breviter acuminatis basi leviter cordatis supra fere laevibus, pedunculis gracilioribus, ab illa foliis pro rata brevioribus et latioribus, petiolis satis brevioribus, receptaculis distincte umbonatis differt.

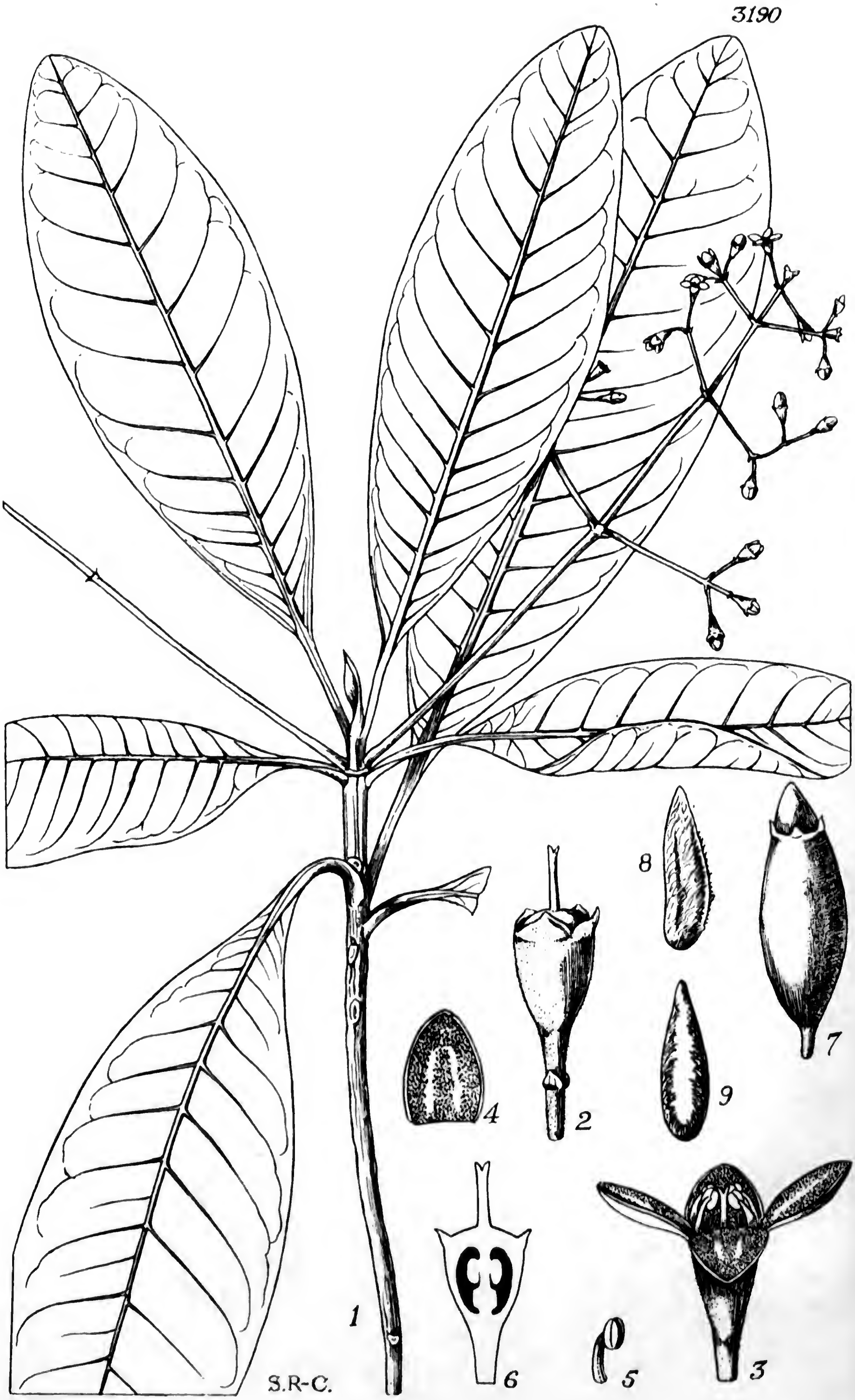
Frutex scandens, silvarum primaevarum incola. *Caulis* truncos arborum arcte amplectens, ramis patenti-dependentibus; ramuli subteretes, leviter longitudinaliter rugosuli, annotini cortice atro-brunneo obtecti, cicatricibus prominentibus foliorum delapsorum et stipularum notati. *Folia* alterna, petiolata; laminae ovatae vel orbiculari-ovatae, apiculatae vel breviter acuminatae, basi rotundatae usque leviter cordatae, 8–10 cm. longae, 6–9 cm. latae, basi tri- vel subquinque-nerviae, costa supra impressa subtus prominente, nervis lateralibus utrinsecus 4 e costa angulo 40–50° exeuntibus incurvatis prope marginem arcuatim conjunctis, rete venularum crebro distinctissimo, tenuiter coriaceae, supra glabrae vel pilis sparsissimis praeditae, subtus praesertim in venis pilis plus minusve adpressis sparsiuscule obtectae; petioli graciles, supra anguste et leviter canaliculati, 1·3–1·6 cm. longi, ferrugineo-puberuli; stipulae lanceolatae, acuminatae, 7–8 mm. longae, dense adpresse ferrugineo-hirsutae. *Receptacula* solitaria vel saepius bina, pedunculata, globosa, apice anguste et prominenter umbonata, 2 cm. diametro, matura sordide purpurea, densiuscule puberula, basi bracteis tribus triangulari-ovatis subacutis instructa, bracteis osteolaribus manifestis; pedunculi graciles, dense ferrugineo-puberuli, circiter 1 cm. longi. *Flores* ♂ et ♀ cecidiophori commixti; receptacula inter flores pilis setuliformibus 0·6–0·9 mm. longis dense obtecta. *Flores* ♂ sessiles, acuminato-ovoidei; perianthii segmenta 3–4, plus minusve connata, 4·5 mm. longa; stamina 2, filamentis brevibus leviter arcuatis 1 mm. longis, antheris subulato-triangularibus acuminatis 3·5 mm. longis. *Flores* ♀ *cecidiophori* sessiles; perianthii segmenta 4, linearia, subacuta, 4–4·5 mm. longa; ovarium 0·7–2 mm. longe stipitatum, compresse ellipsoideum, 1·3–1·7 mm. longum; stylus plus minusve apicalis, 0·5–0·7 mm. longus, stigmate minuto leviter excavato coronatus.

Santa Cruz Islands. Vanikoro, 50 m., common vine growing on rain-forest trees, main thick stem clinging close to trunk, branches hanging out up to 2 m., fruit dirty-purple when ripe, 24 Oct. 1928, *Kajewski*, 525.

A species chiefly notable for the proboscis-like projection of the ostiolar region of the receptacle. Its affinity is with *F. laevis*, Bl. and *F. obtusa*, Hassk., both natives of the Malay Archipelago. The differences are set out in the diagnosis. There are several specimens from Borneo in the Kew Herbarium which are named *F. piperifolia*, Miq., but which do not seem to agree with the description of that species, which is reduced to *F. obtusa*, Hassk. by King in his monograph. These specimens agree closely with *F. nasuta* in external characters, differing mainly in the much longer setae on the inside of the receptacles. It is, however, clear that this group of species requires further investigation. I have not seen any close allies from New Guinea, so that as far as is known at present the Santa Cruz species is widely separated geographically from its nearest relatives.

V. S. Summerhayes.

Fig. 1, branch with leaves and receptacles, *natural size*; 2, portion of lower surface of leaf, × 4; 3, longitudinal section of receptacle containing male and galled female flowers, × 2; 4, male flower, showing setae on receptacle, × 8; 5, perianth of male flower, spread out, × 8; 6, male flower, with perianth removed, showing stamens, × 8; 7, a stamen, seen from within, × 8; 8, galled female flower, with bract, × 8; 9, the same with perianth segments opened out, × 8.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Tabula 3190.

DORISIA RARISSIMA, *Gillespie.*

Cornaceae. Tribus Mastixioïdeae.

Dorisia,* *Gillespie*; genus novum, *Mastixiae*, Bl. et *Mastixiodendro*, Melch., affine, ab illa ovario biloculari, ab hoc ovario omnino inferiore et calyeis segmentis liberis differt.

Flores epigyni, hermaphroditi. *Calycis* tubus nullus; sepala 4, parva, aperta. *Petala* 4, libera, valvata. *Stamina* 4, alternipetala, filamentis liberis, antheris dorsifixis longitudinaliter dehiscentibus. *Ovarium* inferum, biloculare, ovulis in loculo solitariis supra medium affixis. *Drupa* anguste ellipsoidea, carnosa, annulo prope apicem distincto, sepalis persistentibus.—*Arbor* parva. *Folia* opposita; stipulae in gemmis magnae, mox caducae. *Flores* parvi, in thyrsis terminalibus et axillaribus dispositi.

D. rarissima, *Gillespie*, species uniea.

Arbor parva, glabra; ramuli recti, crassiusculi, ad extremitates valde compressi, in siccitate rugosi, cicatricibus magnis. *Folia* elliptica vel oblongo-elliptica, apice obtusa vel subacuminata, basi acuta paululum decurrentia, 13–20 cm. longa, 4–7 cm. lata, subcoriacea, supra nitidula viridia, subtus pallidiora, nervis primariis utroque costae latere circiter 10 fere rectis ad marginem arcuatis cum venulis supra prominulis conspicue reticulatis subtus minus distinctis; petiolus crassiusculus compressus, 2–3 cm. longus; stipulae oblongo-lanceolatae, 1–2 cm. longae, mox caducae. *Thyrsi* terminales vel in summis axillis folia subaequantes, multiflori, ramulis ultimis trifloris; pedunculi primarii (usque ad 8 cm. longi) et partiales graciles, rigidiusculi; bracteae circiter 1 mm. longae; pedicelli gracillimi, 3–5 mm. longi, apice bibracteolati. *Flores* inconspicui. *Sepala* late deltoidea, apiculata, vix 1 mm. longa. *Petala* lutea, ovata, acuta, circiter 2 mm. longa, coriacea, intus papillato-verrucosa, extus laevia. *Discus* 1 mm. latus, leviter elevatus. *Stylus* crassus, 1·5 mm. longus, minute bilobatus. *Stamina* 1·5 mm. longa; filamenta crassa; antherae oblongae, longitudinaliter dehiscentes. *Ovarium* clavato-turbinatum, 4 mm. longum,

* Named in honour of my wife, Doris Kildale Gillespie, Ph.D., a well-known Californian plant-collector.

carnosum. *Drupae* (immaturae) ellipsoideo-cylindraceae, 12–16 mm. longae, circiter 6 mm. crassae, laeves, carneae, 1- vel 2-loculares, disco prominenti 2–3 mm. longo et lato acuto, sepalis persistentibus coronatae.

FIJI. On the northern coast of Vanua Levu, at the edge of a clearing, vicinity of Lambasa, about 60 m., 17 Sept. 1922, *Greenwood*, 517. Only a single tree seen.

The species is also represented by *Horne*, 608, from Vanua Levu, at the top of mountains between Waiwai and Lomaloma, and *Horne*, 441, from the forests of Rambi. *Horne*, 1132, from Vanua Levu in the vicinity of Mbua, is certainly of the same genus and possibly the same species, but the leaves are pubescent beneath.

The essential differences between *Dorisia* and its allies *Mastixia*, Bl. and *Mastixiodendron*, Melch. are given below :

Mastixia. Flowers 4–5-merous ; calyx-tube turbinate or sub-campanulate ; ovary inferior, 1-locular.

Mastixiodendron. Flowers 4-merous ; calyx-tube patelliform ; ovary semi-inferior, 2-locular.

Dorisia. Flowers 4-merous ; calyx-tube none ; ovary inferior, 2-locular.

The known geographical range of the three genera is interesting. *Mastixia* occurs in the Indo-Malayan region from Ceylon, the Philippine Islands, Java and Borneo ; *Mastixiodendron* is found in New Guinea ; *Dorisia* is known from Fiji, occurring there only on Vanua Levu and the adjacent island of Rambi.

Fruits in the glabrous-leaved specimens are immature, but those of *Horne*, 1132, are similar to *Mastixiodendron pachyclados* (K. Schum.) Melch.* in that frequently only one of the two ovules develops, so that a 1-celled 1-seeded fruit arises ; they also agree in having the seed attached to the axis for nearly its entire length. The little " flap " of tissue projecting from the axis of the ovary immediately below each ovule is not explained : apparently it is not an abortive ovule.—J. W. GILLESPIE.†

FIG. 1, flowering branchlet, *natural size* ; 2, pedicel with bracteoles and flower, corolla and androecium removed, × 6 ; 3, expanded flower, × 6 ; 4, petal, from within, × 6 ; 5, stamen, × 6 ; 6, longitudinal section of pistil, × 6 ; 7, fruit, × 2 ; 8, 9, seed, lateral and adaxial views, × 2.

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* *Engl. Bot. Jahrb.* vol. lx. p. 168, t. 1 (1925).

† Dr. Gillespie died in September 1932.

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Tabula 3191.

SCLERIA BARTERI, *Boeck.*

Cyperaceae. Tribus Scleрieae.

S. Barteri, *Boeck. in Linnaea*, vol. xxxviii. p. 504 (1874); *C. B. Cl. in Durand et Schinz, Conspect. Fl. Afr.* vol. v. p. 669 (1894); *et in Dyer, Fl. Trop. Afr.* vol. viii. p. 507 (1902); *Th. et Hél. Durand, Syll. Fl. Congol.* p. 595 (1909); species caule alte scandente angulis vaginorum et foliorum marginibus minute retrorse denticulatis, nuce purpurascente minute pubescente distinctissima.

Caulis alte scandens, triangularis, angulis vaginorum anguste alatis retrorso-denticulatis, inter angulos glaber vel parce pilosus. *Folia* linearia, ad apicem sensim angustata, usque ad 25 cm. longa, 4–5 mm. lata, utrinque circiter 12-nervia, marginibus et interdum costa media infra crebre retrorso-denticulatis; ligula magna, usque as 6 mm. longa, sicco brunnea et scariosa, extra nervoso-reticulata. *Paniculae* axillares, pedunculatae, pyramidales, circiter 6 cm. longae et 3–4 cm. latae, pubescentes; pedunculi triquetri, angulis retrorso-denticulatis vel fere laevibus; rhachis molliter pubescens; bracteae primariae basin versus paniculae foliaceae, superiores abrupte minores et fere lineari-filiformes, ciliolatae, spiculis multo longiores. *Spiculae* atropurpureae, ♂ circiter 5 mm. longae, breviter pedunculatae, glumis subaequalibus ovatis carinatis atropurpureis, antheris apice longe aristatis, ♀ breviores, glumis inaequilongis exterioribus minoribus oblongis intermediis late ovatis interioribus longissimis ovato-lanceolatis; ovarium anguste oblongum, glabrum; stylus infra medium tripartitus, ramis hirtis. *Nux* alba vel purpurascens, late ovoidea, parce et minute pubescens. *Discus* hypogynus dupliciter patelliformis, parte superiore leviter triloba et recurva.—*S. reflexa*, Benth. in Hook. Niger. Fl. p. 555, non H. B. et K. *S. ovuligera*, Rendle in Cat. Talb. Nig. Pl. p. 150, non Nees.

Tropical Africa. Sierra Leone: Kambia, Scarcies, Jan., *Scott Elliot*, 4388; Central Province, July–Aug., *Dawe*, 545; Rowalla, July, *Thomas*, 1195; Mabum, Aug., *Thomas*, 1589; without definite locality, Sept., *Deighton*, 2112. Liberia: Grand Bassa, Aug., *Dinklage*, 2010; without definite locality, *Reynolds*. Ivory Coast: Guideko, May, *Chevalier*, 16454; Dabou, Feb., *Chevalier*, 17259; Tepos country, July, *Chevalier*, 19548. Gold Coast: Assin Yan Kumasi, *Cummins*, 238;

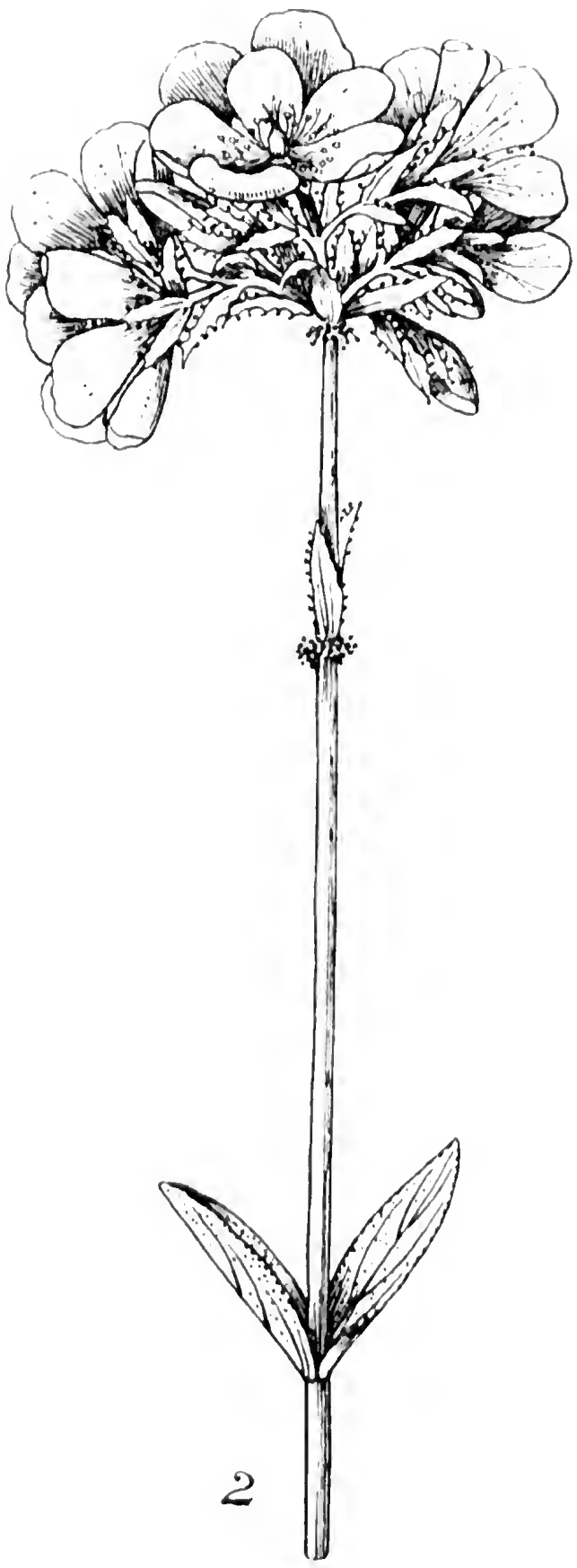
Tarkwa, Dec., *Johnson*, 1000 ; Angje Oil Plantation, Oct., *Howes*, 988. Dahomey : Atacora Mts., June, *Chevalier*, 24184. S. Nigeria : Onitsha, *Barter*, 1786 (type) ; Onia Olona, Oct., *Thomas*, 1854 ; Oban, *Talbot*, 855. Fernando Po, Nov., *Vogel*, 87 ; *Mann*, 113. Cameroons : Bipinde, *Zenker*, 3651 ; Yaunde, 800 m., *Zenker and Staudt*, 376 ; 423 ; Batanga, common, Aug., *Bates*, 342. Uganda : Entebbe, lake shore near forest, Aug., *Maitland*, 78 ; Sesse Islands, Lake Victoria, Nov., *Brown*, 120 ; *Dawe*, 955 ; *Maitland*, 443 ; Sezibura Falls, Nov., *Dümmer*, 1079. Pemba Island, *Vaughan*, 622 ; *Greenway*, 1458. Belgian Congo : Jangambi, *Michiels*, 74.

Vernacular names.—Sierra Leone : Ingiwoya (*Sc. Elliot*) ; Njewe (*Dawe ; Thomas ; Deighton*).

Scleria Barteri is a very remarkable species on account of its peculiar habit. It is a climber, sometimes as much as 20 ft. long, and occurs mainly in dense, damp forests. According to Barter it even renders passage through the forest impossible, and is said to form the impenetrable thickets of the Timne country, in the Southern Province of Nigeria. It climbs by means of minute reflexed barbs on the angles of the leaf-sheaths, and on the margins and sometimes the midrib of the leaves, after the manner of the common "Goosegrass," *Galium Aparine*, Linn.

The numerous tributaries of the Ubangui and Congo rivers support a narrow belt of evergreen vegetation, even in the dry savannah regions, and these streams form the connecting link for the migration of species from the great forest area of the west to that around the East African lakes. *Scleria Barteri* follows closely the distribution of this evergreen forest, ranging from its extremity in Sierra Leone through Upper Guinea and the Cameroons to the shores of the Victoria Nyanza in Uganda, and in the island of Pemba off the east coast of Africa. According to Belgian authors it is found in most of the lower-lying districts of the Congo. Its occurrence in the isolated island of Pemba is interesting. According to Greenway it is fairly common in woodlands and damp shady places throughout the island.—J. Hutchinson.

Fig. 1, upper part of flowering branchlet, *natural size* ; 2, margin of lamina, × 10 ; 3, branch of inflorescence, with ♂ and ♀ spikelets, × 4 ; 4, stamen, × 14 ; 5, nut with its subtending glumes, × 6 ; 6, nut with upper half of hypogynous disk, × 6 ; 7, hardened base of disk, × 6.



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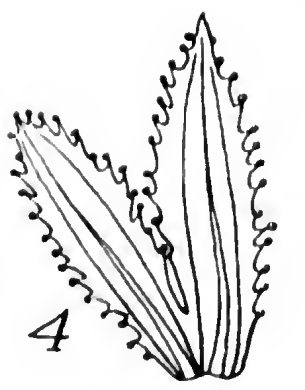

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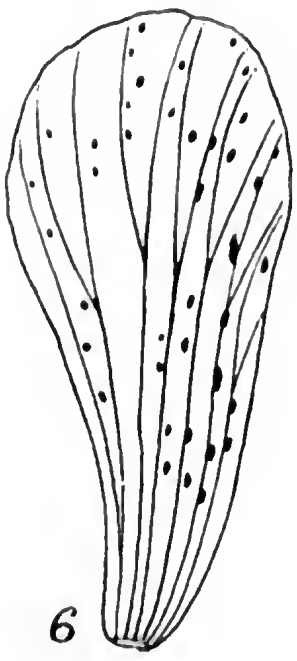

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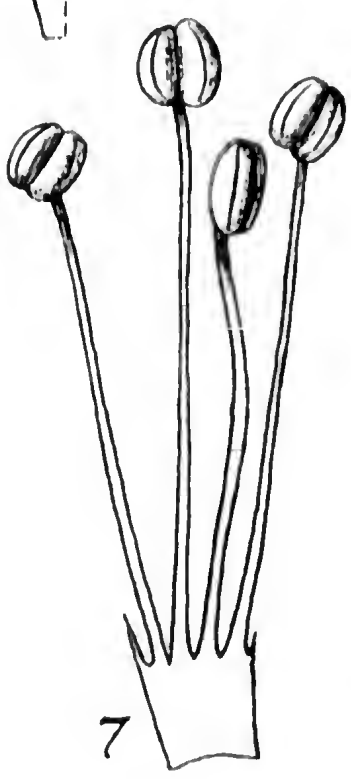

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S.R-C.

Tabula 3192.

HYPERICUM AFROMONTANUM, *Bullock.*

Hypericaceae. Tribus Hypericeae.

H. afromontanum, *Bullock in Kew Bull.* 1932, p. 492; *H. intermedio,* Steud. affinis, floribus capitato-congestis, petalis multo majoribus, sepalis latioribus, glandulis stipitatis brevioribus et crassioribus, stylis brevioribus, caulibus simplicibus, foliis valde ascendentibus multo minoribus utrinque puberulis facile distinguitur.

Herba perennis usque 45 (raro 60–90) cm. alta. *Caules* annui, simplices vel apicem versus parce ramosi, ramis semper floriferis, glabri vel praesertim inferne minute puberuli, teretes, graciles, internodiis basin versus circiter 1 cm. longis sed superne saepe multo longioribus. *Folia* valde ascendentia, sessilia, oblonga vel oblongo-lanceolata, apice rotundata (praesertim inferiora) usque subacuta, basi truncata vel leviter auriculato-amplexicaulia, usque 2·3 cm. longa, sed plerumque circiter 1·5–2 cm. longa et 5–7 mm. lata, utrinque puberula, glandulis oleiferis dense pellucide punctata, plerumque (marginibus praesertim) glandulis resiniferis nigro-punctata; folia summa interdum basi stipitato-glandulosa. *Flores* 5-meri, in cymas capituliformes terminales aggregati; pedunculi usque 10 cm. longi sed saepe minores, circa vel supra medium bracteis duabus oppositis praediti; bracteae foliis subsimiles sed multo minores, basi glandulis nigris stipitatis dense indutae, laminis glandulis sessilibus praeditis, marginibus laevibus vel glandulis stipitatis ciliatis; bracteolae semper satis dense glanduloso-ciliatae. *Sepala* ovato-lanceolata, apice acuta, 5 mm. longa et fere 2 mm. lata, glandulis stipitatis ciliata. *Petala* lutea, rubro-vittata, inaequilateralia, oblanceolato-obovata, apice rotundata, circiter 1·3 cm. longa et usque 5 mm. lata, glandulis nigris parce punctata. *Stamina* 35; filamenta fere libera. *Ovarium* ovoideum, 1·5 mm. longum, glabrum, apice glandulis stipitatis circiter 6 ornatum; styli 3, circiter 3 mm. longi. *Fructus* maturi non visi.

Kenya Colony. Mt. Elgon: 3500 m., Dec. 1930, *Major E. J. and Mrs. Cyril Lugard,* 338a (typus); moorland, 3300–3600 m., Feb. 1930, *H. M. Gardner,* 2259.

Uganda Protectorate. Mt. Elgon: short grass-land, 3000–3600 m., 22 Oct. 1916, *J. D. Snowden,* 479; grassy swamp on the west side

of the crater, 3600 m., Jan. 1918, *R. A. Dümmer*, 3301 ; grass country below Madangi Camp, 3500 m., March 1930, *L. C. C. Liebenberg*, 1622.

This interesting species has been collected only at high altitudes on Mt. Elgon, between 10,000 and 12,000 ft. The small erect leaves and the dense head of yellow flowers render it strikingly distinct in general appearance from any other African member of the genus, but detailed examination at once reveals its relationship with the widely distributed *H. intermedium*, Steud.

The simple stems, which are often purplish in colour, sometimes branch slightly in the upper part, such branches, like the main stem, terminating in a dense cymose head of flowers up to about two inches in diameter. Each yellow petal has a red streak running down the back. The two bracts about the middle of the peduncle form an interesting morphological feature. In shape they are similar to the ordinary leaves, but are provided, at any rate at the base, with a dense fringe of black-headed stipitate glands which are otherwise confined to the bracteoles and sepals. In some cases the uppermost pair of otherwise ordinary foliage leaves have also a few of these peculiar glands at their bases. Sessile black glands may accompany the stipitate ones, but these are scattered over the surface.

The specific epithet, *afromontanum*, refers to its resemblance, particularly in habit, to the British and European *H. montanum*, Linn.

A. A. Bullock.

Fig. 1, upper part of a flowering stem, *natural size* ; 2, uppermost part of another stem with a single inflorescence, *natural size* ; 3, lower surface of leaf, × 26 ; 4, part of calyx, from within, × 3 ; 5, marginal glands of sepals, × 14 ; 6, petal, × 3 ; 7, portion of androecium, from within, × 8 ; 8, pistil, × 8.

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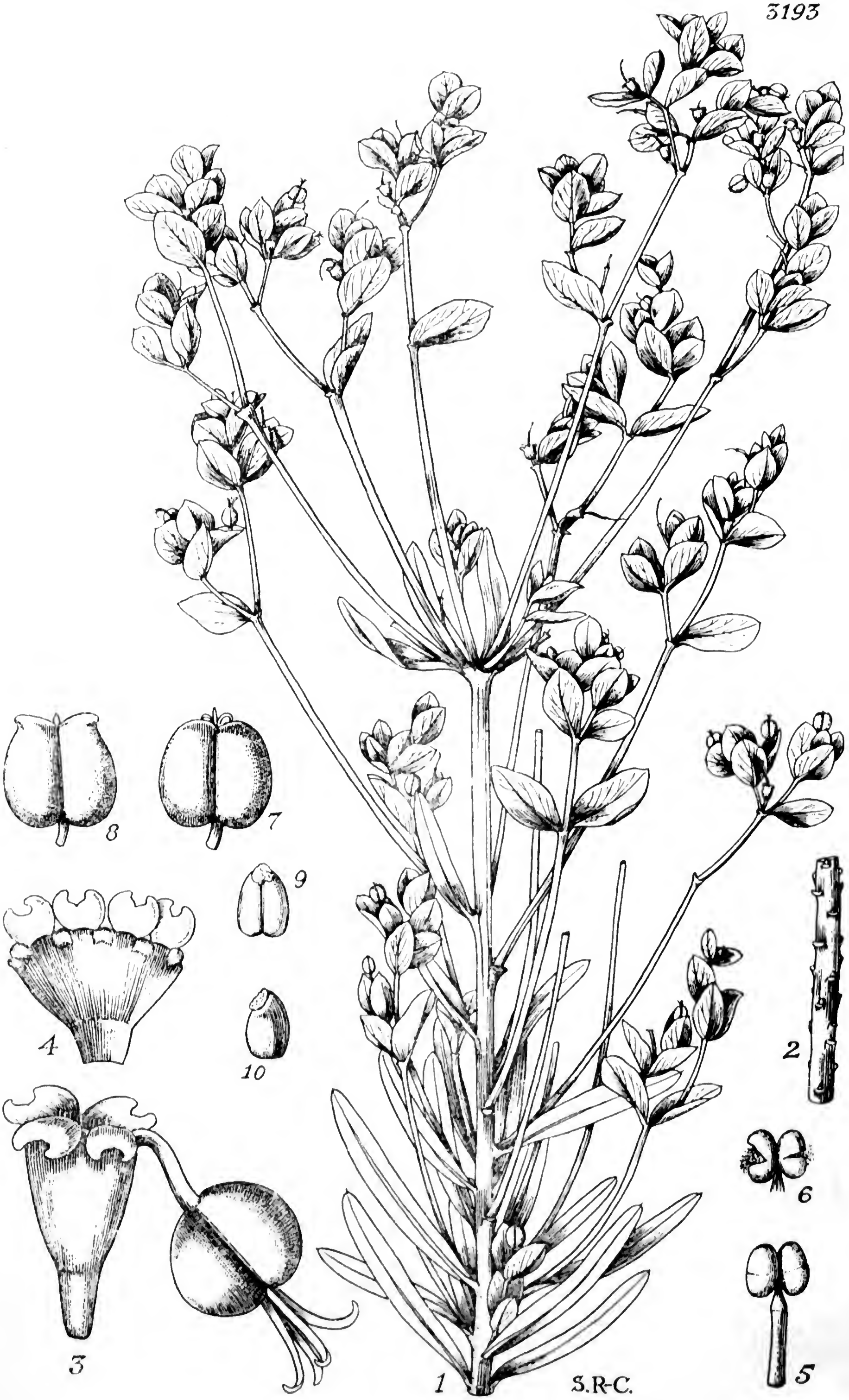

S.R-C.

Tabula 3193.

EUPHORBIA EURYOPS, *Bullock.*

Euphorbiaceae. Tribus Euphorbieae.

E. Euryops, *Bullock in Kew Bull.* 1932, p. 492; *E. Schimperianae*, Scheele, affinis, caulibus simplicibus dense foliatis, foliis anguste oblongis usque oblanceolatis, petiolis prominentibus tuberculiformibus foliorum delapsorum valde distincta; habitu ramulorum floriferorum *E. epicyparissias*, E. Mey., sed foliis majoribus, inflorescentiis majoribus multo laxioribus facile distinguitur; ab ambabus ovario 2-loculari differt.

Herba perennis, usque 6 dm. alta; caules pilis crispis leviter pubescentes, simplices, lignosi, dense foliati, petiolis tuberculiformibus foliorum delapsorum conspicue notati; rami floriferi cymam terminalem 4–7-radiatam efformantes, bracteis foliaceis oblongo-lanceolatis 2·5 cm. longis suffulti, ramis aliis similibus infra umbellam ex axillis foliorum ortis. *Folia* brevissime petiolata, alterna, spiraliter disposita, utrinque minute densissime papilloso-pustulata, exstipulata, angustе oblonga usque oblanceolata, apice obtusiuscula, mucronulata, basin versus angustata, 3·5–4·5 cm. longa, 4·5 mm. lata, inferne deciduа. *Rami* inflorescentiae 5–10 cm. longi, ramulis brevibus secundariis 1–3 vel 4 praediti. *Bracteae* (saltem maturae) saturate sanguineo-coloratae, oppositae, altera saepe mox decidua persistente altera, sessiles, ovatae usque rhomboideo-ovatae, apice subobtusae, mucronulatae, basi cuneatae usque fere rotundatae, usque ad 1·5 cm. longae et 8 mm. latae. *Involucra* solitaria, subsessilia, campanulata, 1 mm. longa et circiter 1 mm. diametro, glandulis 4 et glandula abortiva minima cum lobis 5 inflexis oblongis vel ovatis ciliatis apice obtusis vel bifidis alternantibus; glandulae ambitu suborbiculares, 1·1 mm. diametro, supernе crescentiformes. *Pedicelli* florum masculorum filiformes, glabri. *Filamenta* brevia, basi leviter incrassata, glabra. *Antherae* in alabastro suborbiculares, 0·4 mm. diametro, loculis ellipsoideis transverse dehiscentibus. *Ovarium* 2-loculare; styli 2, biramosi. *Capsula* exserta, graciliter pedicellata, glabra, bilocularis, leviter compressa, inter loculos valde constricta, ambitu quadrato-suborbicularis, circiter 2 mm. longa et lata, emarginata, basi truncata latissima, sursum satis angustata, saepe marginibus apice leviter recurvata, obtuse subrostrata. *Semina* oblongo-ellipsoidea, 1·5 mm. longa, apice unilateraliter carunculata, basi cordata, pallide cinerea, laevia.

KENYA COLONY. Mt. Elgon, 3000 m., Dec. 1930, *Major E. J. and Mrs. Cyril Lugard*, 280.

The simple erect stems, up to about two feet high, clothed except in the lower part with crowded, spirally arranged, narrow leaves, and branching above to form a considerable inflorescence with numerous deep crimson-coloured bracts, render this species strikingly distinct in general appearance from its close ally *E. Schimperiana*, Scheele. There is a superficial resemblance to the flowering branches of several South African species, notably *E. epicyparissias*, E. Mey., but it is doubtful whether this indicates affinity or merely parallel development.

The bilocular ovary appears to be a constant character, but as only two flowering stems, very probably taken from the same rhizome, are available for study, it may not be so. The fruit is more or less square in shape, but very frequently the shoulders become somewhat produced into short, recurving, blunt beaks.

The specific epithet, *Euryops*, is given to indicate the superficial resemblance of the leafy portions of the stem to some species of the genus *Euryops*, Cass. (Compositae).—A. A. BULLOCK.

FIG. 1, upper, leafy part of stem and inflorescence, *natural size*; 2, lower part of stem, showing persistent petioles, *natural size*; 3, a cyathium, × 12; 4, the same, opened, with flowers removed showing the glands and the inflexed involucral lobes, × 6; 5, young male flower, × 20; 6, anther, after dehiscence, × 20; 7, 8, capsules, × 6; 9, seed, adaxial view, × 6; 10, seed, lateral view, × 6.


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Tabula 3194.

PAVETTA UNIFLORA, *Bremekamp.*

Rubiaceae. Tribus Ixoreae.

P. uniflora, *Bremekamp*; species nova ab omnibus congeneribus hactenus cognitis floribus solitariis distinguenda.

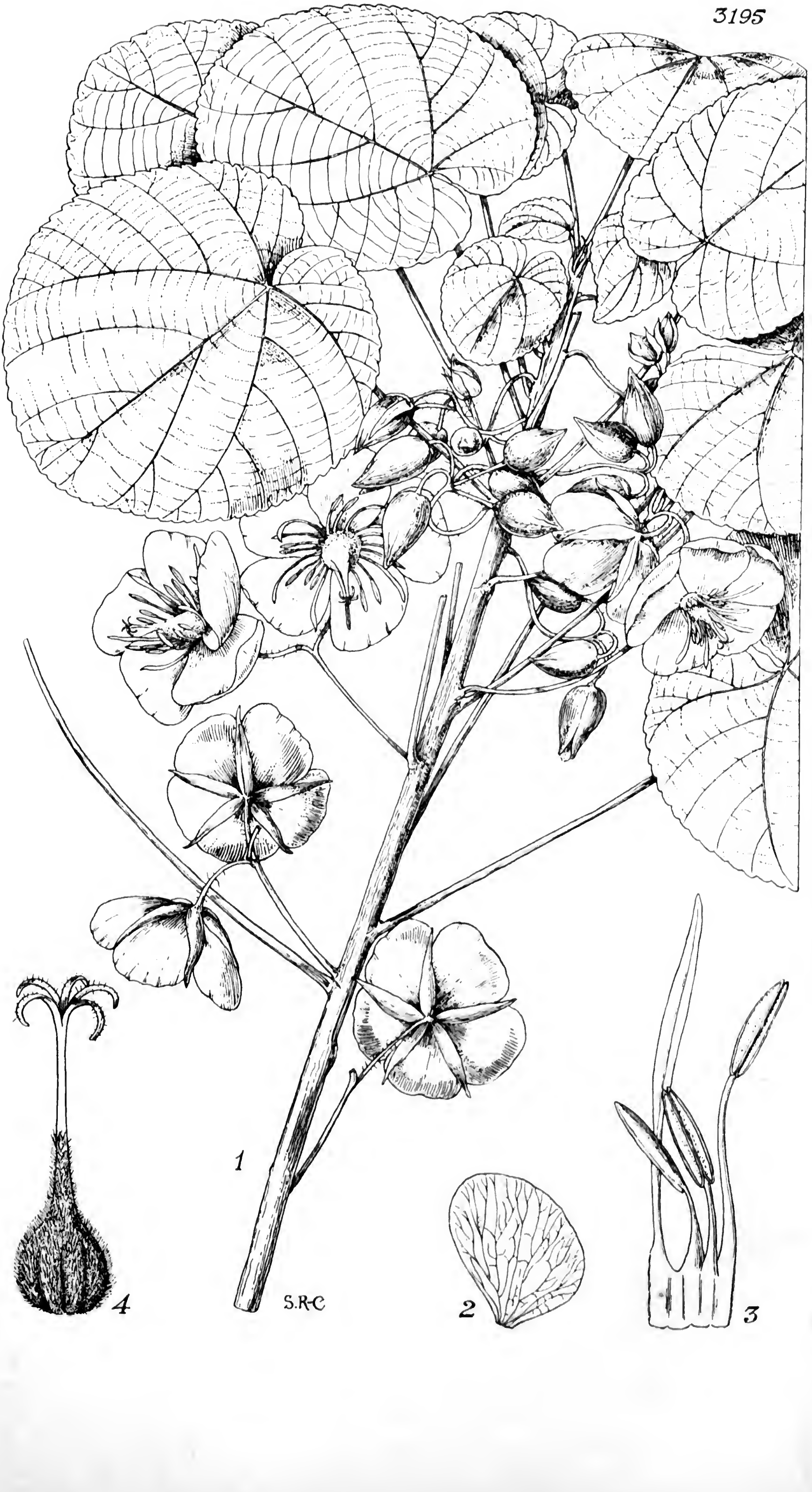
Frutex scandens, circiter 3 m. altus, omnibus partibus facie interiore stipularum et bractearum excepta glaber. *Ramuli longi* sympodiales, ex internodiis concatenatis 3–5 cm. longis constantes; internodia singula in ramulos abbreviatos usque ad 0·6 cm. longos desinentia. *Ramuli abbreviati* apice plerumque foliis quattuor coronati. *Folia* brevissime petiolata; lamina obovata, 2–2·5 cm. longa, 0·7–1·2 cm. lata, apice obtusa, calloso-mucronulata, basi cuneata, membranacea, nervis utroque latere costae 2–3, domatiis nullis, nodulis baetcriorum paucis linearibus irregulariter dispersis; petiolus usque ad 0·3 cm. longus; stipulae ovatae, cuspidatae, intus sericeo-villosae. *Flores* ramulos abbreviatos ordinis secundae perbreves in parte defoliata ramulorum abbreviatorum primariorum dispositos terminantes, solitarii, subsessiles, parte inferiore braetcis stipularibus connatis circumdati, inodori. *Calycis tubus* 0·6 mm. longus; lobi filiformes, 9 mm. longi. *Corollae tubus* 3·5 cm. longus, tenuissimus; lobi 0·5 cm. longi, acuti. *Stylus* 5·5 cm. longus.

Tropical Africa. Kenya Colony: Arabuko, in undergrowth of *Brachylaena* forest, *R. M. Graham*, 1856.

The solitary flowers distinguish *P. uniflora* from all previously described species of *Pavetta*. They are subtended at the base by a pair of connate bracts such as subtend the inflorescence in the other species. The flowers terminate minute "short shoots" which are borne on the older, leafless part of the primary "short shoots."

The "long shoots" of *P. uniflora* are sympodial, formed by a chain of axes each consisting of a single internode. The upper part of each axis develops into a pseudo-lateral "short shoot," from the base of which the next axis of the sympodium arises as a lateral branch.—C. E. B. Bremekamp.

Fig. 1, flowering branch, *natural size*; 2, leaf, upper surface, showing bacterial "nodules," × 2; 3, receptacle and calyx, × 2; 4, upper part of corolla, with stamens, × 4; 5, stamen, × 6.



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S.R-C

Tabula 3195.

DOMBEYA BRACHYSTEMMA, *Milne-Redhead.*

Sterculiaceae. Tribus Dombeyeae.

D. (Eudombeya) brachystemma, *Milne-Redhead*; species nova affinis *D. parvifoliae*, K. Schum. et *D. roseae*, E. G. Baker, ab illa foliis rotundatis vel obtusissimis, pedunculis petiolis multo brevioribus, ab hac ramis glabris, foliis indivisis differt.

Frutex subscandens, deciduus, usque 6 m. altus. *Rami* tenues, pauciramosi, glabri, cortice longitudinaliter costato brunneo; rami juniores minute puberuli. *Folia* longe petiolata, late ovata vel suborbiculata, indivisa, apice rotundata vel obtusissima, basi cordata sinu 2–2·5 cm. alto, 8–11 cm. longa, 8–11 cm. lata, crenulato-dentata, supra pilis stellatis velutino-pubescentia, subtus glauco-tomentella; costa et nervi laterales utrinque 6–7 (tribus e basi costae inclusis), utraque pagina tomentelli, subtus prominentes; petioli teretes, vix 11 cm. longi, glabri, prope apicem minute puberuli et sparse hirsuti; stipulae caducae, subulatae, circiter 1 cm. longae, inferne ut innovationes dense glanduloso-papillatae et, praesertim superne, sparsiuscule stellato-hirsutae. *Inflorescentiae* umbelliformes, 3–5-florae, ex axillis foliorum ortae, foliis breviores; pedunculi 2·5–3 cm. longi, stellato-pubescentes et glanduloso-papillati; pedicelli 1·2–1·5 cm. longi, minute stellato-tomentelli, pilis longis simplicibus hinc inde inspersis; bracteolae 3, deciduae, lanceolato-subulatae, usque 9 mm. longae, utrinque dense tomentellae. *Flores* conspicui, 4·5 cm. diametro; alabastra ovata, acuta, circiter 1·7 cm. longa et 0·9 cm. lata. *Sepala* 5, lanceolata, acuta, 1·9 cm. longa, 3 mm. lata, extra dense tomentella, intus glabra. *Petala* 5, pallide rosea, rotundato-triangulata, basi late cuneata, 2·2 cm. longa, 1·7 cm. lata, glabra, nervis siccitate prominentibus. *Stamina* 15, per tria cum staminodiis 5 alternantia; triadis stamen medium breve, extra tubum paullum infra apicem insertum, staminum lateralium alterum breve, alterum longum; filamentorum tubus sinibus valde inaequalibus itaque 2–3·5 mm. longus; staminodia spathulato-linearia, 1·5–1·7 cm. longa (tubo incluso); staminum filamenta subulata, longiora 9 mm. longa, breviora 6–7 mm. longa (tubo incluso); antherae lineares, 3·5–4·5 mm. longae. *Ovarium* late ovoideum vel subglobosum, usque 6 mm. altum et 6 mm. diametro, obscure 5-lobatum,

horride hirsuto-tomentosum, 5-loculare, ovulis 6 pro loculo; stylus circiter 1 cm. longus, inferne densissime stellato-hirsutus, superne glaber, stigmatibus 5 recurvatis sparse longihirsutis. *Capsula* non visa.

NORTHERN RHODESIA. Solwezi District: among shrubs in evergreen vegetation by Mbulungu Stream, west of Mutanda Bridge, 3 July 1930, *Milne-Redhead*, 657.

During the months of July and August, *Dombeya brachystemma* forms a conspicuous feature of the evergreen fringing forests in the Solwezi District of Northern Rhodesia. It is a weak shrub, sometimes only 2 m. high, but frequently reaching as much as 6 m., gaining support from the evergreen shrubs among which it grows. The large pale-pink flowers, which much resemble wild roses, are very fragrant.

E. MILNE-REDHEAD.

FIG. 1, flowering branch, × ⅔; 2, petal, *natural size*; 3, part of androecium, seen from without, showing a staminode and a group of three stamens, × 4; 4, pistil, × 3.

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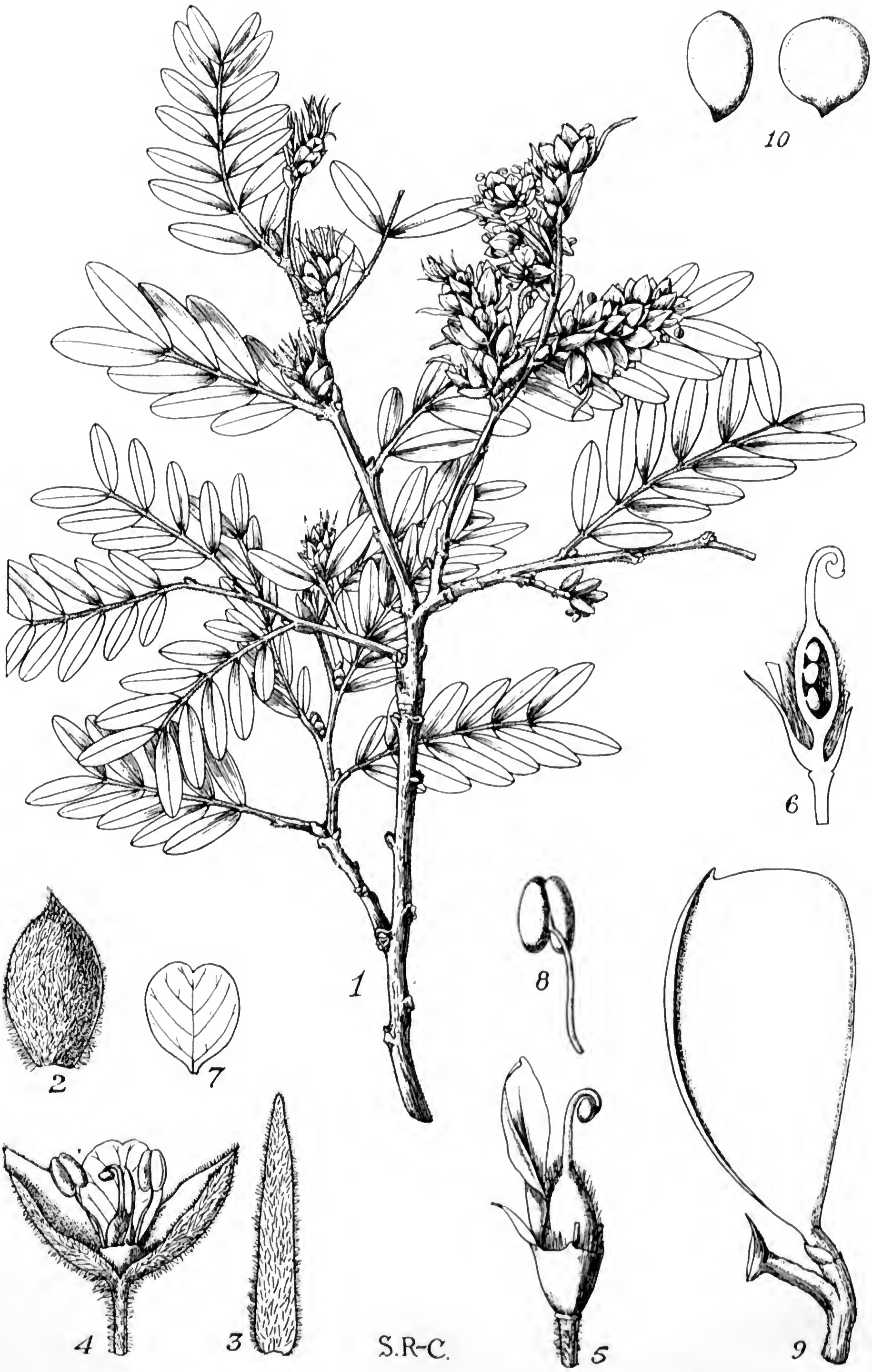

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Tabula 3196.

CRYPTOSEPALUM PSEUDOTAXUS, *E. G. Baker.*

Leguminosae. Tribus Amherstieae.

C. pseudotaxus, *E. G. Baker in Journ. Bot.* vol. lxvi. suppl. I, p. 148 (1928); a *C. arboreo*, E. G. Baker, habitu sempervirente, foliis et floribus minoribus, foliolis apice obtusis vel rotundatis, racemis axillaribus vel pseudoterminalibus recedit.

Arbor parva vel interdum magna, usque 30 m. alta, sempervirens, trunco recto simplici interdum usque 20 m. alto, supra copiose ramosa, ramis horizontalibus densissime foliosis. *Ramuli* pilis cinereis rectis patentibus densiuscule hirsuti. *Stipulae* lineares vel subulatae, usque 1·5 cm. longae, hirsutae, caducae. *Folia* abrupte pinnata, 4–7-jugata, circiter 3 cm. longa, 1·5 cm. lata; petiolus 1–2 mm. longus; rhachis usque 2·5 cm. longa, cum petiolis cinereo-hirsuta; foliola subaequalia, subsessilia, oblonga, parum inaequilateralia costa subcentrali, apice rotundata, basi leviter inaequilateralia, usque 1·7 cm. longa, 0·5 cm. lata, coriacea, supra glabra, nitidula, subtus margine et costa sparse hirsutis exceptis glabra; costa supra prominula, subtus valde conspicua; nervi laterales utraque pagina inconspicui; petioluli minuti, hirsuti. *Racemi* perulati, multiflori, densissimi, axillares vel pseudoterminales; perulae ovatae, concavae, apice acutae, usque 7 mm. longae, ferrugineo-hirsutae; bracteae florum singulorum lineari-lanceolatae vel subulatae, vix 1 cm. longae, hirsutae, caducae; pedicelli usque 5 mm. longi, pubescentes; bracteolae 2, concavae, alabastrum includentes, ovatae, obtusae vel subacutae, circiter 6 mm. longae, 3·5 mm. latae, pubescentes. *Calyx* brevis, cupuliformis, truncatus, lobo unico adaxiali deltoideo acuto 1·5 mm. longo excepto, nonnunquam denticulis 3 (2 lateralibus et 1 anteriori) additis. *Petalum* unicum calycis lobo oppositum, prope apicem tubi insertum, ellipticum vel ovatum, apice rotundatum, basi cuneatum, usque 6 mm. longum, 3·5 mm. latum, glabrum, ochroleucum. *Stamina* 3, perfecta vel interdum 1–2 staminodiales; filamenta filiformia, usque 5 mm. longa; antherae vix 2 mm. longae, rubro-brunneae. *Ovarium* inconspicue stipitatum, stipite pilis occulto, oblongum, circiter 1 mm. longum, suturis hirsutis, circiter 2–3-ovulatum; stylus circiter 1 mm. longus, glaber, superne recurvatus stigmate capitato instructus. *Legumen* late oblongum vel obovato-oblongum, usque 6 cm. longum et 2·5 cm. latum, lignosum, glabrum, saepissime 1-spermum.

Angola. T'Chirondongombe, Rio Luassingua, 18 June 1906, *Gossweiler*, 2709 (type in Herb. Mus. Brit.). An evergreen tree of total height of 60 ft.; head small, densely branched; branches spreading, recalling the habit of a Cedar of Lebanon; flowers whitish; petal white, one only; calyx greenish-white, tomentose; anthers purplish-violet; filaments white; slightly fragrant. It is this species that gives the phytological and physiographical characters to the country known as Ganguellas and Umbuellas. Native name "Mucuwe." Cavange, 27 Aug. 1905, *Gossweiler*, 1900 (Herb. Mus. Brit.). The "Mucuwe" of the Ganguellas, a dwarf evergreen tree and as such resembling a Cedar or *Taxus* at a first glance; leaves remarkably dusky green; trunk erect, head broad, branches spreading dilately; flowers white, scented; an early-flowering specimen from Cavange. It is this tree that so distinctly characterizes the woods; it is common in the dense secondary woods and constitutes, with a few other Caesalpinieae, the primeval densely wooded grassless forests of this region; underneath its densely leaved crown only mosses occur. On an ant-hill east of Fte. P. Amelia, Sept. 1905, *Gossweiler*, 1900A (Herb. Mus. Brit.). A small and dwarf evergreen tree branched from the base; branches densely branched again, short, spreading; flowers whitish. Native name "Mucuwe." In thickets together with *Diplorhynchus* sp. at Cuito by Capunda, 1 July 1906, *Gossweiler*, 3032 (Herb. Mus. Brit.). A dwarf evergreen tree resembling a conifer; flowers white, anthers blackish-purple. Cutchi, near Fte. Conselheiro Barja, in fruit, Nov. 1906, *Gossweiler*, 3486 (Herb. Mus. Brit., Herb. Kew.).

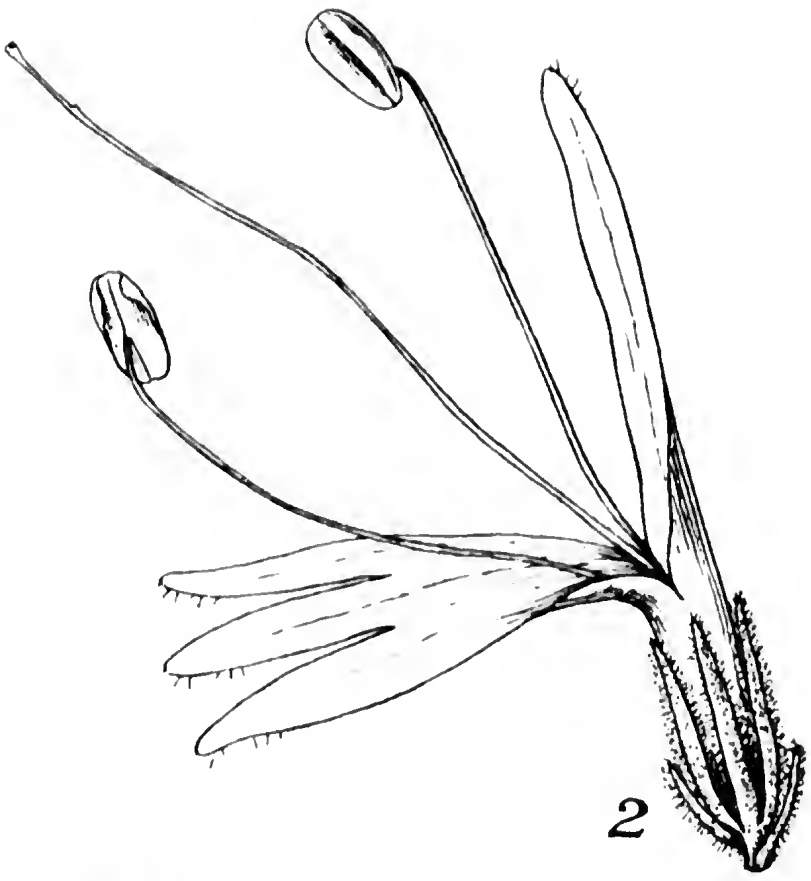
Northern Rhodesia. Mwinilunga District: dominant on areas of sand between R. Kabompo and R. Kasingiko, 1 Aug. 1930, *Milne-Redhead*, 810. A flat-topped cedar-like evergreen tree, up to 9 m. high, not yet in flower, and no fruits seen; young and previous season's foliage present together on the tree. The dominant tree of the "Mavunda" sand country about 60 Km. south of Mwinilunga, and 19 Km. west of R. Lunga, 15 Aug. 1930, *Milne-Redhead*, 916. An evergreen tree usually about 15 m. high, but sometimes met with as much as 30 m. high; flowers cream-coloured, anthers red-brown. Vernacular name "Mukwechi" (Chikaonde).

Cryptosepalum pseudotaxus is the dominant tree of the woodlands, occurring on the so-called Kalahari sand in the Mwinilunga District of Northern Rhodesia and the adjacent portion of Eastern Angola. This tree at times grows to a great height, and beneath its shade a dense growth of evergreen shrubs, knit together by species of *Landolphia*, forms an almost impenetrable tangle. Below this evergreen shrub layer the shade is so dense that the loose sand is practically destitute of any herbaceous vegetation, two species of moss (*Leucobryum madagassum*, Besch. and *Campylopus inandae*, Rehm.) alone appearing able to enjoy the very unfavourable conditions. This *Cryptosepalum* woodland is known by the Kaonde natives as "Mavunda," and is almost entirely uninhabited. Associated with *Cryptosepalum pseudo-*

taxus in these woodlands are *Copaifera coleosperma*, Benth., *Marquesia acuminata* (Gilg) R. E. Fr., *Parinari mobola*, Oliv., *Pterocarpus angolensis*, DC., *Afrormosia angolensis* (Bak.) Harms, and one or two species of *Brachystegia*, to mention only some of the more important timber trees. It is interesting to note that *Cryptosepalum pseudotaxus* has not been recorded from the Kalahari sand area to the south of Northern Rhodesia, where the rainfall is considerably less than it is in the Mwinilunga District, and conversely that the two common trees of this southern area of similar sand, *Baikiaea plurijuga*, Harms, and *Pterocarpus Stevensonii*, Burtt Davy, were not noticed in the *Cryptosepalum* woodland, and that neither species appears to have been collected by Gossweiler in Angola.—E. Milne-Redhead.

Fig. 1, flowering branchlet, *natural size*; 2, one of the perulae from the base of the inflorescence, × 4; 3, subtending bract of flower, × 4; 4, flower with pedicel and pair of bracteoles, anterior view, × 4; 5, flower, with bracteoles and upper part of stamens removed, lateral view, × 8; 6, median longitudinal section of flower, showing attachment of petal and pistil, and placentation, × 8; 7, petal, × 4; 8, stamen, from the back, × 8; 9, part of infructescence, showing mature legume and persistent basal part of a second one after dehiscence, *natural size*; 10, seeds, *natural size*.

3197



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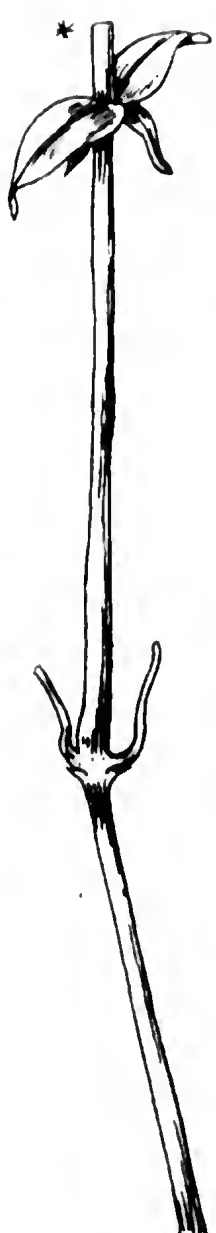

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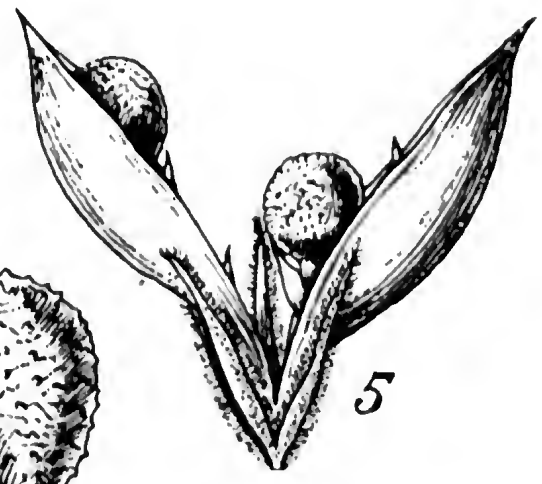

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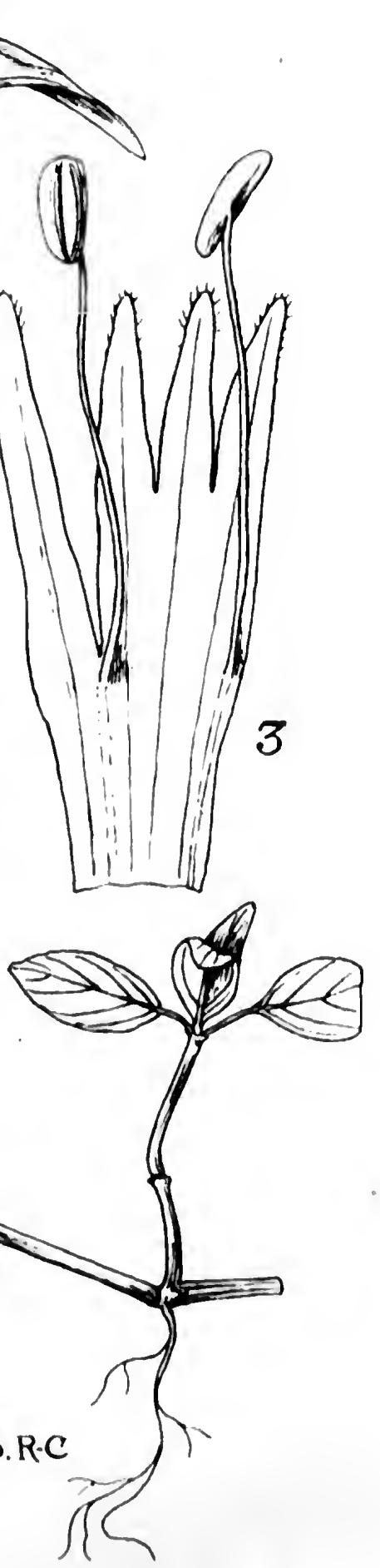

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Tabula 3197.

OREACANTHUS MONTIFUGA, *Milne-Redhead.*

Acanthaceae. Tribus Isoglosseae.

O. montifuga, *Milne-Redhead*; species nova, affinis *O. Mannii*, Benth., sed habitu humili, foliis minoribus, inflorescentiis dense purpureo-glanduloso-pilosis, floribus magis confertis, tubo corollae paullo longiore differt.

Herba perennis, vix 3 dm. alta; caules decumbentes, nodis inferioribus radicantibus, infra paniculam puberuli vel glabrescentes. *Folia* ovata vel ovato-lanceolata, acuminata, in petiolum cuneatim angustata, vix 5 cm. longa, 2 cm. lata, utrinque parce puberula; petioli usque 6 mm. longi. *Thyrsi* oblongi, 5–6 cm. longi, circiter 3 cm. lati, pilis purpureis crispatis glandulosis dense pubescentes. *Calyx* fere usque ad basin 5-partitus, 4 mm. longus, segmentis linearibus subaequalibus purpureo-glanduloso-pilosis. *Corolla* alba vel subcaeruleo-alba, glabra, loborum apicibus parcissime hirsutis, 11 mm. longa; tubus cylindricus, 4 mm. longus; limbus 7 mm. longus, labiis aequilongis; labium posticum anguste lanceolato-oblongum, integrum, suberectum; anticum patens, alte trifidum, lobis planis anguste lanceolato-oblongis 3·5 mm. longis. *Stamina* 2, fauci inter labia affixa; filamenta filiformia, 9 mm. longa, limbo hiante conspicua; antherae monothecae, oblongae, dorsifixae, purpureo-caeruleae; staminodia nulla. *Discus* minutus, cupularis. *Stylus* filiformis, usque ad 18 mm. longus, subinteger; ovarium circiter 2 mm. longum, 4-ovulatum. *Capsula* elliptica, in basin attenuata, 8 mm. longa; semina abortu 2, compressa, rugoso-tuberculata, 2 mm. diametro.

Northern Rhodesia. Solwezi District: in evergreen vegetation by stream just east of River Kabompo near Mebwanki's village, 1400–1600 m., 31 July 1930, *Milne-Redhead*, 807. Perennial herb, growing in dense shade of evergreen shrubs on damp ground rich in humus; flowers white or bluish-white.

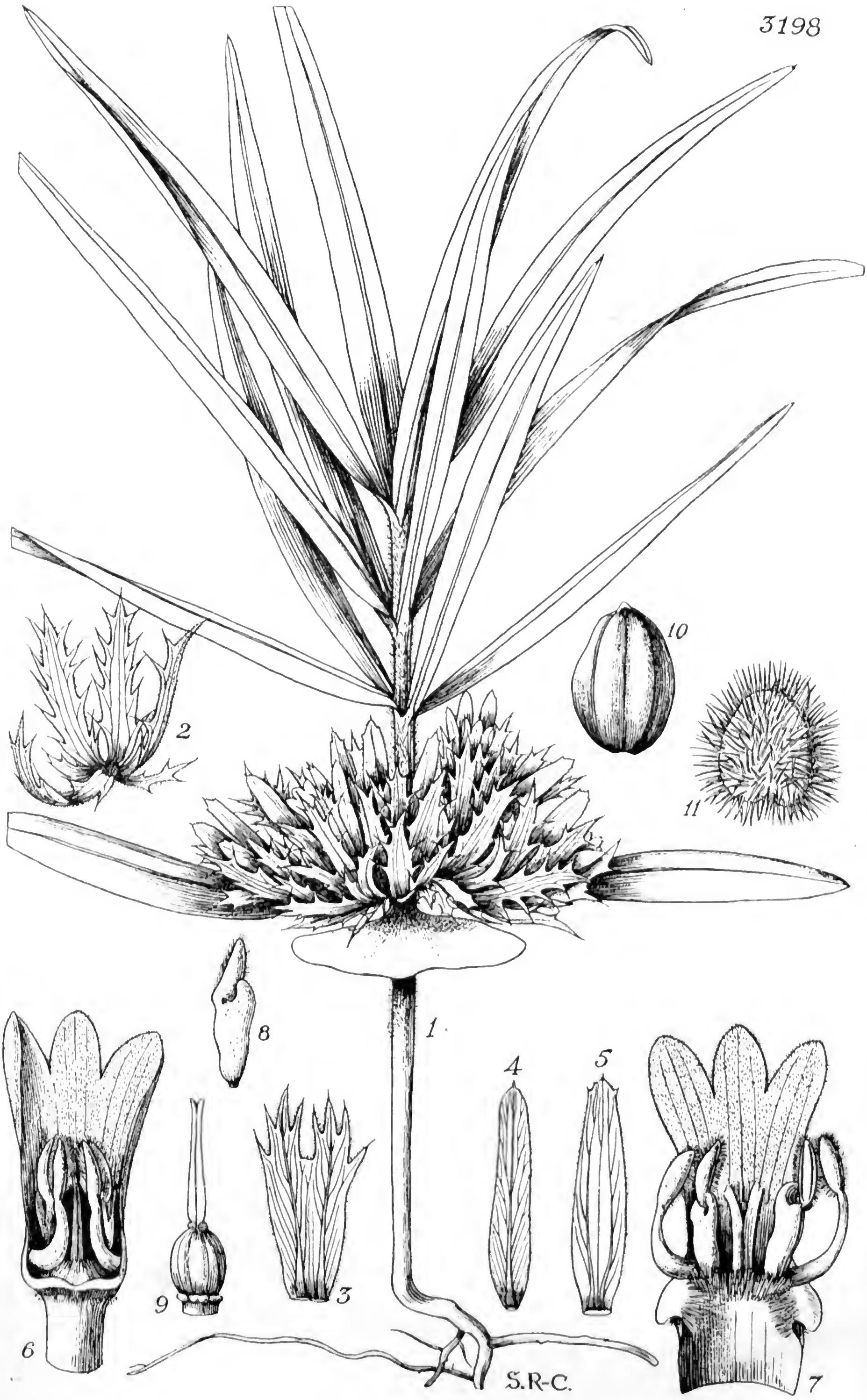
The discovery in Northern Rhodesia of a second species of *Oreacanthus* extends the known distribution of this hitherto monotypic genus by a distance of no less than 2400 Km., for *O. Mannii*, Benth. is known only from the Cameroons Mountain.

In Bentham's description of *Oreacanthus Mannii* (Hook. Ic. Pl. t. 1211: 1877), the stamens are said to be attached near the bottom of the tube. An examination of the type material proves, however, that the point of attachment of the stamens is near its mouth. As the tube in that species is very short the point of attachment is consequently not far from the bottom of the corolla, which is in agreement with the generic description in Benth. et Hook. f. Gen. Pl. vol. ii. p. 1104.

In Dyer, Fl. Trop. Afr. vol. v. p. 176, the capsule of *Oreacanthus* is said to be 4-seeded. In Gen. Pl., l.c., Bentham describes the capsule as being 4-seeded, or by abortion, fewer-seeded, and an examination of the type material reveals that 2-seeded capsules are most frequent. *O. Mannii* is described by Mann in his field notes as being an "herbaceous pl. 12 ft. high" (*Mann*, 1259), and an "herb. pl. 10–12 ft. high" (*Mann*, 1971), whereas C. B. Clarke in Fl. Trop. Afr., l.c., describes it as a shrub. According to Dunlap (No. 50 in Herb. Kew.), it is very common on the Cameroons Mountain, "forming thickets 12–15 ft. high, from 3000 ft. up to the timber line."—E. MILNE-REDHEAD.

FIG. 1, plant, *natural size*; 2, flower, lateral view, × 4; 3, corolla, laid open, showing insertion of stamens, × 4; 4, ovary and disk, × 10; 5, capsule after dehiscence, showing the two seeds, × 4; 6, a seed, × 6.

3198



Tabula 3198.

BLEPHARIS MENOCOTYLE, *Milne-Redhead.*

Acanthaceae. Tribus Acantheae.

B. (**Acanthodium**) **menocotyle**, *Milne-Redhead*; species nova a *B. Buchneri*, Lindau, foliis pseudo-verticillorum subaequalibus marginibus cspinosis, foliis duobus infimis cum cotyledonibus persistentibus pseudo-verticillum formantibus, inflorescentiis saepe ex axillis cotyledonum exortis, floribus multo minoribus recedit.

Herba annua, erecta; caules simplices, usque 26 cm. longi partc hypocotylari 5–14 cm. longa superne hirsuta inclusa, hirsuti. *Cotyledones* persistentes, cum foliis infimis pseudo-verticillatae, lunato-flabelliformes, 1·1 cm. longae, 3·5 cm. latae, glabrae, inferne aspere ciliatae. *Folia* pseudo-verticillata, sessilia, subaequalia, oblonga vel linearia, usque 14 cm. longa, 1·3 cm. lata, apice acuta vel apiculata, sparsiuscule albo-hirsuta vel glabrata, minute serrulato-ciliata, venis perinconspicuis. *Inflorescentiae* 1–2, ex axillis cotyledonum vel foliorum inferiorum exortae, valde confertae, usque 4·5 cm. diametro; bracteae lanceolatae, 6–15 mm. longae, apice et margine valde spinosae, glanduloso-hirsutae. *Calyx* usque ad basin 4-partitus, parce glanduloso-hirsutus; segmentum posticum oblongo-lanceolatum, apice minute dentatum, apiculatum, 3-nerve, 1·7 cm. longum, 3·2 mm. latum; anticum binerve, apice bifidum, margine valde spinoso bracteis simile, 1·3 cm. longum, 5 mm. latum; segmenta lateralia uninervia, oblongo-lanceolata, apice obtusa, apiculata, 1·4 cm. longa, 2·2 mm. lata. *Corolla* caerulea, 1·3 cm. longa; tubus 3 mm. longus, extra glaber annulo pilorum apicali excepto, fauce pilis horizontalibus clausa; labium oblongum, apice 3-lobum, utrinque breviter pubescens, intus basin versus lamellis duabus parallelis longitudinalibus 3 mm. longis instructum. *Stamina* quatuor, fauce affixa; filamenta postica arcuata, sursum angustata, 3 mm. longa, basin versus 1 mm. lata; filamenta antica subrecta, 3 mm. longa, 1·2 mm. lata, lobo antherifero 0·5 mm. longo, lobo altero curvato obtuso 1 mm. longo; antherae monothecae, puberulae, valde ciliatae, 2·5 mm. longae. *Ovarium* late ovoideum, 1·5 mm. altum, 1·2 mm. diametro, glabrum, apice postice glandulis duabus papillatis instructum; stylus ensiformis, breviter bifidus. *Capsula* ovoidea, leviter compressa, 1 cm. longa, 6 × 4 mm. diametro, glabra, nitidula. *Semina* duo, alba, compressa, ovato-orbicularia,

7 mm. longa, 5·5 mm. lata, 2 mm. crassa, pilis inconspicuis arcte adpressis dense induta, pilis post humectandum patentibus satis longis albis mucilaginosis subtiliter plumosis.

Northern Rhodesia. Solwezi District: among grass in *Brachystegia* woodland at Mutanda Bridge, 20 June 1930, *Milne-Redhead*, 537 (type). Erect annual, 2 dm. high, leaves smooth, linear; persistent cotyledons just below the flower-heads; flowers blue. Mumbwa District: near Mumbwa, 1911, *Mrs. Macaulay*, 648, pro parte.

This species, which is known only from Northern Rhodesia, is remarkable in having part of its inflorescence borne in the axils of the persistent cotyledons. The hypocotyl is frequently 10 cm. or more in length, and the persistent crescent-shaped cotyledons form a false whorl in conjunction with the lowest pair of foliage leaves; in the axils of this false whorl the inflorescence is frequently but not invariably borne, as it sometimes occurs in the axils of the next false whorl of foliage leaves. *Blepharis glumacea*, S. Moore, with which *B. menocotyle* was found growing, also has persistent cotyledons, but they do not form a false whorl nor bear the inflorescences in their axils.

Both species were found growing in very hard dry ground in partial shade of species of *Brachystegia* and other deciduous trees. *B. menocotyle* was both flowering and fruiting, and in every specimen the cotyledons were alive and functioning as assimilatory organs.

The seeds, while still dry, appear smooth and glabrous, but after soaking in water are seen to be densely hispid with mucilaginous hairs (fig. 11). The hairs are present in the dry condition, but escape notice owing to their being closely appressed to the testa. This peculiar phenomenon occurs also in various other genera of Acanthaceae such as *Asteracantha*, *Chaetacanthus*, *Dyschoriste* and *Ruellia*, according to Lindau (Engl. u. Prantl, Nat. Pflanzenfam. vol. iv. 3B, p. 284: 1895).

The presence of two glands at the apex of the ovary on its posticous surface is a generic character of *Blepharis*, according to C. B. Clarke (Fl. Trop. Afr. vol. v. p. 94: 1899).—E. Milne-Redhead.

Fig. 1, an entire plant, showing the persistent cotyledons forming a false whorl with the first pair of foliage leaves, *natural size*; 2, bracts, × 2; 3, bifid anticous calyx segment, × 2; 4, a lateral sepal, × 2; 5, posticous sepal, × 2; 6, corolla seen from the back, × 4; 7, the same laid open, × 4; 8, an anticous stamen, × 4; 9, pistil, × 4; 10, capsule, lateral view, × 2; 11, moistened seed, showing the mucilaginous hairs, × 2.

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S.R-C.

Tabula 3199.

SAPIUM ACETOSELLA, *Milne-Redhead.*

Euphorbiaceae. Tribus Hippomaneae.

S. (Armata) Acetosella, *Milne-Redhead*; species nova a *S. suffruticoso*, Pax habitu humiliore, foliis minoribus subsessilibus eglandulosis, bracteis ♂ unifloris, floribus ♀ sessilibus, seminibus carunculatis differt.

Herba perennis, valde caespitosa, tota glabra; caules multi, erecti, e caudice crasso lignoso valde ramoso orti, simplices vel parte inferiore ramis paucis axillaribus instructi, circiter 10–15 cm. longi, usque ad basin foliiferi. *Folia* elliptica vel elliptice ovata vel obovata vel lanceolata, usque 1·8 cm. longa et 0·9 cm. lata, vel usque 2·3 cm. longa et 6 mm. lata, apice acuta, basin versus attenuata, vix petiolata, margine minutissime serrulata, eglandulosa, plus minusve glauco-viridia venis perinconspicuis; stipulae minutissimae, lineari-subulatae, mox deciduae. *Inflorescentiae* terminales, 2–3 cm. longae, inferne flores ♀ 1–4 gerentes, floribus ceteris ♂. *Flores* ♂:—*Bracteae* uniflorae, superne triangulares, acutae, irregulariter denticulatae, inferne biglandulosae; glandulae breviter compresse cornucopiiformes, 1 mm. longae. *Calyx* trifidus lobis triangularibus irregulariter denticulatis. *Stamina* 3, filamentis liberis. *Flores* ♀:—*Bracteae* superne subrhomboideae, medio utrinque dente grosso instructae, inferne biglandulosae; glandulae stipitatae, cornucopiiformes, leviter compressae. *Calyx* e sepalis 3 liberis late triangularibus denticulatis compositus, glandulis 1–2 sepalis alternantibus instructus. *Ovarium* glabrum, grosse 6-appendiculatum appendiculis aliformibus; styli basi in columnam brevem connati. *Capsula* tricocca, circiter 8 mm. alta, 8 mm. diametro, crustacea (nec lignosa nec drupacea), breviter 6-corniculata. *Semina* subcylindrica, circiter 5 mm. longa, 4 mm. diametro, valde et conspicue carunculata.

Northern Rhodesia. Mwinilunga District: in sandy plain after early burning, east of Mwinilunga and about 25 Km. west of R. Kabompo, 11 Sept. 1930, *Milne-Redhead*, 1105. Tufted perennial forming patches 3 dm. in diameter; leaves glaucous; inflorescence resembling that of *Rumex Acetosella*; fruits corniculate; seeds carunculate.

In the key to the genera of the tribe Hippomaneae of Euphorbiaceae in Engl. Pflanzenreich, vol. iv. 147 V. p. 13, Pax and Hoffmann separate the genus *Sapium* from *Stillingia* on account of the former having ecarunculate seeds. Yet they include under *Sapium* the Madagascan plant, *Sapium melanostictum* (Baill.) Pax et K. Hoffm., which has carunculate seeds. *S. Acetosella* agrees with *S. melanostictum* in this character, and can be distinguished from *Stillingia* by the base of the pericarp not being persistent after the dehiscence of the fruit.

The affinity of *Sapium Acetosella* appears to be with *S. suffruticosum*, Pax, an Angolan species the fruit and seed of which are unknown. *S. suffruticosum* has been placed by Pax and Hoffmann in their section *Armata*, the numbers of which are characterized by having six spiny outgrowths on their capsules. The ovary of *S. suffruticosum* has six wing-like appendages, which it is presumed would develop into the spines as the capsule ripens. Similarly *S. Acetosella* has an appendiculate ovary, and its capsule is known to be spiny. However, the capsule of *S. Acetosella* differs from all those that are known in the section *Armata* in its texture, being neither woody nor drupaceous, but crustaceous.

Not only is *S. Acetosella* of interest in connection with its taxonomic position, but it is remarkable on account of its very reduced habit, it being by far the smallest member of the genus. It is an undershrub with a woody underground rootstock, and forms large patches on the sandy plains in the Mwinilunga District of Northern Rhodesia. After the annual fires, and before the beginning of the rains, the plant sends up large numbers of flowering shoots, and at the same time leafy shoots develop from their lower buds. The shoots at the time of collecting were about 10–15 cm. high, and apparently were not yet mature, whilst the plant was in full flower, and a number of capsules were already ripe.—E. Milne-Redhead.

Fig. 1, plant, *natural size*; 2, portion of rhachis with bract and male flower, × 21; 3, 4, bract of male flower, flattened, abaxial and adaxial views, × 12; 5, calyx of same, from below, × 6; 6, portion of rhachis with bract and female flower, × 12; 7, female flower, abaxial view, showing calyx with intersepaline glands, × 12; 8, the same, with calyx removed, showing the wing-like appendages of the carpels, × 12; 9, dehiscing capsule, × 2; 10, a single coccus, × 2; 11, seed, adaxial view, × 2.

S.R-C.

Tabula 3200.

PELARGONIUM FRUTETORUM, *R. A. Dyer.*

Geraniaceae. Tribus Pelargonieae.

P. frutetorum, *R. A. Dyer in Kew Bull.* 1932, p. 446; affine *P. inquinanti*, L. et *P. zonali*, L.; ab illo foliis zonatis, petalis salmoneis nec cruento-rubris, ab hoc petalis latioribus, florum colore, sepalis oblongo-lincaribus apice rotundatis vel breviter apiculatis, foliis mollius pubescentibus lobis crenatis differt.

Herba suffrutescens, sparse ramosa, ramis plus minusve scandentibus, usque 1·25 m. alta. *Caules* pubescentes, pilis brevibus glandulosis et longioribus eglandulosis instructi, teretes, 5–7 mm. crassi, carnosulo-sublignosi. *Folia* orbiculata vel reniformi-orbiculata, basi cordata, 5-lobata, lobis crenatis vel crenato-dentatis, basalibus sese imbricantibus, usque 5 cm. longa, 4–7·5 cm. lata, vix carnosula, zonata, utrinque indumento molli satis induta; stipulae late vel latissime ovatae, 1·1–1·8 cm. longae, 0·9–1·3 cm. latae, abrupte acuminatae, acutae, mox membranaceae. *Pedunculi* 8–20 cm. longi, pubescentes, pilis glandulosis brevibus et eglandulosis longis instructi, usque 14-flori. *Bracteae* plerumque 6, stipulis similes sed multo minores. *Flores* pedicellati, pedicellis 3·5–5·5 cm. longis, infra calcar pilosis, calycis calcare tenui, 3·3–4·7 cm. longo eis adnato, pilis brevibus glandulosis et perpaucis longioribus eglandulosis ornato. *Sepala* oblongo-linearia, 6–8 mm. longa, circiter 1·5 mm. lata, breviter apiculata extra pilosa. *Petala* subaequalia, obovata, vel obovato-cuneata, apice plerumque rotundata, 3 inferiora usque 2 cm. longa, 1 cm. lata, leviter emarginata, extra dilutissime rosea, intus rosco-salmonea, 2 superiora saturatius colorata. *Stamina* 10, antheris fertilibus 7, 5 antesepala calyci fere aequilonga, 2 antepetala posteriora breviora. *Ovarium* dense villosum. *Fructus* fere 3 cm. longus, rostro pilis patulis albidis hirsuto.

South Africa. Cape Province: Bathurst Div.; near the Kowie River, 9 Oct., *Burchell*, 4029, 4090 (type); in Kowie bush near Salt Vlei, shady, *Britten*, 6891. Alexandria Div.; in bush at Bushmans River mouth, occasional, 12 May, *Galpin*, 10664.

In the wild state this species is found as a member of the middle tier of the coastal scrub vegetation. In consequence of its shady habitat

it assumes a somewhat scandent habit and seldom flowers profusely, and is never very abundant in one place. It was from a living plant from the type locality, brought to Kew by Miss E. M. Hill during 1931, that the accompanying figure was drawn. A specimen has been preserved in the Kew Herbarium under the number P. 103. As compared with wild specimens, the cultivated plants show a more compact growth, and a more pronounced zonal leaf-marking, and the sepals are more uniformly narrowed towards the apex. The beautiful salmon-pink colour of the flowers, combined with the dark zonal leaf-marking, make it a very desirable species for cultivation.

In the diagnosis, *P. frutetorum* has been compared with *P. inquinans* and *P. zonale*, both of which occur in the Eastern Cape Province, rather than with cultivated species with no "wild" history and which may well have originated by hybridization. Although *P. inquinans* and *P. zonale* occur in the same botanical region, neither species has been found in the coastal bush to which *P. frutetorum* is restricted.

The true relationship between the wild species of this group has certainly been obscured by the presence of artificial hybrids and possibly of natural hybrids also. The classifications of Harvey (Harv. and Sond. Fl. Cap. vol. i. p. 198: 1860) and Knuth (Engl. Pflanzenr. vol. iv. 129, p. 439 : 1912) include too many forms under *P. inquinans* and *P. zonale*, but owing to the delicate nature of the flowers and the absence of adequate herbarium material accompanied by good field notes, the solution of the various problems concerned lies more in the hands of residents than with overseas botanists.—R. A. Dyer.

Fig. 1, a branch showing the spreading scandent tendency of the plant, *natural size*; 2, pedicel and flower, with petals removed, the solid basal part of the pedicel long-pilose, the portion fused with the calyx-spur glandular-pubescent with only a few long hairs, and the pilose sepals with fewer glandular hairs, × 1·5; 3, staminal tube opened out, 3 staminodes and 2 posterior stamens viewed from the back; the two short filaments fused on the outside of the staminal tube, their anthers dehiscing extrorsely; the anthers of the longer stamens opening in a circle round the immature style, × 3; 4, ovary with rostrum and 5-branched style, × 4.