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ERRATA

- page 7, line 7
delete the parenthesis before 203
- page 9, line 1
for ed read de
- page 50, line 35
for (1864) read (1904)
- page 67, line 26
for *Curcurbita* read *Cucurbita*
- page 72, line 5
for 1 read 3
- page 72, line 6
for 3 read 1
- page 77, line 18
for is read are
- page 117, line 23
for showed read shows
- page 125, line 15
for Lyons read Lyon
- page 165, line 19
for Baskervillea read Baskervilla
- page 171, line 4
after satisfied insert in 1933
- page 196, line 5
for orchidaceae read Orchidaceae

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~~Schweinfurth~~

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NOTES ON AMERICAN ORCHIDS

BY

CHARLES SCHWEINFURTH

THE FOLLOWING NOTES on American orchids consist chiefly of nomenclatorial reductions occasioned by a critical study of collections recently received from Costa Rica.

The sequence of genera follows that of Engler and Prantl in "Die natürlichen Pflanzenfamilien".

Ponthieva Türckheimii Schlechter in Fedde Repert. 3 (1906) 47, as *Ponthiea Türkheimii*.

Ponthieva graciliscapa Schlechter in Fedde Repert. Beihefte 19 (1923) 166.

It appears that the Costa Rican *Ponthieva graciliscapa* is conspecific with the Guatemalan *P. Türckheimii* as shown by a careful comparison between the types of the two concepts. The type of the latter species is described as rather taller than *P. graciliscapa*, but another Guatemalan collection of *P. Türckheimii* has quite the measurements of *P. graciliscapa*. It is noteworthy that the altitude where each type was collected is nearly the same, and especially that the flowers of the two concepts are practically identical.

One Costa Rican collection of this species (an immature plant) is only about 21 cm. tall with the smallest leaf-blade measuring about 3 cm. long and 1.3 cm. wide.

Liparis tipuloides (*Lindl.*) *Schlechter* in *Fedde Repert. Beihefte* 19 (1923) 91.

Microstylis tipuloides Lindley in *Ann. & Mag. Nat. Hist.* 15 (1845) 256.

Malaxis tipulodea O. Kuntze *Rev. Gen. Pl.* 2 (1891) 673.

Liparis eustachys *Schlechter* in *Fedde Repert. Beihefte* 19 (1923) 91.

I agree with *Schlechter* that the species described as *Microstylis tipuloides* should be transferred to the genus *Liparis*, for, although it has an abbreviated column, the anther appears to be opercular and incumbent as in *Liparis* and not erect as in *Malaxis*.

Although *Microstylis tipuloides* originated in Colombia (Popayan), it was reported in 1866 from Costa Rica (near San Miguel) by H. G. Reichenbach.

As a result of *Ridley*'s rather misleading description of *Microstylis tipuloides* in his monograph in *Journ. Linn. Soc. Bot.* 24 (1888) 332, *Schlechter* erected *Liparis eustachys* declaring that his new species doubtless represented *Reichenbach*'s Costa Rican record of *Microstylis tipuloides*. *Schlechter*'s statement that the leaves of the latter species are shorter and narrower than those of the Costa Rican form is not borne out by an examination of a photograph of typical *Microstylis tipuloides*. In this record the leaves are approximately similar to those depicted in a drawing of the type of *Liparis eustachys* of which the supposedly shorter inflorescence is quite immature toward the apex. The flowers of each species appear to be of nearly the same size and form, with the exception that in *Microstylis tipuloides* the lip is represented as acuminate, whereas in *Liparis eustachys* it is shown as acute.

Pleurothallis obliquipetala *Acuña & Schweinfurth sp. nov.*

Herba minima, caespitosa, muscicola. Radices fibrosae, numerosae. Caules minuti, filiformes, maxima pro parte vaginis scariosis celati. Folia oblanceolata, acuta vel obtusa, inferne sensim angustata. Inflorescentia perbrevis. Flores singuli vel bini. Sepala petalaeque membranacea. Sepalum dorsale peranguste lanceolatum, longe acuminatum, trinervium. Sepala lateralia ovato-lanceolata, abrupte longe acuminata, parte inferiore connata. Petala oblique rhombico-lanceolata, acuminata. Labellum linguatum, basi lobulato-dilatatum, apice late rotundatum; discus medio bicarinatus, parte superiore papillosus.

Plant minute, caespitose, together with mosses forming a dense mat. Roots numerous, fibrous, flexuous, glabrous, as stout as the sheathed stems. Stems up to about 5 mm. long, filiform, monophyllous, mostly concealed by three imbricating loose tubular scarious sheaths. Leaves oblanceolate to obovate, obtuse or acute, gradually narrowed into a slender petiole, up to 11 mm. long and 3.4 mm. wide when expanded, commonly conduplicate and apparently very fleshy in the living state. Inflorescence very short. Flower solitary or two, large for the plant, membranaceous; perianth segments apparently subparallel. Dorsal sepal very narrowly lanceolate, long-acuminate to an obtuse tip, about 5.1 mm. long and 1.6 mm. wide near the concave base, 3-nerved with the nerves carinate dorsally. Lateral sepals ovate-lanceolate, connate for the basal third, rather abruptly long-acuminate, about 5.2 mm. long, 3-nerved with the inner nerves short and indistinct and the two outer nerves prominent and carinate dorsally, each free portion about 2 mm. wide. Petals asymmetrically rhombic-lanceolate with the anterior margin dilated, acuminate, about 2.6 mm. long and 1 mm. wide in the middle, 1-nerved, irregularly

crenulate above the middle on the anterior margin. Lip lingulate, lobulate-dilated on each side near the base, sessile, broadly rounded at the apex, 3-nerved, slightly crenulate above, about 3.5 mm. long, 2 mm. wide near the base, about 1.6 mm. wide near the apex; disc papillose above the middle especially toward the apex, with a pair of low slightly converging keels near the middle. Column about 2 mm. long, uniformly membranaceous-winged above the base; rostellum suborbicular, convex, decurved.

A collection of this species in the herbarium of the New York Botanical Garden (*Shafer 9048*) is apparently in a more advanced condition than the type, for it has generally longer leaves (reaching 23 mm. in length) and very mature perianths on the summit of the ovoid ovaries.

The nearest ally of *P. obliquipetala* appears to be *P. semperflorens* Lindl. which differs in having elongate peduncles, and about twice smaller flowers with broader dorsal sepal, dissimilar petals and different lip. Vegetatively it suggests *P. bicristata* Cogn., *P. calcarata* Cogn., *P. cryptantha* Cogn. and *P. mornicola* Mansf.

Pleurothallis obliquipetala was sent and tentatively described (but not published) by Dr. J. Acuña of Santiago de las Vegas, Cuba.

CUBA: Province of Oriente, Estribo del Este, Pico Turquino. August 1, 1935. *J. Acuña 9540* (TYPE in Herb. Estación Central Agronomica, Santiago de las Vegas, Cuba; DUPLICATE TYPE in Herb. Ames No. 46830); Oriente, Gran Piedra. At about 1500 meters altitude. On tree trunk. March 4, 5, 1911. "Flor purpurea". *J. A. Shafer 9048*.

Epidendrum notabile *Schlechter* in Fedde Repert. Beihefte 19 (1923) 121.

In an interesting collection of Costa Rican orchids sent by Manuel Valerio, there is a specimen referable to this species. It apparently differs from the type in several particulars. The inflorescence is terminal only (not

lateral and terminal), the sepals are 5-nerved rather than 3-nerved, the petals are acute rather than acuminate and the subquadrate lip (which is scarcely pandurate when expanded) is about 10 mm. long from the auricles of the deeply cordate base and about 12 mm. wide below the middle. The ovary appears to be definitely fusiform.

COSTA RICA: La Palma. At 1500 meters altitude. "Flor blanquecino-verdosa". November 1937. *Manuel Valerio 2480*.

Oncidium cabagrae *Schlechter* in *Fedde Repert.* 9 (1911) 292.

Oncidium Rechingerianum Kränzlin in *Engler Pflanzenreich* IV. 50, pt. 2 (Heft 80) (1922) 202, fig. 18 C, a-c.

A drawing of the habit with a floral analysis of *Oncidium cabagrae* made under the supervision of Dr. Schlechter shows no appreciable differences from *O. Rechingerianum* as illustrated by a photograph of the type and a floral analysis (l.c.) made by Dr. Kränzlin. Slight differences consist in the somewhat smaller leaves and nodding upper part of the raceme of *O. Rechingerianum*.

A flower from the type of *O. cabagrae* (kindly sent by Dr. R. Mansfeld of Berlin) seems to resemble not only the analysis of typical *O. Rechingerianum*, but also a large series of Costa Rican specimens referred to that species. In this flower the dorsal sepal appears to be somewhat smaller than specified for *O. cabagrae* and to approach in size that of *O. Rechingerianum*. Moreover, the callus at the base of the lip appears to be reduced to an oblong thickening extended into an apical pair of lobules thus differing from the typical form of *O. Rechingerianum*.

Apparently *O. cabagrae* is a rather variable species with the variation shown in the size of the plant, the breadth of the leaves, the strictness of the inflorescence, the size of the floral segments, the lobing of the callus

on the lip and the degree of lobing of the column-wings. It appears to be frequent in Costa Rica and occurs in the Province of Chiriqui, Panama.

Oncidium obryzatoides *Kränzlin* in Engler Pflanzenreich IV. 50, pt. 2 (Heft 80) (March 1922) 240.

Oncidium fulgens Schlechter in Fedde Repert. Beihefte 17 (December 1922) 83.

Oncidium varians Schlechter in Fedde Repert. Beihefte 19 (1923) 151.

Oncidium Brenesii Schlechter in Fedde Repert. Beihefte 19 (1923) 257.

A photograph of the type of *Oncidium obryzatoides* in the Ames Herbarium shows that this species differs from the description in having flattened-ovoid rather than oblong pseudobulbs and in having the lateral lobes of the lip triangular-ovate or semioblong and auriculate instead of linear and retuse.

A drawing of *Oncidium fulgens* made under the supervision of Dr. Schlechter together with specimens said to represent the type collection indicate that this concept is scarcely separable from *O. obryzatoides*. From the latter species, *O. fulgens* appears to vary in having somewhat narrower leaves, less prominently produced lateral lobes of the lip, more sharply lobulate callus on the lip and column-wings which are obtuse at the base. However, these tendencies are present in otherwise typical forms of *O. obryzatoides*.

Oncidium varians, of which there is an example of the type number in the Ames Herbarium, differs from typical *O. obryzatoides* in having more elongated pseudobulbs and leaves. The callus on the lip appears to be very similar to that of *O. fulgens*, and the base of the column-wings is either acute or obtuse.

Oncidium Brenesii, judging from analyses made from

the type, appears to be only a small, few-flowered form of *O. obryzatoides*. Its pseudobulbs are rounder, and its inflorescence is a simple few-flowered raceme. The parts of the flower, however, do not show any morphological differences from those of *O. obryzatoides*.

It appears to me that *O. angustisepalum* Kränzl. (in Engler Pflanzenreich IV. 50, pt. 2 (Heft 80) (1922) (203) is a closely allied plant and is possibly conspecific, as shown by a floral analysis; but this species was described from an inflorescence only, and the basal portion of the lip appears to be considerably narrower than that of *O. obryzatoides*.

Two other allies of *O. obryzatoides* appear to be *O. sclerophyllum* Kränzl., which has about twice smaller flowers, and *O. tetraskelidion* Kränzl., which is described and drawn as having acute or acutish sepals and petals, and is said to have the lateral lobes of the lip linear.

Oncidium obryzatoides apparently is a polymorphic species both vegetatively and florally. At one extreme are small plants about 10 cm. tall with elliptical leaves and 1- or 2-flowered racemes, while at the other extreme are large luxuriant plants up to 75 cm. tall with oblong-ligulate leaves and spreading many-flowered panicles. Florally the variation extends from spatulate-oblong petals about 1 cm. long and 4 mm. wide to broadly oblong-obovate petals about 1.4 cm. long and 9.5 mm. wide; the lateral lobes of the lip are more or less well-developed; the apical portion of the lip ranges from about 1 cm. to 2 cm. in width; the basal callus of the lip is now distinctly 5- (or more) lobulate with three distinct apical teeth and now obscurely lobulate with only two distinct apical lobes. It is altogether a most variable species in which similar parts may vary in the same flower!

Dichaea Morrisii *Farwett & Rendle* in Journ. Bot.

48 (1910) 107: Fl. Jam. 1 (1910) 139, t. 30, fig. 31-36.
Dichaea Bradeorum Schlechter in Fedde Repert.
Beihefte 19 (1923) 154.

The description of *Dichaea Bradeorum* together with a habit drawing and floral analysis of that concept made at Berlin show that it is referable to *D. Morrisii* of which I have seen the co-type (Hardware Gap, Jamaica, *G. E. Nichols*).

Dichaea Bradeorum, to be sure, is said to possess smooth sepals, whereas those of *D. Morrisii* are minutely but clearly ciliolate under the hand lens. The outline and proportions of the lip appear to be very similar in both concepts. As a matter of fact, the sepals and petals of *D. Morrisii* seem to be rather more acuminate than those illustrated in Fl. Jam. t. 30 and thus to approximate those of *D. Bradeorum*.

In the Costa Rican specimens examined (in all of which the sepals are more or less ciliolate), there appears to be considerable variation in the degree of acumination of the parts of the perianth as well as in the prominence of the lateral lobules or auricles of the lip. The latter vary from elongate falcately triangular-linear lobes to short bluntly triangular projections.

JAMAICA: Mt. Moses. At 3500 feet altitude. On trees. Flowering in July. J.P. 2269, *Morris* (TYPE of *D. Morrisii*): Hardware Gap. July 17, 1903. *G. E. Nichols*.

SANTO DOMINGO: Constanza. At 1200 meters altitude. Epiphyte "im Laubwald". Flowers greenish yellow, lip blue on the margin. May 1910. *Türckheim 3283*: Province of Monte Cristi, Monción, Cordillera Central, at junction of Río Cenobi and Río Cenobicito. At c. 700 meters altitude. At edge of stream. "20-VI-1929." *E. L. Ekman 12928*. (Both collections in advanced flower).

COSTA RICA: Carpintera. Blooming in April 1908. *A. & C. Brade 1305* (TYPE of *D. Bradeorum*): La Palma. "Alt. 1190. 3-XI-1922." *A. M. Brenes (74) 404* [fl. passé]; "Alt. 1250 m. 19-XII-1922." *Brenes 511*. [fl. passé]; "Alt. 1290 m. 8-II-1923." *Brenes 521*: La Palma

ed San Ramón. "Epiphyte. . . . bois et arbres des pâturages. Alt. 1150-1250 m. 5-X-1927." *Brenes* (63) 1642. [fl. passé]: Cataratas de San Ramón. "17-20-IV-1935." *M. Quirós* (122) 111. [fl. passé]: San Jerónimo de Moravia. "19-IX-1933. Comprada a un campesino." *Brenes* 218: La Union General. "fl spotted violet." May 1935. *C. H. Lankester s.n.*

Dichaea muricata (*Sw.*) *Lindley* Gen. & Sp. Orch. Pl. (1833) 209—*Fawcett & Rendle* Fl. Jam. 1 (1910) 137, t. 30, fig. 22–25.

Cymbidium muricatum *Swartz* in *Nov. Act. Upsal.* 6 (1799) 71; *Fl. Ind. Occ.* (1799) 1454.

Dichaea latifolia *Lindley* Gen. & Sp. Orch. Pl. (1833) 208.

Dichaea Moritzii *Reichenbach filius* in *Nederl. Kruidk. Arch.* 4 (1858) 328.

Dichaea muricata *Lindl.* β . *latifolia* *Lindl.* ex *Grisebach* *Fl. Brit. W. Ind.* (1864) 624.

Dichaea muricata *Lindl.* var. β . *Moritzii* *Cogniaux* in *Martius Fl. Bras.* 3, pt. 6 (1906) 488.

Dichaea ovatipetala *Schlechter* in *Fedde Repert. Beihefte* 19 (1923) 266.

Dichaea similis *Schlechter* in *Fedde Repert. Beihefte* 19 (1923) 307.

Dichaea verrucosa *Ames & Schweinfurth* in *Sched. Orch.* 8 (1925) 83.

The description of the Jamaican *Cymbidium muricatum* of *Swartz* and the diagnosis of *Dichaea muricata* by *Fawcett* and *Rendle* state that the flowers are glabrous or else make no mention to the contrary. However, in a very large series of specimens which I take to be undoubtedly referable to this species, the sepals are usually more or less verrucose on the dorsal surface but occasionally appear to be smooth. This character, therefore, seems to be variable or evanescent, and not to be of diagnostic weight.

The Costa Rican *Dichaea ovatipetala* differs from typical *D. muricata* in having sparingly subverruculose sepals, somewhat broader petals and a minutely papillose-ciliate margin on the basal portion of the lip. Though I have been unable to examine any Jamaican specimens of *D. muricata*, a flower of that species from Guadeloupe shows both the sparsely verruculose sepals and the minutely ciliate base of the lip. The breadth of the petals appears to be a variable character, but in no flower of *D. muricata* which I have examined could they be called "linear", as described by Kränzlin in his monograph of *Dichaea* (in Engler Pflanzenreich IV. 50 (Heft 83) (1923) 37).

The Costa Rican *Dichaea similis* is scarcely to be distinguished from *D. ovatipetala* save by its somewhat narrower petals, smooth basal margins of the lip and rather longer and more acuminate lateral lobules or auricles of the lip. However, I have seen one Costa Rican specimen (*Quirós 260 = 240*) in which one petal is much broader than the other, with the papillose-ciliate base of the lip as in *D. ovatipetala*, but having long slender lateral lobes of the lip, as in *D. similis*.

Another Costa Rican species, *Dichaea verrucosa*, has larger flowers than those of *D. ovatipetala* and *D. similis*, but is otherwise precisely similar to a combination of those concepts.

In this connection it seems advisable to correct some statements made in the type description of *Dichaea vaginata* Reichb.f. ex Kränzl. (in Engler Pflanzenreich IV. 50 (Heft 83) (1923) 42) and thus to eliminate this species from the puzzling alliance of *D. muricata*. In his description Kränzlin (l.c.) says: "ovarium setosum, capsula breviter tamen, densissime echinata." However, a note on a record of the Endres collection from the Reichenbachian Herbarium which must be regarded as the type says:

“Ovary glabrous.” Since a major cleavage in *Dichaea* is commonly made on the condition of the ovary, it results that *D.vaginata* is removed from the category of *D.muricata*. In addition, Kränzlin states in his description of the lip of *D.vaginata*: “lobulos . . . divergentes non retrorsos”; whereas he draws these lobes as strongly retrorse in his floral analysis (l.c. p. 43, fig. 4 D, a-c) and, moreover, they are pictured as retrorse in the record of the Endres collection.

Other species which appear to be closely allied to *D.muricata* and which may be found to be variants of one polymorphic species are *Dichaea Acostaei* Schltr., *D.costaricensis* Schltr., *D.neglecta* Schltr. and *D.oxyglossa* Schltr.

Dichaea muricata is apparently a widely distributed and variable plant (both vegetatively and florally) and extends from the West Indies and Guatemala to Brazil.

***Dichaea Powellii* Schlechter** in Fedde Repert. Beihefte 17 (1922) 90.

Dichaea Brenesii Schlechter in Fedde Repert. Beihefte 19 (1923) 264.

The description of *Dichaea Brenesii*, supplemented by a habit drawing and floral analyses of that species made at Berlin, shows that it should be regarded as a synonym of *D.Powellii*.

For separation from *D.Powellii*, Schlechter relied on the longer leaves of *D.Brenesii* and its supposedly dissimilar lip. However, in a specimen of the type number of *D.Powellii* in the Ames Herbarium, the narrowly linear leaves are up to about 8.5 cm. long and 5 mm. wide (well within the range of size of the leaves in *D.Brenesii*) and the lip approaches that species very closely. Indeed the floral parts assigned to *D. Brenesii*, even with their measurements, appear to be a close approximation to

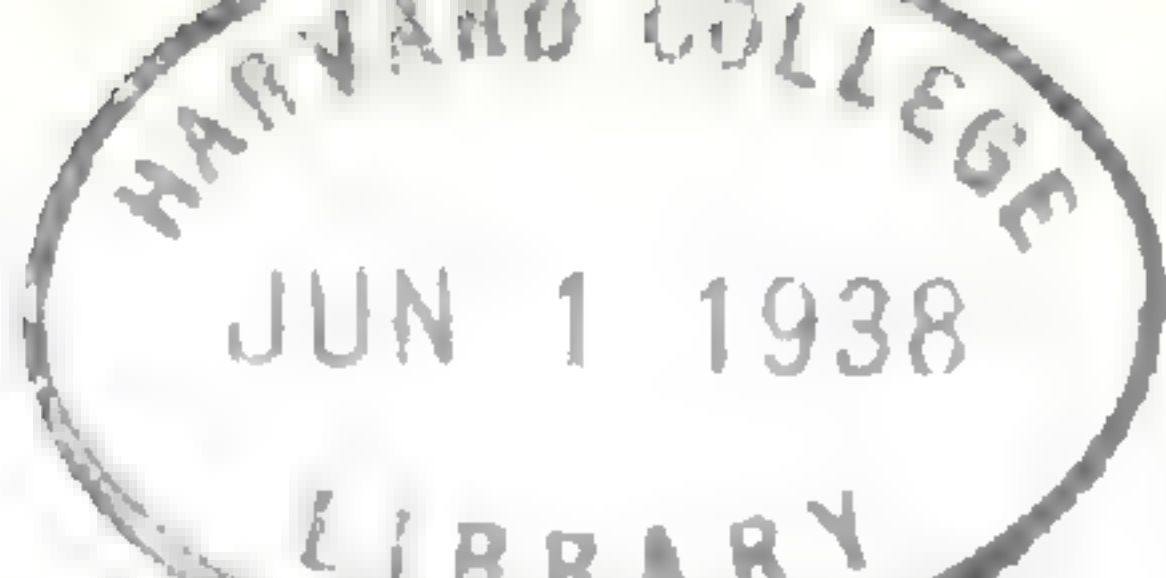
those of *D. Porcellii*. Rather than the term "oblong", however, as used in the description of the sepals and petals of both species, the term "ovate-lanceolate" would be more applicable to the acute sepals, and "elliptic-ovate" a preferable term for the petals. Moreover, the lateral angles of the lip are short and obtuse rather than "acuminate" as credited to *D. Powellii*.

The only appreciable differences between the two concepts seem to be that the ligule on the column of *D. Brenesii* is described and drawn as linear and the flowers are noted as yellowish, whereas in *D. Porcellii* the ligule appears to be rather short and triangular while the sepals and petals are noted as yellow-greenish and the lip a deep blue.

HONDURAS: Department of Cortes, Santa Cruz de Yojoa. Epiphyte in dense tropical forest. At 2000 feet altitude. Sepals and petals old ivory, lip white with purple spots. Column white. November 7, 1933. *J.B. Edwards 584*. (The leaves in this collection are up to 13.6 cm. long and 7 mm. wide); Epiphyte in open mountain forest. At 2000 feet altitude. Sepals, petals and column light green. Lip dark blue mottled with white. August 26, 1933. *Edwards 516*.

COSTA RICA: San Pedro de San Ramón. "arbres des pâturages. Alt. 1075 m. XI. 1921. Fleurs jaune". *A.M. Brenes 66*: San Pedro de San Ramón. "arbres des pâturages. Alt. 1050 m. 12-VII-1925. Fleurs jaune verdâtres (avec le labelle tacheté de pourpre viol. pâle?)." *Brenes (141) 1343*: San Ignacio de Acosta (cult. at San José) "21-VI-1935." *Alfredo Brade 283*.

PANAMA: On hills near Bohio (in vicinity of Panama City). Sea level. Sepals and petals yellow-greenish, lip deep blue. *C.W. Powell 23*.



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STUDIES IN STELIS. VII

BY
OAKES AMES

TWO SPECIES OF STELIS from Costa Rica receive attention here, one a member of the section characterized by stigmatic lobes on the gynostemium, the other a member of the section in which the stigmas are more or less confluent beneath the triangular rostellum. Both species were collected by Alexander F. Skutch.

From our present knowledge of the orchid flora of Middle America, *Stelis* is preponderantly Costa Rican. With the addition of the species described below, the genus is now known to be represented in Costa Rica by forty-two species.

***Stelis planipetala* Ames sp. nov.**

Caules secundarii graciles, caespitosi, monophylli, vaginis tubularibus vestiti. Folium anguste oblongo-lanceolatum, utrinque attenuatum, apice conspicue tridentatum. Racemus gracilis, cum pedunculo folium excedens, multiflorus. Sepala lateralia ovato-elliptica, trinervia, intus glandulosa. Sepalum dorsale simile. Petala membranacea, subquadrata, leviter apiculata, uninnervia. Labellum a latere visum triangulum, superne excavatum, infra medium callo vel septo membranaceo ornatum. Columna petala aequans, antice utrinque lobo carnosio elliptico stigmatifero instructa.

EXPLANATION OF THE ILLUSTRATION

STELIS PLANIPETALA Ames. Plant drawn natural size from a dried specimen of the type. 1, a flower much enlarged showing the glandular sepals, petals, labellum. 2, petals, labellum and column much enlarged. 3, a petal much enlarged. 4, a labellum much enlarged showing the transverse callus. 5, labellum, as seen when depressed from its normal position, the petals shown in relation to the column (anther removed). The circular areas represent the receptive stigmas. Figures 1-5 drawn from specimens preserved in alcohol.

Drawn April 1938 by BLANCHE AMES



Secondary stems up to 4 cm. long, slender, monophyllous, caespitose, concealed by closely appressed sheaths. Leaf 6–13 cm. long, about 1 cm. wide, narrowly oblong-lanceolate, conspicuously tridentate at the apex with the middle tooth subulate and exceeding the somewhat larger lateral ones; lamina contracted toward the sulcate, slender base. Raceme 3–11 cm. long, borne on a slender elongated paucibracteate peduncle. Bracts of the raceme obliquely infundibuliform, 1–1.5 mm. long, about 2 mm. apart. Pedicels exceeding the bracts, slender, somewhat nodding. Flowers pale green, 3–4 mm. in diameter. Lateral sepals ovate-elliptic, about 2 mm. long, 1 mm. wide, 3-nerved, glandulose on the inner surface. Dorsal sepal similar. Petals 1 mm. long, hardly 1 mm. wide, subquadrate, imperceptibly if at all thickened at the apex, obscurely apiculate, 1-nerved. Labellum about 0.75 mm. long, cucullate, obscurely apiculate with a thickened septum below the middle. Column equalling the petals with the stigmatic processes elliptical and laterally produced.

Stelis planipetala, in the structure of the labellum, resembles *S. cucullata* Ames. The glandulose sepals and the imperceptibly thickened one-nerved petals serve to distinguish it.

COSTA RICA: Province of San José, vicinity of El General. At 1130 meters altitude. On mossy trunk in open woods. Flowers greenish white. August 1936. *Alexander F. Skutch 2825* (TYPE in Herb. Ames No. 49252).

***Stelis Skutchii* Ames sp. nov.**

Herba epiphytica. Caules secundarii graciles, monophylli, vaginis tubularibus vestiti. Folium coriaceum, anguste oblongum, utrinque attenuatum. Racemus multiflorus, folium excedens. Bracteae racemi urceolatae. Flores nutantes, purpurei. Sepala lateralia ovato-lanceo-

EXPLANATION OF THE ILLUSTRATION

STELIS SKUTCHII Ames. Plant drawn natural size from a specimen of the type. 1, a flower showing the glandular sepals. 2, a labellum much enlarged. 3, a petal much enlarged. 4, a column (anther removed) showing the confluent stigmas beneath the projecting rostellar process. 5, a labellum much enlarged, as seen from the side.

Drawn April 1938 by BLANCHE AMES



lata, trinervia, intus plus minusve glandulosa, extus per medium unicarinata, apice breviter apiculata. Sepalum dorsale oblongo-lanceolatum, intus sparse glandulosum, extus per medium obscure unicarinatum, apice breviter apiculatum. Petala flabellata, valde carnososa, supra medium conspicue incrassata. Labellum linguiforme, valde incrassatum, utrinque obscure lobatum. Columna carnososa, petala aequans.

An herbaceous epiphyte 15–20 cm. tall with elongated racemes of dull purplish nodding flowers. Secondary stems 5–10 cm. long, slender, densely caespitose, concealed by several elongated tubular sheaths, monophyllous. Leaves including the slender sulcate base 10–13 cm. long, about 1 cm. wide, coriaceous, narrowly oblong, tapering at base and narrowed toward the apex, bilobulate with an apicule between the lobules. Raceme 11–16 cm. long, slightly exceeding the leaf. Peduncle sheathed at base by a conduplicate, acute sheath which is 12 mm. long and about 4 mm. wide when spread out. Bracts of the raceme about 2 mm. long, 4 mm. apart, or the lowermost ones almost contiguous, obliquely infundibuliform, equalling the pedicels of the nodding flowers. Pedicels about 4 mm. long, smooth. Flowers twenty-five to fifty, vinous-purple when dry. Lateral sepals about 4.5 mm. long, 2 mm. wide below the middle, ovate-lanceolate, apiculate, sparsely glandulose on the inner surface, 3-nerved, on the outer surface distinctly carinate along the mid-nerve. Dorsal sepal 6 mm. long, 2 mm. wide, oblong-lanceolate, apiculate, 3-nerved with the middle nerve lightly if at all carinate. Petals scarcely 1 mm. long, 1 mm. wide, flabellate, much thickened above the middle, 1-nerved. Labellum 1 mm. long, about 0.5 mm. wide, linguiform with an obscure acute lobule on each side near the middle, 3-nerved, quadrate-thickened below the middle, minutely glandulose near the base, lightly concave

on the upper surface, slightly narrowed above the middle, rounded at the apex. Column equalling the petals, similar to the column of *S. Standleyi* Ames.

Stelis Skutchii is closely allied to *S. Standleyi*, differing from it chiefly in the dissimilarly proportioned sepals and lip. It is noteworthy that the dorsal sepal in *S. Skutchii* is strikingly unlike the lateral sepals, being oblong-lanceolate rather than ovate-lanceolate.

In the same locality where the type was found, Dr. Skutch discovered a single plant in a more advanced state of maturity. The flowers of this single specimen are identical with those of *S. Skutchii*, but the vegetative parts show differences. For example, the plant is 30 cm. tall and the leaves are from 1.4-2 cm. wide, borne on secondary stems which attain a length of 11 cm.

S. Skutchii is a member of the alliance to which *S. rubens* Schltr. belongs.

COSTA RICA: Vara Blanca de Sarapiquí, north slope of Central Cordillera. At 1500-1750 meters altitude. On fallen tree. Flowers dull purple. July-September, 1937. *Alexander F. Skutch 3126* (TYPE in Herb. Ames No. 49253); Flowers tinged with maroon. *Skutch 3235*.

A NEW CAMPYLOCENTRUM FROM THE DOMINICAN REPUBLIC

BY
OAKES AMES

THE SARCANTHINAE of the West Indies consist of several genera in which some of the species are aphyllous and in flower-structure call to mind the Old World species of *Angraecum* and its allies. An altogether puzzling species of this alliance has been received from the Dominican Republic where it was collected by L. Ariza Julia near La Romana. The flowers are angraecoid in appearance, resembling somewhat the flowers of *Mystacidium distichum*, yet they exhibit the distinctive characters of *Campylocentrum*, differing from the known West Indian species in having an elongated slender spur. From specimens preserved in alcohol the roots appear to have been greenish and doubtless possess chlorophyll as is true of species of *Taeniophyllum*, exercising the functions associated with foliar structures. The abbreviated stems are concealed by the mass of these roots from among which the flower-shoots emerge. From the specimens examined it would seem that the flowers open in succession, only one flower being expanded while the succeeding ones are still in bud.

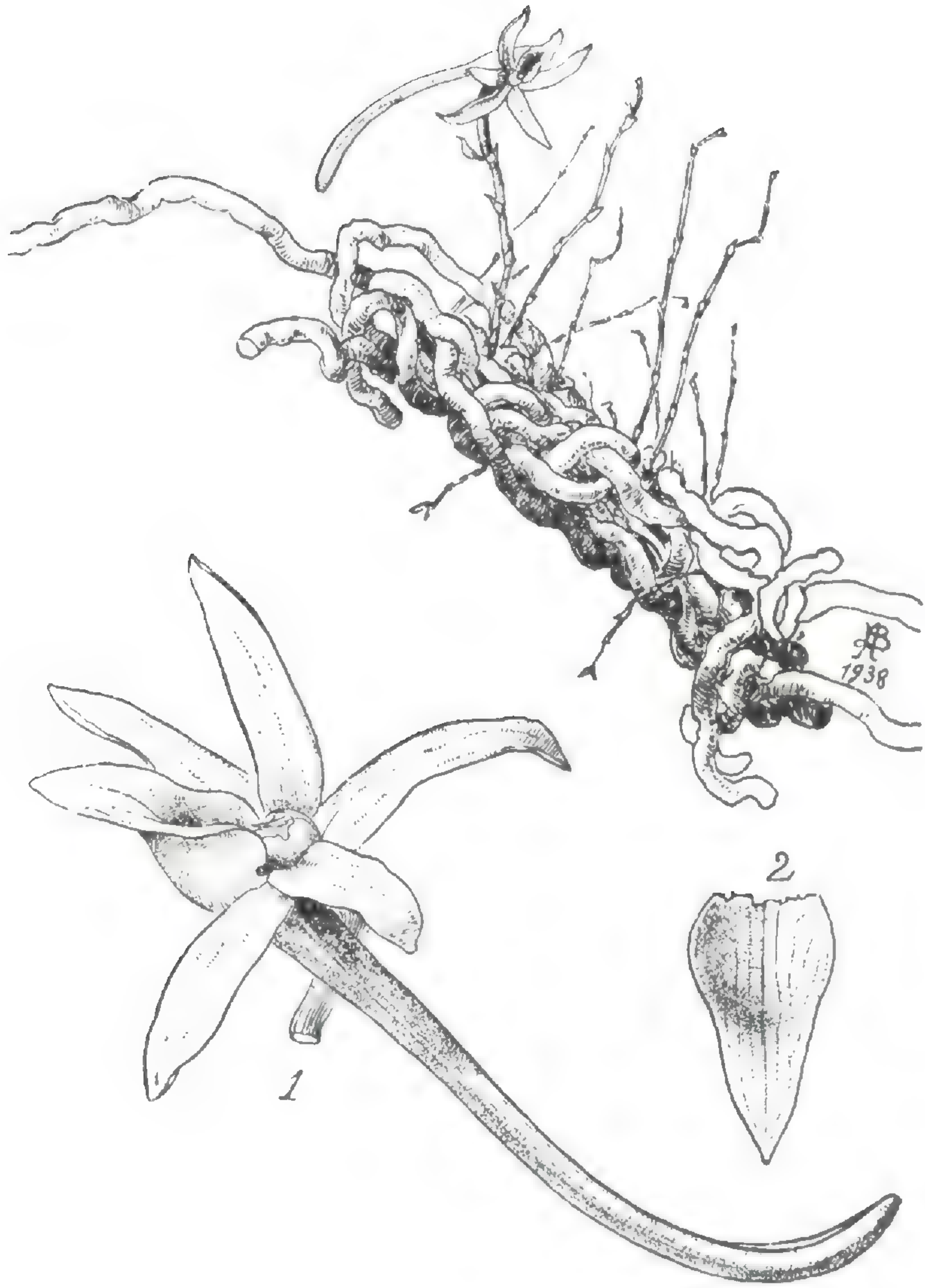
***Campylocentrum Ariza-Juliae* Ames sp. nov.**

Herba epiphytica, perpusilla, acaulis, aphylla. Radices vermiformes, elongatae, dense fasciculatae. Pseudobulbus nullus. Scapi adscendentes, graciles, pauciflori. Flores mediocres, in scapo solitarii vel pauci, verisimiliter succedanei. Sepala oblonga, supra medium leviter attenuata, apice valde incrassata, trinervia. Sepalum dorsale simile. Petala oblonga, trinervia, incrassata, acuta. Labellum indivisum, valde concavum, acutum, in calcar

EXPLANATION OF THE ILLUSTRATION

CAMPYLOCENTRUM ARIZA-JULIAE *Ames*. Plant drawn natural size from a specimen preserved in alcohol. 1, flower much enlarged. 2, labellum about three times natural size.

Drawn April 1938 by BLANCHE AMES



elongatum cylindraceum productum. Columna generis. Pollinia duo.

A leafless epiphyte with tangled vermiform roots. Roots 2–4 mm. in diameter, elongated, greenish white, closely appressed in a tangled mass to twigs and branches of trees. Scapes up to 4 cm. long, the older ones persisting, seeming to spring from the roots, slender, bearing several sheathing bracts which are about 2 mm. long and acute at the apex. Ovary sharply arcuate above the middle, verruculose. Flowers few, light yellowish green, opening in succession. Sepals and petals spreading, similar, about 8 mm. long, about 1 mm. wide, oblong, narrowed toward the tip, acute, 3-nerved, rather fleshy. Labellum simple, produced at base into an elongated slender cylindrical spur which is about 15–19 mm. long; above the spur the labellum is trulliform, about 6 mm. long, strongly concave, fleshy, acute, ecallose. Column abbreviated. Pollinia two, rounded.

HISPANIOLA: Dominican Republic, near La Romana. Leafless orchid with light yellowish flowers. April 1937. *L. Ariza Julia s.n.* (TYPE in Herb. Ames No. 46738).

A NEW TELIPOGON FROM COSTA RICA

BY

OAKES AMES

FROM ALEXANDER F. SKUTCH there has been received a rather distinct Costa Rican species of the genus *Telipogon* collected in 1937 at Vara Blanca de Sarapiquí. From a casual examination of the flowers, it would seem that this species is identical with *T. parvulus* as described by Charles Schweinfurth in 1937 in the fourth volume of the Botanical Museum Leaflets. But on close study it becomes quite clear that there are differences between it and *T. parvulus* which taken together constitute a new species. The petals and lip are broader, are more decidedly rhombic than in *T. parvulus*, and have fewer nerves; the gynostemium bears elongated setose hairs and is not merely pubescent. Furthermore, the labellum is characterized by dark-banded nerves. As originally described, *T. parvulus* was in part differentiated from its allies by having 9-nerved petals and a 14-nerved lip. In his monograph of the genus *Telipogon*, Fritz Kränzlin was inclined to regard the number of perianth nerves as a substantial means of differentiation, but from my studies it has become evident that the nerves vary from plant to plant of the same species if an abundance of material is available for study, and is consequently an unreliable guide to specificity. Therefore *T. parvulus* should not be separated from *T. setosus* by the difference in the number of perianth nerves, but rather by the form and color of the petals and lip and by the elongated setose hairs produced by the gynostemium.

***Telipogon setosus* Ames sp. nov.**

Herba parvula. Caulis vaginis foliorum distichorum omnino tectus. Folia lineari-lanceolata, coriacea, extus

per medium carinata, prope apicem glandulosa. Inflorescentiae axillares, laxe pauciflorae. Flores succedanei. Sepala acuta, extus per medium carinata, uninervia. Petala multo majora, rhombico-ovata, septemnervia, intus prope basim glandulosa. Labellum transverse ellipticum, latius quam longius, acutum, prope basim glandulosum, callo bullato utrinque ornatum. Columna inaequaliter setosa, dense et breviter glandulosa.

Roots vermiform, whitish, longitudinally sulcate when dry. Stems short, concealed by the sheaths of the distichous linear-lanceolate leaves, the entire plant including the inflorescence 10–14 cm. tall. Leaves 1–3 cm. long, up to 3 mm. or more wide, obliquely ascending, distinctly carinate when dry, acute, with the apical margin minutely glandulose. Peduncles axillary, together with the raceme 10–13.5 cm. or more long, smooth. Flowers 21–23 mm. across, opening in succession, usually two being simultaneously expanded, the rachis elongating as the buds mature. Bracts triangular, acute, fleshy, much shorter than the slender pedicels of the flowers. Pedicels together with the ovary about 1.6 cm. long when the flowers are fully developed. Sepals similar, about 7 mm. long, about 2 mm. wide, lanceolate, acute, distinctly carinate on the outer surface along the mid-nerve, cymbiform at the apex, 1-nerved. Petals about 11 mm. long and equally wide, rhombic-ovate with a finely ciliolate margin, conspicuously 7-nerved, provided with numerous glandular hairs on the inner surface near the base. Labellum about 1 cm. long, 1.3 cm. wide, transversely elliptic, acute, 10-nerved, minutely ciliolate on the margin, minutely glandular on the inner surface at the base with a bullate callus on each side near the base of the column. Column 3 mm. long, very fleshy, provided with numerous setose hairs on the dorsal surface and densely covered with shorter but conspicuously elongated hairs on the

EXPLANATION OF THE ILLUSTRATION

TELIPOGON SETOSUS Ames. Plant drawn natural size from a dried specimen of the type. 1, flower enlarged. 2, column (anther removed) and basal part of the labellum much enlarged, showing the setose hairs on the column, one of the pulvinate calli and the glandular hairs on the labellum. 3, the two pairs of pollen-masses, stipe and viscid disc much enlarged.

Drawn April 1938 by BLANCHE AMES



anterior surface. Pollinia four, in pairs, separated from the strongly arcuate viscid disc by an elongated stipe.

COSTA RICA: Vara Blanca de Sarapiquí, north slope of Central Cordillera. At 1500-1750 meters altitude. On branches of tree. Flowers yellowish veined with maroon. July to September, 1937. *Alexander F. Skutch 3246* (TYPE in Herb. Ames No. 46702).

AN ADDITION TO THE GENUS TELIPOGON
FROM COSTA RICA

BY
CHARLES SCHWEINFURTH

A SMALL COLLECTION of orchids from Costa Rica recently sent to us for determination contained a *Telipogon* which is apparently undescribed. It seems to be unique among the Central American species of the genus by reason of its dwarf vegetative structure and relatively large flower.

Telipogon ampliflorus *C. Schweinfurth sp. nov.*

Herba epiphytica, nana cum flore magno. Caulis brevis, inferne cum radicibus numerosis flexuosis, superne cum foliis nonnullis approximatis lanceolato-ellipticis. Scapus uni- vel biflorus. Sepala late lanceolata, acuminata, trinervia. Petala multo majora, subquadrato-rhombica, multinervia, acuta. Labellum transverse rhombico-ovatum, multinervium. Columna brevissima, postice setosa.

Plant dwarf but with a large flower, about 11 cm. tall including the flower. Stem short, arcuate, producing in the lower portion numerous stout flexuous roots and in the upper portion several approximate leaves. Leaves seven, lanceolate-elliptic, up to about 5.6 cm. long and 1 cm. wide (some blades very small), acute, narrowed to a sessile clasping base. Scapes axillary, apparently 1- or 2-flowered, about 5-6 cm. long. Flower large and showy with widely spreading perianth segments. Dorsal sepal broadly lanceolate, concave below, about 1.83 cm. long and 7.6 mm. wide, acuminate, mucronate with a sub-apical keel on the outer surface, 3-nerved. Lateral sepals similar, broadly lanceolate, concave below, about 1.83 cm. long and 6.4 mm. wide, acuminate, dorsally carinate

near the apex, 3-nerved, slightly oblique. Petals subquadrate-rhombic, about 3.5 cm. long and 2.9 cm. wide in the middle, abruptly acute, cuneate toward the base, 15-nerved near the middle, with very obscure reticulations, setose near the base inside, very minutely papillose-ciliolate especially toward the base. Lip transversely rhombic-ovate, acute with a short dorsal keel, about 2.6 cm. long and 3.4 cm. wide below the middle, 23-nerved below the middle, minutely papillose below the middle, very minutely cellular-ciliolate especially near the base. Column very short and broad, protuberant on the disc of the lip, finely short-pubescent in front, long-setose in the rear (agglutinated in this specimen). Pollinia four, in two pairs, complanate-obovoid at the broadened apex of a long linear stipe. Viscid disc linear-oblong, circinnate.

Telipogon ampliforus has apparently no near allies in Central America, but there are several similar species in South America. It differs from the Ecuadorian *T. aureus* Lindl. in having broader leaves, dissimilar transversely ovate lip, and many more nerves in the petals and lip. It varies from the Colombian *T. dubius* Reichb. f. (which was described from a flower only) in having a larger flower with broader petals and lip, and purplish (not white) hairs on the column. It diverges from the Peruvian *T. Papilio* Reichb. f. (apparently a very nearly allied species) in having considerably larger flowers and differently proportioned lip.

COSTA RICA: Province of San José, northeast of El Copey. In dense oak and bamboo forest near Laguna de la Escuadra. At 2000-2200 meters altitude. On tree. Flowers pale yellow with dark purple veins. December 16, 1925. *Paul C. Standley 42021* (TYPE in U. S. Nat. Herb. No. 1309567).

NOMENCLATORIAL NOTES. VI

BY

CHARLES SCHWEINFURTH

Pleurothallis Urbaniana *Reichenbach filius* in Ber. Deutsch. Bot. Gesell. 3 (1885) 279—Cogniaux in Urban Symb. Antill. 6 (1909) 411.

Pleurothallis dichotoma Ames in Sched. Orch. 6 (1923) 58, non Schltr.

Pleurothallis diveva Ames in Sched. Orch. 7 (1924) 20.

It appears certain that the Central American *Pleurothallis diveva* is referable to the West Indian *P. Urbaniana*. The range of the species, as at present known, extends from Costa Rica and probably Panama to Guadeloupe and Porto Rico.

As to the color of the flowers, Cogniaux (l.c.) says of the Porto Rican plant: "Flores albidi, intense rubro-striati." One specimen of *P. Urbaniana* from Guadeloupe (*H. Stehlé 1295*) shows the flowers yellow. However, the Costa Rican *P. diveva* has the flowers maroon-purple, purple-red, or "hyaline, purple marked."

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ZEUXINE STRATEUMATICA IN FLORIDA

BY
OAKES AMES

THE OCCURRENCE of the Asiatic *Zeuxine strateumatica* in Florida was reported in *Orchidologia Zeylanica* 4 (1937) 89. This report was based on a single colony found on January 17, 1937, in a nursery, the Ormond Tropical Gardens, at Ormond in Volusia County. It was suggested that this orchid might have been introduced with nursery stock, but convincing evidence for such an introduction was lacking and efforts to substantiate it met with failure. Records of *Zeuxine strateumatica* having been cultivated in American gardens have not been found. It is not an orchid of horticultural significance and to my knowledge has never been cultivated in our botanic gardens.

Shortly after the discovery of *Zeuxine strateumatica* at Ormond, my attention was directed to a photograph representing several plants of this species collected by George Nelson on January 27, 1936, west of Fellsmere in Indian River County. These plants, unlike those found at Ormond, grew at a distance from cultivated ground. In January, 1938, Nelson again visited the Fellsmere area and reported that *Zeuxine strateumatica* was sparingly distributed over a stretch of two miles and was apparently spreading. The original colony was a small one although composed of numerous specimens.

In December, 1937, Donovan S. Correll brought to my laboratory for identification an orchid which had been collected by Charles C. Deam, on January 30, of that year, twelve miles southeast of Kissimmee in Osceola County. This proved to be conspecific with the Ormond plants and with those found by Nelson near Fellsmere. Later (February, 1938) Correll sent in additional records for the occurrence of the species, indicating its presence in Highlands County, Collier County, Hendry County and Glades County. These were localities visited by Mr. Deam. Then Correll reported that specimens had been found on January 22, 1938, by Miss Mary Singeltary near Kissimmee growing on the edge of a swamp on Johnson Island.

These records indicate very clearly that *Zeuxine strateumatica* is already widespread in peninsular Florida and appears to be adapted to Floridian soil and climate. At the season of anthesis, in 1938, there were frosts in Ormond, but the flowers of the orchid did not show frost-injury although mulberry trees were completely defoliated.

In January, 1938, I again visited the Ormond Tropical Gardens and found an abundance of specimens. Along the edges of a drainage ditch the plants were numerous, in one case fifteen flowering stalks being found in an area of less than one square foot of ground. Some of these specimens were so luxuriant that the lower part of the stems had become procumbent, a condition I have never observed in plants collected in the eastern tropics. The smallest specimens were hardly 4 cm. tall, one of these bearing a single flower, perhaps being a very young plant blooming for the first time.

When I first saw *Zeuxine strateumatica* in lawns of the Ormond Tropical Gardens, I was inclined to believe that it had been introduced from China with seeds of

Centipede Grass (*Eremochloa ophiuroides*). Centipede Grass, now common in Florida as a lawn-grass, was introduced in 1917 from regions in China where *Zeuxine strateumatica* is a native, and the length of time since the introduction of the grass to the United States would seem to be commensurate with the length of time it has taken for the orchid to become naturalized. Protocorms of *Zeuxine* might well have been distributed with stolons of *Eremochloa ophiuroides* and in the course of time might have established themselves in favorable locations. But until we discover definite information in this regard conjecture must of necessity be our only recourse.

As efforts to trace the introduction of *Zeuxine strateumatica* to Florida have failed, it might seem that this is so because the species has been a native for a very long time; that it is a species with representatives in both hemispheres and comparable in this respect to *Eulophia alta* and *Polystachya luteola*, orchids known for many years to be components of the flora of Florida. On this assumption it would have to be argued that the plant has escaped attention until recently and is just coming to the notice of botanists. To argue thus would be quite justifiable if the localities where *Zeuxine strateumatica* has been found were just now being explored for the first time and were remote from travelled paths and from human habitations and if the plants proved to be confined because of their dependence on special soils to limited areas from which they have been unable to spread. But the simultaneity of the reported discoveries of colonies in widely separated areas near thoroughfares and in the vicinity of human dwellings constitute rather convincing evidence that the species is a recent newcomer rather than a native being noticed for the first time in regions where it has escaped observation for untold decades. Intensive botanical exploration has been in progress many

years where the species has been found. Where it occurs it exhibits the propensities of a weed and has become amenable to a diversity of conditions, growing in clipped lawns, under shrubs, along ditches, and thriving equally in sun or shade.

The behavior of *Zeuxine strateumatica* is remarkably unlike that of any other orchid I have observed. As is well known, our native terrestrial species are extremely fastidious. With few exceptions they exhibit intolerance of human contacts. Even though we endeavor to supply the delicate balance of soil conditions revealed necessary by scientific research they seem to resent attempts made to cultivate them in our gardens. *Zeuxine strateumatica* behaves as if it were adapted to the disturbing influences usually associated with cultivated ground and this was strikingly evident in the Ormond Tropical Gardens where the plants survive the clipping of lawns and the cultivation of the soil beneath shrubs.

The roots of the plant are provided with endophytic fungi. From cultures made at the Biological Laboratories by John N. Porter, the fungal symbiont would seem to be a species of *Rhizoctonia* with typical monilioid conidial chains. Attempts to germinate the seeds in association with this fungus have failed, but failure may be the result of the methods used rather than evidence of incompatibility. The likelihood that the fungus isolated is a species other than the one on which mycorrhizal association depends is of course a possibility.

Zeuxine strateumatica is rather unusual in the brevity of its floral maturation in Florida. It comes into flower in January and in a very few weeks sets an abundance of fertile seeds. By the middle of March the withered stems, leaves and inflorescence have completely vanished. In early April I was unable to find a trace of the plant in the Ormond Tropical Gardens and transplanted colonies

in my garden at Ormond, with one exception, were without a vestige of superterranean parts. In passing it may be emphasized that many terrestrial orchids appear to be prevalently subterranean in their nature, the stems, leaves and flowers being but a brief stage in the developmental history. Noteworthy examples of this are the species of *Triphora* including *T. trianthophora*, and the remarkable Australian species *Rhizanthella Gardneri* and *Cryptanthemis Slateri*, the latter a small herbaceous saprophyte wholly subterranean with the exception of the flowers which just reach the surface of the ground. It is as if the production of flowers were but an interlude in the vegetative life of the plant, something incidental to ensure wide distribution of the species. Whether or not the flowers of *Zeuxine strateumatica* are self-pollinated is a question for which the answer is yet to be found, but the rapidity of seed maturation and the abundance of fertile seeds (often polyembryonic) may be regarded as in a measure bound up with the extraordinary rapidity with which the species is becoming established in peninsular Florida.

Zeuxine strateumatica (*Linn.*) *Schlechter* in Engl. Bot. Jahrb. 45 (1911) 394.

Orchis strateumatica Linnaeus Sp. Pl. ed. 1 (1753) 943.

Pterygodium sulcatum Roxburgh Hort. Beng. (1814) 63, *nomen*; Fl. Ind. ed. 2, 3 (1832) 452.

Spiranthes strateumatica Lindley in Bot. Reg. 10 (1824) sub t. 823.

Strateuma zeylanica Rafinesque Fl. Tellur. pt. 2 (1837) 89.

Zeuxine sulcata Lindley Gen. & Sp. Orch. Pl. (1840) 485.

Adenostylis strateumatica Ames Orch. 2 (1908) 59.

EXPLANATION OF THE ILLUSTRATION

ZEUXINE STRATEUMATICA (*Linn.*) *Schltr.* Three plants, drawn natural size, from specimens found growing spontaneously in Ormond, Florida. 1, a side view of the labellum and column. 2, the labellum showing the pandurate lamina and shallow sac. 3, the dorsal sepal. 4, a petal. 5, a lateral sepal. 6, the pollinium. Figs. 1-6 much enlarged.

Drawn in January 1937 by BLANCHE AMES



ZEUXINE *strateumatica* (L.) Schltr.

FLORIDA: Volusia County, Ormond, in the Ormond Tropical Gardens. January 17, 1937, also January 13, 1938. *Ames*: Indian River County, State Road west of Fellsmere. January 27, 1936, also January 21, 1938. *George Nelson*: Osceola County, twelve miles southeast of Kissimmee in moist sand in the bottom of a roadside ditch. January 30, 1937. *Charles C. Deam*; Edge of swamp, Reedy Creek Swamp, Johnson Island, Kissimmee. January 22, 1938. *Mary Singeltary*: Highlands County, along Road 8 south of Lake Placid. February 1, 1938. *Deam*; On State Road just north of Venus. February 1, 1938. *Deam*: Glades County, along road, two to three miles south of Lakeport. February 1, 1938. *Deam*: Hendry County, in mucky soil just south of the levee at Clewiston on border of a swamp. February 2, 1938. *Deam*: Collier County, along roadside north of Naples. February 4, 1938. *Deam*.

ORCHID STUDIES, VI

BY

LOUIS O. WILLIAMS

THE PRESENT NUMBER in my series of orchid studies contains: (1) a synopsis of the Philippine species of *Plocoglottis*, (2) a study of the polymorphic *Ionopsis utricularioides*, (3) a description of a new genus of the *Sarcanthinae* from the Philippine Islands and (4) three new species of orchids from Borneo.

A SYNOPSIS OF THE PHILIPPINE SPECIES OF *PLOCOTLOTTIS* *Blume*

Six species of the genus *Plocoglottis* have been described from material gathered in the Philippine Islands. All of these were described by Ames. An additional species is proposed in the present paper. Among the seven concepts now accredited to the Philippines five appear to be distinct on the basis of the material I have examined.

1. ***Plocoglottis bicallosa*** Ames in Elmer Leaf. Philipp. Bot. 5 (1912) 1571.

Plocoglottis bicallosa is quite easily distinguished from its allies by means of the lacerated lip. Although the leaves are usually narrow, this character is of little value because there is a collection available which shows very broad leaves, quite as broad as the leaves of the other Philippine species. This broad-leaved collection bears the following data: "in forest slopes, Mt. Halcon," Mindoro. At 3000 feet altitude. March 10, 1922. Ramos & Edaño 60.

2. ***Plocoglottis Copelandii*** Ames in Philipp. Journ. Sci. 2 (1907) Bot. 326.

Plocoglottis acuminata Ames in Philipp. Journ. Sci. 2 (1907) Bot. 326, *nomen nudum in synonym.*, non Blume.

This is the common and most widespread of the Philippine species of *Plocoglottis* and was the first member of the genus to be described from Philippine material.

3. *Plocoglottis bicomata* L. O. Williams sp. nov.

Herba terrestris, usque ad 4 dm. alta. Pseudobulbi grandes, quadrifoliati. Folia lanceolata, acuminata, tri-vel multinervia, longe petiolata. Scapus vaginatus, piloso-pubescent sed basi glaber. Inflorescentia laxa; bracteae triangulari-lanceolatae, acuminatae, pubescentes. Sepalum dorsale anguste oblongum, obtusum, dorso pubescens. Sepala lateralia oblongo-ovata, obliqua, obtusa. Petala lineari-lanceolata, acuta. Labellum subquadratum, apiculatum, quadricallosum et bicomatum, marginibus lateralibus laceratis.

A terrestrial herb up to about 4 dm. tall. Pseudobulb (only one seen) large, about 2.5 cm. long and 1.5 cm. thick, bearing four leaves at its summit. Leaves lanceolate, acuminate, with three prominent and several lesser nerves; blade 15–25 cm. long and 2–3 cm. broad; petioles nearly as long as the blades, sheathing the stem at the base. Scape apparently lateral from the base of the thickened pseudobulb, shortly pilose-pubescent, becoming glabrous below, with several acute sheaths which are reduced to bracts toward the upper portion. Inflorescence lax, about 2 dm. long; bracts triangular-lanceolate, acuminate, pubescent, about 4–7 mm. long. Dorsal sepal narrowly oblong, obtuse, pilose-pubescent on the back, about 7-nerved, slightly concave, 15 mm. long and 5 mm. broad. Lateral sepals oblong-obovate, oblique, obtuse, slightly concave, pubescent on the back, 7-nerved, about 12 mm. long and 6 mm. broad. Petals linear-lanceolate, acute, glabrous, about 14 mm. long and 3 mm. broad at the base. Lip nearly quadrate when expanded, about 7 mm. long and 8 mm. broad, with an apiculation at the apex

on either side of which is a callus; disc with two ovate or oval callus-like thickenings; on the outer side of each of the terminal calli is a lacerated membrane or coma of coarse hairs; lateral margins of the lip serrated. Column slightly arched, glabrous, 7–8 mm. long.

Plocoglottis bicomata is not closely allied to any of the other Philippine species of *Plocoglottis*. It may be distinguished from all of them by the large pseudobulbs, by the two tufts of hair, by the two large terminal calli on the lip and by the two large callus-like thickenings on the disc of the lip. *Plocoglottis bicomata* appears to be closely allied to *Plocoglottis pubiflora* Schltr., a native of New Guinea. I have not seen specimens of the New Guinea species, but from the description it seems to be amply distinct.

By vegetative characters, *Plocoglottis bicomata* is not easily distinguished from the other Philippine species, but because of the two patches of pubescence and the two large thickenings on the lip, this is perhaps the most distinctive *Plocoglottis* known from the Philippines.

LUZON: Rizal Province, Paningtingan. March 1915, *Loher s. n.* (TYPE in Herb. Ames No. 44335); Rizal Province, Sumag. April 1914. *Loher s. n.*

4. ***Plocoglottis lucbanensis*** Ames in Elmer Leaf. Philipp. Bot. 5 (1912) 1572.

Plocoglottis lucbanensis may be recognized without much difficulty by the small distinctively shaped lip and by the compact inflorescence.

5. ***Plocoglottis mindorensis*** Ames in Philipp. Journ. Sci. 2 (1907) Bot. 327.

Plocoglottis Wenzelii Ames Orch. 5 (1915) 101.

Plocoglottis McGregorii Ames Orch. 7 (1922) 121.

This species appears to embrace a group of rather

variable plants regarding which it is difficult to reach a satisfactory basis for segregation. Indeed, I am not sure that the three concepts cited above should not all be referred to *Plocoglottis Copelandii* Ames. When the abundant material now available is taken into account, there are no characters given in the original descriptions by which these three concepts may be separated. I have been unable to find characters which are constant.

IONOPSIS UTRICULARIODES, A POLYMORPHIC SPECIES

I have recently studied a number of specimens of *Ionopsis* from South America sent to the Ames Herbarium for determination. These specimens raised the question of the proper specific name for the plant which has generally been named *Ionopsis paniculata* Lindl. of which the identity has been investigated with the aid of available material. Two species, which I have not seen, from the Cordilleran region of South America, may belong to this complex. These are *Ionopsis orchioides* Kränzl. in Fedde Repert. 17 (1921) 388 and *I. zebrina* Kränzl. in Notizbl. Bot. Gart. Berlin 7 (1920) 435. The former may be a synonym of *I. utricularioides*, but the latter, if it is well characterized, may prove to be distinct.

The synonymy which follows belongs, I believe, to *Ionopsis utricularioides*, a widespread and polymorphic species.

Ionopsis utricularioides (Sw.) Lindley Coll. Bot. (1821) t. 39A; Gen. & Sp. Orch. Pl. (1833) 194; Fol. Orch. *Ionopsis* (1852) p. 2—Reichenbach filius in Walp. Ann. 6 (1863) 684—Hemsley in Godman & Salvin Biol. Centr.-Am. Bot. 3 (1884) 290—Cogniaux in Martius Fl. Bras. 3, pt. 6 (1904) 174—Ames in Proc. Biol. Soc. Wash. 17 (1904) 116; Orch. 1 (1905) 19, t. 5—Fawcett & Rendle Fl. Jam. (1910) 125, t. 27, figs. 4-6—Schlechter in Fedde Repert. Beihefte 8 (1921) 165.

Epidendrum utricularioides Swartz Prodr. Veg. Ind. Occ. (1788) 122.

Dendrobium utricularioides Swartz in Nov. Act. Upsal. 6 (1799) 83.

Ionopsis pulchella Humboldt, Bonpland & Kunth Nov. Gen. et Sp. 1 (1815) (Quarto ed.), 348, t. 83—Lindley Fol. Orch. Ionopsis (1852) p. 3—Reichenbach filius in Walp. Ann. 6 (1863) 684—Schlechter in Fedde Repert Beihefte 7 (1920) 276.

Iantha pallidiflora Hooker Exot. Fl. 2 (1824) t. 113.

Ionopsis pallidiflora Lindley in Bot. Reg. 22 (1836) sub t. 1904; Fol. Orch. Ionopsis (1852) p. 2—Reichenbach filius in Walp. Ann. 6 (1863) 684.

Ionopsis tenera Lindley in Bot. Reg. 22 (1836) t. 1904—Lindley & Paxton in Paxton's Flow. Gard. 2 (1851) 13, f. 141—Lindley Fol. Orch. Ionopsis (1852) p. 2, with varieties A-E—Reichenbach filius in Walp. Ann. 6 (1863) 684.

Ionopsis paniculata Lindley in Bot. Reg. 22 (1836) sub t. 1904; Fol. Orch. Ionopsis (1852) p. 4—Reichenbach filius in Walp. Ann. 6 (1863) 685—Bateman in Bot. Mag. 91 (1865) t. 5541; Second Cent. Orch. Pl. (1867) t. 184—Cogniaux in Martius Fl. Bras. 3, pt. 6 (1904) 172, t. 41—Hoehne in Comm. Linh. Tel. Estrat. Matto Grosso, Anexo 5, Bot. pt. 1 (1910) 57 and in Atlas t. 45—Schlechter in Fedde Repert. Beihefte 10 (1922) 76.

Ionopsis zonalis Lindley & Paxton in Paxton's Flow. Gard. 2 (1851) 13, *in textu*.

In addition to the names cited above, Lindley (Fol. Orch. Ionopsis (1852) p. 3) gave four others under *I. tenera* to which he referred as forms in an explanatory paragraph. They are (B.) *zonalis*, (C.) *tomentosa*, (D.) *effusa* and (E.) *violacea*.

Cogniaux (in Mart. Fl. Bras. 3, pt. 6 (1864) 175)

included these same names under *Ionopsis utricularioides* as varieties and ascribed them to Lindley. In addition to these four varieties he cited var. *latifolia* Cogn. and var. *angustifolia* Cogn.

Three other varietal names which without doubt belong to this complex are *Ionopsis paniculata* var. *maxima* L. Lind. & Rodigas in *Lindenia* 3 (1887) 39, t. 114, *I. paniculata* var. *grandiflora* Hort. ex Stein *Orchideenb.* (1892) 282 and *I. utricularioides* var. *parviflora* Schltr. in *Fedde Repert. Beihefte* 17 (1922) 74.

These several varietal names, to which reference is made in the preceding three paragraphs, are hardly more than horticultural forms and have little scientific value.

A few comments concerning some of the specific synonyms of *Ionopsis utricularioides* follow:

Ionopsis pulchella—my knowledge of this name is based on the plate cited. There can be little doubt but that it belongs to this complex species.

Ionopsis pallidiflora—my knowledge of this name is based on Hooker's plate cited above under *Iantha pallidiflora*. The only difference worthy of note is in the tip of the spur which is slightly retuse. This character is hardly of specific value.

Ionopsis tenera—the plate cited above leaves little doubt regarding the affinity of the plant bearing this name.

Ionopsis paniculata—this is the most luxuriant form of *I. utricularioides*. It is apparently not uncommon in South America and occasional in the Caribbean region. H. G. Reichenbach thought it doubtful whether *I. paniculata* could be kept distinct from *I. utricularioides* (cf. *Walp. Ann.* 6 (1863) 686).

Ionopsis utricularioides is one of the most widely distributed of the tropical American species of orchids. It occurs from Florida and the Caribbean region to Mexico

and Central America; through a large portion of northern South America and is one of the five orchids known to occur on the Galapagos Islands. In a species occurring over such a vast region one would expect to find considerable variation, and it is owing to this variation that we may ascribe the many synonyms, not to mention the fact that the plant has been frequently cultivated and variously named for horticultural purposes.

A NEW GENUS OF THE SARCANTHINAE

Phragmorchis *L. O. Williams gen. nov.* Orchidacearum—Sarcanthinae—Aerideae.

Sepala lateralialia ad apicem ovarii affixa, a columna libera. Sepalum dorsale liberum, naviculare. Petala sepalis similia sed minora. Labellum basi columnae affixum, in saccum aut calcar apice paulo bidentatum productum, antice in laminam ovatam productum, prope laminae basim in calcar callis duobus tenuibus ornatum; lobi laterales erecti, parvi. Columna mediocris, cylindracea, apoda, exalata, rostello brevi. Pollinia globosa, paulo fissa; stipes tenuis, a basi usque ad apicem sensim dilatata; glandula ovata, parva.

Herba epiphytica, caulescens cum foliis angulariteretibus. Species una adhuc nota, habitu Schoenorchidis.

Caulescent, epiphytic herbs with angular-terete leaves. Lateral sepals adnate to the apex of the ovary, free from the column. Dorsal sepals free, navicular. Petals similar to the sepals but smaller. Lip adnate to the base of the column, prolonged at the base into a sac or spur which has a slightly bidentate tip; produced into an ovate blade in front; near the base of the blade (mid-lobe) in the spur are two slender calli; lateral lobes of the lip erect, small. Column medium-sized, cylindrical, without a foot, without stielidia; rostellum short. Pollinia two, globose, each one slightly divided; stipe slender,

slightly dilated from the base toward the apex: gland ovate, small.

Phragmorchis teretifolia *L.O. Williams sp. nov.*

Herba epiphytica cum caulibus gracilibus, usque ad 4.5 dm. altis. Folia subulata, teretia. Inflorescentia lateralis, brevis, pauciflora; bracteae parvae, triangulari-acuminatae. Sepalum dorsale naviculare, obovatum, breviter apiculatum, uninervium. Sepala lateralia oblongo-ovata, leviter obliqua, acuta. Petala oblongo-lanceolata, obtusa vel acuta, uninervia. Labellum trilobatum, valde saccatum vel calcaratum, bicallosum; lobus medius late ovatus, paulo carinatus; lobi laterales erecti, apice acuti.

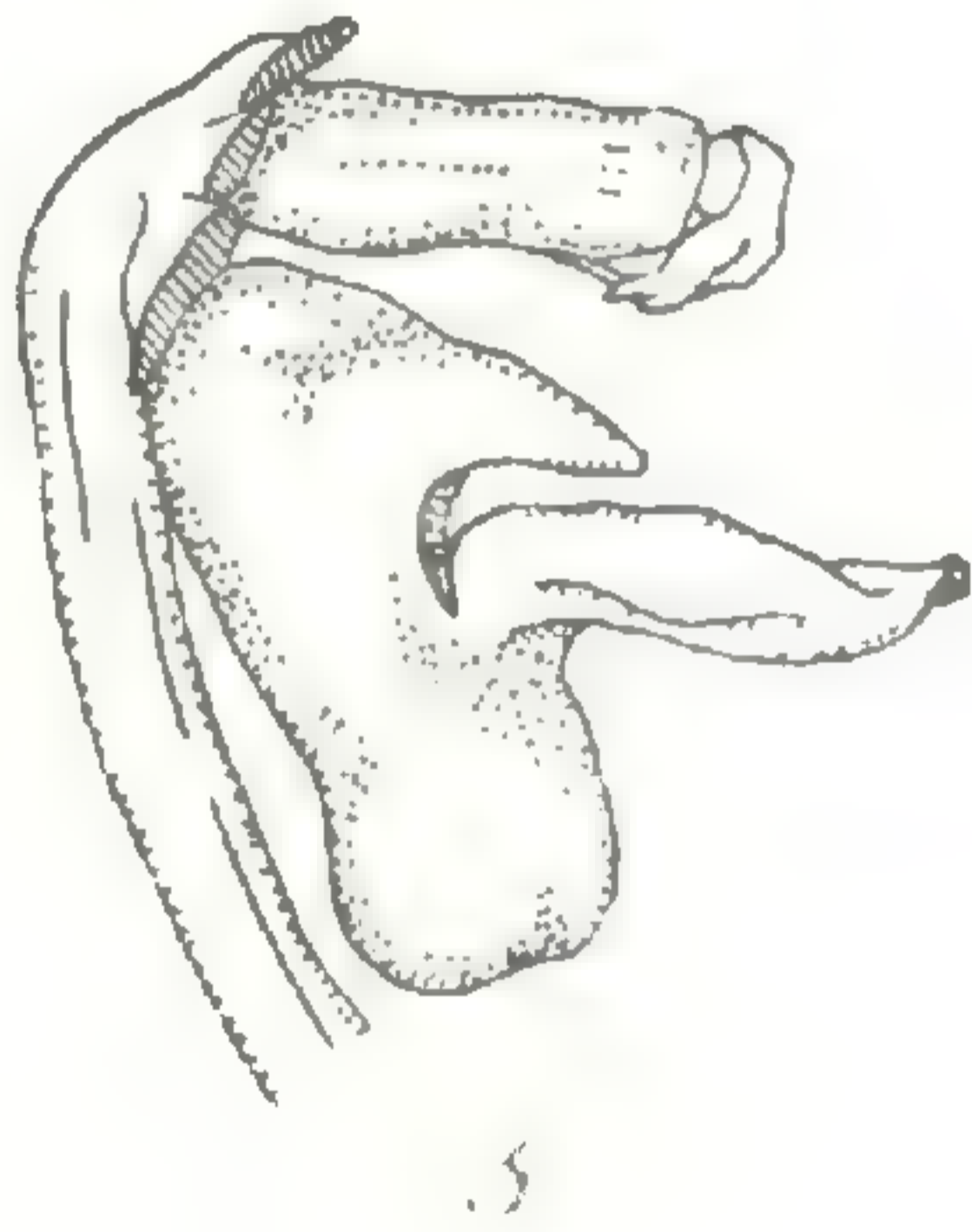
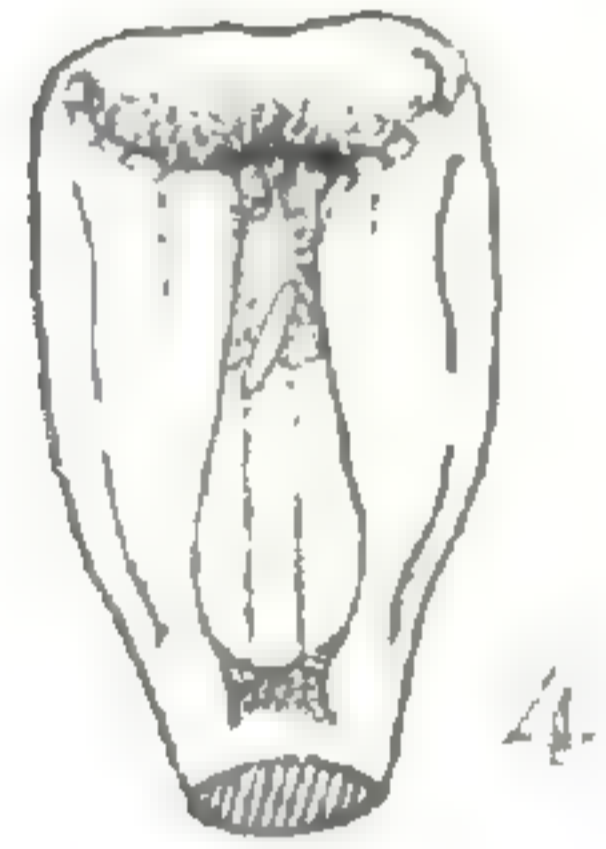
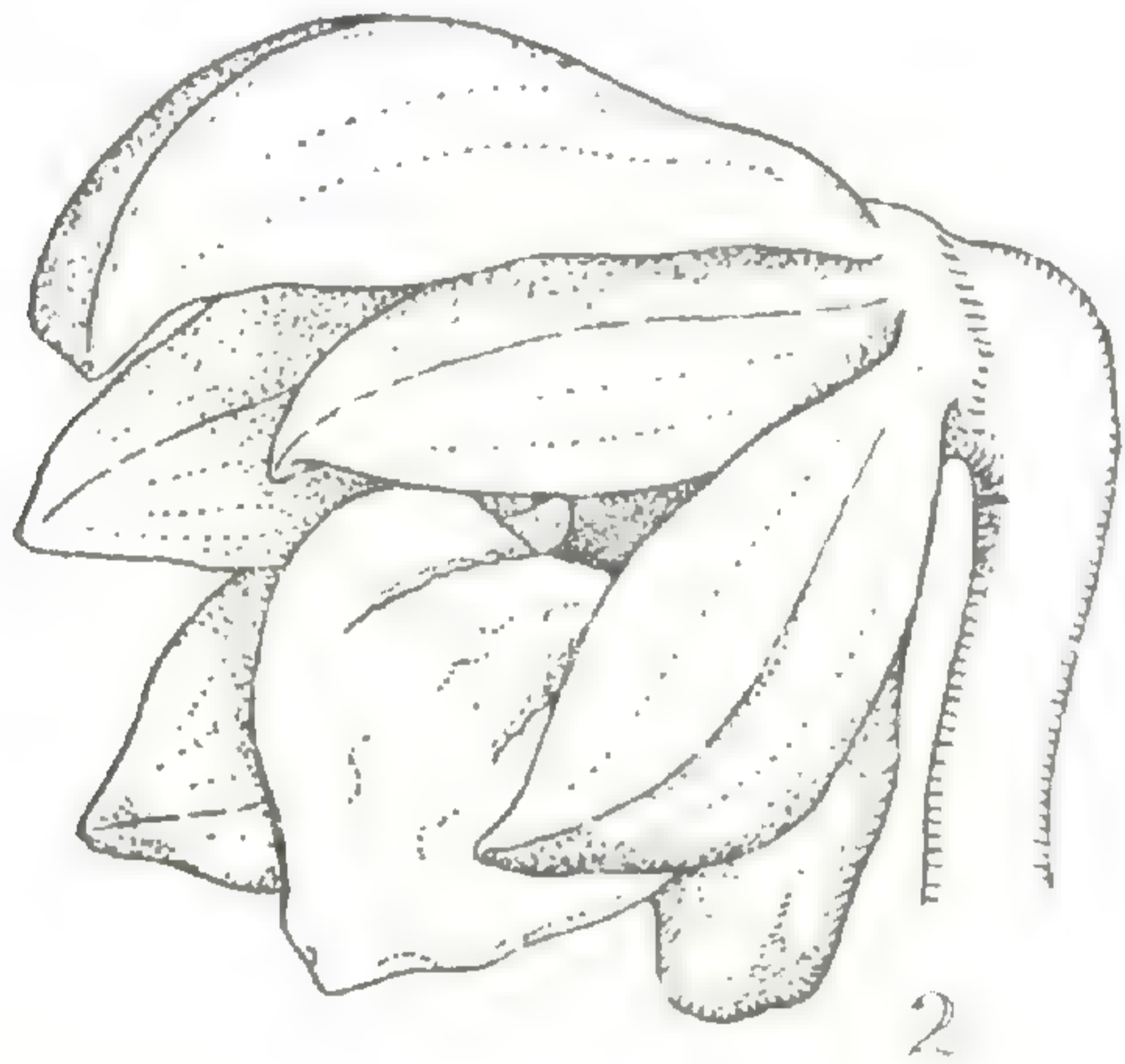
An epiphytic herb with slender stems, up to 4.5 dm. long. Roots short, strongly verrucose (at least when dry). Stems slender, terete, covered with the persistent bases of the old leaves, 2–3 mm. thick. Leaves subulate, angular-terete, up to about 6 cm. long and 3 mm. thick. Inflorescences lateral, short, few-flowered, several from each stem, breaking through the leaf-sheaths opposite the base of a leaf. Bracts of the inflorescence small, triangular-acuminate, about 2 mm. long. Dorsal sepal navicular, obovate, short-apiculate, 1-nerved, about 4 mm. long and 2 mm. broad. Lateral sepals oblong-ovate, slightly oblique, acute, about 4 mm. long and 1.5 mm. broad. Petals oblong-lanceolate, obtuse or acute, 1-nerved, about 4 mm. long and 1 mm. broad. Lip 3-lobed, strongly saccate or spurred, with two very thin callus plates in the spur near the base of the mid-lobe of the lip; mid-lobe broadly ovate, somewhat carinate, about 2 mm. long and 1.5 mm. broad; lateral lobes erect, free from the column, about 1 mm. long, the acute apex of the lobes directed outward. Anther cucullate, apiculate-acuminate, on the apex of the column, about 1.5 mm. long and 1 mm. broad. Rostellum minute, in the

EXPLANATION OF THE ILLUSTRATION

PHRAGMORCHIS TERETIFOLIA *L. O. Williams*. 1, plant, drawn about one fourth natural size. 2, flower, enlarged about three and one half times. 3, lateral view of column and lip (sepals and petals removed), enlarged about three and one half times. 4, column seen from below, enlarged about five times. 5, anther, enlarged about three and one half times. 6, pollinia, enlarged about five times.

Drawn by G. W. DILLON

PHRAGMORCHIS TERETIFOLIA
L O Williams



upper part of the very large, deep, stigmatic cavity. Pollinia two, globose, each one slightly furrowed and thus divided into a large and a small perfectly joined mass; the pollinia are attached to the rostellum by a stipe which passes (in a groove) from the apex of the column to the rostellum which is about 0.5 mm. below.

PHILIPPINE ISLANDS: Luzon, Rizal Province. September 1909. *Loher 14744* (TYPE in Herb. Ames No. 46300; ISOTYPES in Herb. Bur. Sci., Manila, in Herb. Kew. and in Herb. Mo. Bot. Gard.).

The genus *Phragmorchis* seems to be most closely allied to *Schoenorchis*. It should doubtless be placed between *Schoenorchis* and *Sarcanthus* in the system proposed by Schlechter in *Notizbl. Bot. Gart. u. Mus. Berlin-Dahlem* 9 (1926) 563–591.

Phragmorchis may be distinguished from all other genera of the *Sarcanthinae* known to me, by a combination of the following characters: a very small (almost minute) rostellum; a straight footless or nearly footless exalate column; a deep groove from the clinandrium to the rostellum in which the stipe of the pollinia lies; a very large stigmatic cavity; the lateral lobes of the lip being free from the column; the spur or sac with only two very thin, inconspicuous calli at the base of the mid-lobe of the lip; the terete leaves which are angled (at least when dry); and a very short few-flowered inflorescence.

THREE NEW SPECIES OF ORCHIDS FROM BORNEO

The orchids described below are among a collection sent by the Botanic Gardens, Singapore, Straits Settlements to the Ames Herbarium for study and determination. The specimens were collected by Major J. C. Moulton in Borneo. The three species described here are of particular interest, but many of the other specimens are of rare species.

***Dendrochilum pubescens* L. O. Williams sp. nov.**

Herba epiphytica, usque ad 2.5 dm. alta. Folia oblanceolata, acuta, fulvo- vel nigropubescencia, septemnervia. Inflorescentia folium superans; bracteae nigropubescentes. Sepala lanceolata, acuta, paulo carnososa, dorso paulo pubescencia. Petala oblongo-lanceolata, acuta, paulo carnososa, obscure crenulata. Labellum oblongo-ovatum, acutum, integrum sed parte inferiore paulo laceratum, carnosum, tricallosum. Stelidia prope columnae medium stant.

An epiphytic herb up to about 2.5 dm. tall. Pseudobulbs ovate, sulcate when dry, about 2.5 cm. long and 1 cm. thick: young floriferous pseudobulbs small, subtended by several pubescent chartaceous sheaths. Leaves oblanceolate, acute, shortly black- or brown-pubescent on the back, slightly less pubescent on the upper surface, with three prominent and four less prominent nerves, about 25 cm. long and 3.5 cm. broad above the middle. Flowering peduncle evidently surpassed by the mature leaves but surpassing the subtending leaf, black-pubescent. Bracts of the inflorescence black-pubescent, about 5 mm. long. Dorsal sepal lanceolate, acute, somewhat fleshy, sparingly pubescent on the dorsal surface, 7-8 mm. long and 3-3.5 mm. broad. Lateral sepals similar to the dorsal sepal. Petals oblong-lanceolate, acute, somewhat fleshy, obscurely crenulate, about 6 mm. long and 2.5-3 mm. broad. Lip oblong-ovate, entire but the lower half more or less lacerated, acute, fleshy, about 5 mm. long and 2.5-3 mm. broad; near the base of the lip is a large thickening which has two lateral ridges. Column about 3 mm. long; stelidia near the middle of the column, acute, about 1 mm. long; rostellum prominent, triangular.

Dendrochilum pubescens has no near allies in Borneo with which it is likely to be confused. It may be distin-

guished from all species of *Dendrochilum* known to the author, by the black or brownish pubescence on the leaves, sheaths, flowering scape and sepals.

BORNEO: Gunong Temabok, Upper Barami Valley. At 3000 feet altitude. November 8, 1920. *Moulton 6763* (TYPE in Herb. Ames No. 48305).

***Pholidota gracilis* L. O. Williams sp. nov.**

Herba tenella, epiphytica, usque ad 4 dm. alta. Folia linearia, acuta vel acuminata, nervosa, sub apice paulo constricta. Pedunculus gracilis, foliis aequalis; racemus distichus, pauciflorus, laxis; bracteae oblongo-ovatae, obtusae, scariosae. Sepalum dorsale late lanceolatum, acutum, trinervium, naviculare. Sepala lateralia ovato-lanceolata, acuminata, paulo obliqua, trinervia. Petala lanceolato-rhombica, acuta, trinervia. Labellum saccatum, trilobatum, supra medium bicallosum; lobi laterales erecti, oblongi; lobus medius late lanceolatus, acutus, recurvatus. Columna generis.

A slender epiphytic herb up to 4 dm. tall. Pseudobulbs small, more or less cylindrical, monophyllous, up to 2 cm. long. Leaves linear, acute or acuminate, several-nerved, somewhat constricted just below the apex, up to 30 cm. long and 1 cm. broad. Peduncle slender, as long as the leaves; raceme distichous, few-flowered, rather lax, about 6 cm. long; flowers alternate, about 4 mm. apart; bracts oblong-ovate, obtuse, scarious, striated, about 5 mm. long and 3.5 mm. broad. Dorsal sepal broadly lanceolate, acute, 3-nerved, navicular, about 4 mm. long and 2 mm. broad. Lateral sepals ovate-lanceolate, acuminate, slightly oblique, 3-nerved, about 5 mm. long and 2-2.5 mm. broad. Petals lanceolate-rhomboid, acute, 3-nerved, about 4 mm. long and 1.5 mm. broad. Lip saccate, 3-lobed, with two prominent calli just above the mid-lobe, the calli free and forming mammillae at their lower points; lateral lobes erect, oblong, length

from the tip of the lateral lobes to the lowest part of the sac about 2 mm.; mid-lobe broadly lanceolate, acute, strongly recurved, about 2.5 mm. long and 1-1.3 mm. broad. Column slightly arcuate, about 2 mm. long; rostellum linear-lanceolate, about 0.7 mm. long.

I have been unable to find any close allies of *Pholidota gracilis*.

BORNEO: Gunong Temabok, Upper Barami Valley. At 3000 feet altitude. November 8, 1920. *Moulton 6762*. (TYPE in Herb. Ames No. 48306).

Pholidota Schweinfurthiana *L. O. Williams* sp. nov.

Herba epiphytica, gracilis, usque ad 2 dm. alta. Folia lineari-oblongata, acuta, nervosa. Pedunculus tenellus; racemus brevis, pauciflorus, distichus; bracteae late lanceolatae, acuminatae, scariosae. Sepalum dorsale late ovatum, obtusum, trinervium, naviculare, dorso lepidotum. Sepala lateralia ovata, obtusa, trinervia. Petala late ovata, obtusa vel acuta, paulo obliqua, trinervia. Labellum obscure trilobatum, saccatum, callis binis prope lobos laterales parvos et callo medio prope sacci basim ornatum; lobi laterales parvi et obscuri, acuti, prope labelli medium; lobus medius reflexus, retusus, quadratus. Columna generis.

A slender epiphytic herb up to 2 dm. tall. Pseudobulbs obpyriform, monophyllous, up to 2 cm. long. Leaves linear-oblongate, acute, somewhat plicate (at least when dry), several-nerved, 10-20 cm. long, 7-9 mm. broad. Peduncle slender; raceme short, fractiflex, few-flowered, distichous, up to about 3 cm. long; flowers alternate, about 4 mm. apart; bracts broadly lanceolate, acuminate, scarious, striated, about 8 mm. long and 4 mm. broad. Dorsal sepal broadly ovate, obtuse, 3-nerved, navicular, lepidote dorsally, about 3 mm. long and 2.5 mm. broad. Lateral sepals ovate, obtuse, 3-nerved, lep-

idote dorsally, about 3.5 mm. long and 2.5 mm. broad. Petals broadly ovate, obtuse or acute, slightly oblique, 3-nerved, about 3 mm. long and 2.5 mm. broad. Lip obscurely 3-lobed, saccate, about 4 mm. long and 2-3 mm. broad, with two prominent mammillate calli near the small lateral lobes and a central thickening near the base in the sac; lateral lobes small and obscure, near the middle of the lip; mid-lobe strongly reflexed, slightly retuse, quadrate, about 2 mm. long and 2 mm. broad. Column about 2 mm. long, with a broad wing on either side.

Pholidota Schweinfurthiana is very closely allied to *Pholidota pectinata* Ames and might easily be confused with that species on a superficial examination. *Pholidota Schweinfurthiana* may be distinguished from *P. pectinata* by the following characters:

<i>P. Schweinfurthiana</i>	<i>P. pectinata</i>
Calli of lip mammillate.	Calli of lip elongated.
Lip obscurely 3-lobed.	Lip simple.
Mid-lobe of lip no broader than the basal half of the lip.	Middle part of the lip much broader than the basal half, nearly twice as broad.
Sepals and petals comparatively broad.	Sepals and petals comparatively narrow.
Raceme of flowers markedly fractiflex.	Raceme of flowers not markedly fractiflex.

It is indeed a pleasure to name this species in honor of my colleague, Mr. Charles Schweinfurth, who, several years ago indicated its distinctness.

BORNEO: Gunong Temabok, Upper Barami Valley. At 4000 feet altitude. November 5, 1920. *Moulton 6678*. (TYPE in Herb. Ames No. 48307).

A NEW BLETIA FROM MEXICO

BY

CHARLES SCHWEINFURTH

IN A SMALL COLLECTION of orchids from northern Mexico collected by H.S. Gentry and sent for determination by Dr. Forrest Shreve of the Desert Laboratory (at Tucson, Arizona) of Carnegie Institution of Washington, appeared the following species which seems to be undescribed.

Bletia amabilis C. Schweinfurth sp. nov.

Herba terrestris, speciosa. Folia plura, prope basim, imbricantia, elliptico-lanceolata vel lineari-elliptica, longe acuminata, vaginis duabus cylindraccis fulta. Caulis fistulosus, glaber. Racemus laxus. Flores spectabiles, grandes. Sepalum dorsale elliptico-oblongo-oblanceolatum, acutum. Sepala lateralia oblongo-elliptica, acuta. Petala obovato-oblonga. Labellum medio profunde trilobatum: lobi laterales semiobcordati; lobus medius obcordatus, profunde bifidus. Discus carinis quinque percursus. Columna valde arcuata, superne dilatata.

Plant terrestrial, up to about 9.4 dm. tall (doubtless becoming taller). Base of the plant enveloped by two imbricating tubular scarious sheaths which appear to be finely more or less reddish-maculate, from above these bracts issues a cluster of three imbricating erect-spreading leaves. Leaves elliptic-lanceolate to linear-elliptic, up to about 23.5 cm. long and 5 cm. wide (the uppermost much narrower), long-acuminate, convolute, many-nerved with five to seven more prominent nerves, sub-membranaceous. Stem stout, fistulose, glabrous, provided below with one tubular appressed scarious sheath which is 3 cm. long. Raceme very loosely 12-flowered, arcuate-flexuous near the summit, about 23 cm. long

inclusive of the terminal buds. Floral bracts ovate-lanceolate, very long-acuminate, concave, many-nerved, the lowest one about 1.8 cm. long. Flowers large and showy, rather membranaceous. Dorsal sepal elliptic-ob lanceolate, acute, about 4 cm. long and 1.4 cm. wide, 7-nerved with numerous reticulations. Lateral sepals oblong-elliptic, acute, about 4.1 cm. long and 1.5 cm. wide, 8- to 9-nerved. Petals obovate-oblong, falcate, nearly 4 cm. long, about 1.5 cm. wide, very shortly acute or subacute, 6- to 8-nerved in the middle with numerous reticulations. Lip deeply 3-lobed near the middle with the mid-lobe deeply bilobed, about 4.2 cm. long to the tip of a terminal lobule, about 3.1 cm. wide across the widest part of the lateral lobes, very shortly clawed and abruptly rounded to subcordate at the base; lateral lobes semiobcordate, broadly rounded at the apex, about 1.3 cm. wide where broadest; mid-lobe nearly sessile, obcordate, minutely but broadly apiculate in the deep median sinus, about 2 cm. long to the tip of a lobule and 2 cm. wide near the apex, with the margins irregularly crenulate and undulate-plicate. There are five approximate median keels which are scarcely more than thickened nerves through the basal third of the lip, are abruptly dilated into high thin semielliptical plates near the middle of the lip, and then decrease into low keels of which the outer pair are relatively lower and extend about to the center of the mid-lobe; the inner pair which are higher than the outer pair are gradually dilated to an abruptly truncate apex near the anterior third of the mid-lobe; the central keel, which is lower but stouter than the ones beside it, is slightly dilated at its apex where it terminates close to the median sinus of the mid-lobe. Column strongly arcuate, gradually dilated above, about 3 cm. long, winged on each side with the wing some-

what dilated just above the base; margins of the clinandrium irregularly lobulate.

Another specimen of the same collection shows the following discrepancies. A detached fragment consists of a moniliform cluster of three small approximate ellipsoid rugose corms which produce fibrous flexuous roots; two of these corms are adorned at the summit with the short remnants of a stem. The entire plant is smaller in all parts than the type; the cauline bract is somewhat above the middle of the stem and three of the flowers of the shorter raceme appear to issue from one point of the rachis.

Another collection (*Gentry 2473*), which is referable to this species, appears to be in an advanced stage of anthesis, since it bears two immature capsules and a single flower at the summit of the raceme. It differs from the type in having commonly longer leaves (the uppermost of the three blades 31.6 cm. long), in having a rather lax raceme (about 30.5 cm. long) and smaller flowers of which the segments are 3 cm. or less in length.

This species appears to be allied to *Bletia campanulata* La Llave & Lex., which is a plant difficult to interpret adequately. It differs from our conception of that species, however, in its somewhat broader leaves, broader lateral lobes and deeply bilobed mid-lobe of the lip which bears yellow markings. It lacks the striking claw of the mid-lobe of the lip which characterizes *B. macristhmochila* Greenm.

MEXICO: State of Sonora, Sierra Charuco, Río Mayo. "Upper Sonoran; oaks, shaded humus. . . . Terrestrial in soil. Fl. lavender, laterals yellow with purple veins, upper lip purple". July 23, 1936. *Howard Scott Gentry 2302* (TYPE in Herb. Ames No. 49093): State of Chihuahua, Guasaremos, Río Mayo. "Upper Sonoran; tolerant oak slope. . . . Terrestrial with lavender flowers". August 26, 1936. *Gentry 2473*.

The Department of Botany
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**CUCURBITA MOSCHATA FOUND
IN PRE-COLUMBIAN MOUNDS
IN GUATEMALA**

BY
PAUL A. VESTAL

INVESTIGATIONS OF PLANT REMAINS found in the environs of prehistoric man are recondite and technical, the materials generally unattractive and the results often meager. The interest which we take in such remains is largely genealogical, influenced by the hope of finding evidence to determine the region and age in which certain species of plants were first cultivated. Questions of ancestry and history touch us closely; so an inquiry into the source and parentage of the plants with which man is associated is fully as attractive as any question concerning the origin of the prototypal vegetation of the earth. There is a deep satisfaction in knowing how man lived in early times and what he used as food.

During excavations of pre-Columbian mounds by Carnegie Institution of Washington at Uaxactun, Department of Petén, Guatemala, a number of plant remains were recovered. These have been submitted to the writer for identification. Among them was a carbonized peduncle of a cucurbit. This was found in Construction P, Burial 37, Room 54, Structure A-V. Mr. A. L. Smith, who was in charge of the expedition, gives this a Maya date of roughly 10.5.0.0.0, which, he states, according

to the correlation of Goodman, Martinez and Thompson, would be about 900 A.D.

There has long been widespread confusion and doubt regarding the nomenclature and classification of the cucurbits. Recent works (1) (6) (13) have so simplified the characters that it is now comparatively easy to differentiate between the annual cultivated species of *Cucurbita*. With very distinct characters in the leaves, fruit-stalks and seeds, the separation of the species *C. Pepo*, *C. moschata* and *C. maxima* is now possible even though the material is only a fragment of the complete plant.

The carbonized peduncle examined by the writer is distinctly five-sided, regularly grooved, and flaring at the point of attachment to the fruit. From its carbonized condition it may also be assumed that it was hard. These characters, checked with the keys and descriptions (1) (6) (11) (13), have allowed the writer to identify the specimen as *Cucurbita moschata* Poiret.

The characters of the specimen under consideration appear to match exactly those described for the typical *C. moschata*. These characters, however, seem to be dependable in such a pronounced way only in the Cheese Group of this species (6) (8), which have a shape similar to that of a cheese-box much flattened at both ends. Other varieties may have fruit-stalks which are not distinctly five-sided nor noticeably enlarged at the point of attachment with the fruit. This has led to the following statement by Erwin (7): "The identity of the peduncles, if considered alone, might raise a question as to whether they are *moschata* or *pepo*". However, the characters of this specimen seem to exclude this difficulty by being essentially like the figures given in the literature (1) (2) (6) (8) (13), which the authors consider typical of the species.

Although A. de Candolle (5) was undecided as to

where this species was native, the accumulated evidence of more recent work shows it to be American in origin. Erwin (8) summed up the evidence thus: "The existence of specimens from pre-Columbian times, supported by the Seminole pumpkin which the Indians of that tribe claim is one of their ancient food plants, points rather definitely to the conclusion that *C. moschata* is an ancient American species". All the evidence cited by Erwin, however, merely establishes a long use for *C. moschata* within the United States (7) (8) (10). This is also suggested by Bailey (3), who, in writing of the Okeechobee gourd which at one time was thought to be closely related to the Seminole pumpkin, made the following statement: "There appears to be nothing in the Seminole cultivation of this pumpkin to suggest the nativity of *C. moschata*: these people grow only well-developed rather than primitive forms of the species". Although this plant has had a long history within the United States, it may have had its origin much farther south and have been brought northward with maize.

Following the formula proposed by Vavilov (12) for determining the origin of cultivated plants by locating the "regions displaying a maximal primary diversity of varieties" and the "series of regularities in the distribution of these varieties", Zhiteneva (15) and Burkasov (4) concluded that the white-seeded group of *Curcubita moschata* had its origin in Mexico and Guatemala.

Wittmack's (14) find of seeds in an old Peruvian tomb of Ancon, some of which Naudin identified as *C. moschata*, extends this species far southward at an early date. Unfortunately no definite date is given for this material and there is no indication whether it is the dark-seeded form of the species supposedly native of South America or the white-seeded form of Guatemala (4) (15).

The presence of a carbonized peduncle of *C. moschata*

in pre-Columbian mounds in Guatemala, and the distributional evidence of the Russian authors (4) (12) (15) may indicate a Central American origin of this species. This statement is strengthened, both by the suggestion of Bailey (3) regarding the pumpkin cultivated by the Seminole Indians of Florida and the age of the specimen in hand, in spite of the fact that the material obtained from the remains of the Basket Makers is much older (8) (10). The present pre-Columbian specimen also suggests that the Cheese Group of pumpkin, an old established variety in the United States, has had a long history in Central America.

Well preserved rinds, seeds and peduncles of *Cucurbita moschata* from the American Southwest, seeds from Peru, and a peduncle from Guatemala have now been obtained and identified from pre-Columbian cultures. The evidence suggests conclusively that this species is of New World origin and for many centuries was known to the aboriginal inhabitants.

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AN ADDITION TO THE GENUS LEPANTHOPSIS

BY
OAKES AMES

A NEW SPECIES of *Lepanthopsis* (Cogn.) Ames, a native of Colombia, differing from all known species of the genus in its conspicuously acuminate sepals, has appeared among collections made in 1922 by Ellsworth P. Killip.

Lepanthopsis is a genus of exceptional interest. In its vegetative organs it suggests *Lepanthes*; in the general aspect of the flowers it recalls *Pleurothallis*, but in its generative structures it leans strongly toward that section of *Stelis* which is distinguished by having the stigmatic lobes widely separated.

***Lepanthopsis acuminata* Ames sp. nov.**

Herba epiphytica, caespitosa. Caules secundarii ascendentes, monophylli, vaginis infundibuliformibus omnino inclusi, vaginarum ostiis hispidis. Folium ellipticum, bene marginatum, breviter petiolatum. Inflorescentia folium multo superans. Racemus multiflorus. Flores parvi. Sepala lateralia prope basim connata, lanceolata, valde acuminata. Sepalum dorsale lanceolatum, valde acuminatum, uninervium. Petala oblongo-ovata, acuta. Labelium cordatum, trinervium. Columna generis.

A small caespitose epiphyte about 7 cm. tall. Roots fibrous, glabrous. Stems slender, concealed by closely appressed tubular sheaths, monophyllous. Sheaths 7-10 mm. long, smooth except for the minutely ciliate margins of the infundibuliform tips. Leaves 10-15 mm. long, 6-8 mm. wide, elliptic-oblong or elliptic, obtuse, marginate, shortly petiolate. Inflorescence produced from the axil of the leaf. Raceme 1.5-3 cm. long, unilateral. Bracts of the inflorescence infundibuliform, about 1 mm.

long. Flowers about 1.5 mm. apart. Lateral sepals about 3 mm. long, lanceolate, acuminate, connate only near the base. Dorsal sepal lanceolate, acuminate, obscurely 1-nerved, about 3 mm. long and 1 mm. wide. Petals ovate-oblong, acute or somewhat obtuse, about 0.75 mm. long and 0.50 mm. wide. Labellum about 1 mm. long and broad, cordate, 3-nerved. Column very short with the stigmatic lobes separated by the triangular rostellar process.

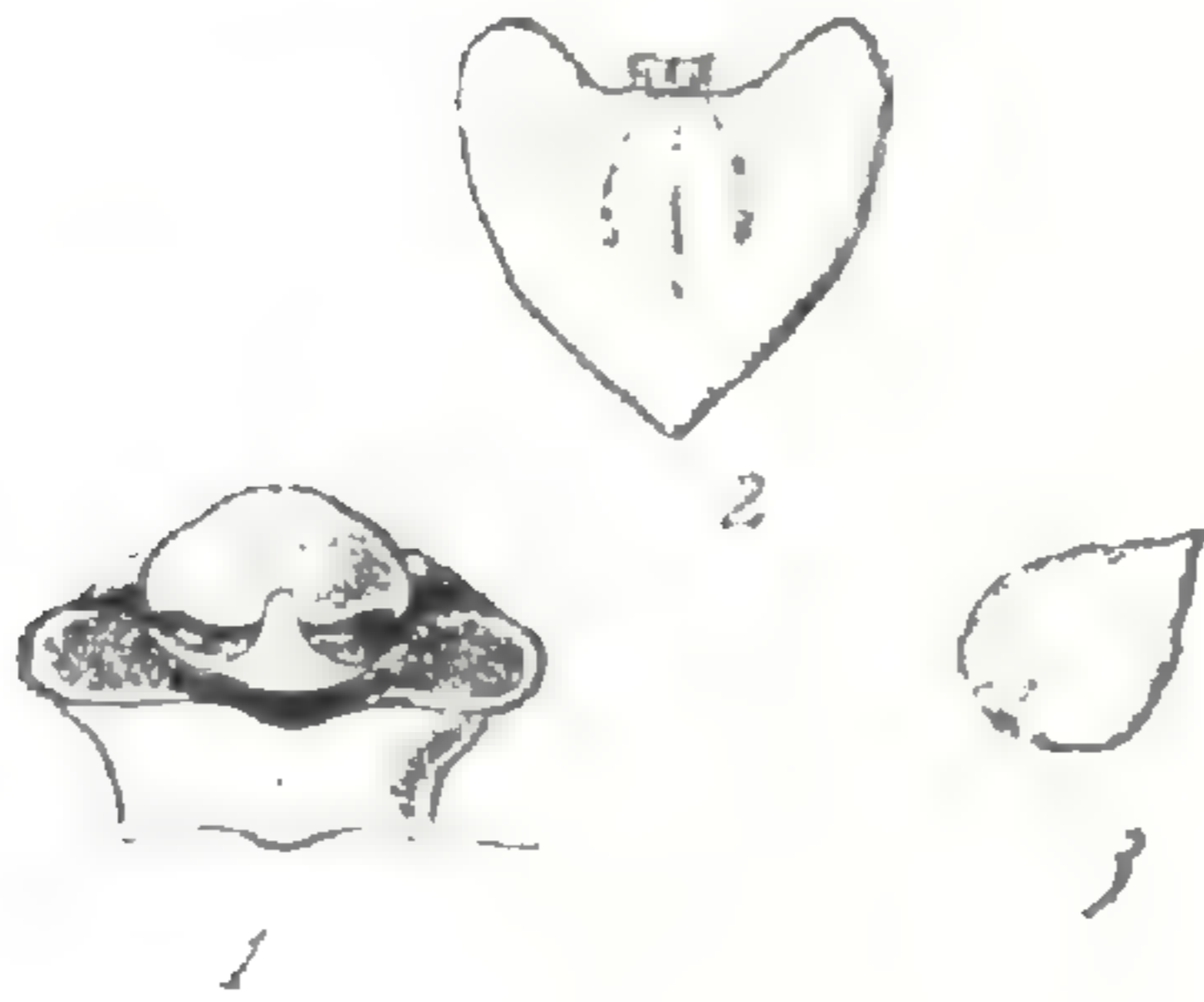
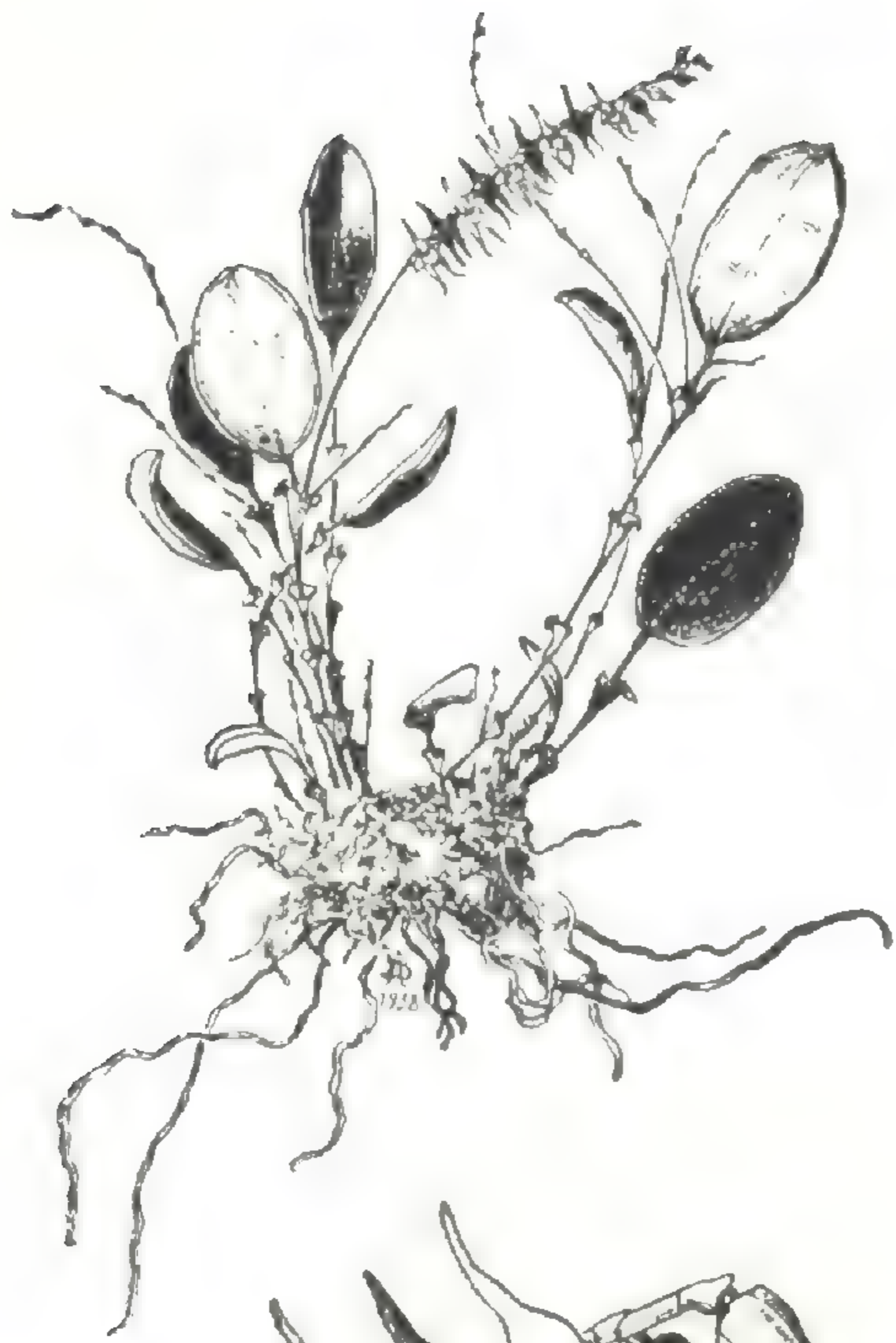
Lepanthopsis acuminata is allied to *L. densiflora* (Rodr.) Ames and to *L. floripecten* (Reichb.f.) Ames, differing from them chiefly in the acuminate lateral sepals which are connate only near the base.

COLOMBIA: Department of El Valle, La Cumbre, Cordillera Occidental. Epiphytic herb in forest. At 700-2200 meters altitude. Perianth red-brown and green. September 11, 18, 1922. Killip 11298 (TYPE in Herb. Ames No. 47693).

EXPLANATION OF THE ILLUSTRATION

LEPANTHOPSIS ACUMINATA Ames. Plant drawn natural size from a dried specimen of the type. A fragment of the raceme is represented much enlarged. 1, a petal, much enlarged. 2, a labellum, much enlarged. 3, a column, much enlarged, showing the laterally situated stigmatic lobes.

Drawn May 1938 by BLANCHE AMES



THE NOMENCLATORIAL STATUS OF
MALAXIS EXCAVATA

BY
LOUIS O. WILLIAMS

Malaxis excavata (*Lindl.*) *O. Kuntze* Rev. Gen.
Pl. 2 (1891) 673.

Microstylis excavata Lindley in Bot. Reg. 24 (1838)
Misc. p. 51.

Microstylis hastilabia Reichenbach filius Beitr. Orch.
Centr.-Am. (1866) 101.

Cheiropterocephalus sertulifera Rodriguez Gen. et Sp.
Orch. Nov. 1 (1877) 29.

Malaxis hastilabia (Reichb.f.) *O. Kuntze* Rev. Gen.
Pl. 2 (1891) 673.

Microstylis quadrangularis Cogniaux in Martius Fl.
Bras. 3, pt. 6 (1906) 551, t. 114.

Microstylis Carpinteraе Schlechter in Beihefte Bot.
Centralbl. 36 (1918) Abt. 2, p. 381.

Microstylis paranaensis Schlechter in Fedde Repert.
16 (1920) 330—Schlechter & Mansfeld in Fedde Re-
pert. Beihefte 58 (1930) t. 18, f. 69.

Malaxis Carpinteraе (Schltr.) Ames Orch. 7 (Apr.,
1922) 157.

Microstylis Ottonis Schlechter in Fedde Repert. Bei-
hefte 10 (May, 1922) 39—Schlechter & Mansfeld in
Fedde Repert. Beihefte 57 (1929) t. 136, f. 532.

Microstylis sertulifera (Rodr.) Schlechter in Fedde
Repert. Beihefte 35 (1925) 46—Hoehne & Schlechter
in Arch. Bot. Estad. S. Paulo 1 (1926) 197, t. 7, f. I.

Malaxis uncinata Ames & Schweinfurth in Sched.
Orch. 10 (1930) 15.

I am indebted to Sir Arthur W. Hill, Director of
the Royal Botanic Gardens, Kew, for the loan of a flower
from Lindley's type specimen of *Microstylis excavata*

which makes it possible to correlate the species definitely with names subsequently proposed.

Malaxis excavata is a widespread species and is, as one might expect, subject to considerable variation. This variation in the species accounts for much of the synonymy cited above. The species occurs from Mexico to Argentina. I have seen specimens or records of specimens (drawings, photographs) from the countries cited below. *Malaxis excavata* may be found in other adjacent countries as botanical exploration progresses.

Mexico, Costa Rica, Panama, Colombia, Ecuador?, Bolivia, Peru, Brazil and Argentina.

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REVIEW OF THE GENUS *THRIXSPERMUM*
IN THE PHILIPPINE ISLANDS

BY
LOUIS O. WILLIAMS

THRIXSPERMUM is one of the most difficult genera of the Philippine Sarcanthinae to study and to determine as the flowers are membranaceous, are rarely produced in abundance and tend to become agglutinated upon drying and pressing.

In the large collection of orchids made in the Philippines by A. Loher and received by the Ames Herbarium from the Philippine Bureau of Science for study and determination, were many specimens belonging to the genus *Thrixspermum*. In order to determine them and other accumulated specimens of the genus, a revision of the Philippine species became necessary.

The specimens now at hand, while not a complete representation of the probable Philippine species, is adequate for a study of the species recognized at present. A study of the genus through the medium of living plants may necessitate a change in the conception of some of the species as represented in this revision.

The only paper of importance concerning the Philippine species of *Thrixspermum* is that of Ames (Orch. 5 (1915) 201-210) in which most of the previously known Philippine species are described.

It is the plan of this paper to give a key to the recognized Philippine species of *Thrixspermum*, their bibliography, distribution and descriptions of the new species.

KEY TO THE SPECIES AND VARIETY

- A.* Inflorescence spirally arranged (Subg. *Dendrocolla*)
- a.* Pubescence of the lip confined to a dense mass on either side of the apex; disc shallowly concave
 - b.* Lip transversely rhomboid
 - 1. *comans*
 - b.* Lip broadly subpandurate
 - 1a. var. *bicristatum*
 - a.* Pubescence of the lip, when present, not confined to dense masses, scattered or the lip glabrous; disc usually deeply concave or saccate
 - c.* Leaf-bearing stems 3 cm. or less long; plants appearing acaulescent, the leaves approximate
 - d.* Middle or terminal lobe of the lip pubescent
 - e.* Lip 5-lobed, the lateral lobes spreading
 - 4. *quinquelobum*
 - e.* Lip 3-lobed, the lateral lobes strongly falcate
 - 6. *sp.*
- NOTE: The material is inadequate for description
- d.* Middle or terminal lobe of the lip glabrous, but sometimes the calli are not glabrous
 - f.* Lip entire, i.e. no distinct sinuses between the terminal and lateral lobes
 - g.* Lateral calli near the margin of the lip
 - 9. *Vanoverberghii*
 - g.* Lateral calli near the orifice of the sac of the lip
 - 8. *integrum*
 - f.* Lip 3-lobed (or apparently 4-lobed) with a distinct sinus between the terminal and lateral lobes
 - h.* Lateral lobes of the lip about four times larger than the mid-lobe
 - 3. *Elmeri*
 - h.* Lateral lobes subequal to or smaller than the mid-lobe
 - i.* Lateral and terminal lobes of the lip subequal in size; mid-lobe not retuse
 - j.* Median callus subcordate; lip cruciform; lateral calli near the margin of the lip
 - 5. *fantasticum*
 - j.* Median callus not subcordate, small and

inconspicuous; lateral calli on the orifice of the sac of the lip

2. *Robinsonii*

- i. Lateral lobes of the lip smaller than the terminal lobe; mid-lobe retuse

7. *eximium*

c. Leaf-bearing stems 5 cm. long or usually much longer

k. Bracts of the inflorescence subulate

l. Peduncle much exceeding the leaves in length, at least twice as long

10. *agusanense*

l. Peduncle subequal to the leaves in length or usually much shorter

m. Mid-lobe of the lip subequal to or longer than the lateral lobes; sheathed stems not conspicuously flattened; sepals not auriculate

n. Central longitudinal callus pubescent for its entire length; mid-lobe of the lip subequal in length to the lateral lobes

12. *Hystrix*

n. Central callus not longitudinal, short, glabrous; mid-lobe of the lip longer than the lateral lobes

11. *Amesianum*

m. Mid-lobe of the lip considerably shorter than the lateral lobes; sheathed stem conspicuously flattened; sepals auriculate

15. *Weberi*

k. Bracts of the inflorescence not subulate

o. Lip distinctly 3-lobed; callus one

p. Mid-lobe of the lip flat, broadly lanceolate; median callus not emarginate

13. *Wenzelii*

p. Mid-lobe of the lip canaliculate, oblong; median callus strongly emarginate

14. *angustatum*
- o. Lip indistinctly 3-lobed; calli
two
16. *subulatum*
- A. Inflorescence distichous (Subg. Orsidice)
17. *amplexicaule*
- a. Leaves amplexicaul; sepals and petals oval or ovate
18. *linearifolium*
- a. Leaves not amplexicaul; sepals and petals broadly lanceolate
or usually linear
- b. Leaves linear to linear-lanceolate, not more than 1 cm. broad
19. *ligulatum*
- b. Leaves not linear to linear-lanceolate or if so much broader
than 1 cm.
- c. Upper margins of the bracts free from the rachis
20. *rostratum*
- d. Inflorescence half as long as the leaves or less; sepals
broadly lanceolate
21. *elongatum*
- d. Inflorescence exceeding the leaves in length; sepals linear
22. *acuminatissimum*
- c. Upper margins of the bracts adnate to the middle of the ra-
chis
- d. Lateral sepals oblique at the base; a rare species
20. *rostratum*
- d. Lateral sepals not oblique at the base; a common species
21. *elongatum*

1. **Thrixspermum comans** *J. J. Smith* in Bull. Dépt. Agric. Ind. Néerl. 13 (1907) 61; in Fedde Repert. 5 (1908) 300; in Bull. Jard. Bot. Buitenz. 6 (1924) t. 13, fig. II.

This species had been described (in manuscript) as a variety of *T. bicristatum* Ames. Our specimens agree with those from Java cultivated and determined as *T. comans* by J. J. Smith, as well as with his published figures. Samar, Mindanao; also Java.

1a. **Thrixspermum comans** *J. J. Smith* var. **bicristatum** (*Ames*) *L. O. Williams* comb. nov.

Thrixspermum bicristatum Ames Orch. 5 (1915) 202.

The Mindanao specimen reported as *T. bicristatum* by Ames in Merrill Enum. Philipp. Flow. Pl. 1 (1925) 405 is *T. comans*.

Luzon, Leyte.

2. **Thrixspermum Robinsonii** Ames Orch. 5 (1915) 207.

Apparently widely distributed but not common in the Philippines. The two specimens which I have seen from Negros are sterile, but probably belong to this species. The specimens from Mindanao differ from the type in having a more prominent and more pubescent median callus. By typographical error, the mid-lobe of the lip is characterized as pubescent in the original description.

Luzon, Leyte, Negros, Mindanao.

3. **Thrixspermum Elmeri** L. O. Williams sp. nov.

Planta parva, foliosa. Folia disticha, oblongo-lanceolata. Pedunculus gracilis, folium multo excedens. Bracteae inflorescentiae leviter subulatae, acutae, imbricatae. Sepalum dorsale elliptico-ovatum, obtusum. Petala sepalis similia. Labellum leviter saccatum, trilobatum; lobi laterales semiorbiculares; lobus medius semiorbicularis, parvus.

A small epiphytic herb. Stems about 1.5–2 cm. long, slightly complanate, leafy. Leaves distichous, crowded, coriaceous, rugose when dry, oblong-lanceolate, about 3 cm. long and 5–6 mm. broad; persistent leaf-sheaths covering the stem. Peduncles glabrous, slender, suberect or erect, much longer than the leaves, with one or more sterile bracts subtending the inflorescence. Inflorescence densely flowered, about 1 cm. long. Bracts of the inflorescence somewhat subulate, acute, imbricated, narrowly triangular, about 1.5–2 mm. long. Dorsal sepal elliptic-ovate, obtuse, 3- to 5-nerved, about 4 mm. long and 2

mm. broad. Lateral sepals semiovate, oblique, acute, 5-nerved, about 4-5 mm. long and 3 mm. broad. Petals similar to the lateral sepals but smaller, about 3.5 mm. long and 2 mm. broad. Lip 3-lobed, slightly saccate, about 2 mm. long; lateral lobes semiorbicular, about 2 mm. broad; mid-lobe semiorbicular, small; lip with a callus in each sinus and one in the sac. Column characteristic of the genus.

Among the Philippine species of the genus, *Thrixspermum Elmeri* is most closely allied to *T. Robinsonii* Ames. It may be distinguished from *T. Robinsonii* by having much smaller flowers, by a lip which has the mid-lobe very small in comparison with the lateral lobes, by the sac being much larger in comparison to the size of the flower, and by the pubescent median callus being very small and inconspicuous.

The type specimen of *T. Elmeri* consists of one plant, of a single flower which is now in the glycerine collection of the Ames Herbarium and of the analytical drawings which I have made.

NEGROS: Dumaguete (Cuernos Mountains), Province of Negros Oriental, April 1908, *Elmer 9848* (TYPE in Herb. Ames No. 43878).

4. ***Thrixspermum quinquelobum*** Ames Orch. 5 (1915) 206.

A most distinctive and rare species which is to be distinguished from the other Philippine species of *Thrixspermum* by means of the 5-lobed lip.

Luzon.

5. ***Thrixspermum fantasticum*** L. O. Williams *sp. nov.*

Herba epiphytica, parva. Radices fibratae, elongatae. Caules leviter complanati, foliosi. Vaginae foliorum persistentes, caulem obtegentes. Folia oblongo-oblancea-

ta, obtusa, disticha, valde conferta. Bracteae triangulares, obtusae, imbricatae. Sepalum dorsale elliptico-oblongum, obtusum, trinervium. Sepala lateralia late obovata, obtusa, quinquenervia. Petala ovata, leviter acuta, trinervia. Labellum cruciforme; lobi laterales oblongi, crenati; lobus medius semiquadratus, crenatus; discus callo saccato, semicordato, pubescenti, apice furcato ornatus; sinu utrinque callus lanceolatus divergens stat. Columna generis.

A small epiphytic herb. Roots fibrous, elongated. Stems slightly complanate, foliose, about 2 cm. long. Leaf-sheaths persistent, covering the stems. Leaves distichous, oblong-ob lanceolate, obtuse, somewhat crowded, coriaceous, rugose when dry, about 2–4 cm. long and 5–6 mm. broad. Peduncle glabrous, slender, with one or two sterile bracts. Inflorescence densely flowered, 4–12 mm. long. Bracts of the inflorescence triangular, obtuse, imbricated, about 1 mm. long. Dorsal sepal elliptic-oblong, obtuse, 3-nerved, about 3.5 mm. long and 2.5 mm. broad. Lateral sepals broadly ovate, obtuse, 5-nerved, about 4 mm. long and 3 mm. broad. Petals ovate, somewhat acute, 3-nerved, about 3 mm. long and 2.5 mm. broad. Lip cruciform, about 3.5 mm. long and 6 mm. broad; lateral lobes of the lip oblong, crenulate, about 2.5 mm. long; mid-lobe of the lip subquadrate, crenulate, about 1 mm. long; in the sac is a semicordate, saccate, pubescent, furcate callus; in each sinus is a divergent lanceolate callus. Column characteristic of the genus.

Thrixspermum fantasticum is allied to that group of species which contains *T. Robinsonii* Ames and *T. quinquelobum* Ames, but is not closely allied to either of these species or to any of the other Philippine species. The cruciform lip, the very large saccate furcate median callus with glandular tips, the lanceolate calli in the sinuses, and the very broad perianth segments make this species an

outstanding one. *Thrixspermum fantasticum*, in habit, is not easily distinguished from *T. comans* J. J. Sm. and the other species preceding *T. fantasticum* in this paper.

LEYTE: epiphyte in forest, Jaro, Buenavista, at 500 meters altitude, July 14, 1914, *Wenzel 496* (TYPE in Herb. Ames No. 48896).

6. *Thrixspermum* sp.

The specimen cited below seems to represent an undescribed species, but the material is not adequate for description. There is but a single flower available and that is withered. The lateral lobes of the lip which are strongly falcate are longer than the pilose-pubescent mid-lobe, and there seems to be only a single transverse callus on the lip.

The relationship of the plant would appear to be with *T. fantasticum* L. Wms., but the single transverse median callus suggests a possible alliance with *T. agusanense* Ames.

MINDANAO: epiphytic in forest, Placer, Province of Surigao, at 150 meters altitude, May 31, 1927, *Wenzel 10054*.

7. *Thrixspermum eximium* L. O. Williams sp. nov.

Herba parva, epiphytica. Radices fibratae, elongatae. Caules breves, foliosi. Vaginae foliorum persistentes, caulem obtegentes. Folia oblongo-lanceolata, obtusa, leviter retusa, disticha, aliquid conferta et coriacea. Bracteeae inflorescentiae perbreves, obtusae, imbricatae. Sepalum dorsale ovatum, obtusum. Sepala lateralia subrotunda, obtusa, quinquenervia. Petala oblongo-ovata, obtusa, quinquenervia. Labellum trilobatum, tricallosum.

A small epiphytic herb. Roots fibrous, elongated. Stem short, leafy, 2-3 cm. long, covered with persistent leaf-sheaths. Leaves oblong-lanceolate, distichous, obtuse or slightly retuse, crowded, rugose (at least when dry),

coriaceous, 3-7 cm. long and 0.8-2 cm. broad. Peduncle slender, glabrous, with one or two sterile bracts. Inflorescence densely flowered, 0.8-2 cm. long. Bracts of the inflorescence imbricated, obtuse, very short, about 0.5 mm. long. Dorsal sepal ovate, obtuse, about 6 mm. long and 3 mm. broad. Lateral sepals subrotund, obtuse, 5-nerved, 6-7 mm. long and 6 mm. broad. Petals oblongovate, about 6 mm. long and 4 mm. broad, obtuse, 5-nerved. Lip 3-lobed or apparently 4-lobed because of the retuse mid-lobe, with three prominent calli; the median callus extends nearly the length of the lip, with the apical portion free; two arcuate lateral calli are free for nearly their full length; the sac at the base of the lip is directed backward (not downward). Column characteristic of the genus.

Thrixspermum eximium is allied to *T. Vanoverberghii* Ames from which it may be distinguished by the short obtuse instead of subulate, bracts; by the broader sepals and petals; by the lip being saccate at the base instead of toward the apex; and by the lip having a longitudinal callus and two lateral calli instead of two lateral calli and a median comose appendage. The lobing of the lip in the two species also differs.

LUZON: Bontoc Subprovince, January 1911, *Vanoverbergh 1091* (TYPE in Herb. Ames No. 13654); on branches of trees, Mt. Caua, Bontoc Subprovince, at 4900 feet altitude, March 3, 1920, *Ramos & Edaño 37979* (COTYPE in Herb. Bur. Sci., Manila); epiphyte in forest, Jaro, Masaganap, at 600 meters altitude, March 9, 1914, *Wenzel 309* (Herb. Ames No. 43985).

8. ***Thrixspermum integrum*** *L. O. Williams* sp. nov.

Herba parva, epiphytica. Caules breves, foliorum vaginis obtecti. Folia oblongo-lanceolata, obtusa vel acuta, disticha, valde conferta. Inflorescentia densiflora.

Sepalum dorsale elliptico-ovatum, acutum. Sepala lateralalia late ovato-lanceolata. Petala ovato-lanceolata vel ovata, acuta. Labellum integrum, late subcordatum, tricallosum.

An epiphytic herb with fibrous roots. Stem short, about 2 cm. long, covered with persistent leaf-sheaths. Leaves distichous, crowded, coriaceous, rugose when dry, oblong-lanceolate, obtuse or acute, 2.5–9 cm. long, 0.5–1.7 cm. broad. Peduncle exceeding or subequaling the leaves, slender, usually with a sterile bract near the middle. Inflorescence densely flowered, 7–25 mm. long. Bracts of the inflorescence lanceolate, acerose, imbricated, about 3 mm. long. Dorsal sepal elliptic-ovate, acute, 5-nerved, about 7 mm. long and 3.5 mm. broad. Lateral sepals broadly ovate-lanceolate, 5-nerved, about 8 mm. long and 4 mm. broad. Petals ovate-lanceolate to ovate, 5–6 mm. long and 1.2–1.5 mm. broad, acute, 3- to 5-nerved. Lip entire, broadly subcordate, obtuse, rather strongly saccate, about 6 mm. long and nearly as broad, with three calli; the lateral pair of calli small, mammillate, on the margin of the sac; the median callus somewhat larger, glandular-pubescent, situated in the sac. Column characteristic of the genus.

Thriasperrum integrum may be distinguished from its allies, *T. eximium* L. Wms. and *T. Vanoverberghii* Ames, by means of the entire lip and other details of the perianth. The bracts of the inflorescence are much longer than those of either of its allies.

LUZON: on trees, Bauco, Bontoc Subprovince, at 1450 meters altitude, September-October 1912, *Vanoverbergh 1531* (TYPE in Herb. Ames No. 15112); on trees, Bontoc Subprovince, at 1400 meters altitude, July 30, 1910, *Vanoverbergh 632*.

LEYTE: on trees of medium height, Dagami, Panda, at 60 meters altitude, October 24, 1912, *Wenzel 53*.

9. **Thrixspermum Vanoverberghii** *Ames* in Philipp. Journ. Sci. 8 (1913) Bot. 438.

Thrixspermum Vanoverberghii, according to my conception of it, rests on the type specimen, *Vanoverbergh 1792*. The collections (*Vanoverbergh 632, 1091* and *1531*) cited by Ames in Merrill Enum. Philipp. Flow. Pl. 1 (1925) 406 as referable to *T. Vanoverberghii* belong in reality to *T. eximium* L. Wms. and *T. integrum* L. Wms. which were undescribed at the time when Ames published his conclusions.

Luzon.

10. **Thrixspermum agusanense** *Ames* Orch. 5 (1915) 201.

An easily distinguished species.

Leyte, Mindanao.

11. **Thrixspermum Amesianum** *L. O. Williams* *sp. nov.*

Herba epiphytica. Folia oblongo-elliptica, obtusa, in sicco valde rugosa, disticha, valde conferta. Inflorescentia densiflora, spicata. Sepalum dorsale ellipticum, obtusum, trinervium. Sepala lateralia oblongo-lanceolata, paulo obliqua. Petala anguste oblonga, obtusa. Labellum trilobatum; lobi laterales leviter arcuati; lobus medius triangularis, pubescens. Columna generis.

An epiphytic herb with numerous fibrous roots. Stem 5 cm. or more long (mostly 10–20 cm. long), terete, covered with persistent leaf-sheaths. Leaves distichous, mostly less than 1 cm. apart, oblong-elliptic, obtuse (sometimes obliquely obtuse), more or less rugose when dry, 3–6 cm. long, 0.5–1.5 cm. broad. Peduncle subequal to the leaves in length. Inflorescence spicate, densely flowered, about 0.5–4 cm. long. Bracts of the inflorescence subulate, mostly 3–5 mm. long. Dorsal sepal

elliptic, obtuse, 3-nerved, about 4.5 mm. long and 2 mm. broad. Lateral sepals oblong-lanceolate, acute, slightly oblique, dorsally somewhat carinate along the mid-rib, about 5 mm. long and 2.5 mm. broad. Petals narrowly oblong, obtuse, about 5 mm. long and 1.5 mm. broad. Lip 3-lobed, about 5 mm. long and 6 mm. broad, strongly saccate at the base; lateral lobes oblong, arcuate; mid-lobe triangular, obtuse, exceeding the lateral lobes in length; lip with a short retuse callus near the mouth of the sac; mid-lobe and margins of the lateral and mid-lobe subglandular-pubescent. Column characteristic of the genus.

Thrixspermum Amesianum is a segregate from *T. Wenzelii* as Ames delimited that species. The easiest and surest method of distinguishing *T. Amesianum* from *T. Wenzelii* (even when there are no flowers) is by means of the subulate-aristate bracts of the inflorescence as contrasted with the shorter non-aristate bracts of *T. Wenzelii*.

When better and more complete material is at hand, it is not improbable that *T. Amesianum* may prove to be an aggregate species.

LEYTE: epiphyte in forest, Jaro, at 300 meters altitude, November 25, 1914, *Wenzel 746* (TYPE in Herb. Ames No. 43830).

MINDANAO: cultivated in the Bureau of Science orchid house, Manila, said to be from Surigao, *Quisumbing 84513*.

The following collections, which for one reason or another cannot be determined with certainty, seem to belong to this species.

LUZON: on floating trees in the river, San Mateo River, Province of Tayabas, at 30 meters altitude, May 9, 1917, *Ramos & Edaño 28539*.

LEYTE: tops of trees, Dagami, Panda, at 60 meters altitude, October 10, 1912, *Wenzel 41* and same data June 9, 1913, *Wenzel 156*; epiphyte in forest, Jaro, Conpagal, at 800 meters altitude, November 24, 1914, *Wenzel 714*.

MINDANAO: Placer, Surigao, July 8, 1916, *Wenzel 1010*¹ and *1011*¹.

12. **Thrixspermum Hystrix** (*Bl.*) *Reichenbach filius* in *Trans. Linn. Soc.* 30 (1874) 136, 145—J.J. Smith in *Fl. Buitenz.* 6 (Orch. Java) (1905) 577 and in *Figuren-Atlas* pt. 5 (1912) fig. CDXXXIII.

Dendrocolla Hystrix Blume *Bijdr.* (1825) 291.

It is with some misgiving that the present specimen is referred to *T. Hystrix*. The petals and sepals of the single flower present have been broken, but the lip is in good condition. The lip corresponds very well with the figure given by Smith and until more complete material is available it seems best to refer the specimen here, even though dubiously. I have seen no herbarium material referable to *T. Hystrix*.

Attention should be called to the similarity of *T. adenotrichum* Schltr. to the present specimen.

LUZON: without definite locality, 1909, *Lyon 128*.

13. **Thrixspermum Wenzelii** *Ames* *Orch.* 5 (1915) 209.

This species is cited by Ames (*Orch.* 5 (1915) 209) as occurring in Leyte, Palawan and Luzon and again it is attributed to Luzon, Leyte, Palawan, Mindanao and Basilan by Ames in *Merrill Enum. Philipp. Flow. Pl.* 1 (1925) 406. The distributions given above are, I believe, based on an aggregate.

The specimens from Luzon and Leyte belong here in part, some of them belonging to *T. Amesianum* L. Wms. The specimen from Palawan is possibly undescribed and may belong to Schlechter's proposed section *Katocolla*. The specimen from Basilan belongs to the following species, *T. angustatum* L. Wms.

Luzon, Leyte.

¹These two collections seem to differ somewhat from the others.

14. ***Thrixspermum angustatum*** *L. O. Williams*
sp. nov.

Herba epiphytica. Caules plusminusve 5 cm. longi, vaginis foliorum obtecti. Folia lineari-oblonga, obtusa, coriacea, disticha. Inflorescentia densiflora. Sepalum dorsale angustissime rhombicum. Sepala lateralia elliptico-lanceolata. Petala oblanceolata, obtusa. Labellum trilobatum. Columna generis.

An epiphytic herb with numerous fibrous roots. Stems mostly more than 5 cm. long, covered with persistent leaf-sheaths. Leaves distichous, linear-oblong, obtuse, mostly about 7 mm. apart, rather thin for the genus, about 4–7 cm. long and 0.5–1 cm. broad. Peduncles much exceeding the leaves (mostly about twice as long), usually with a single sterile bract much below the inflorescence. Inflorescence densely flowered, 0.5–3 cm. long. Bracts of the inflorescence about 2 mm. long, apparently rather fleshy when fresh, neither subulate nor aristate. Dorsal sepal very narrowly rhombic, obtuse, 3-nerved, about 8 mm. long and 2.5 mm. broad. Lateral sepals elliptic-lanceolate, acute, 3-nerved, about 6 mm. long and 2.5 mm. broad. Petals oblanceolate, obtuse, 3-nerved, about 6 mm. long and up to 1.5 mm. broad. Lip 3-lobed, with a single emarginate callus (free only at the apex) at the orifice of the spur; lateral lobes slightly arcuate, obtuse, subglandular-pubescent on the margin; mid-lobe oblong, obtuse, canaliculate, about 3 mm. long, covered throughout with a fine pubescence, much exceeding the lateral lobes; spur directed slightly forward, about 4.5 mm. long from the junction with the sepals to the tip. Column characteristic of the genus.

Thrixspermum angustatum has been confused with *T. Wenzelii* Ames to which it is doubtless most closely allied. From *T. Wenzelii* it may be distinguished by the peduncles being more than twice as long as the leaves,

whereas in *T. Wenzelii* the peduncles are subequal to the leaves in length. In *T. angustatum* the leaves are comparatively much narrower than those of *T. Wenzelii*. Florally the present species may be distinguished from *T. Wenzelii* by the much narrower sepals and petals, by the narrow mid-lobe of the lip and by the more pronounced sac (or spur).

BASILAN: September 1912, *Reillo 16352* (TYPE in Herb. Ames No. 13358).

15. ***Thrixspermum Weberi* Ames** *Orch.* 7 (1922) 134.

Thrixspermum Weberi, which is known from but one locality in the Philippines, is one of the most easily distinguished species of the subgenus *Dendrocolla* in the Philippines by reason of its comparatively very large, strongly flattened stems and its distinctive facies.

Mindanao.

16. ***Thrixspermum subulatum* (Bl.) Reichenbach filius** *Xen. Orch.* 2 (1867) 122—J. J. Smith in *Fl. Buitenz.* 6 (*Orch. Java*) (1905) 578 and in *Figuren-Atlas* pt. 5 (1912) fig. CDXXXIV.

Dendrocolla subulata Blume *Bijdr.* (1825) 291.

Aerides subulatum Lindley *Gen. & Sp. Orch. Pl.* (1833) 241.

Sarcochilus subulatus Reichenbach filius in *Walp. Ann.* 6 (1863) 500.

Schlechter proposed the section *Katocolla* (*Orchis* 5 (1911) 54) for this and other species. I am unable to pass upon the validity of the section.

Ames in Merrill *Enum. Philipp. Flow. Pl.* 1 (1925) 406 included *T. falcilobum* Schltr. as a synonym, following J. J. Smith. I have not verified this reduction.

The specimens on which this Philippine record is

based are by no means perfect and the identifications may be in error.

Luzon; also in Java, Sumatra, Amboina, and Tenimber.

17. **Thrixspermum amplexicaule** (*Bl.*) *Reichenbach filius* Xen. Orch. 2 (1867) 121—J.J. Smith in Fl. Buitenz. 6 (Orch. Java) (1905) 573, and in Figuren-Atlas pt. 5 (1912) fig. CDXXX.

Dendrocolla amplexicaulis Blume Bijdr. (1825) 288.

Aerides amplexicaule Lindley Gen. & Sp. Orch. Pl. (1833) 239.

Orsidice amplexicaulis Reichenbach filius in Bonplandia 2 (1854) 93.

Sarcochilus amplexicaulis Reichenbach filius in Walp. Ann. 6 (1863) 499.

Thrixspermum amplexicaule is easily distinguished from all other members of the genus by the amplexicaul leaves.

An additional synonym, but one which is based on extra-Philippine material and which has never been used for Philippine plants, is *T. lilacinum* (Griff.) Reichb. f. It has been figured in Griffith Icon. Pl. Asiat. 3 (1851) t. 320, fig. D, and by J. D. Hooker in Bot. Mag. 127 (1901) t. 7754.

Luzon, Mindanao; also in Malay Peninsula, Sumatra, Amboina, Celebes and Banda Islands.

18. **Thrixspermum linearifolium** *Ames* Orch. 5 (1915) 205.

A rare species which is easily distinguished from other Philippine species of the genus.

I have seen a specimen which possibly represents an allied, but undescribed, species. This specimen bears the following data:

MINDANAO: on trees in damp forest, Mt. Camates, Subprovince of Bukidnon, at 4000 feet altitude, July 9, 1920, *Ramos & Edaño* 38587.

Mindanao.

19. ***Thriasperrum ligulatum*** *L. O. Williams* sp. nov.

Herba epiphytica. Caules 1–6 dm. longi, foliorum vaginis obtecti. Folia oblongo-ligulata, obtusa, retusa, valde coriacea, disticha. Inflorescentia valde elongata, pauciflora. Sepalum dorsale lanceolatum, acutum. Sepala lateralialia late lanceolata, acuta. Petala anguste lineari-oblancheolata. Labellum trilobatum. Columna generis.

An epiphytic herb with few roots. Stem 1–6 dm. long, covered with persistent leaf-sheaths, terete. Leaves distichous, oblong-ligulate, obtuse, usually retuse and somewhat unequal at the apex, 15–21 cm. long, 2.5–4.5 cm. broad, with the surface usually remaining vernicose in dried specimens. Peduncles much shorter than the leaves, (usually about one half as long). Inflorescence distichous, apparently few-flowered, having usually fewer than twelve floral bracts. Bracts of the inflorescence about 1 cm. long, obtuse, with the upper margins completely encircling the rachis, probably somewhat fleshy when fresh. Dorsal sepal lanceolate, acute, about 30 mm. long and 8 mm. broad. Lateral sepals broadly lanceolate, acute, about 30 mm. long and 13 mm. broad, with the widest part near the base. Petals linear-lanceolate, acute, about 25 mm. long and 6 mm. broad. Lip 3-lobed, about 20 mm. long; lateral lobes oblong, about 5 mm. long; mid-lobe lanceolate, about 12 mm. long, acute, apparently thickened; sac rather shallow, with a small bifid callus in the orifice. Column characteristic of the genus.

Thriasperrum ligulatum is apparently most closely allied to *T. elongatum* Ames and to *T. rostratum* Ames,

but differs from these species in many respects. The petals and sepals of *T. ligulatum* are very broad in comparison to those of the allied species; the lanceolate, but not long-caudate, lip is another point of difference; the inflorescence generally has far fewer bracts of which the upper margins encircle the rachis, whereas they are adnate near the middle of the rachis in the allied species; vegetatively the plant is larger than any which I know in the genus.

LUZON: Montalban, Province of Rizal, May 1915, *Loher s. n.* (TYPE in Herb. Ames No. 50009) and *Loher 13320* (COTYPE in Herb. Ames No. 43957); [Mt.?] Paete, Province of Laguna, June 1915, *McGregor 22819* (Philipp. Nat. Herb., Manila); on trees, Province of Laguna, June 20, 1912, *Reillo 27*.

The following sterile specimens, which are in the Philippine National Herbarium, seem to belong to this species.

LUZON: on tree, Papat, Province of Laguna, February 24, 1913, *Ramos 20448*; San Fernando, Province of Unión, January 1922, *Lete 666*.

20. ***Thrixspermum rostratum*** *Ames* Orch. 5 (1915) 208.

Apparently a rare plant which is dubiously distinct from *T. elongatum* Ames.

Panay, Samar.

21. ***Thrixspermum elongatum*** *Ames* Orch. 5 (1915) 203.

A most difficult species to study because of the ephemeral nature of the flowers. The mid-lobe of the lip is somewhat fleshy, terete, and often becomes deformed in drying.

It is quite possible that the material referred here represents more than one species. Certainly the material

is variable, with great difference in the size and shape of the leaf, and in the size of the flowers.

Luzon, Polillo, Mindoro, Samar, Leyte, Palawan, Balabac, Bohol, Mindanao, Basilan.

22. *Thrixspermum acuminatissimum* (Bl.) Reichenbach filius Xen. Orch. 2 (1867) 121—J.J. Smith in Fl. Buitenz. 6 (Orch. Java) (1905) 569 and in Figuren-Atlas pt. 5 (1912) fig. CDXXVII.

Dendrocolla acuminatissima Blume Bijdr. (1825) 201.

Aerides acuminatissimum Lindley Gen. & Sp. Orch. Pl. (1833) 240.

Sarcochilus acuminatissimus Reichenbach filius in Walp. Ann. 6 (1863) 498.

Luzon, Leyte; also in Malay Peninsula, Java.

ORCHID STUDIES, VIII

BY

LOUIS O. WILLIAMS

THE PRESENT NUMBER of my Orchid Studies deals with a number of new species and an outstanding new genus of Philippine orchids.

Ceratostylis caespitosa *L. O. Williams sp. nov.*

Herba parva, epiphytica, caespitosa, usque ad 6 cm. alta. Pseudobulbi unifoliati. Folia elliptico-lanceolata vel oblanceolata, acuta, coriacea. Inflorescentia uni- vel forsitan pauciflora. Sepalum dorsale lanceolatum, acutum, trinervium. Sepala lateralia lanceolata, acuta, columnae pedi adnata et mentum breve formantia. Petala lineari-lanceolata, acuta, uninervia. Labellum simplex, ovato-lanceolatum, acutum vel obtusum, unicallosum, breviter unguiculatum; unguis bi- vel tricarinatus. Columna generis.

Small caespitose, epiphytic herbs up to 6 cm. tall. Stem pseudobulbous, unifoliate, up to about 1 cm. long, covered with imbricated sheaths. Leaf elliptic-lanceolate to oblanceolate, acute, coriaceous, 2.5–4 cm. long, 6–10 mm. broad. Inflorescence one- or few-flowered, borne laterally in a cavity of the pseudobulb; peduncle 4–8 mm. long, with a peltate bract at its junction with the pubescent ovary. Dorsal sepal lanceolate, acute, 3-nerved, about 3 mm. long and 1.5 mm. broad. Lateral sepals lanceolate, acute, 3- to 5-nerved, joined to the column-foot and with it forming a short mentum, about 4.5 mm. long and 2 mm. broad. Petals linear-lanceolate, acute, 1-nerved, 2.5–3 mm. long and about 1 mm. broad. Lip simple, ovate-lanceolate, acute or obtuse, short-clawed, about 4 mm. long and 2.5 mm. broad; claw with two or three carinate ridges; disc with a bipartite callus which

extends to the thickened apex of the lip. Column characteristic of the genus.

Ceratostylis caespitosa is noticeably distinct from all the other Philippine species of *Ceratostylis* in its caespitose habit, in its short comparatively broad leaves and in its floral structure.

Luzon: Montalban, Province of Rizal, October 1912, *Loher s.n.*; Province of Rizal, September 1909, *Loher 14658* (TYPE in Herb. Ames No. 44937).

***Ceratostylis Loheri* L. O. Williams sp. nov.**

Herba epiphytica usque ad 3 dm. alta. Caules ramosi, vaginis reticulatis obtecti. Pseudobulbi unifoliati. Folia linearia, acuta, teretia. Inflorescentia uniflora. Ovarium piloso-pubescent. Sepalum dorsale ellipticum, acutum, dorso pubescens. Sepala lateralia late lanceolata, dorso pubescentia, columnae pedi adnata et mentum formantia. Petala anguste lanceolata, glabra. Labellum trilobatum: lobi laterales erecti, obtusi; lobus medius carinatus, recurvus, triangulus; discus plusminusve pubescens. Columna generis; pes columnae floccosus.

Epiphytic herbs up to about 3 dm. tall. Stems branching, covered with rufous reticulate-nerved sheaths, up to about 1.5 dm. long. Pseudobulbs unifoliate, small, slender, 1–1.5 cm. long, covered by sheaths. Leaves linear, acute, terete, canaliculate on the inner surface, up to about 2 dm. long and 2–3 mm. broad. Inflorescence 1-flowered, borne laterally in a pocket on the pseudobulb. Ovary densely sericeous-pilose-pubescent, about 10 mm. long. Dorsal sepal elliptic, more or less acute, 7-nerved, dorsally densely pubescent, about 10 mm. long and 5 mm. broad. Lateral sepals broadly lanceolate, dorsally pubescent, 8–9 mm. long and 4–5 mm. broad, adnate to the column-foot and with it forming a distinct mentum. Petals narrowly lanceolate, 3-nerved, glabrous, about 8 mm.

long and 3 mm. broad. Lip 3-lobed, triangular in outline, about 2 mm. long and as broad, joined to the column-foot by a longitudinal keel; lateral lobes erect, obtuse, about 2 mm. long, thickened on the inner surface; mid-lobe much thickened, with a median ridge, strongly recurved; disc more or less pubescent. Column characteristic of the genus; column-foot floccose near the junction with the column, about 2–3 mm. long.

Ceratostylis Loheri has no near allies known to the author. It may be distinguished easily by the 3-lobed lip and by the method of attachment of the column-foot to the lip. This latter character is also found in Schlechter's genus, *Epiblastus*.

In addition to the specimens cited below, there is in the Ames Herbarium a cultivated specimen belonging to this species. This specimen was derived from Kränzlin's Herbarium. It bears an unpublished name and the following note in Kränzlin's handwriting: "Heimat unbekannt. Philippinen? Febr. 1919. Kränzlin".

LUZON: Province of Rizal, September 1909, *Loher s.n.*; Panigtingan, Montalban, Province of Rizal, *Loher 13223* (TYPE in Herb. Ames No. 44939); Province of Rizal, September 1909, *Loher 14736*.

Bulbophyllum (§. *Racemosae*) **calophyllum** *L.*
O. Williams sp. nov.

Herba parva, epiphytica. Folia coriacea, oblonga vel ovalia, obtusa, breviter petiolata. Inflorescentia racemosa, brevis, plusminusve triflora; bracteae lanceolatae. Sepalum dorsale lanceolatum, acutum, apice obscure serrulatum. Sepala lateralia triangulari-lanceolata, acuta, integra vel apice obscure serrulata. Petala lineari-lanceolata, acuta. Labellum oblongo-panduratum, apice obscure serrulatum; lobi laterales erecti; discus callis binis ornatus. Columna brevis, cum stelidiis binis terminalibus lanceolatis.

Small epiphytic herbs without prominent pseudobulbs. Leaves coriaceous, oblong to oval, obtuse, very short-petiolate, 1–3.5 cm. long, 0.5–1 cm. broad; petiole of the mature leaves about 1–2 mm. long. Inflorescence racemose, very short, 1–2 cm. long, usually laxly 3-flowered; bracts subtending the flowers lanceolate, 2.5–3 mm. long. Dorsal sepal lanceolate, acute, minutely serrulate on the terminal half, with the dorsal surface obscurely papillate, 3-nerved at the base and 1-nerved above, about 3 mm. long and 1–1.5 mm. broad. Lateral sepals triangular-lanceolate, acute, entire or very obscurely serrulate toward the apex, 3-nerved at the base and 1-nerved above, about 3.5 mm. long and 1.5 mm. broad. Petals linear-lanceolate, acute, 1-nerved, 1.5–2 mm. long, about 0.5 mm. broad. Lip oblong-pandurate, about 1.5 mm. long and 1 mm. broad, obscurely serrulate toward the apical part; lateral lobes more or less distinct, erect; disc with two crests which extend from the lateral lobes toward the center of the lip. Column short, with two lanceolate, acute, terminal stamens which are about 0.3 mm. long.

Bulbophyllum calophyllum may be distinguished from *B. gimagaanense* Ames, its closest ally, by the comparatively shorter and broader leaves which are not cuneate at the base, by the shorter inflorescence, by the differently proportioned lip which lacks ciliations and by minor details of the sepals and petals.

LUZON: Province of Rizal, September 1909, *Loher 14649* (TYPE in Herb. Ames No. 45900; ISOTYPE in Herb. Bur. Sci., Manila).

Bulbophyllum (§. *Monanthaparva*) ***caudatum*** *L. O. Williams* sp. nov.

Herba epiphytica, rhizomatosa. Pseudobulbi cylindraceo-pyriformes. Folium singulum, elliptico-lanceolatum vel anguste elliptico-lanceolatum, acutum vel leviter obtusum, obscure mucronatum. Inflorescentia uniflora.

Flos pro sectione magnus. Sepala similia, longe caudata; lamina lanceolata. Petala lanceolata, acuta, tri- vel quinquenervia. Labellum lineari-lanceolatum, basi biauriculatum, obscure ciliatum. Columna generis, parva.

Epiphytic herb with a repent rhizome. Pseudobulbs cylindric-pyriform, sulcate when dry, unifoliate, about 1 cm. long and 0.5 cm. in diameter, mostly about 1–2 cm. apart on the rhizome. Leaves elliptic-lanceolate to narrowly elliptic-lanceolate, acute or somewhat obtuse, occasionally obscurely mucronate, 3.5–7 cm. long, 0.8–1.2 cm. broad. Inflorescence 1-flowered; flower large for the subgenus; peduncle filiform, much exceeding the leaves, up to 15 cm. long; bracts two, one subtending the flower and one near the base of the peduncle. Sepals similar, very long-caudate, about 40 mm. long; blade lanceolate, 4-to 5-nerved, about 14 mm. long and 3 mm. broad; apex caudate, filiform, about 26 mm. long. Petals lanceolate, acute, 3-to 5-nerved, about 12 mm. long and 3 mm. broad. Lip linear-lanceolate, 8–9 mm. long and about 1.5 mm. broad, biauriculate at the base; auricles rounded, erect, obscurely ciliate, about 1 mm. long. Column small, about 0.75 mm. long, with two aristate apical stelidia.

Bulbophyllum caudatum is most closely allied to *B. Bolsteri* Ames from which it may be easily distinguished by the very long-caudate sepals and by the narrower and longer leaves, as well as by the several-nerved petals.

MINDANAO: epiphyte in forest, Tubud Placer, Province of Surigao, at 150 meters altitude, flowers yellow, August 2, 1913, *Wenzel 10030* (TYPE in Herb. Ames No. 45925).

Bulbophyllum (§. *Racemosae*) ***nemorale*** *L. O. Williams sp. nov.*

Herba epiphytica, rhizomatosa. Pseudobulbus parvus, monophyllus. Folium singulum, elliptico-lanceola-

tum, acutum. Inflorescentia racemosa, pluriflora. Sepalum dorsale lanceolatum, acutum, naviculare. Sepala lateralia lanceolato-acuminata, falcata et leviter obliqua, margine posteriore paulo serrulata. Petala lanceolata, longe acuminata. Labellum profunde trilobatum; lobi laterales erecti, rotundati; lobus medius lanceolatus, obtusus. Columna generis.

An epiphytic herb with a rhizome. Pseudobulb inconspicuous, small, probably nearly round (in the living state), about 1–1.5 cm. in diameter, bearing one large leaf from its summit. Leaves elliptic-lanceolate, acute at both ends; blade 15–20 cm. long and 4.5–5.5 cm. broad; petiole sulcate, 5–7 cm. long. Inflorescence racemose, about 15- to 20-flowered; peduncle about as long as the leaves, with two or three sheathing bracts below; bracts lanceolate, acuminate, 6–9 mm. long. Dorsal sepal lanceolate, acute, strongly navicular, about 15 mm. long and 4 mm. broad. Lateral sepals lanceolate-acuminate, falcate and somewhat oblique, about 12–15 mm. long and 4–5 mm. broad, minutely serrulate on the posterior margin. Petals lanceolate, long-acuminate, about 12 mm. long and 2.5 mm. broad; the broad basal portion narrowly oblong, abruptly contracted into the narrow terminal part which is as long as the broad portion, serrulate at the constriction. Lip strongly 3-lobed; lateral lobes erect, round, about 2 mm. long; mid-lobe lanceolate, obtuse, about 3 mm. long and 1 mm. broad; disc with one large bilobate central callus at the base and two smaller longitudinal calli near the sinuses of the lobes. Column about 4 mm. long, rather stout, with a linear tooth on either side at the apex; column-foot prominent, curved, about 2.5 mm. long.

Bulbophyllum nemorale is distinguished easily from all the previously described Philippine species of *Bulbophyllum* by the strongly 3-lobed lip. It has also the larg-

est flowers of the section *Racemosae* growing in the Philippine Islands. Superficially *Bulbophyllum nemorale* most resembles *B. masaganapense* Ames (also from the Island of Leyte), but is distinguished easily from that species by the structure of the flowers and also by the presence of a pseudobulb.

LUZON: Province of Rizal, without date or number, *Loher*.

LEYTE: epiphyte in forest, Jaro, Masaganap, at 700 meters altitude, flowers pale yellow with purple spots, February 15, 1915, *Wenzel 871* (TYPE in Herb. Ames No. 45575).

Phaius fragilis *L. O. Williams sp. nov.*

Herba terrestris, parva. Folia plura, lanceolata vel elliptico-ovata, acuminata. Inflorescentia vulgo biflora, lateralis; bracteae lanceolatae vel ovatae, acuminatae, scariosae. Flores magni, albi, tenues. Sepalum dorsale elliptico-lanceolatum, acutum. Sepala lateralia lanceolata. Petala elliptica, acuta vel obtusa. Labellum integrum, oblongo-obovatum, cum calcaris gracili longo; discus callis binis praeditus. Columna generis.

A terrestrial herb up to 4 dm. tall, small for the genus. Stems slender, scarios-sheathed, with several nodes; sheaths becoming fibrous with age. Leaves lanceolate to broadly elliptic-oval, acuminate, with five to seven more prominent nerves and numerous smaller ones, very thin, gradually contracted into a petiole at the base, 8-30 cm. long, 3-10 cm. broad. Inflorescence borne laterally at a node, commonly about 2-flowered; peduncle up to 2.5 dm. long; bracts lanceolate to ovate, acuminate, scarios, 1-2 cm. long. Flowers large, delicate, white with the lip possibly somewhat yellow at the base. Dorsal sepal elliptic-lanceolate, about 35 mm. long and 12 mm. broad, acute, several-nerved. Lateral sepals similar, but tending to be more lanceolate. Petals elliptic, about 35 mm. long and 12-14 mm. broad, acute or

obtuse, several-nerved. Lip simple, oblong-obovate, several-nerved, about 3.5–4 cm. long and 2 cm. broad above the middle, with a long slender spur; disc with two short inconspicuous longitudinal calli; spur slender, acute at the tip, directed straight backward from the lip and only slightly curved, about 2.5 cm. long and 4–6 mm. broad at the throat. Column slightly winged and with two short broadly lanceolate arms at the apex.

Among the Philippine species of *Phaius*, *P. fragilis* is most nearly allied to *P. linearifolius* Ames and *P. Lyonii* Ames. The alliance to these species, however, is not very close. *Phaius fragilis* may easily be distinguished from these species by its lower habit of growth, by its shorter and broader leaves and especially by the long slender acute spur.

LUZON: Lucban, Province of Tayabas, May 1907, *Elmer 9444*; Irosin (Mt. Bulusan), Province of Sorsogón, August 1916, *Elmer 16882* (TYPE in Herb. Ames No. 47580); Los Baños (Mt. Maquiling), Province of Laguna, June-July 1917, *Elmer 17768*; Montalban, Province of Rizal, April 1912, *Loher s.n.*; epiphyte, Mt. Binuang, Province of Tayabas, May 12, 1917, *Ramos & Edaño 28821*.

PANAY: near Flores, Culasi, Antique Province, at 1200-1500 meters altitude, June 7, 1918, *McGregor 6003* (Herb. Bur. Sci., Manila); mossy forest, hills east of Culasi, Antique Province, at about 900 meters altitude, July 18, 1918, *McGregor 6290*.

NEGROS: Canlaon Volcano, June 1906, *Banks 1141* (Herb. Bur. Sci., Manila).

MINDANAO: Todaya (Mt. Apo), District of Davao, May 1909, *Elmer 10632a*.

CAMAGUIN DE MINDANAO: terrestrial, Mt. Mahinog, April 17, 1912, *Ramos 14424* (Herb. Bur. Sci., Manila).

Macropodanthus *L. O. Williams gen. nov.* Orchidacearum—Acrotonae—Sarcanthinae—Aerideae.

Sepala lateralia, petala et labellum columnae pedi elongato adnata. Sepalum dorsale liberum. Labellum valde saccatum, carinatum ad columnae pedem articula-

tum, obscure quinquelobatum, in sacco callus nullus. Columna brevis, truncata, prope apicem utrinque ala parva vel stelidio ornata, in pedem longissimum producta. Rostellum terminale, columnae subaequale, filiforme. Pollinia duo, globosa; stipes glandulae singulae adnatus.

Herbae epiphyticae cum foliis distichis conduplicatis. Species una adhuc nota, habitu *Aeridis*.

Lateral sepals, petals and lip attached to the elongated column-foot. Dorsal sepal free. Lip articulated to the column-foot, strongly saccate, carinate, inconspicuously 5-lobed; lateral lobes four, erect; callus in the sac lacking. Column short, truncate, with a pair of small wings or stelidia toward the apex, produced below into an exceptionally long foot. Rostellum terminal, about as long as the column, filiform, closely appressed to the inner surface of the column. Pollinia two, globose; stipe attached to a single gland.

Epiphytic herbs with distichous conduplicate leaves. A single species known, having the habit of *Aerides*.

Macropodanthus philippinensis *L. O. Williams*
sp. nov.

Herba epiphytica, caule brevi. Folia disticha, anguste oblongo-lanceolata, acuta, obscure retusa et apice paulo obliqua, coriacea. Inflorescentia foliis subaequalis, plusminusve decemflora; bracteae ovatae. Sepalum dorsale elliptico-ovatum, obtusum. Sepala lateralia late ovata, obtusa, leviter obliqua, columnae pedi adnata. Petala anguste obovata, obtusa, columnae pedi adnata. Label-lum ad columnae pedem articulatum, saccatum, carinatum, obscure quinquelobatum; lobi laterales erecti.

An epiphytic herb. Stem short, about 4 cm. long. Leaves distichous, narrowly oblong-lanceolate, acute, obscurely retuse and slightly oblique at the apex, coria-

ceous, up to 11 cm. long and 2.3 cm. broad. Inflorescence about as long as the leaves, breaking through the leaf-sheaths approximately opposite the base of a leaf, about 10-flowered; rachis becoming slightly thickened upward; bracts ovate, 1-2 mm. long. Dorsal sepal slightly concave, elliptic-ovate, obtuse, several-nerved, about 14 mm. long and about 9 mm. broad. Lateral sepals broadly ovate, obtuse, slightly oblique, attached to the column-foot, several-nerved, about 15 mm. long and 10 mm. broad. Petals narrowly obovate, obtuse, several-nerved, attached to the column-foot, about 13 mm. long and 7 mm. broad near the apex. Lip articulated to the long column-foot, strongly saccate, carinate, inconspicuously 5-lobed, with the four lateral lobes erect; sac toward the apex of the lip, about 12 mm. long, 6 mm. in diameter dorso-ventrally and 2-3 mm. laterally, ecallose within.

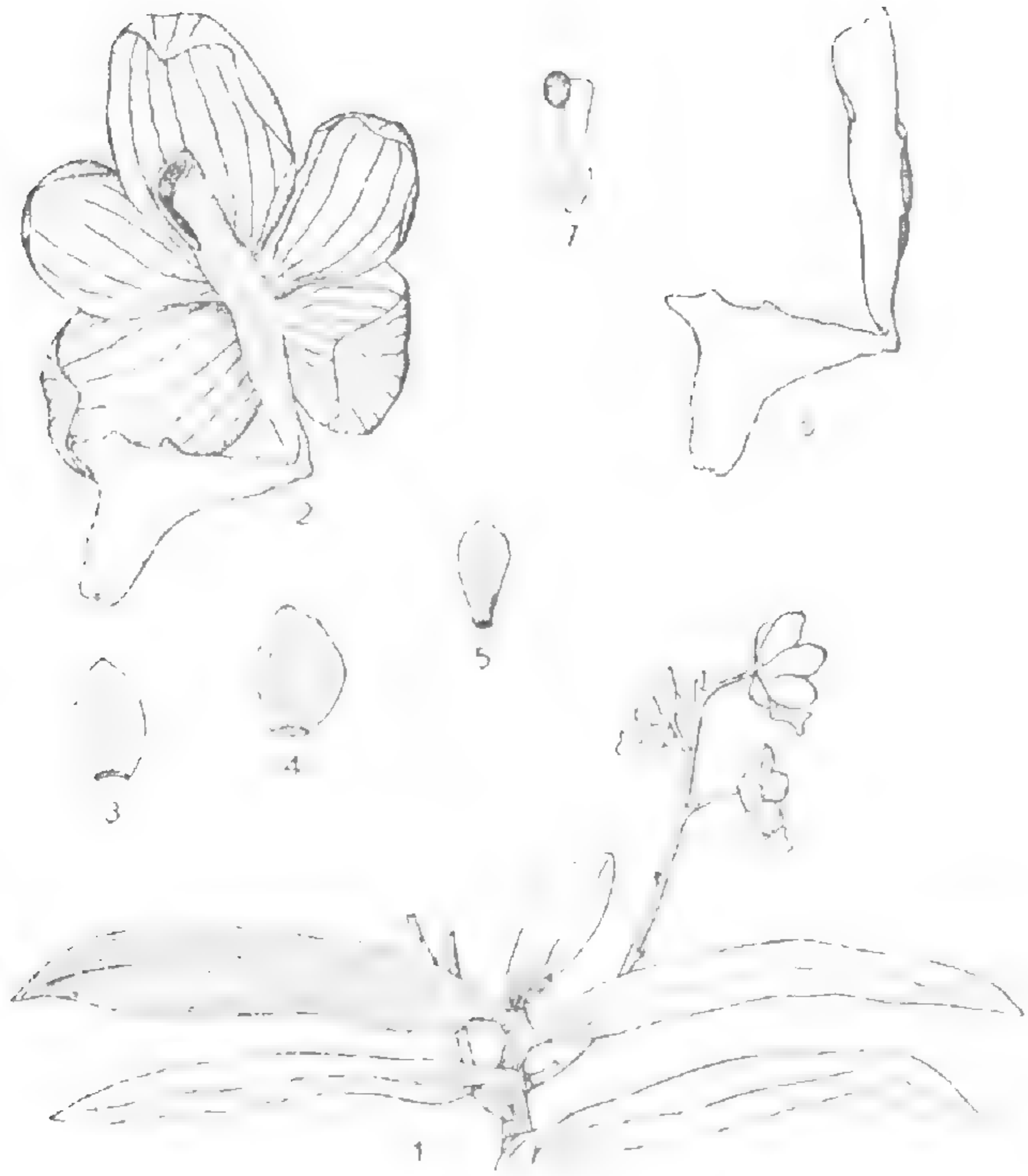
Macropodanthus is apparently a most distinct genus and is somewhat difficult to place as to relationship among the known genera. It seems to be most closely allied to *Aerides* and possibly should be placed between *Aerides* and *Rhynchostylis* in the system proposed by Schlechter in Notizbl. Bot. Gart. Berlin 9 (1926) 563-591.

Macropodanthus differs from *Aerides* in having the column-foot much more strongly developed, in the structure of the lip, in having the petals as well as the lateral sepals attached to the column-foot, and in the structure of the column (especially of the rostellum).

A sketch of the flower, drawn by Ramos, gives the coloration of the flower in part as follows: sac of the lip green, with the upper part pink and yellow; column-foot brown; the half of the lateral sepals nearest the column-foot yellow with the apical half white. No color is noted for the petals and dorsal sepal; possibly they were the same color as the lateral sepals.

EXPLANATION OF THE ILLUSTRATION

MACROPODANTHUS PHILIPPINENSIS *L. O. Williams*. 1, plant, about one fourth natural size. 2, flower, about natural size. 3, dorsal sepal, about one half natural size. 4, lateral sepal, about one half natural size. 5, petal, about one half natural size. 6, lip, column-foot and column, about natural size. 7, stipe with one of the two pollinia, about five times natural size.



MINDANAO: Malangas, Zamboanga District, October 26, 1919, Ramos & Edaño 37063 (TYPE in Herb. Ames No. 44400).

Saccolabium brevirhachis *L. O. Williams sp. nov.*

Folia disticha, elliptica vel oblanceolata, obtusa vel apice leviter retusa et obliqua, coriacea. Inflorescentia brevis, plusminusve quindecimflora; rhachis leviter incrassata; bracteae breves, inconspicuae. Sepalum dorsale lanceolatum, acutum, naviculare, trinervium. Sepala lateralia lanceolata, acuta, leviter obliqua, trinervia. Petala lineari-lanceolata, acuta vel obtusa, trinervia. Labellum valde concavum, obscure trilobatum; lobi laterales erecti, triangulares, prope labelli apicem; lobus medius parvus, carinatus. Columna generis.

Size of plant unknown. Leaves distichous, elliptic to oblanceolate, obtuse or slightly retuse and oblique at the apex, coriaceous, 10–15 cm. long, 2–3 cm. broad. Inflorescence short, about 15-flowered; rachis somewhat thickened, 2–3 cm. long; bracts short, inconspicuous, about 1 mm. long. Dorsal sepal lanceolate, acute, navicular, 3-nerved, about 6 mm. long and 2.5 mm. broad. Lateral sepals lanceolate, acute, 3-nerved, slightly oblique with the margins somewhat inrolled toward the apex, about 6 mm. long and 2.5 mm. broad. Petals linear-oblanceolate, acute or obtuse, 3-nerved, about 4.5–5 mm. long and 1–1.5 mm. broad. Lip deeply concave (not spurred), minutely 3-lobed, about 4 mm. long, 1.5 mm. broad and 2 mm. in depth; lateral lobes erect, triangular, situated near the apex of the lip, about 0.5 mm. long; mid-lobe small, much thickened. Column small, about 1 mm. long; column-foot obscure; rostellum prominent, lanceolate.

Saccolabium brevirhachis is closely allied to *S. Loheri* Ames and apparently (from the description) also to *S. sarcochiloides* Schltr. From both of these species *S. brevirhachis* may be distinguished by the shorter perianth parts which are (on the average) 2 mm. shorter and by

the lip which is concave only instead of saccate toward the base.

LUZON: Province of Rizal, September 1909, *Loher s.n.* (TYPE in Herb. Ames No. 45010).

Saccolabium Quisumbingii *L. O. Williams* sp.
nov.

Herba epiphytica, caule abbreviato. Folia disticha, conferta, ligulata, coriacea, obtusa, retusa et apice inaequaliter bilobata. Inflorescentia foliis subaequalis, paene usque ad basim florifera; rhachis leviter carnosae et alatae; bracteae hyalinae. Sepalum dorsale oblongo-ellipticum, obtusum, carinatum. Sepala lateralia similia sed paulo obliqua. Petala anguste-obovata, obtusa, carinata, trinervia. Labellum valde saccatum, trilobatum, plusminusve triangulare; lobi laterales leviter obliqui, rotundati, obtusi; lobus medius brevis, valde carinatus, callum simulans.

Epiphytic herb. Stem abbreviated, 2-3 cm. long. Leaves ligulate, coriaceous, distichous, crowded, obtuse, retuse and unequally lobed at the apex, constricted and articulated at the base, 8-15 cm. long, 1.5-3 cm. broad. Inflorescence about as long as the leaves, floriferous nearly to the base; rachis somewhat thickened and winged (at least in dried material); bracts hyaline, broader than long. Dorsal sepal elliptic-oblong, obtuse, thickened, dorsally with a short apiculation toward the apex, about 6 mm. long and 4 mm. broad. Lateral sepals similar but slightly oblique, at the base adnate to the claw of lip, 4- to 5-nerved, dorsally with a short apiculation toward the apex, about 6 mm. long and 3 mm. broad. Petals narrowly obovate, obtuse, thickened, 3-nerved, about 5 mm. long and 2 mm. broad. Lip strongly saccate, 3-lobed, approximately triangular in outline, about 6 mm. long from the base of the sac to the apex of the erect lateral lobes;

lateral lobes slightly oblique, rounded, obtuse, about 2 mm. long and as broad at the base, with a short erect acute callus within; mid-lobe short, very much thickened and callus-like; sac or spur narrowed toward the tip. Column about 2 mm. long, prolonged into a distinct foot.

Saccolabium Quisumbingii is most closely allied to *S. Escritorii* Ames with which it had been confused. The two species may be distinguished as follows:

Saccolabium Escritorii

Lip, as seen from the side, approximately quadrangular in outline.

Lateral lobes of the lip lanceolate, acute.

Leaves apparently not retuse at the apex, comparatively small.

Inflorescence comparatively densely flowered.

Saccolabium Quisumbingii

Lip, as seen from the side, approximately triangular in outline.

Lateral lobes of the lip oblique, rounded, obtuse.

Leaves retuse and oblique at the apex, comparatively large.

Inflorescence comparatively laxly flowered.

LUZON: cultivated in the Bureau of Science Orchid House, Manila, December 24, 1929, *Quisumbing* 78806 (TYPE in Philipp. Nat. Herb., Manila; fragment and analytical drawings in Herb. Ames No. 44200). The original living specimen is said to have been collected by McGregor at Majayjay, Province of Laguna, at 300 meters altitude. The flowers are noted by Quisumbing as white with the lobes of the lip purple-violet.

NOMENCLATORIAL NOTES. VII

BY

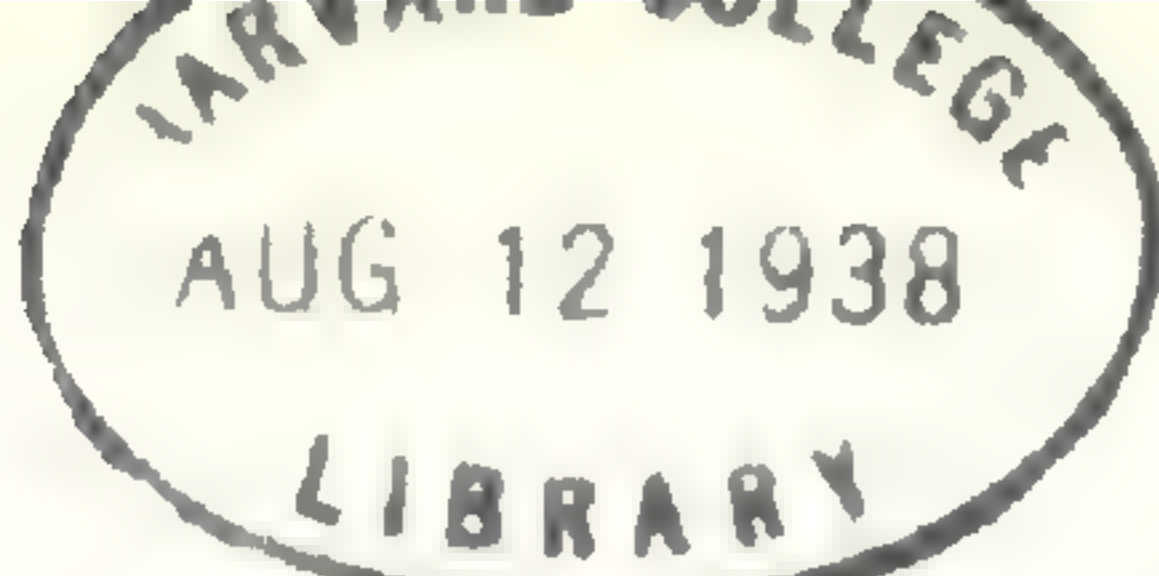
CHARLES SCHWEINFURTH

Elleanthus virgatus (*Reichb.f.*) *C.Schweinfurth*
comb. nov.

Sertifera virgata Reichenbach filius in *Linnaea* 41
(1876) 64.

Both from the description and a record of the type of *Sertifera virgata* from the Reichenbachian Herbarium at Vienna, it appears certain that this species represents a typical *Elleanthus*. In *Sertifera* the inflorescences are axillary with complanate peduncles, whereas in *Elleanthus* the inflorescence is always terminal with terete peduncles. It is difficult to understand how Reichenbach could have identified the species as a representative of *Sertifera*.

Although originally described from Peru (*Warscewicz*), it has subsequently appeared in Colombia.



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A REMARKABLE FOSSIL SELAGINELLA WITH PRESERVED FEMALE GAMETOPHYTES

BY

WILLIAM C. DARRAH

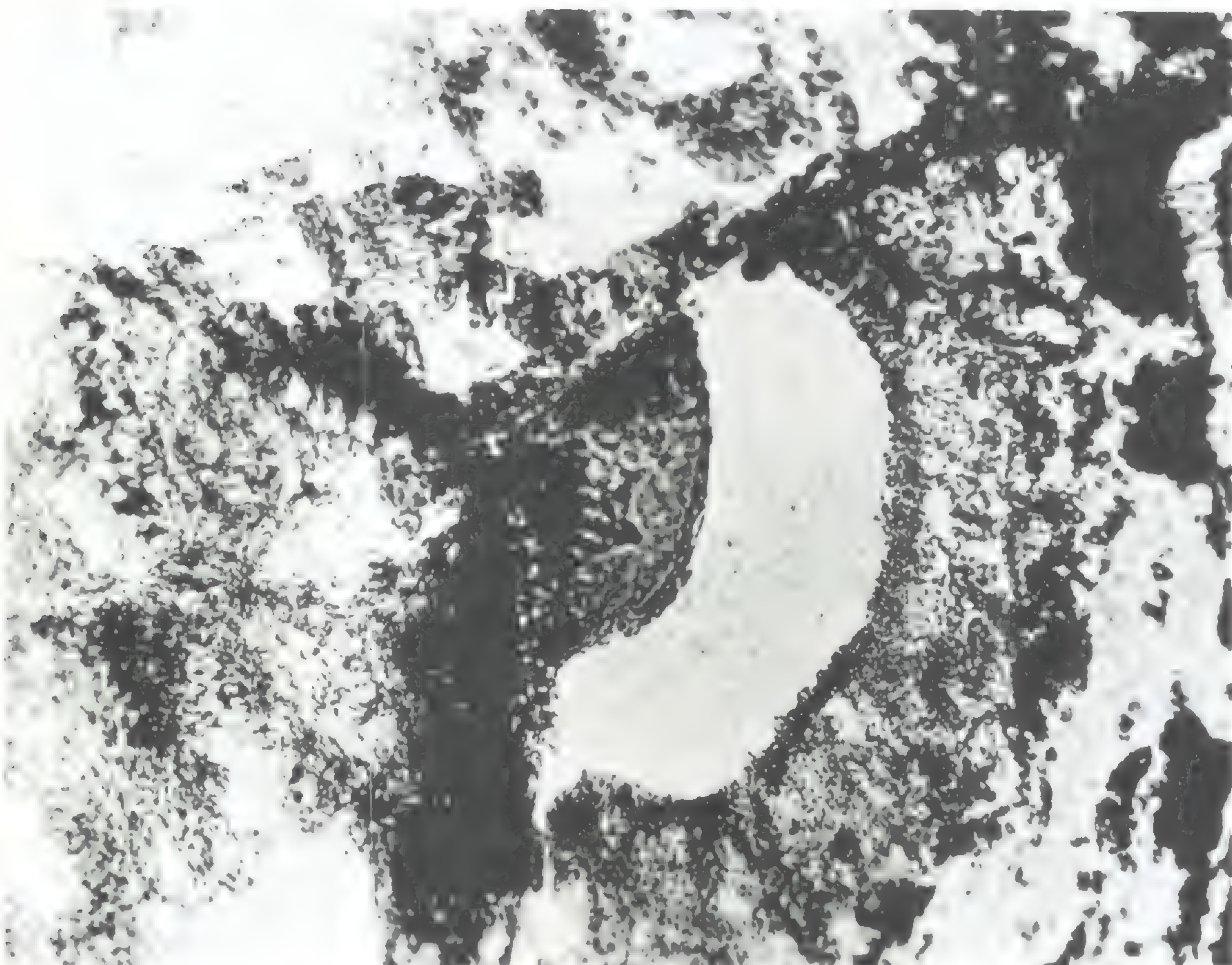
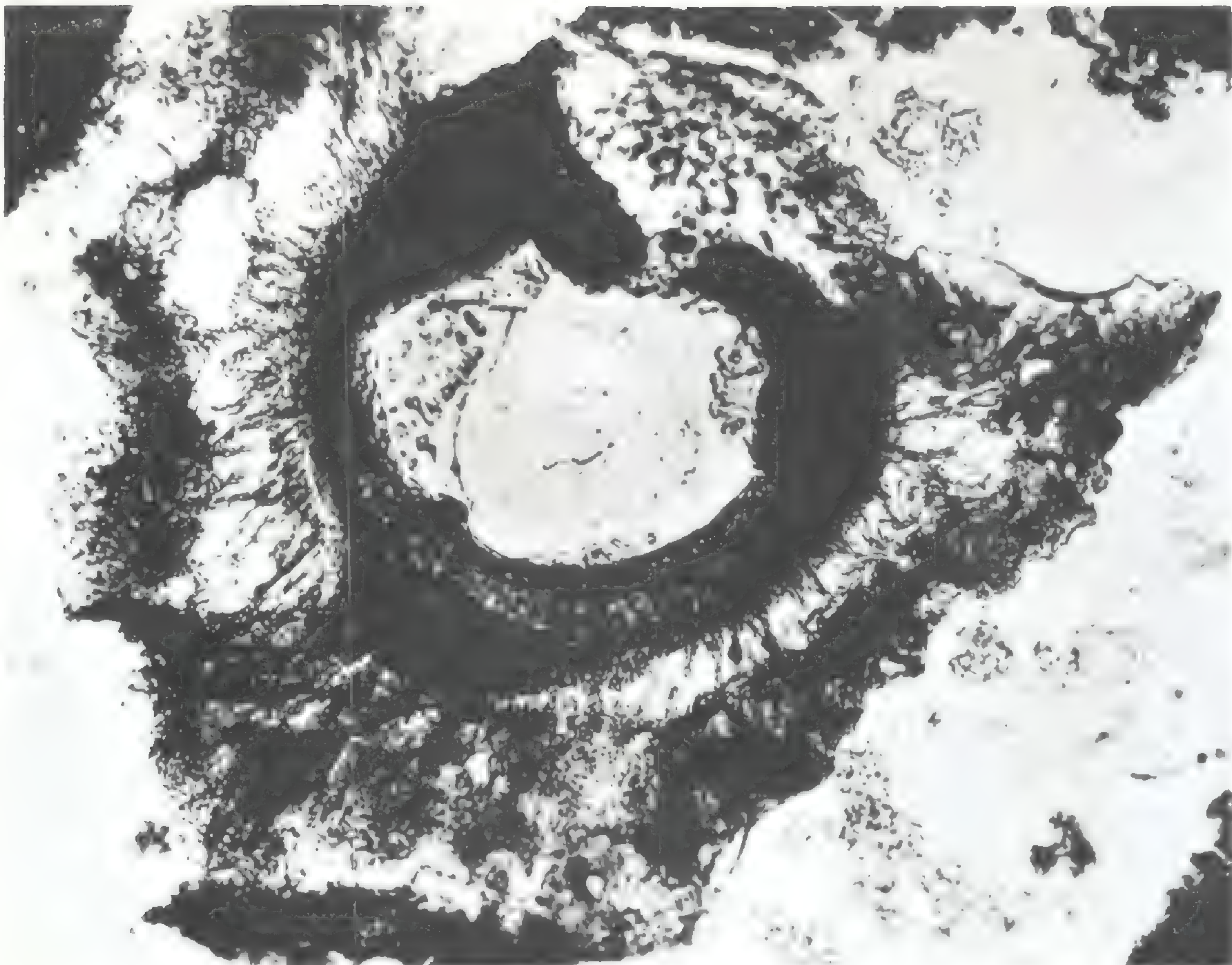
OF ALL PLANTS known to the botanist, *Selaginella* is one of the most familiar. It is regarded as the classical example of a heterosporous plant. *Selaginella* has been recognized in the fossil record as far back in geological time as the lowest Cretaceous, but several earlier species, based upon fructifications, are similar enough to the living genus to be referred to *Selaginellites*. This form-genus is known from rocks of Carboniferous, Permian, and Mesozoic age.

Recently there was found in a newly acquired collection of fossil plants, received by the Botanical Museum of Harvard University from the environs of Mazon Creek, Illinois, a small strobilus bearing four large spores in each sporangium. The striking resemblance of this strobilus to strobili found in living species of *Selaginella* was especially interesting, because the perfect state of fossilization suggested the probability that cellular detail might be preserved. Following a study of the specimen by a combination of the maceration and peel methods, it was discovered that the fossil contained numerous early female gametophytes which exhibited remarkably well-preserved nuclei and nucleoli. So numerous were these

EXPLANATION OF THE ILLUSTRATION

SELAGINELLA AMESIANA Darrah. The figure at the top shows a large megaspore with its equatorial flange. Note the thickness of the spore wall. One hundred times natural size. Nitrocellulose peel from the holotype. Preparation number 1.

The figure at the bottom shows one megaspore pulled from a tetrad. The spore shows a dense vesicle, a large vacuole, and a thick spore wall. One hundred times natural size. Nitrocellulose peel from the holotype. Preparation number 2.



gametophytes and so fine their state of preservation, that it has been possible to compare the life-history of this fossil form, stage by stage, with the life-history of living species of *Selaginella*.

The specimen is referred without hesitation to the existing genus, *Selaginella*. It extends the paleontological history of the group to the upper Carboniferous. Its age, translated into years, according to the estimates of the geologist, is approximately 225 million years.

None of the other five or six known Paleozoic gametophytes exhibits cellular contents, so this discovery may, without over-estimation of the quality of the material, be regarded as one of the most marvellous petrifications thus far recognized by paleobotanists. A study of the untouched reproductions in this paper should prove this claim.

Description of the specimen.

The single specimen known is a typical nodule from Mazon Creek, Illinois, which was collected by Frederick O. Thompson. The only plant fragment in the nodule, in addition to the strobilus, is a small unidentifiable fragment of stem. The strobilus is 27 mm. long, 3.5 mm. wide at its greatest width, and showed 34 sporangia, each containing four spores. The sporangia vary from 1.6 to 2.2 mm. in width. The strobilus is slightly curved, but it is not possible to determine whether the curvature was formed in life or during the process of petrification.

Methods employed.

The specimen contains megaspores which are visible to the naked eye (without ornamentation the spores attain a diameter of 0.6 mm.). These spores, which are brown in color, are infiltrated with calcium carbonate and iron carbonate (siderite). Minute crystals of pyrite (iron

sulphide) and galenite (lead sulphide) can be observed under magnification of six to ten times. I first interpreted the brown color of the spores to be due to siderite, but upon the application of dilute hydrochloric acid (10%) they lost their muddy appearance and became "resinous." The brown color was due to a coalified residue.

Three spores were isolated from a sporangium by maceration with 25% hydrochloric acid. These were washed with distilled water, and subsequently bathed in absolute alcohol and permitted to dry on a glass slide. The air-dried spores were placed between two glass cover slips, and gently heated over the flame of an alcohol lamp. They volatilized quickly and left a negligible amount of white ash upon the slide.

From these observations it is believed that such mineral substances as were present — if the crystals were formed congenerically with the petrification— may have acted as preservatives against bacterial decay. It is also probable that the volatile, but resistant, resinous substances in the megaspores may have permitted almost perfect fossilization.

The fossil was smoothed slightly by scraping off the rough elevations on the strobilus by means of a dull scalpel. Serial nitrocellulose peels (1) were prepared at intervals as close as possible; i.e. 0.1 mm. for the first ten peels, and approximately 0.15 mm. for the next twenty-two peels. Eight peels were made from the counterpart at intervals of about 0.15 mm. The peels were mounted in "damar" in xylol.

Minute anatomy of the spores.

The average dimensions based upon ten spores cut longitudinally in a median plane are:

Total diameter including equatorial flange	750 micra
Diameter excluding equatorial flange	620 micra
Length of spore	420 micra

The wall of the spore is ornamented by a coarse reticulation. The wall is thick (20 to 25 micra) and is colored by a dense bituminous substance. The apex of the spore bears a large tetrad scar. Coal technologists have referred isolated spores of this type to the form-group *Perisporozonales*, and the closest resemblance is to be observed in Spore Type IX (2) or *Triletes circumtextus* Zerndt (3). The megaspores of the strobilus from Mazon Creek are of the type found in *Bothrodendron mundum* (4), but this species is believed to have been arborescent.

Comparison with Fossil Forms.

The genus *Selaginellites* was founded in 1906 by Zeiller (5) for herbaceous fossil lycopods believed to be heterosporous. Brongniart in 1822 (6) defined the form-genus *Lycopodites* to include the slender, dichotomously branched shoots which resembled the living *Lycopodium* or *Selaginella*. The name *Selaginites* has been given to various foliage types which appear to have been anisophyllous, but none of the so-called *Selaginites* are known from reproductive parts.

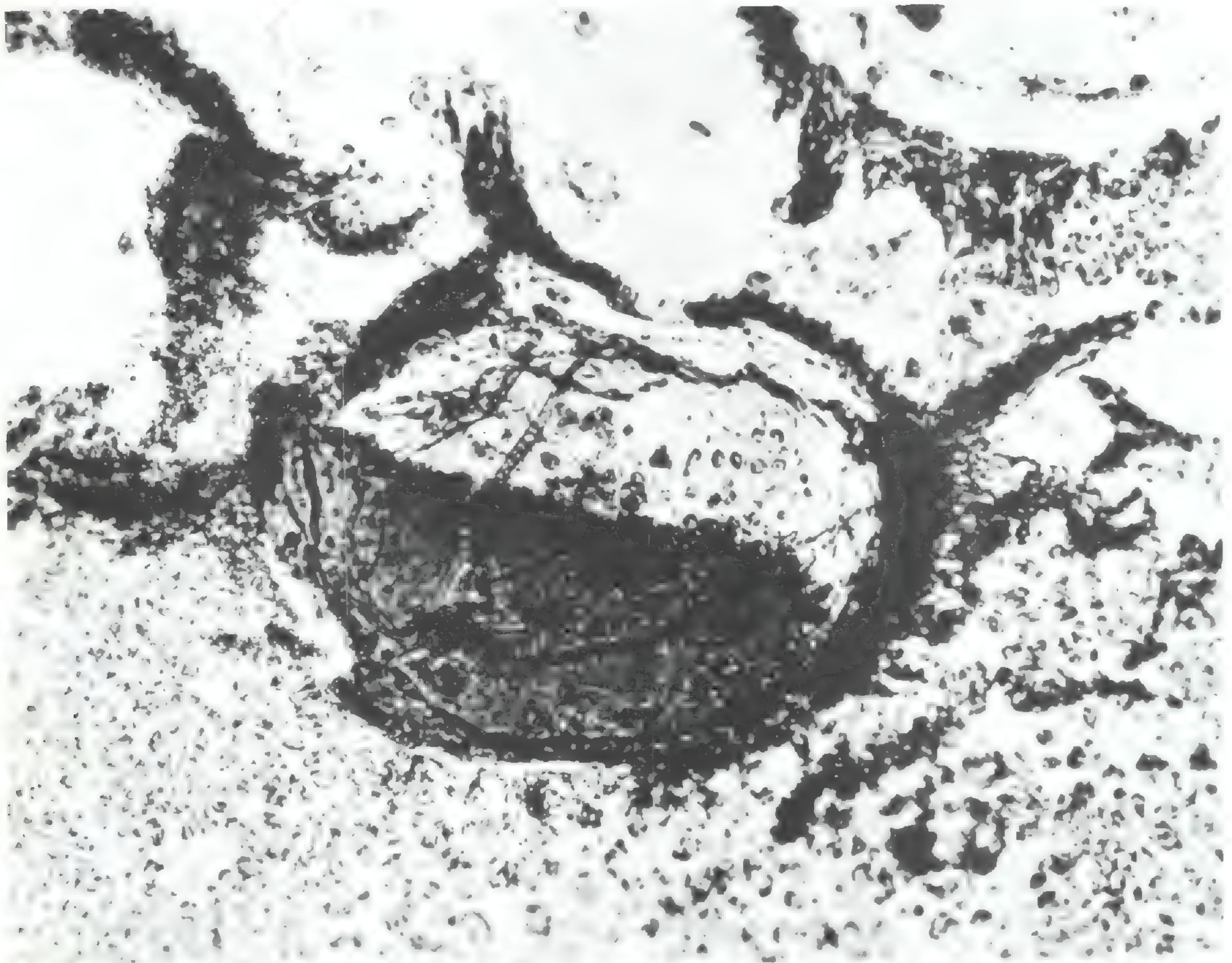
Lesquereux (7) has described three species of *Lycopodites* (*Selaginites*) from Morris and Mazon Creek, Illinois: *Lycopodites cavifolius*, *Lycopodites pendulus*, and *Lycopodites Meekii*. All of these are known from only foliage impressions.

The various species of *Selaginellites* are much more completely known. The genotype is *Selaginellites Suessi* Zeiller (loc. cit.). The strobili were of comparatively great size, attaining a length of fifteen centimeters and a diameter of eight to ten millimeters. The sporophylls were very numerous, those near the summit of the strobilus bearing microsporangia filled with many microspores, and those in the lower part of the strobilus bearing megasporangia each with sixteen to twenty-four megaspores.

EXPLANATION OF THE ILLUSTRATION

SELAGINELLA AMESIANA Darrah. The figure at the top shows a megaspore with a tetrad scar. Note the three spore membranes, the mesospore and endospore have shrunken away from the exospore. One hundred times natural size. Nitrocellulose peel from holotype. Preparation number 2.

The figure at the bottom shows a megaspore and its enclosed megagametophyte. Note in the upper corners, portions of two sister spores. The gametophyte is composed of cells with large nuclei and moderately large nucleoli. Detail of cell-contents is beyond the depth of focus. One hundred times natural size. Nitrocellulose peel from the holotype. Preparation number 2.





Both kinds of spores were provided with an equatorial flange. The foliage was dimorphic. The megaspores resembled those of the existing *Selaginella caulescens*. They measured 500 to 650 micra in diameter. The microspores, in contrast, attained a diameter of only 40 to 60 micra.

Halle (8) in 1907, transferred *Lycopodites primaevus* Goldenberg and *L. elongatus* Goldenberg (9) to *Selaginellites*. These two species apparently bore only megaspores in the preserved sporangia. Those of *Selaginellites primaevus* attained a diameter of 400 to 500 micra, and those of *Selaginellites elongatus* had a diameter of 450 micra.

Curiously enough Zeiller compared *Selaginellites Suessi* with a third species of Goldenberg (10) *Lycopodites macrophyllus*. Spores have not been observed in this form, but the sporangia are preserved. They are not grouped into strobili, but are borne in the axils of leaves.

Seward (11) in 1913 described a lower Cretaceous (Wealden) *Selaginella* under the name *Selaginella Dawsoni*. This species was heterosporous. The microspores, which were still in tetrads, were finely tuberculate and measured 40 micra in diameter. The megaspore number could not be ascertained, but their size and ornamentation was observed. Their exines were irregularly reticulate and the spore diameter exceeded 300 micra.

The strobilus of the specimen from the Carboniferous of Illinois is distinct from all of the previously described fossil forms in possessing the following features: only four megaspores in each sporangium, the unusually large diameter of 750 micra—including the equatorial flange formed by the expanded arcuate ridges of the spore exine, and by having the gametophyte preserved. The spores are in general similar to the previously described species in having reticulated exines, equatorial flanges and large

size. There are no close resemblances between this new species and those hitherto known.

It is noteworthy that the small number of megaspores per sporangium is a characteristic shared among fossil lycopsids only by *Bothrodendron mundum* and *Selaginellites primaevus*. This is not the less significant, because the relationships of the new form are with the existing *Selaginella*—in its most restricted sense.

Description of the Gametophyte.

More than fifty megaspores show nucleated cellular masses in varying degrees of complexity and organization. The material thus permits a detailed description.

The earliest stage in development is to be observed in preparation number 2. A tetrad of spores is still in conjunction, but the protoplasmic contents are crowded in the apex of each spore into a "vesicle" which has a dense (presumably nuclear) region near its own apex. This stage is shown in the lower figure of the first plate.

The succeeding events are best preserved in preparations 2, 13, 16, and 19, and are well preserved in preparations 1, 3, 4, 6, 14, 20, and 26. The vesicle appears to have become much larger and nuclei are present, at first without cell walls. The spore shown at the top of plate 2 shows many ovate nuclei and the several spore membranes which are not clear on the illustration because they are beyond the depth of focus. The larger gametophytes show increasing numbers of nuclei which are enclosed by cell walls. In several spores (preparations 1, 3, 6), the early cell-plates are beautifully preserved.

The most advanced and best preserved gametophyte is that shown under three different magnifications: the first, within the megaspore on plate 2, and two others on plate 3. The figure on plate 2 also shows the peripheries of two sister spores which are, of course, within the meg-

asporangium. The gametophyte fills almost the entire spore, and all of the nuclei near the apex are enclosed in cell walls. Most of the nuclei show nucleoli and nuclear contents in varying degrees of preservation.

Comparison with the existing Selaginella.

Lyon (12) has fully described the development of the gametophytes of *Selaginella rupestris* and *Selaginella apus*. According to Miss Lyon the initial steps in the development of the female gametophyte are the rapid expansion of the protoplasmic vesicle and the repeated division of the nucleus. A thick envelope surrounds the vesicle, but this envelope becomes proportionately thin as the surface of the vesicle increases. There soon develops a large vacuole.

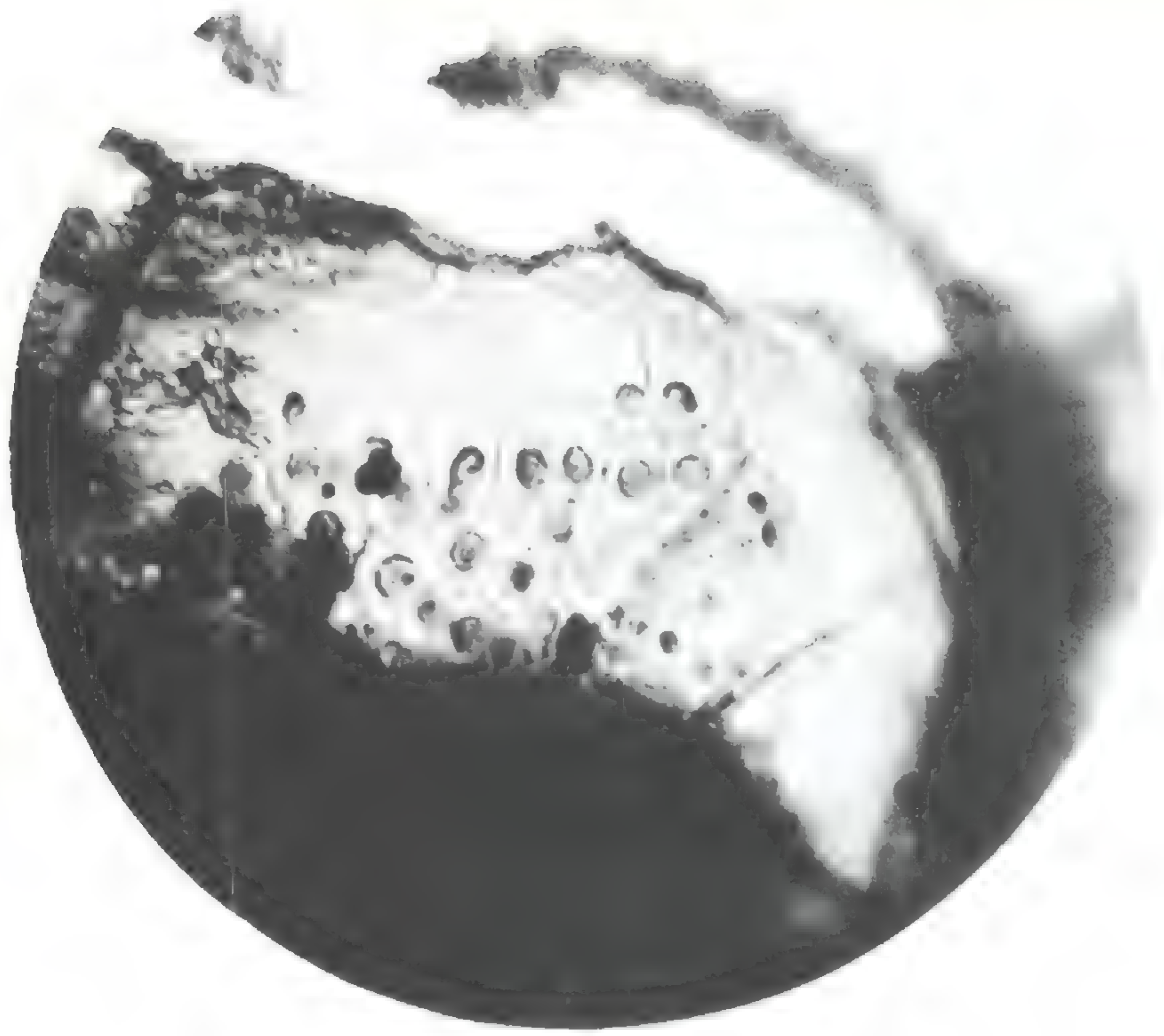
At this stage (Lyons, Plate VI, figure 46) the female gametophyte consists of the exospore, the mesospore, the endospore, the protoplasmic vesicle—which now consists of a thin layer of protoplasm in which there are imbedded numerous flattened ovate nuclei—and the vacuole. After the spore membranes have completed their growth, the nuclei undergo their final division—these divisions being marked by the formation of cell-plates and walls.

In the living species of *Selaginella* the megaspore usually germinates *in situ*. The nucleus undergoes repeated divisions, first producing a number of free nuclei that are subsequently surrounded by cell walls. This development occurs at the apical or scar end of the spore, and at the opposite end there forms a large vacuole. The multicellular female gametophyte is completely enclosed within the megaspore wall. As the gametophyte continues to enlarge, the spore is gradually forced open at the tetrad-scar and the gametophytic body protrudes to some extent. Following, or simultaneously with, this

EXPLANATION OF THE ILLUSTRATION

SELAGINELLA AMESIANA Darrah. The figure at the top shows the megagametophyte figured at the bottom of the second plate, magnified two hundred and twenty-five times. The figure shows cell walls, nuclei, and nucleoli. Nitrocellulose peel.

The figure at the bottom shows the same gametophyte magnified one thousand times. In the lower right is shown a moderately well preserved mitotic figure.





protrusion, archegonia are formed on the prothallus.

All of the gametophytic stages preserved in the fossil strobilus from Illinois are intermediate between the earliest nuclear divisions of the megaspore and the opening of the spore wall. No protruding gametophytes have been observed in more than 1500 sections representing more than 200 megaspores. No archegonia have been observed, presumably because they would have been borne upon the protruding portions of the gametophytes.

Description of the species.

***Selaginella Amesiana* Darrah sp. nov.** 7 figures.

The strobilus is composed of spirally disposed megasporangia each bearing four megaspores. The megaspores were ornamented by a reticulate exospore and by a well developed equatorial flange. The female gametophyte was constructed of angular and somewhat elongate parenchymatous cells with nuclei and nucleoli preserved. Its development was endosporal.

The strobilus (as much as is preserved) measures 27 mm. in length and 3.5 mm. at the maximum width. The megaspores have a diameter of 750 micra including the equatorial flange, and a height of 450 micra.

Foliage, ligule, microspores, microsporangia, and archegonia are not known.

I have the pleasure of naming this species for Professor Oakes Ames, Director of the Botanical Museum of Harvard University, for his continued interest in paleobotany and for his enthusiastic support and encouragement of the activities of our Paleobotanical Laboratory.

Discussion of Relationships.

The megagametophyte of *Selaginella Amesiana* may be compared with the prothalli of *Bothrodendron mundum* and *Lepidodendron Veltheimianus*.

McLean (13) in 1912, described the prothallus of *Bothrodendron mundum* from a thin section of a coal-ball. The prothallus, which lies almost entirely outside of the spore, is composed of angular, elongated, parenchymatous tissue. The specimen shows at least three archegonia—represented by egg-cavities. McLean interpreted the prothallus as follows: “. . . it may be said that this specimen represents a stage in the reduction of the primitive free-living Lycopod gametophyte towards the condition obtaining in the “seed” of *Lepidocarpon*. The prothallus was not produced until after the megaspore had been shed. It developed outside of the spore, but remained attached to the spore-wall at its base, and in form resembled the prothalli of modern heterosporous ferns.” (p. 318)

Gordon (14) in 1910 described the prothallus of *Lepidodendron Veltheimianus* from two thin sections, one showing a single archegonium and a small amount of adjacent tissue, the other showing an unripe (i.e. an unopened) spore completely filled with parenchymatous tissue which resembled to a considerable degree the gametophyte of *Selaginella*. Thus, in at least this species of *Lepidodendron*, the gametophytic development was endosporal and the archegonia developed at the scar in the spore wall, apparently not on a protrusion of the prothallus.

The prothallus of *Selaginella Amesiana* was endosporal and the evidence points to the fact that the archegonia were developed on a protruded part of the prothallus, that is to say, since no archegonia have been found in the prothalli of unopened spores, and some spores show early stages in the opening of the scar slit, presumably the archegonial stage was later than any of those stages which were preserved.

The only feature which militates against the reference

of *Selaginella Amesiana* to the genus *Selaginella* is the absence of microsporangia in the strobilus. However, the deficiency in this case is of little importance because the gametophyte within the megaspore demonstrates clearly the female prothallus which, by all of the concepts of comparative morphology, implies the existence of the male—either on a part of the strobilus which was not preserved or upon a separate strobilus. *Selaginella Amesiana* is undoubtedly heterosporous, and is the earliest known species of *Selaginella*.

Conclusions.

The new species described in this paper as *Selaginella Amesiana* Darrah is a noteworthy addition to our knowledge of Carboniferous plants, not so much because it extends the geological history of the genus into the Paleozoic era, but rather because this specimen has the female gametophyte preserved with almost unbelievable detail. Nuclei, nucleoli, cell-plates and at least two recognizable mitotic figures are preserved.

It is so improbable that this example of preservation is unique, that one is fascinated by the possibilities suggested by its discovery. The occurrence of such delicate and elusive protoplasmic structures in a fossil of the carbonized compression type, reveals how inadequate are our conceptions of the process of petrification.

Three decades have passed since microtechnique was introduced into paleobotany by Nathorst, who utilized strong chemical reagents to macerate carbonized compressions. In more recent years Hamshaw Thomas, Walton, Lang and Harris have used improved methods in this type of work. Halle has developed a paraffin method for serial sectioning macerated carbonizations, and in our laboratory there has been developed a serial section method by the use of nitrocellulose films. The combined

EXPLANATION OF THE ILLUSTRATION

SELAGINELLA AMESIANA *Darrah*. Photograph of a nitrocellulose peel of the strobilus showing the arrangements of the megaspores and the megasporangia. The numerous spores exhibit various structures: the reticulated spore wall, the tetrad-scar, the equatorial flange, and a few spores filled with gametophytic tissue. Eight times natural size. Preparation number 3. The type specimen is number 30645 Paleobotanical Collection of the Botanical Museum.

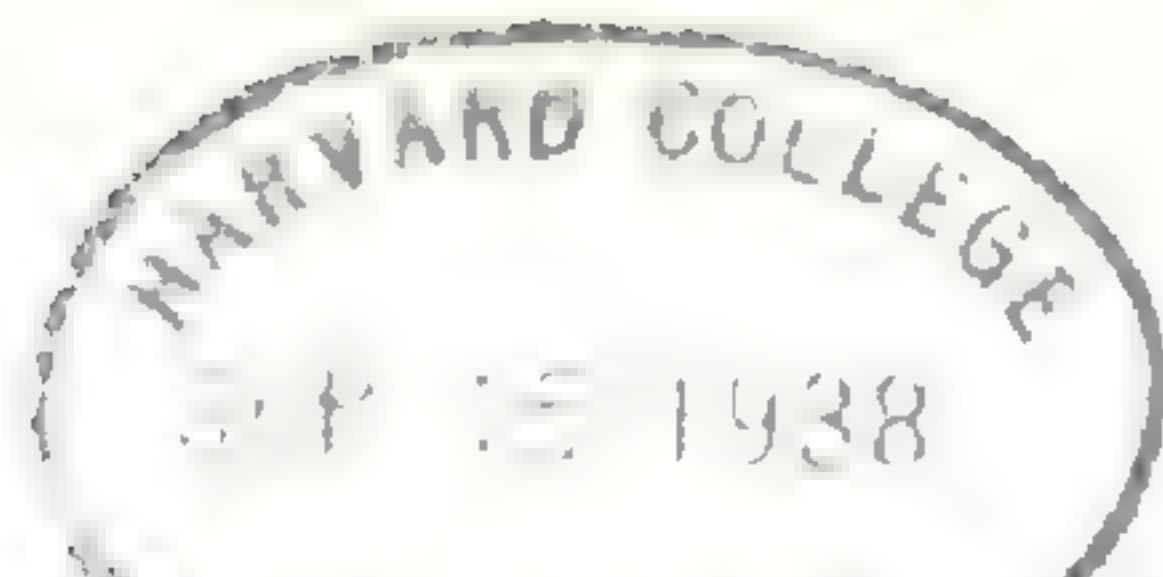


result of these technical methods is that many thousands of specimens formerly considered to be worthless, are now available for investigation.

Thus the subjection of carbonizations, particularly those carbonized compressions which Hamshaw Thomas has called mummifications, to methods of serial section has marked the beginning of a new period of paleobotanical research.

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BOTANICAL MUSEUM LEAFLETS
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Vol. 6, No. 7

ORCHID STUDIES, IX

BY

LOUIS O. WILLIAMS

MISCELLANEOUS OBSERVATIONS

Habenaria graciliscapa *Rodrigues* Gen. & Sp. Orch. Nov. 1 (1877) 155—Cogniaux in Martius Fl. Bras. 3, pt. 4 (1893) 71, t. 14, fig. I—Kränzlin Orch. Gen. & Sp. 1 (1898) 294.

Habenaria graciliscapa is an interesting addition to the orchid flora of both Argentina and Uruguay from which countries it has been sent to me by *Dr. H. R. Descole* and *Dr. Bernardo Rosengurtt*.

The orchids of Argentina and Uruguay are not very great in number when contrasted with those of other areas in South America; seldom, however, does a collection from these countries come in for determination that does not contain some rare, noteworthy or new orchid. It is quite probable that this will continue to be true for many years.

ARGENTINA: quebrada de la mina, Fiambalá, Tinogasta, Catamarca, a 2000 metros altitud, 13 febrero 1930, *Schreiter 6351*.

URUGUAY: en arenas maritimas, Laguna Negra, Rocha, 20 marzo 1938, *Rosengurtt B2611*.

Bipinnula polysyka *Kränzlin* in Engl. Bot. Jahrb. 9 (1887) 317; Orch. Gen. & Sp. 2 (1903) 25, t. 1, fig. E

—Cogniaux in Martius Fl. Bras. 3, pt. 4 (1893) 110, t. 21, fig. III.

Dr. Bernardo Rosengurtt has sent to me a good specimen of this rare plant for determination and it calls to attention the differences from *Bipinnula Gibertii* Reichb.f. which I thought it was at first glance.

The chief character used by *Kränzlin* to separate *Bipinnula polysyka* from *B. Gibertii* in his key, the dentate or papillose dorsal sepal, is slightly evident on only one of the plants available whereas on all of the others the dorsal sepal is entire. However, the two "species" may be separated by means of lip-characters, although a more complete series of specimens may show *B. polysyka* Kränzl. to be only a variety of *B. Gibertii* Reichb.f.

URUGUAY: dry sandy fields, Cerro, Departamento de Montevideo, November 1925, *Herter 442b* (79697) (in Gray Herbarium); Monzón-Heber, Juan Jackson, Departamento Soriano, noviembre 1937, *Gallinal, Aragone, Bergalli, Campal & Rosengurtt 779*; Palleros, Río Negro, Departamento Cerro Largo, diciembre 1937, *Gallinal et al 1897*.

Erythrodes dichopetala (*Kränzlin*) *L. O. Williams*
comb. nov.

Physurus dichopetalus Kränzlin in Kungl. Svenska Vet.-Akad. Handl. 46 (1911) 41, t. 7, fig. 5.

I have seen the following specimen:

ARGENTINA: Posadas, Misiones, January 10, 1924, *Hauman 24/476*.

Malaxis Margaretæ (*F. Brown*) *L. O. Williams*
comb. nov.

Microstylis Margaretæ F. Brown in B. P. Bishop Mus. Bull. 84 (1931) 171, fig. 18, b.

AUSTRAL ISLANDS: *Stokes 105*.

Epidendrum Cogniauxii *L. O. Williams nom. nov.*

Epidendrum Christii Cogniaux in Urban Symb. Antill. 6 (1910) 695, non *Epidendrum Christi* Reichenbach filius, 1876.

It is with pleasure that this West Indian *Epidendrum* is renamed for Cogniaux who described it originally.

Grammatophyllum elegans *Reichenbach filius* in Gard. Chron. n.s. 18 (1882) 776—Schlechter in Orchis 9 (1915) 107.

The plant described from the "South Sea Islands" by *Reichenbach* as *Grammatophyllum elegans* seems not to have been rediscovered until recently. *Mr. A. Meebold* collected a specimen of *Grammatophyllum* in Fiji which seems to answer the description of the plant given by *Reichenbach*.

A supplementary description based on the specimen in hand may be of interest. The specimen has a single leaf and a single flower.

Leaf elliptic-oblong, acute, about 30 cm. long and 5.5 cm. broad. Sepals about 3 cm. long, 1.5–2 cm. broad. Petals about 3 cm. long and 1.5 cm. broad. Lip about 2 cm. long and 2 cm. broad, with a strongly 3-ribbed median callus extending from the base to the middle of the lip or beyond.

In my recent account of the orchids of Fiji *Grammatophyllum elegans* was completely overlooked.

FIJI: Suva, January 1937, *Meebold 21954* (in Herb. Bishop Museum, Honolulu).

Dendrobium strongylanthum *Reichenbach filius* in Gard. Chron. n.s. 9 (1878) 462—Hooker filius Fl. Brit. India 5 (1890) 716—Kränzlin in Engl. Pflanzenr. IV. 50. II. B. 21 (1910) 81.

This peculiar species of *Dendrobium*, which was de-

scribed by Reichenbach and indirectly said to be a native of India, is well represented by the two specimens cited below.

Schlechter has overlooked the species in his *Orch. Sino-Jap. Prodr.* although Kränzlin had cited a specimen from Yunnan, China (*Henry 12962*) in his monograph of *Dendrobium*.

CHINA: epiphyte, between Menglien and Yu Tang Po, between Tengyueh and Lungling, Yunnan Province, October 20, 1922, *Rock 7104*; epiphyte, camp at Ya Tau Pa between Tengyueh and Lungling, Yunnan Province, October 21, 1922, *Rock 7116*.

In addition to the two specimens cited above there is a horticultural specimen in the Ames Herbarium which was procured from Sander with whom it flowered in 1899. This plant is said to have been collected by *Micholitz* in Burma earlier the same year.

Chroniochilus Godeffroyanus* (*Reichb.f.*) *L.O. Williams in *Bot. Mus. Leafl. Harv. Univ.* 5 (1938) 138, as *C. Godeffroyanum* by error.

Thriasperrum Godeffroyanum Reichenbach filius *Xen. Orch.* 2 (1867) 122; in Seemann *Fl. Vit.* (1868) 297, t. 90.

Sarcochilus Godeffroyanus Bentham & Hooker filius ex Drake *Ill. Fl. Ins. Pacif.* (1886) 310.

Chiloschista Godeffroyana Schlechter *Orch. Sino-Jap. Prodr.* (1919) 275.

A character in the flowers of *Chroniochilus Godeffroyanus*, which seems previously to have escaped attention, was noticed while dissecting the flowers of a specimen collected in Fiji by Mr. E. H. Bryan, Jr. (*Bryan 458*). The anther is provided with a pair of lateral antennae (one antenna on either sac of the anther) which seem to be slightly glandular at the apex. The antennae are

about the same length as the column and appear to lie parallel to it, reaching the point of attachment of the perianth parts to the column. The function of the antennae is not known.

Sarcanthus nagarensis *Reichenbach filius* in Seemann Fl. Vit. (1868) 298—L. O. Williams in Bot. Mus. Leaf. Harv. Univ. 5 (1938) 140.

With some doubt that the genus *Sarcanthus* occurred in Polynesia it was included in my account of the orchids of Fiji with the thought that the species probably belonged to some other genus. Since that time Dr. C. Keissler has been kind enough to send to me a copy of Reichenbach's analytical sketches of the species as well as a drawing of the type and, in addition, I have seen a specimen of the species which was collected in Fiji by Mr. E. H. Bryan, Jr. These records and my specimen lead me to believe that the plant is a species of *Sarcanthus* and must be one of the largest species of the genus.

The following short amplification of Reichenbach's description, which was based on an inflorescence only, may be of use.

Large lianas, 3–4 meters tall (fide Bryan), the apical part of the stem up to 2 cm. in diameter. Leaves distichous, ligulate to lanceolate-ligulate, obtuse, up to 25 cm. long and 6 cm. broad, coriaceous, apex only slightly or not at all bilobed.

Fiji: Yathata, climbing over walls of ancient fortified town, summit of Na Koro Levu, liana 3–4 meters high, flower yellow-green and cream, at about 265 meters altitude, October 1, 1924, *Bryan 594*.

HORNEOPIHYTON, A NECESSARY CHANGE OF NAME FOR HORNEA

BY

ELSO S. BARGHOORN, JR. AND WILLIAM C. DARRAH

IN 1920, Robert Kidston and William H. Lang described under the name of *Hornea Lignieri* a remarkable fossil plant from the Middle Devonian Rhynie Chert of Scotland. Morphologists have regarded this fossil as of great phylogenetic significance so that it is very well known; indeed it is so well known that it appears in elementary textbooks of botany and geology.

Recently, during the progress of working over a newly acquired collection of specimens of woods of existing angiosperms received by the Biological Laboratories of Harvard University, it was discovered that the name *Hornea* had also been used for a sapindaceous tree. Reference to the original description of this species showed that it belonged to a monotypic genus which had been described by J. G. Baker in 1877. The prior use of the name *Hornea* in the Sapindaceae thus preoccupies the generic designation for the fossil psilophyte, *Hornea Lignieri*. According to the International Rules of Botanical Nomenclature, it is necessary to give a new name to the fossil plant because of a prior use of the generic name *Hornea*. Interestingly enough, the fossil form is much better known and is, by far, more familiar than the extant *Hornea* which occurs in Mauritius.

The original descriptions of *Hornea mauritiana* Baker and *Hornea Lignieri* Kidston and Lang are here copied.

Hornea *Baker*. 1877. Flora of Mauritius and the Seychelles. London. p. 59.

*Flowers polygamous. Sepals 5, round, much imbricated, silky on the back, naked on the face, the two

outer smallest. Petals 5, just like the inner sepals in shape and vestiture, but with a densely pilose emarginate scale at the claw. Disk cup-shaped, irregularly lobed, enclosing the stamens and ovary. Stamens 20–24, inserted inside the disk, glabrous; filaments short, filiform; anthers minute, oblong. Ovary sessile, densely pilose, 2-celled, with a single ovule in each cell from the axis below the middle; style short, simple, pilose; stigma capitate. Fruit a 2-lobed velvety samara, with a broad wing. Seed globose, black. Endemic and monotypic.”

***Hornea mauritiana* Baker.** l.c. p. 59.

“A shrub or tree, with branchlets clothed with brownish silky hairs. Leaves short-petioled, equally pinnate; leaflets 4, sessile, oblong, obtuse, glabrous, coriaceous, venulose, 2–4 in. long, oblique at the base. Flowers in axillary and terminal panicles with silky ascending branches; pedicels very short. Petals and inner sepals $\frac{1}{4}$ in. long. Lobes of samara rhomboid, erecto-patent, an inch long, above $\frac{1}{2}$ in. broad, brown-velvety, rigidly coriaceous, the wing as broad as the cell. *Thouinia? mauritiana*, Bojer, *Hort. Maur.* 1837. 56 (name only).”

It should be noted that *Thouinia (?) mauritiana* Bojer has no standing because Bojer’s work was merely an enumeration of species, not accompanied by descriptions. The monotypic genus *Hornea* is taxonomically closely allied to *Thouinia*, but has been considered distinct since the publication of Baker’s Flora.

***Hornea* Kidston & Lang.** 1920. *Trans. Roy. Soc. Edinb.* vol. 52. p. 616.

“Plants rootless and leafless. Stems arising from protocorm-like rhizomes, dichotomously branched. Sporangia terminal on ultimate branches, with a sterile columella projecting from the base into the sporangial cavity, and cuticularized spores developed in tetrads.”

Hornea Lignieri *Kidston & Lang*. l.c. p. 616.

“Plant small, consisting of a lobed rhizome from which arise stems which branch dichotomously and range from 2 mm. in diameter downwards. Stele of stem with a zone of phloem surrounding the xylem composed of small central and wider peripheral tracheides. Sporangia cylindrical, terminal on branches, indehiscent, with thick wall composed of thickened epidermis, thin-walled tissue, and persistent tapetal layer. Sterile columella composed of thin-walled elongated cells extending from base to near top of sporangium. Homosporous. Spores about 50 μ . in diameter.”

Locality—Muir of Rhynie, Aberdeenshire, Scotland.

Horizon—Old Red Sandstone, Middle Devonian.

There are no synonyms for this monotypic genus. The fossil plant is a member of the Rhyniaceae, in the order Psilophytales.

Inasmuch as the fossil “*Hornea*” is both better known and of much greater importance to the botanist and paleobotanist than the sapindaceous genus of the same name, it is unfortunate that a duplication of names has occurred. However, we propose to change the name of the Devonian psilophyte, hitherto known as *Hornea Lignieri* to **Horneophyton Lignieri**. This new name reduces possible confusion to a minimum. The root *Horneo* involves but slight orthographic change, and the suffix *phyton* is very frequently used in the naming of extinct plants—particularly those found in rocks of Devonian age.

Horneophyton *nom. nov.*

Hornea Kidston & Lang, non Baker.

Horneophyton Lignieri (*Kidst. & Lang*) *comb. nov.*

Hornea Lignieri Kidston & Lang.



Sci 2170.9.5

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RESUPINATION AS A DIAGNOSTIC CHARACTER IN THE ORCHIDACEAE WITH SPECIAL REFERENCE TO MALAXIS MONOPHYLLOS

BY
OAKES AMES

TO OUR EYES there is something quite proper in the usual position of the labellum of an orchid flower. I suppose our demands for pleasing symmetry go as far as this, that the weightier parts should be the lowermost. (cf. plate of *Cypripedium parviflorum* opposite p. 146) Yet in the bulk of orchid species the labellum owes its satisfying position to a twist of 180 degrees in the ovary or pedicel, proof enough that it is in reality the uppermost member of the perianth, rendered the lowermost by some vagary of nature, or shall we say, by a sympathetic physiological response to the behavior of those food-seeking insects which accomplish pollination.

In the bud of an orchid flower the labellum is adaxial; in other words, it is adjacent to the axis of the inflorescence. If there were not any change in the pedicel or ovary up to and during anthesis, the labellum would remain adaxial. In orchids which have many-flowered racemes it is possible to observe the progressive turning of the buds as the pedicel and ovary twist, until in the expanded flower the labellum, by more or less pronounced curvature of the ovary near the base of the flower, be-

CYPRIPEDIUM PARVIFLORUM var. PUBESCENS
An example of resupination.





comes the lowermost member of the perianth and is adjacent to the subtending floral bract. This is very clearly and beautifully exhibited by *Goodyera pubescens*. (cf. plate opposite p. 150) In this species the raceme develops in such a manner that it attains considerable length before anthesis and the basal flowers begin to expand only after the inflorescence is about to burst into full bloom. Consequently throughout the raceme there is a protracted period of juvenility. This being so, it is possible before a single flower has opened to trace in the buds every stage of ovarian torsion and curvature between the adaxial position of the labellum and complete resupination of the perianth.

In many genera there may be torsion in the rachis as well as in the pedicel or in the ovarian tissues. Torsion may be clockwise or counter-clockwise as is true of *Spiranthes gracilis*; the inflorescence then takes on the aspect of spirality. In these cases torsion has occurred in the ovary, pedicel and rachis. In many species of orchids there may be a pronounced drooping of the raceme and the flowers then become resupinate.

Whatever influences are at work, the orchid flower is designated as being resupinate when the labellum is the lowermost segment of the perianth. This condition was defined by Lee in 1765 as follows: "A Resupination; which is, when the upper Lip of the Corolla looks toward the Ground, and the under Lip towards Heaven." John Lindley, in his *Vegetable Kingdom*, third edition (1853) p. 173, described the orchid flower as being "very often resupinate in consequence of a twist in the ovary." And Vines, in his translation of Sachs' textbook of botany implied that resupination is bound up with torsion stating that: "the long ovary of most orchids undergoes torsion (*resupination*) at the time of the opening of the flower, which causes the posterior side of the flower to assume

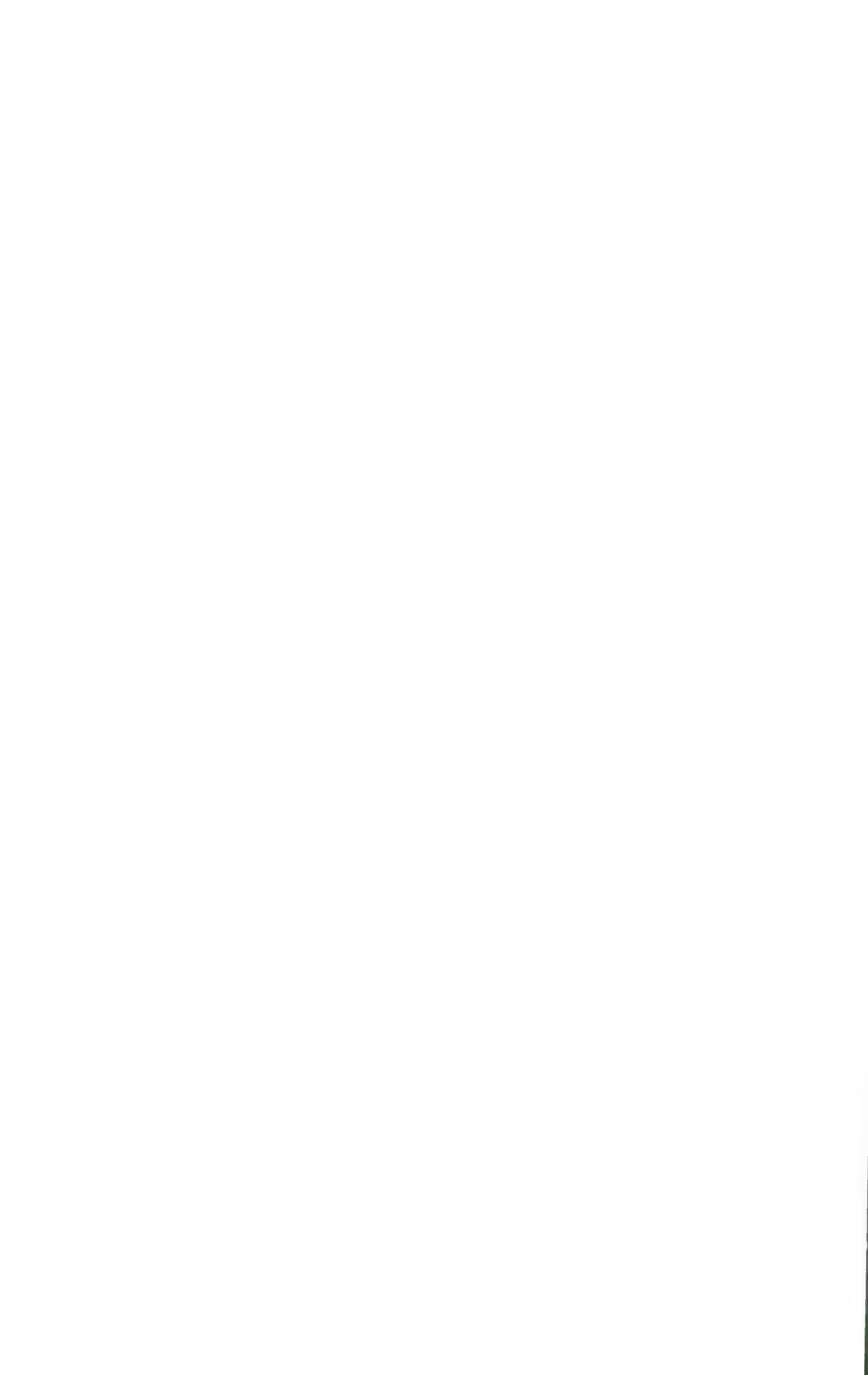
EXPLANATION OF THE ILLUSTRATION

GOODYERA PUBESCENS *R. Brown*. Plant approximately natural size with flowering and fruiting racemes detached, the flowers and fruit slightly less than natural size. 1, flower much enlarged to show the perianth. 2, flower sectioned to show the relation of the labellum and column to the ovary, sepals and petals. 3, column drawn to show position of stigmas and anther. 4, pollinia. 5, a pollen tetrad. 6, the mature seed.

Drawn by BLANCHE AMES



GOODYERA *pubescens* R. Br.



an anterior position." In my use of the term I have ignored the mechanical means by which the position of the labellum may be effected and have employed *resupination* whenever the labellum is visually the lowermost segment of the orchid flower.

As far back as Christian Konrad Sprengel's time, one hundred and forty-five years ago, the relation of the labellum of the orchid to pollination was understood; indeed, Sprengel was one of the first naturalists to emphasize this by pictorial means. On the quaintly adorned title-page of his *Das entdeckte Geheimnis der Natur im Bau und in der Befruchtung der Blumen* published in Berlin in 1793, he introduced a flower of *Listera ovata* with an insect on the labellum, its head in contact with the pollinia. But why the labellum of the orchid should have developed adaxially and then should have become the lowermost perianth segment by a half-twist and by curvature of the ovary is a biological mystery surrounding the effects of symbiosis.



Perhaps this mystery is intensified by *Malaxis paludosa*, a species with the labellum constituting the uppermost member of the perianth. To the casual observer the labellum of *M. paludosa* appears to be quite normally placed and as yet uninfluenced by the forces that cause resupination. Charles Darwin, in his lighter studies,¹ examined the flowers of this orchid and found that the position of the labellum is remarkable because it has been "purposely acquired" as shown by the "ovary"² being

¹ In a letter to Sir J. D. Hooker, Darwin wrote in 1861: "What frightful trouble you have taken about Vanilla; you really must not take an atom more; for the orchids are more play than real work."

² From my observations made on herbarium specimens I am of the opinion that the so-called twist is confined to the pedicel. Colonel M. J. Godfery is also of this opinion and in a letter has informed me that "the ovary itself is not twisted and is scarcely longer than its twisted stalk."

spirally twisted. In other words, *M. paludosa* has boxed the compass with its labellum in what “nature-lovers” might regard as a definite effort to accommodate fickle insects or to attain constancy in pollination through selective modifications adapted to insects with a preference for a non-resupinate flower. Indeed the labellum is the uppermost segment of the perianth because of a twist of the pedicel through 360 degrees. With characteristic promptness Darwin seized on this peculiarity of the pedicel in *M. paludosa* to strengthen the argument for his theory of natural selection and he referred to it as follows: “in many Orchids the ovarium (but sometimes the foot-stalk) becomes for a period twisted, causing the labellum to assume the position of a lower petal, so that insects can easily visit the flower; but from slow changes in the form or position of the petals, or from new sorts of insects visiting the flowers, it might be advantageous to the plant that the labellum should resume its normal position on the upper side of the flower, as is actually the case with *Malaxis paludosa*, and some species of *Catasetum*, &c. This change, it is obvious, might be simply effected by the continued selection of varieties which had their ovaria less and less twisted; but if the plant only afforded varieties with the ovarium more twisted, the same end could be attained by the selection of such variations, until the flower was turned completely round on its axis. This seems to have actually occurred with *Malaxis paludosa*, for the labellum has acquired its present upward position by the ovarium being twisted twice as much as is usual.” (The various Contrivances by which Orchids are fertilized by Insects, ed. 2, p. 284)



Malaxis paludosa
after Darwin

There is surely something physiologically significant in the position of the labellum. It does not seem to be a matter of indifference to a species whether or not the flowers are upside down; whether the labellum is adaxial rather than the lowermost member of the perianth. Just recently I repeated an experiment I have often tried and by means of a string and anchor bent the inflorescence of *Calopogon pulchellus* so that the tip was directed toward the ground. In this species the labellum is normally the uppermost member of the perianth. In about a week the flowers began to expand and in each one the labellum had assumed the position characteristic of the species. These flowers had adapted themselves promptly to an unusual situation and the labellum was the uppermost perianth segment although the raceme was inverted. In the flowers of *Habenaria lacera* the labellum is the lowermost segment of the perianth. If the inflorescence is forcibly inverted so that the apex is directed toward the ground, the flowers as they expand will exhibit varying degrees of resupination, some of them being in the position they would have occupied had the raceme been allowed to remain upright. *Goodyera pubescens* presents an unusually interesting study in connection with resupination. If plants with the lowermost flowers fully expanded are inverted, the ovaries of the remaining flowers will continue to twist and anthesis being imminent, will for the most part cause complete resupination even though no perceptible torsion was observable in the ovaries of the buds. If plants with very young buds are inverted, resupination is checked and the labellum remains adaxial throughout the raceme. (cf. plate on p. 157) If a raceme, intermediate between imminent anthesis and extreme juvenility, is inverted, the flowers may turn variously so that the inflorescence appears to be composed of flowers in every conceivable stage of resupination. It is as if at the mo-

EXPLANATION OF THE ILLUSTRATION

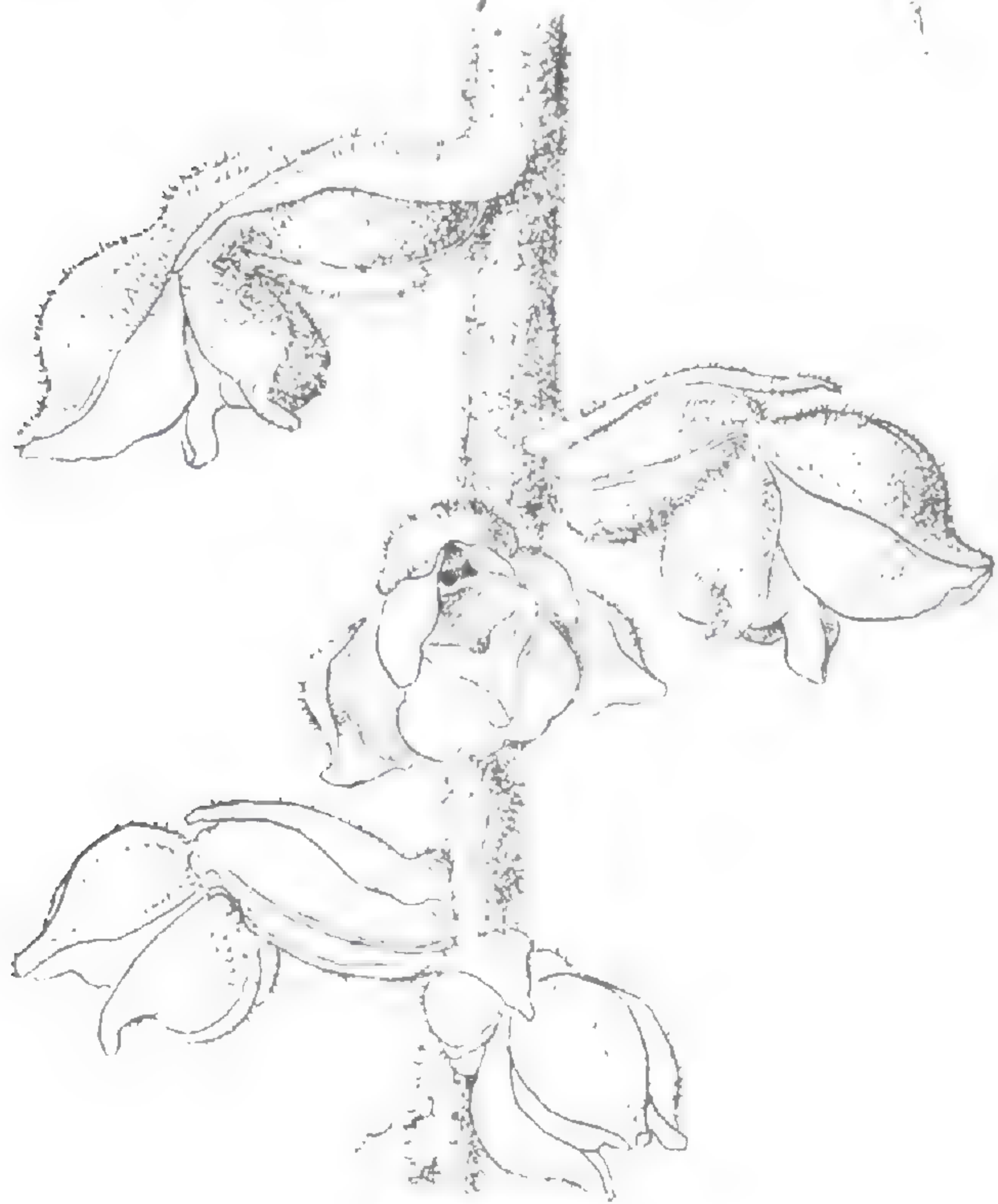
GOODYERA PUBESCENS *R. Brown*. Above, a forcibly inverted raceme (slightly enlarged) in which the flowers have retained their primitive position with the dorsal sepal adjacent to the subtending floral bract. The ovaries have developed at right angles to the rachis. This condition should be compared with the obliquity of the ovaries in a normal raceme. (cf. plate of *Goodyera pubescens* on p. 151)

Below, a portion of the raceme enlarged about three times natural size.

*Drawn with the aid of the camera lucida,
August 1938 by* **BLANCHE AMES**



GOODYERA *pubescens* R. Br.





ment of anthesis some irreversible surge of power were beginning to operate to cause the ovaries to twist. If a raceme is inverted before this power begins to manifest itself, resupination is prevented. However, as my observations on *Goodyera* have been confined to just a few plants, I feel that this matter is in need of further study, although Ziegenspeck in *Lebensgeschichte der Blütenpflanzen Mitteleuropas* (1936) p. 81, states that according to recent experiments the prevention of resupination by means of the klinostat is successfully done with *Orchis* (*Dactyloorchis*), *Habenaria* (*Platanthera*) and *Goodyera*, only if very young buds are used. It has been stated that in *Stanhopea*, a very remarkable genus of orchids occurring in the American tropics, the flowers of the pendulous inflorescence if held erect will completely twist in twenty-four hours and assume the position they would have occupied had the inflorescence been pendulous. In the tropics where epiphytic orchids are not infrequently forced into unusual situations when they grow, with the racemes pendent, on tree trunks or on the sides of rocks or cliffs, I have observed on several occasions that the flowers become adjusted to whatever situation they are in and the labellum assumes the position that is normal for the species. This is true also of compound racemes or panicles in which some of the branches are at right angles to the main flower-shoot. In this case the ovaries of the laterally placed flowers twist through 90 degrees. This is true also for the lateral flowers of those species which have both terminal and lateral racemes. In the prevalently dimorphic genus *Catasetum* and in the dimorphic genus *Cynoches*, the male flowers are frequently borne in elongated, drooping racemes; those of *Catasetum* being resupinate, those of *Cynoches* being non-resupinate. Furthermore, in *Catasetum* the female flowers are usually produced on erect peduncles and are strikingly non-



CYCNOCHES STELLIFERUM *Loddiges*. The terminal portion of a pendulous raceme of male flowers. (The complete raceme consisted of twenty-three flowers.) The labellum, with radiating processes, is uppermost in the fully expanded flower. Above the labellum the lateral sepals are shown. The curved structure seeming to originate from the base of the labellum is the elongated pendent column with the anther and pollinia at the free end.

Drawn, from a plant collected in Honduras, by **BLANCHE AMES**

resupinate. When male and female flowers of certain species of *Catasetum* are produced simultaneously in a single raceme, the males are resupinate and the females non-resupinate. In Robert H. Schomburgk's famous paper published in the Transactions of the Linnean Society of London in 1837, the plate illustrating *Catasetum barbatum* shows both male and female flowers in the same raceme. (cf. illustration opposite p. 162) The males, with the fringed labellum lowermost; the fleshy females, with the deeply saccate or ventricose labellum uppermost, are just the reverse of what one would expect as a result of gravitational influence. They seem to indicate a selective response. This rare and abnormal association of male and female flowers in the same raceme throws light on the taxonomic significance of resupination in the Orchidaceae and in conjunction with the evidence of floral position as a physiological manifestation indicates that twisting of the ovaries is in no sense a symbol of specificity.

Before the true significance of flower-form and resupination in *Catasetum* was understood, there was a wilderness of error in the interpretation of generic and specific limits. John Lindley, in his treatment of the species now grouped under *Catasetum* (relying in part on resupination as a generic character), recognized three genera, namely, *Catasetum*, *Monachanthus* and *Myanthus*. In *Myanthus* the labellum, through resupination, constituted the lowermost segment of the perianth; in *Catasetum* the labellum was uppermost. In both concepts the column was typified by having a pair of antennae or cirrhi (*columna bicirrhosa*). *These genera proved to be composed of males*. In *Monachanthus* the labellum constituted the uppermost segment of the perianth and the column was different from that of *Catasetum* and *Myanthus* in lacking antennae or cirrhi (*columna mutica*). *The genus Monachanthus proved to be composed of females*.

EXPLANATION OF THE ILLUSTRATION

CATASETUM BARBATUM Lindley. Redrawn from a part of Schomburgk's plate in the Transactions of the Linnean Society 17 (1837) tab. 29, showing an *erect* peduncle bearing two male flowers, with the labellum barbate, and four female flowers with the labellum ventricose, the male flowers resupinate, the female flowers non-resupinate. In the lower right-hand corner a single male flower is shown resupinate although the raceme, composed of twenty-five male flowers, was *drooping* (in this flower the antennae or cirrhi may be seen above the hook-like callus at the base of the lip).

Before the dimorphic nature of this species was understood and before the sexes were found occurring simultaneously on a single plant, the female was called *Monachanthus viridis* and the male *Myanthis barbatus*. As early as 1826, John Lindley observed the occurrence of the two sexes of a species of *Catasetum* on the same raceme. He called the females "monsters" and let it go at that.



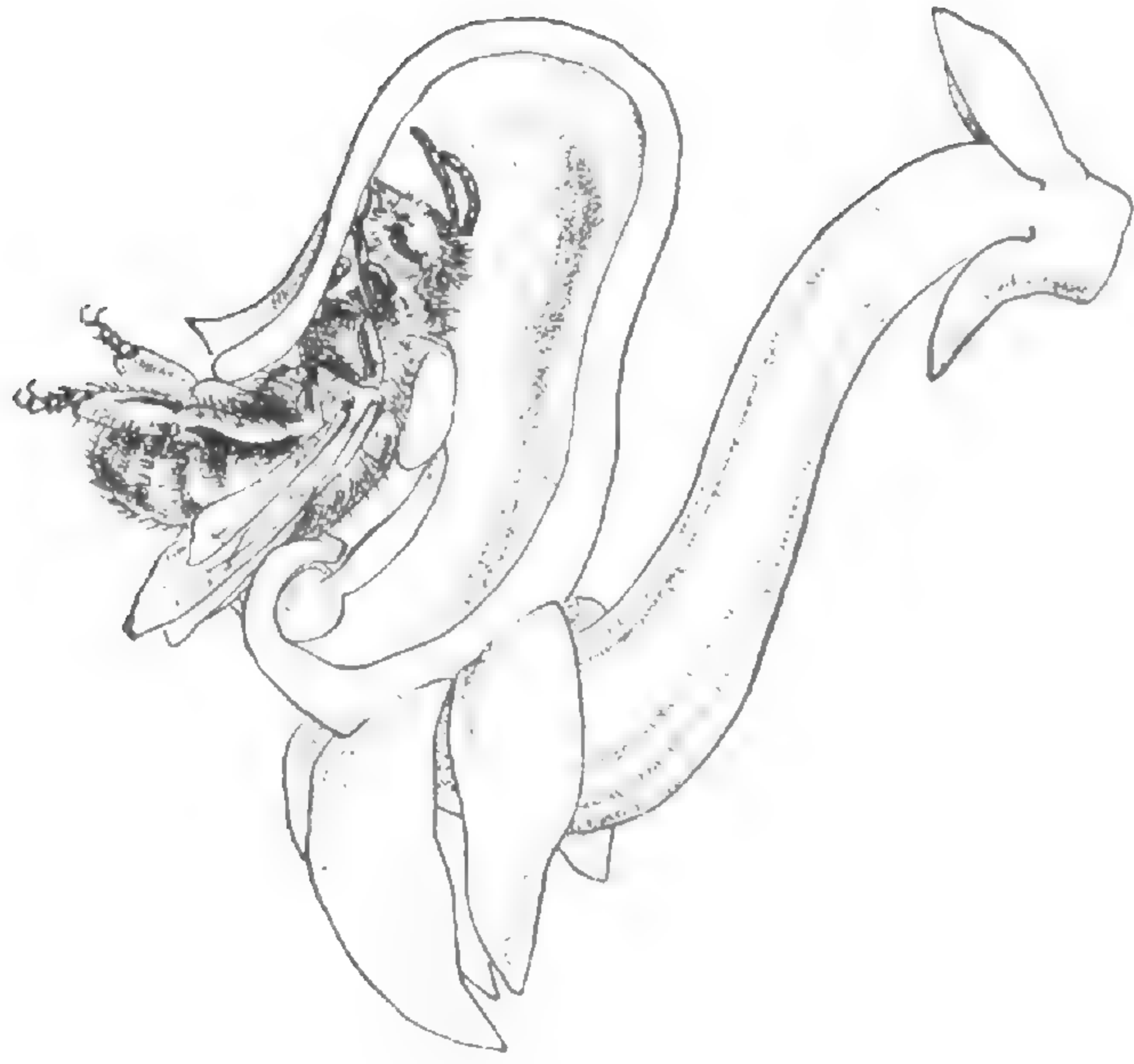


Charles Darwin was very much perplexed by the genera *Catasetum*, *Monachanthus* and *Myanthus*, because he was led to believe, mistakenly, that all three had been found on a single plant. Indeed down to this day, although R. Allen Rolfe explained the reason for Darwin's error (cf. *Journ. Linn. Soc. Bot.* 27 (1891) 206-225), we find an occasional recrudescence of this extraordinary belief. (cf. explanation of the illustration opposite the plate on p. 166.)

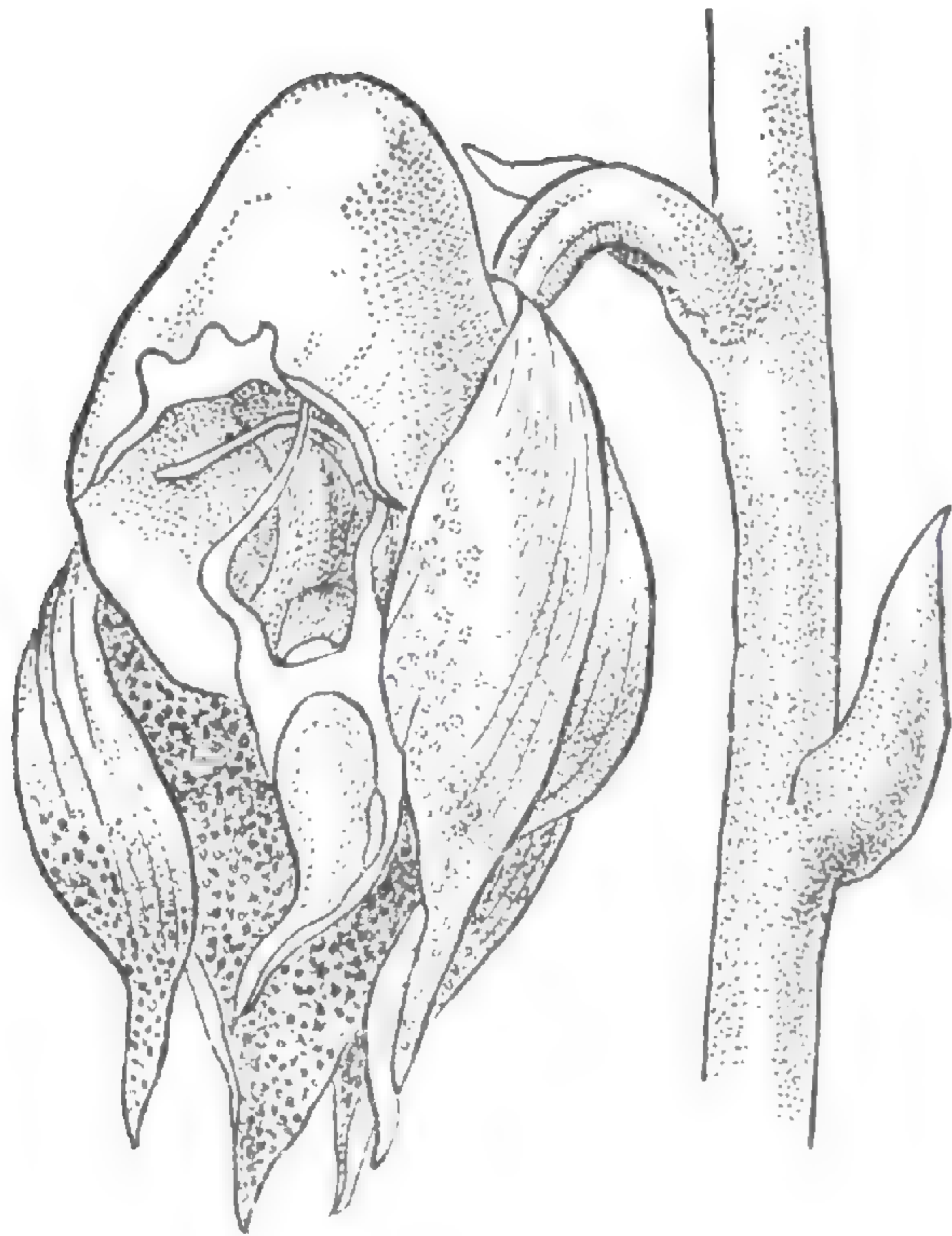
Notwithstanding the failure of resupination or torsion to designate genera in the *Catasetum* alliance, resupination is still used to differentiate between certain subtribes in the Neottiineae, the outstanding example being found in the Cranichideae which are separated from the Spirantheae and Physureae by having the labellum uppermost, that is the labellum is the posterior segment of the perianth. In this extremely puzzling aggregation there has been marked disagreement regarding the final resting-place of certain genera: *Baskervillea*, for example, having been referred to the Spirantheae in one system and to the Cranichideae in another. And *Manniella*, placed by Pfitzer in the Cranichideae, the subtribe with non-resupinate flowers, was made the type-genus of a new subtribe by Schlechter, distinguishable in part by the flowers being resupinate. In the *Orchid Review* 30 (1922) 3, Colonel M. J. Godfery directed attention to Georges Rouy's dependence on the ovaries in establishing subtribal differences between the Spirantheae and Physureae, the former having twisted ovaries, the latter untwisted ovaries (*Flore de France* 13 (1912) 209-210). Godfery argued that twisted and straight ovaries may occur in the same raceme of *Goodyera repens*, a member of the Physureae, and that therefore twisting of the ovary is of no value as a generic, still less as a subtribal character. A careful examination of the genera composing the

EXPLANATION OF THE ILLUSTRATION

CATASETUM MACROCARPUM *L.C.Rich. ex Kunth.* 1, a flower (labellum sectioned longitudinally) of the female, redrawn from H. Crüger's plate in the Journal of the Linnean Society 8, Bot. (1865) t. 9. The bee having gnawed the tissues on the anterior wall of the helmet-shaped labellum is shown leaving the flower. The pollen-masses from a male flower previously visited are being deposited on the stigmas. The male of *C. macrocarpum* (*C. tridentatum* of Darwin's writings, cf. fig. 2), is markedly unlike the female in the structure of the column. It differs from the male of *C. barbatum* (*Myanthus barbatus*) in the ventricose labellum and non-resupinate flowers. Schomburgk and Darwin believed that the female of both *C. macrocarpum* and *C. barbatum* represented a single species, namely *Monachanthus viridis*. It was this belief, formed through ignorance of the fact that the females of several species of *Catasetum* may be puzzlingly alike although the males are strikingly dissimilar, which contributed to the errors in Darwin's observations and conclusions. When a plant, supposedly *Monachanthus viridis* (in reality the female of *C. macrocarpum*), produced male flowers of *C. macrocarpum* (*C. tridentatum* of Schomburgk and Darwin) and when a plant of *C. barbatum* (*Myanthus barbatus*) produced typical male flowers, and females (supposedly *Monachanthus viridis*), simultaneously, in a single raceme, it was thought that two male forms (representing the genera *Catasetum* and *Myanthus*) were associated with a single female form (a *Monachanthus*) and it was assumed that *Catasetum tridentatum*, *Monachanthus viridis* and *Myanthus barbatus* were all referable to *Catasetum barbatum* (*Myanthus barbatus*). To account for the difference between the males Darwin proposed that those of *Myanthus barbatus* should be regarded as being hermaphrodites. This was probably the crowning glory of biological and taxonomic misconception. 2, a male flower, redrawn from Hooker's Exotic Flora 2 (1825) t. 151.



1



2



Cranichideae and Spirantheae makes one wonder if dependence on resupination or its opposite has not resulted in forced and unnatural alliances.

Harry Bolus in his treatment of South African orchids recognized as a section-character (§. Orthocarpa) the untwisted ovary in several species of *Disa*, a genus in which the flowers are preponderantly resupinate. Then he found in *Disa elegans* Reichb.f. (a species which he referred to §. Orthocarpa) that the "nearly posticous position" of the labellum is caused by a complete twist of the ovary. (*Orchids of South Africa* 1 (1896) t. 35) In this case the value of the presence or absence of ovarian torsion with regard to species of *Disa* seems to be severely weakened and of very questionable significance in the recognition of sections.

A more obvious peculiarity than twisting of the ovaries is torsion of the rachis when it twists either in a clockwise or counter-clockwise direction. Given equal weight with resupination as a diagnostic character, variation in the trend of spiral torsion would yield recognizable varieties in *Spiranthes gracilis* and *S.cernua* in which species the raceme twists one way or the other in different plants; but nobody, I think, would seriously employ this difference to establish subtribes, sections or species, even if it so happened that plants exhibiting one type or the other of spirality were to be found restricted to widely separated geographical regions.

In 1926, my colleague, Professor M.L.Fernald, reinstated from synonymy, as *Malaxis brachypoda*, an American orchid described as *Microstylis brachypoda* by Asa Gray in 1835. This concept is set apart from its ally, *Malaxis monophyllos* of Eurasia, because the flowers are resupinate. Undoubtedly in contrasting plants with resupinate and non-resupinate flowers a botanist accustomed to our native species with a pendent labellum

would, were he unmindful of the significance of resupination, conclude that it must be specifically distinct from an exotic though similar species with a non-resupinate, erect labellum. I would have no intention of taking exception to the proposals of Professor Fernald, if his conclusions were supported by all the evidence. He has reinstated *Microstylis brachypoda* to emphasize what he regards as a long overlooked difference between the American and Eurasian plants which have been prevalently referred to *Malaxis monophyllos*.³ (cf. *Rhodora* 28 (1926) 176) In their vegetative and floral structure these plants are perplexingly alike. Professor Fernald's statement in *Rhodora* (l.c. p. 92) leaves no doubt as to what he regarded as the most important differentiating character. He wrote: "Most significant is the fact that the Eurasian plant has the flowers resupinate or up-side-down, so that the lip points up; while in the plants of eastern America the flowers are in normal position with drooping lip." It is quite evident that Professor Fernald uses the word resupinate incorrectly and in a sense very different from that understood by orchidologists and plant morphologists, and he has misinterpreted the behavior of the pedicel in the American plant although he used this structure in establishing a specific difference. The flowers of the Eurasian plant are not "upside-down" nor are the flowers of the American plant "normal" in having a "drooping lip". The American plant has a resupinate or abaxial perianth, whereas the perianth of the Eurasian plant is non-resupinate or adaxial.⁴

³ In *Rhodora* 28 (1926) 92, Professor Fernald stated that I had ignored *Microstylis brachypoda* Gray in my Enumeration of the Orchids of the United States and Canada. In the Preface I made it clear that a complete synonymy would burden the text.

⁴ James Edward Smith, in Smith and Sowerby's English Botany, used the term "resupinata" in describing the position of the "unpaired sepal" in the flower of *Malaxis paludosa*. He referred to this sepal as being "lowermost", assuming, also erroneously, that in the Orchidaceae the flowers are in their primitive position when the unpaired sepal is uppermost and the labellum lowermost. (cf. text cut on p. 154)

Perhaps, if it were not for the emphasis he places on the difference in the position of the labellum, and on supposed "complete geographic isolation", Professor Fernald would have been satisfied to have accepted an already proposed varietal concept.⁵ Aside from the dissimilarity between *Malaxis monophyllos* var. *brachypoda* and *M. monophyllos* revealed by the position of the labellum, there may be slight, indeed elusive variations in the form of the flower-buds, relative size of the flowers and in the comparative length of the pedicels and mature capsules. Professor Fernald has attempted to reveal these variations as important differences by means of photographic evidence (*Rhodora* 35 (1933) tab. 253), but for this purpose his material from the Eurasian sources was doubtfully conclusive. For example, in the Gray Herbarium there is but a single specimen of the Eurasian *Malaxis monophyllos* with mature fruits. From this specimen Professor Fernald selected the capsules used in his illustration of contrasted structures and in making the

⁵ Morris and Eames in *Our Wild Orchids* (1929) 358, used a varietal designation for the American plant and made the combination: *Malaxis monophyllos* Swartz var. *brachypoda* (Gray) Morris and Eames.

Professor Fernald would seem to criticize Morris and Eames because they used the name "White Adder's Mouth" for *Malaxis monophyllos* var. *brachypoda*. He admits that his familiarity with the Old World *M. monophyllos* and his conversance with folk-lore do not suffice to make it clear to him that this popular name applies to the European plant. As a "pseudonym" for the American plant with "greenish-yellow flowers" he regards the name as not descriptive (cf. *Rhodora* 35 (1933) 242). However, the name "White Adder's Mouth" has been used in American floras. It occurs in Britton and Brown's *Illustrated Flora of the Northern United States and Canada*; in *Wild Flowers of New York* by Homer D. House and elsewhere, and is not an innovation on the part of Morris and Eames. European botanists have described the flowers of the Eurasian plant as greenish, yellowish, etc. and have indicated this color in their illustrations. Therefore the flowers are similar in color to those of the American plant.

measurements used to establish a diagnostic point (*Rhodora* 35 (1933) tab. 253). In his description of the capsules and pedicels he gave comparative measurements. These are as follows for the Eurasian specimen: capsules 5-7 mm. long; pedicels 3-5 mm. long. (I have examined the specimen in question and have arrived at the following measurements: capsules 4-6 mm. long; pedicels 3-4.25 mm. long). For the American plant Professor Fernald gave the following measurements: capsules 3-5 mm. long; pedicels 1-2 mm. long. In my herbarium there is a specimen from Vermont from which the following measurements were taken: capsules 3-5.5 mm. long; pedicels 2-3.5 mm. long. The measurements from the Eurasian plant in the Gray Herbarium and from my Vermont specimen, being from only two examples, are of course inconsequential in diagnostic value, yet I think they are useful as they show overlapping of measurements although Professor Fernald indicates otherwise. However, the differentiating value of measurements in this case vanishes completely if we turn to a specimen in the herbarium of the New York Botanical Garden. This specimen was collected by P. Krylov in Siberia and includes a raceme with mature fruits, the capsules being 3.75-4.5 mm. long, the pedicels 2-2.5 mm. long. In the herbarium of the Field Museum of Natural History there is a fruiting specimen collected near Berlin in 1876 by Retzdorf with the capsules 3.5-4 mm. long and the pedicels 2.5-3 mm. long. In the United States National Herbarium there is a specimen with mature fruits collected by Hausser in 1885 in Pomerania with capsules 2.5-3.5 mm. long; pedicels 2-3 mm. long. Mr. Summerhayes has very kindly examined mature fruits of several specimens of the Eurasian plant preserved in the herbarium of the Royal Botanic Gardens at Kew. The minimum and maximum measurements are as follows:

capsules 2.7–4.8 mm. long; pedicels 2.4–4 mm. long.

Professor Fernald, in the explanation of his plate that illustrates the differences he would emphasize, refers to the capsules of the Eurasian *Malaxis* as having a projecting, shriveled perianth. He contrasts these with capsules from a Maine plant which have a reflexed perianth. At first glance one would regard the difference between the vestiges of the perianth as a substantial fruit-character, but the “projecting shriveled perianth” is due to the non-resupinate flowers which had the labellum directed away from the ovary. The “reflexed perianth” is simply the result of resupination, the labellum in this case having rested on the top of the ovary. This is, I think, clearly shown by the flowers in the plate on p. 177. So this difference stands or falls on the value attributed to resupination as a specific difference. Professor Fernald refers to the pedicels of the capsules in the Eurasian plants as being twisted and contrasts them with the pedicels of the American plants which he describes as being “straight”. This difference is desperately difficult to accept because the pedicels are twisted in both the Eurasian and American representatives of *Malaxis monophyllos*; the only difference in the twist of the pedicels being that those of the American plants are twisted through 180 degrees and those of the Eurasian plants are twisted through 360 degrees, it being the additional twist which has returned the labellum to its primitive or non-resupinate position. In both the Eurasian and American representatives of *Malaxis monophyllos* a twisted pedicel is quite normal. The direction of the twisting, however, varies from flower to flower in the same raceme, and while some pedicels turn in a clockwise direction, others turn in a counter-clockwise direction. This peculiarity is clearly shown in the illustration of two capsules borne by a Vermont plant. Either Professor Fernald overlooked the twisted

The upper portion of a raceme showing the twisted, winged rachis and the twisted pedicels of the flowers. The bract of the lowermost flower has been removed. Drawn, much enlarged, from a specimen collected in Vermont by *Carl T. Ramsey*.



Two capsules from a plant collected in Vermont by *Carl T. Ramsey*, showing the twisted pedicels. (Capsules 5 mm. long; pedicels 3 mm. long. cf. p. 173, also p. 182.)

condition in his American material or else unwittingly used abnormal specimens in emphasizing a diagnostic point.

The value attributed to resupination when this peculiarity is associated with "complete geographic isolation" disappears when we find *Malaxis monophyllos* with non-resupinate flowers and its variant with resupinate flowers, growing in Japan. In my herbarium there are two specimens of *Malaxis monophyllos*, collected by Kenzo Shiota (No. 2222), on Mount Hakuso. Both specimens bear resupinate flowers and would pass without question for the New World plant if the geographical source were unknown. In the Gray Herbarium there is a specimen from Hokkaido, collected near Furebetsu, on which the flowers are non-resupinate. In all of these Japanese specimens the distinctive, thickened margin on the basal half of the labellum, a definite characteristic of the species, is present. This thickening, with some of the cells containing raphides, passes into short keels, one on each side of the disc, beneath each membranaceous, inrolled lateral lobe. This thickened margin is also well-developed in New World specimens of *Malaxis monophyllos* and is also distinguished by large cells containing raphides. The constancy of this thickened margin; the keels arising from it and the cells containing raphides are, in my estimation, strong characters aiding in the recognition of *Malaxis monophyllos*, and are of far greater diagnostic value as a specific guide than geographic isolation or differences in the length of the pedicels, capsules and flower-buds or differences in the position of the labellum; differences which are hardly reliable criteria for specific segregation in the Orchidaceae. (cf. plate on p. 177)

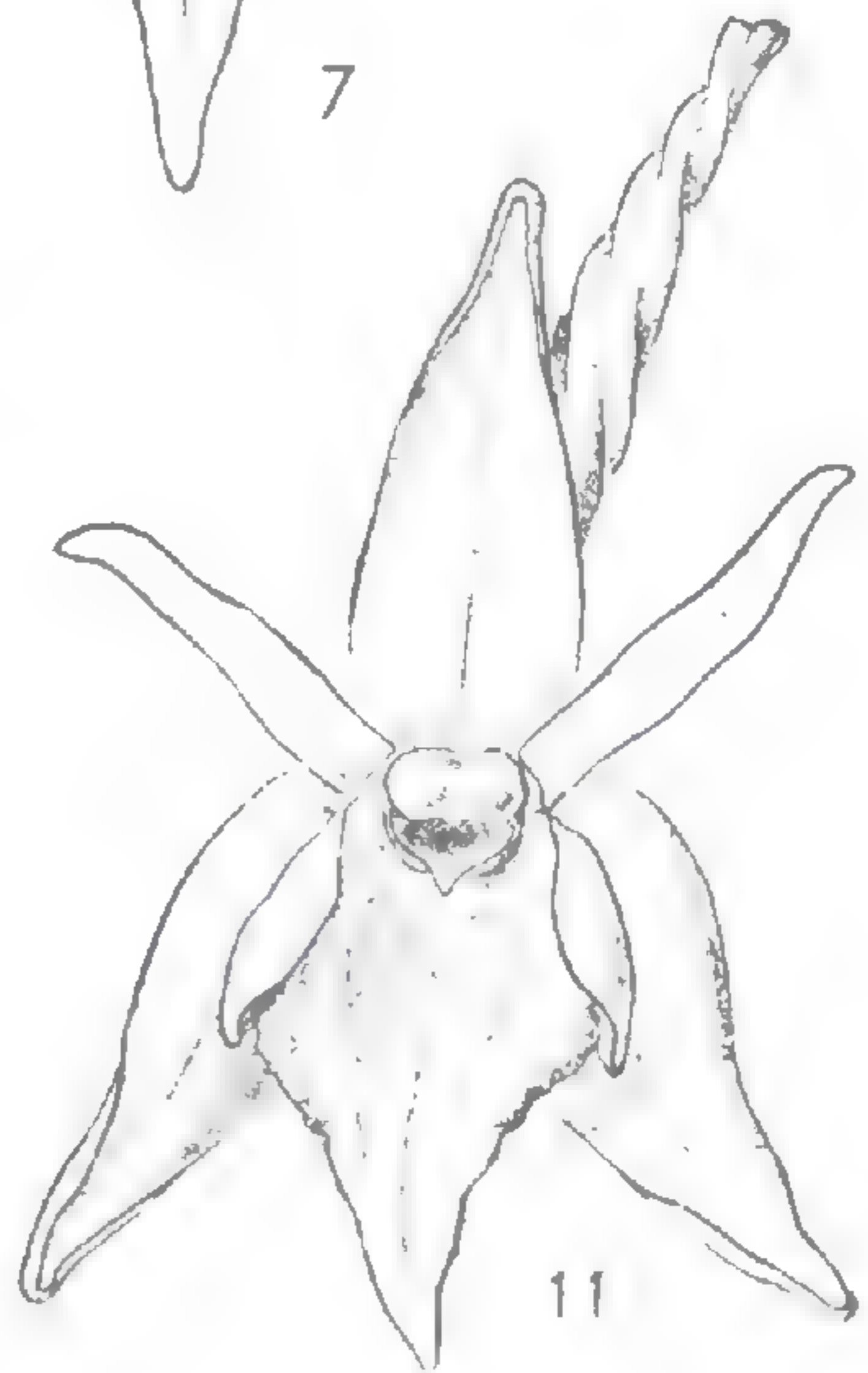
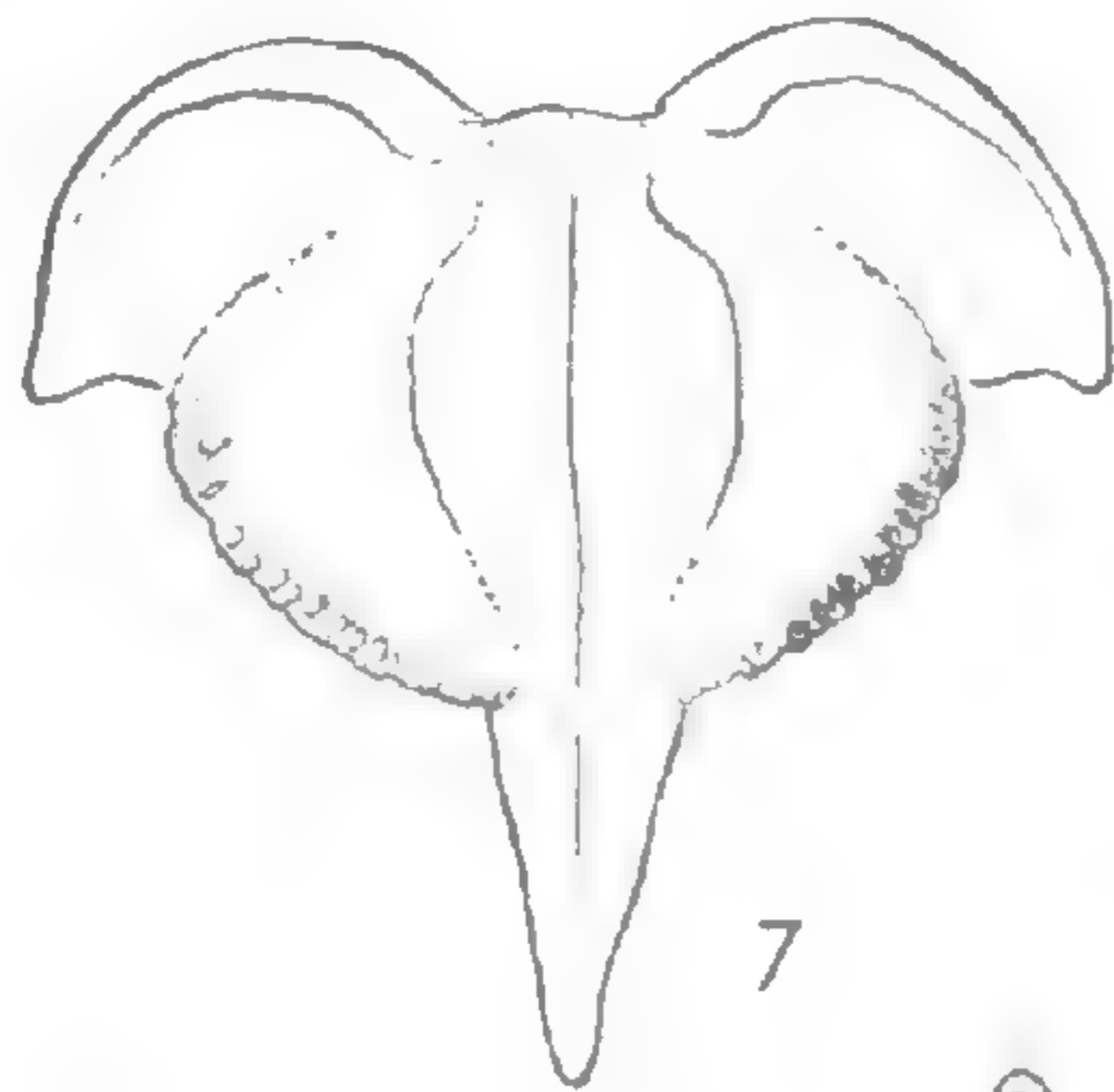
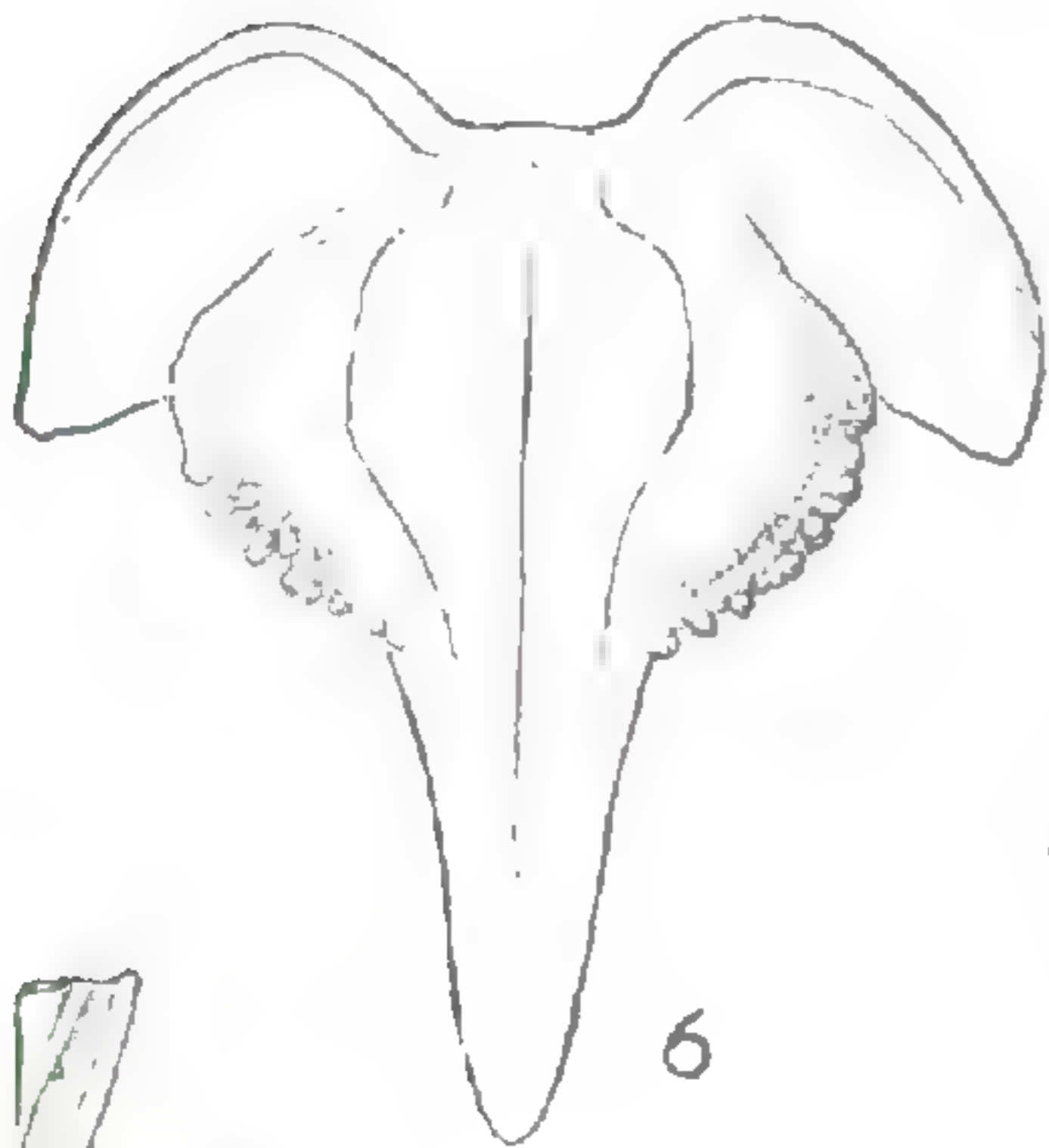
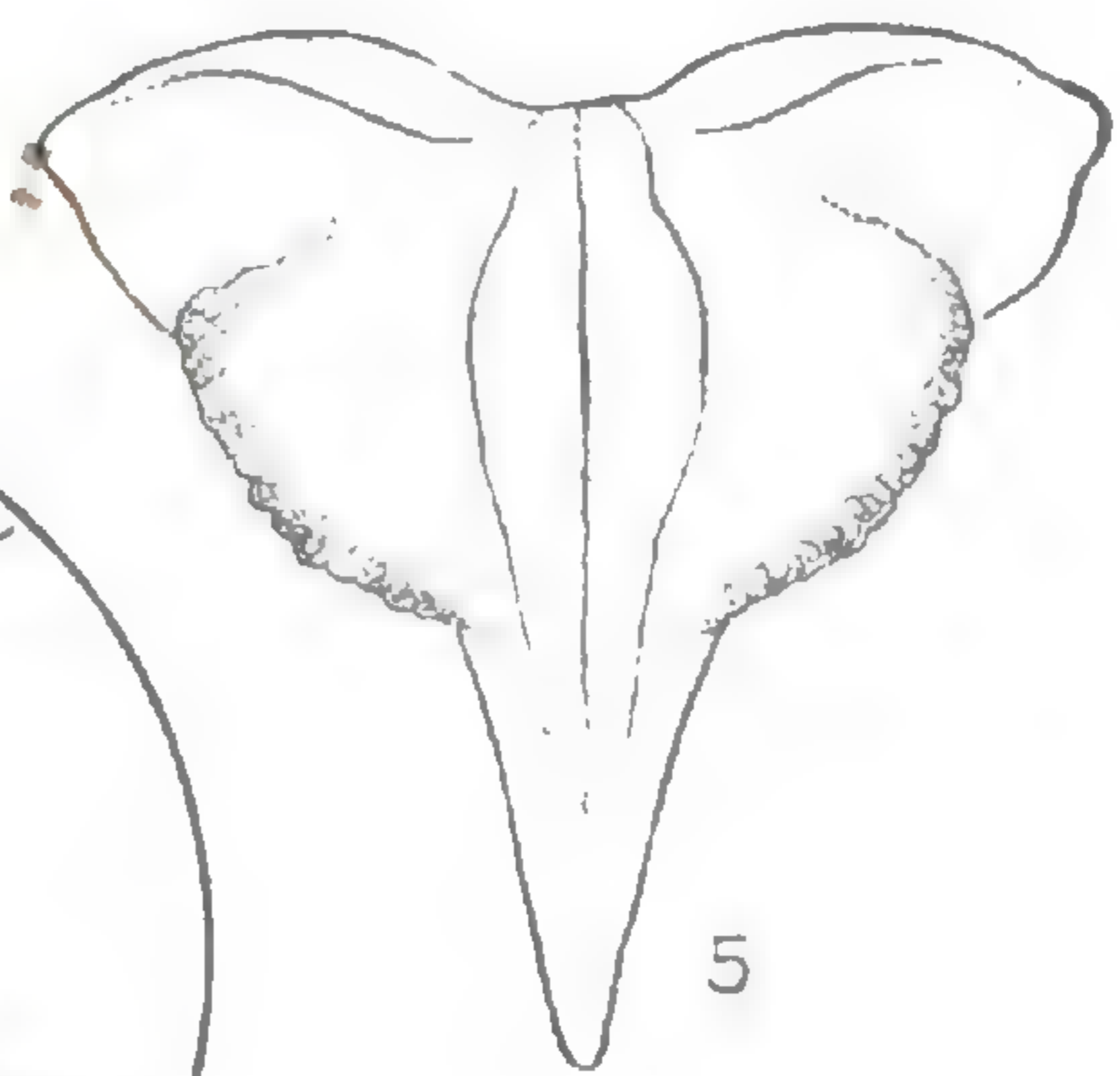
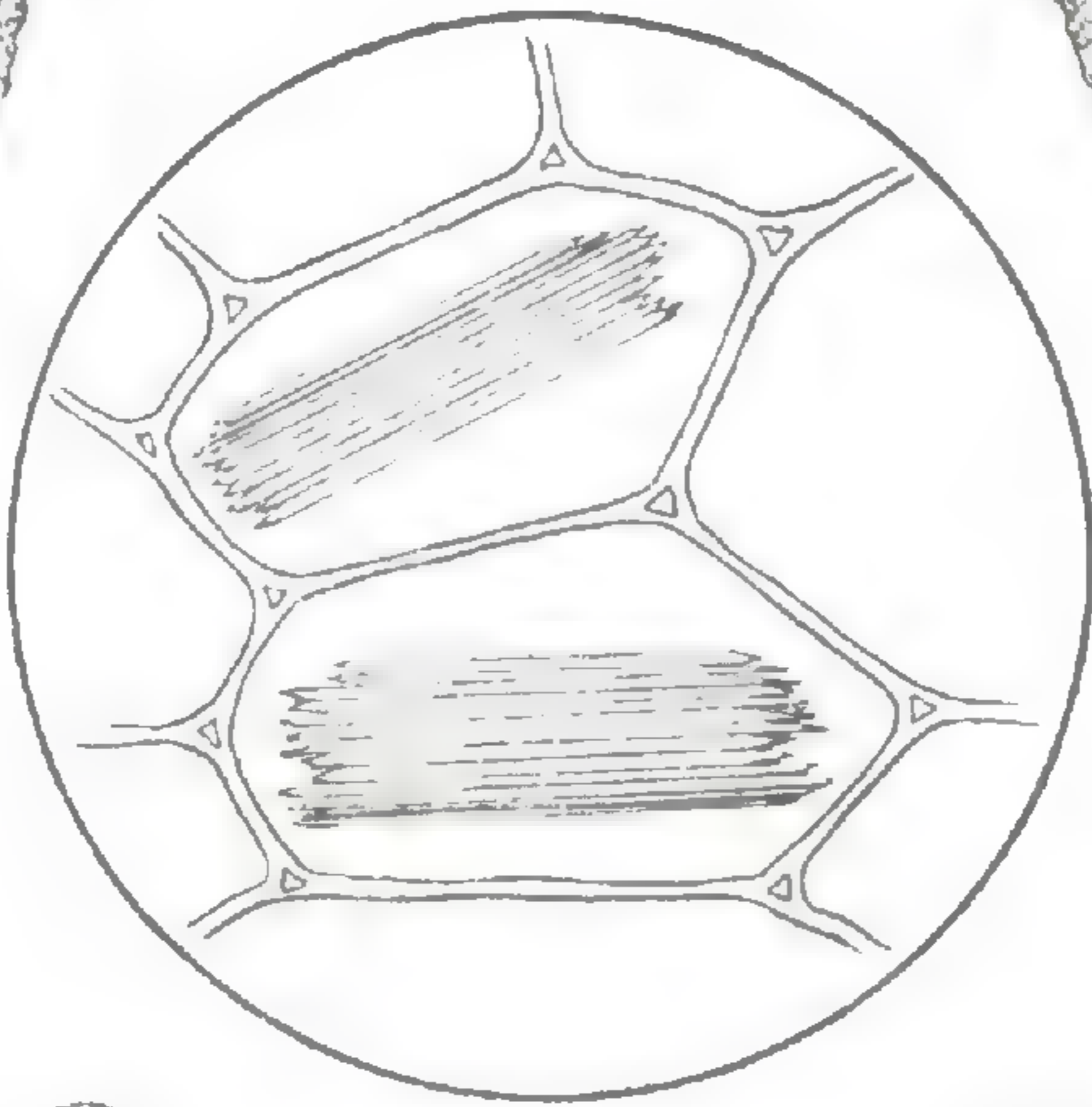
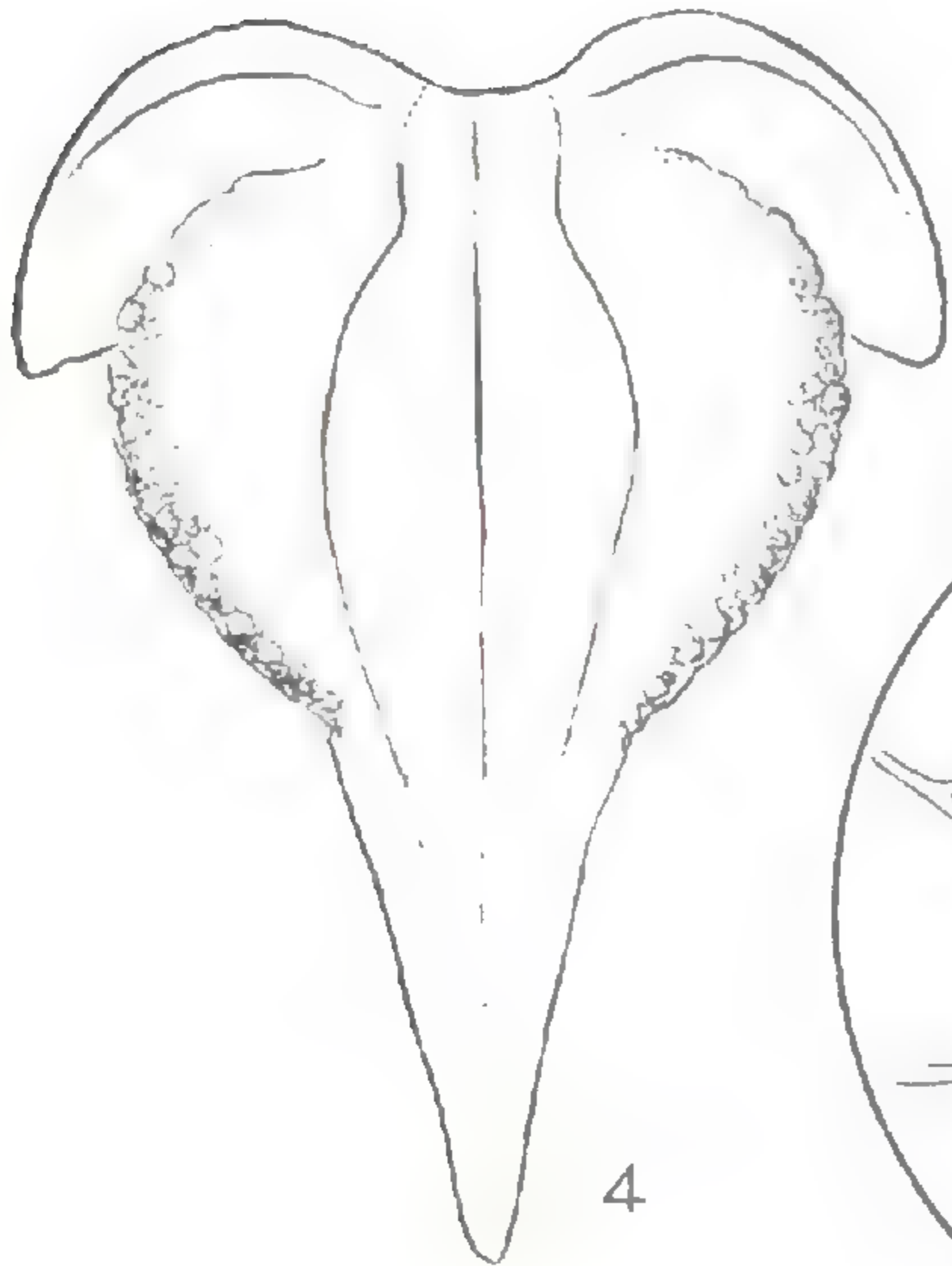
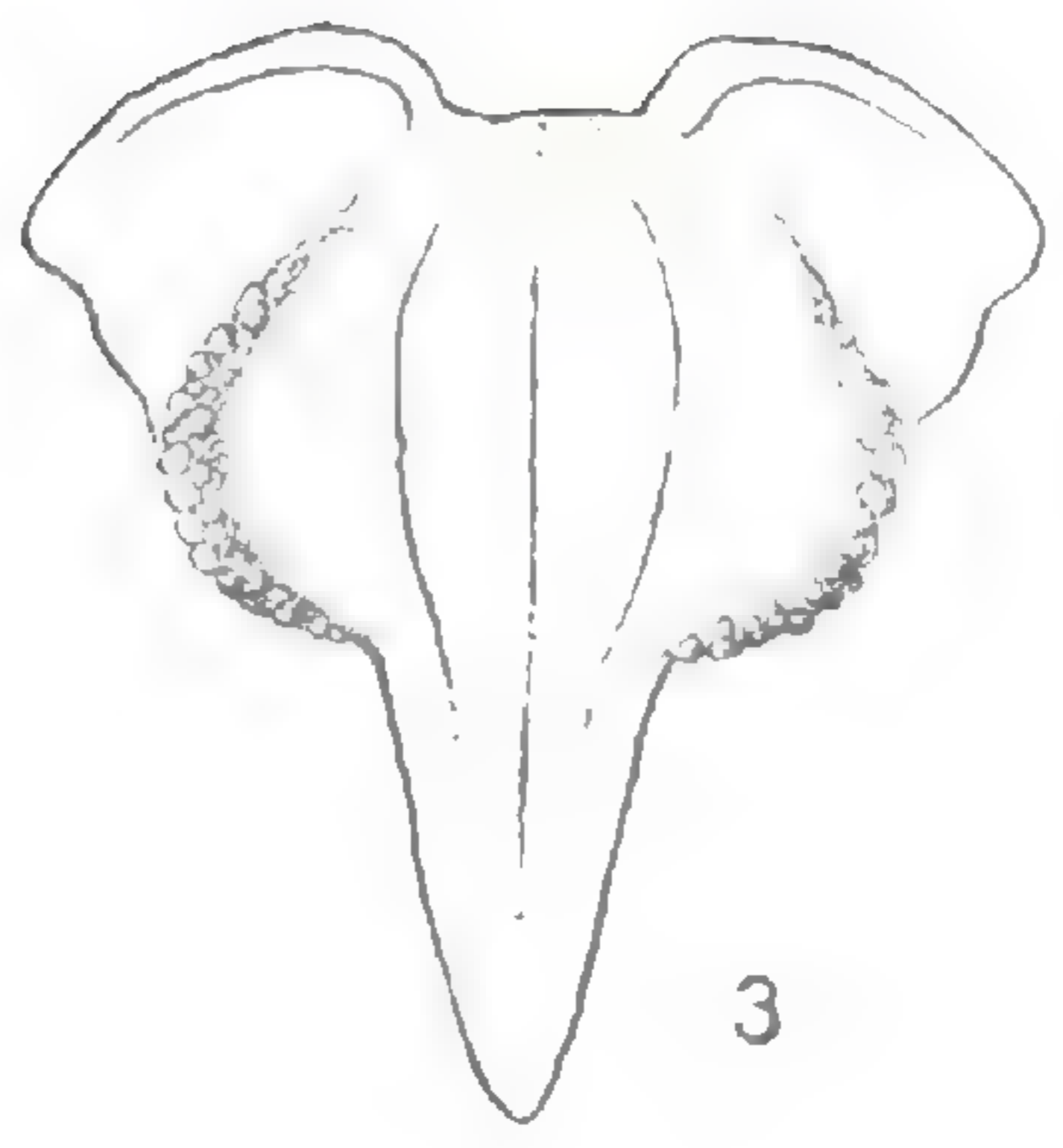
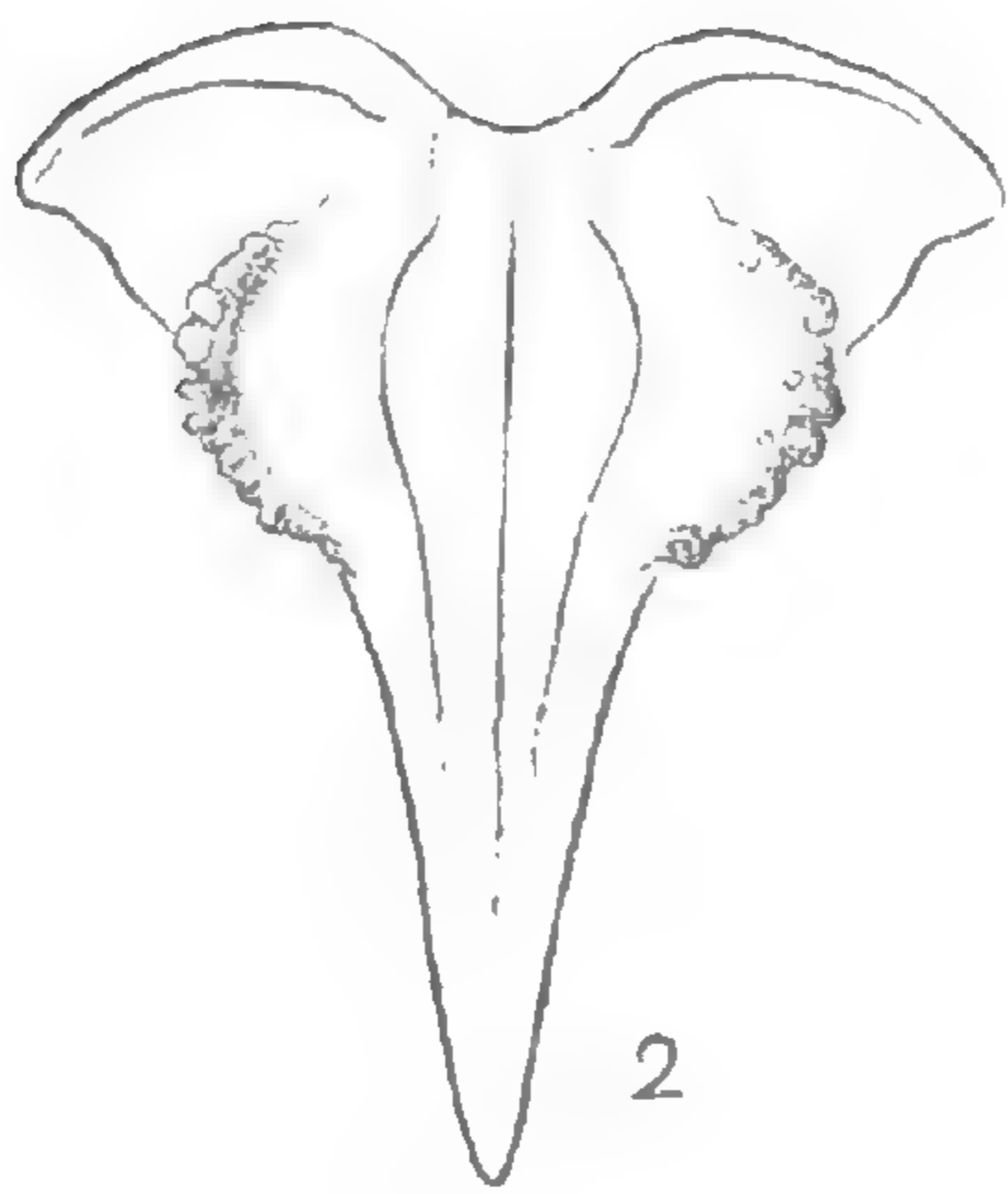
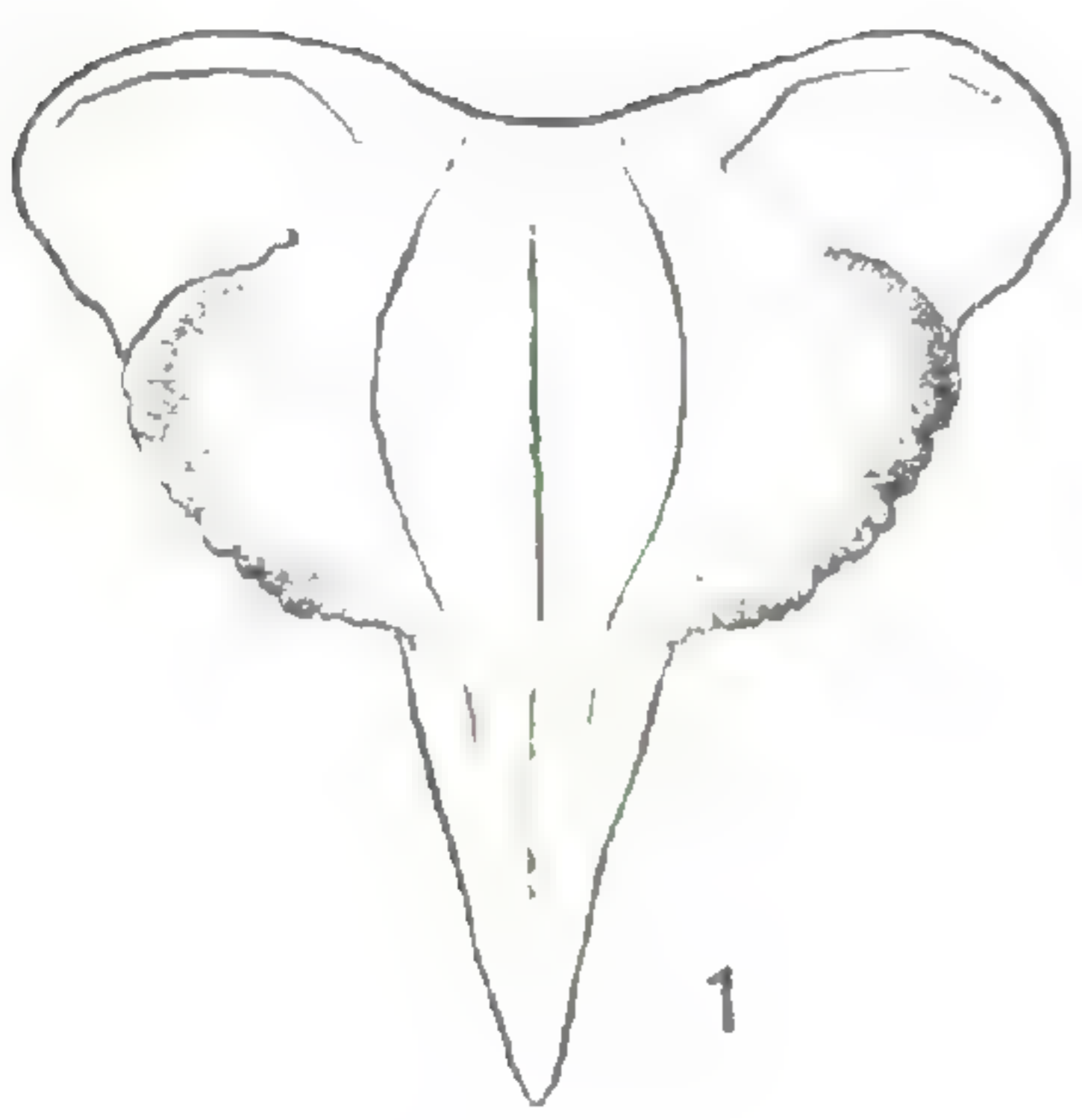
If the form of the labellum is studied in a series of specimens taken from the entire range of *Malaxis monophyllos*, it will be found that there are slight differences

EXPLANATION OF THE ILLUSTRATION

MALAXIS MONOPHYLLOS (*L.*) *Swartz* and var. BRACHYPODA (*A. Gray*) *Morris & Eames*. All of the figures are much enlarged. Figs. 1-7 represent lips taken from different plants and to aid in comparative studies they are represented in the same position. The basal lobes have been flattened out to reveal the outline. The magnification is similar throughout. 1, var. *brachypoda* from Newfoundland, 2 mm. long. 2, var. *brachypoda* from Vermont, 2.5 mm. long. 3, var. *brachypoda* from Japan, 2 mm. long. 4, *M. monophyllos* from Switzerland, 3 mm. long. 5, var. *brachypoda* from Vermont, 2 mm. long. 6, *M. monophyllos* from Japan, 2 mm. long. 7, *M. monophyllos* from China, 1.5 mm. long. 8, raphides found in the thickened margin and keels of the lip of *M. monophyllos* and var. *brachypoda*, much enlarged. 9, *M. monophyllos* from Siberia, lip 2 mm. long. 10, var. *brachypoda* from Vermont, lip 2.5 mm. long. 11, *M. monophyllos* from Pomerania, lip 2.5 mm. long.

Drawn with the aid of the camera lucida, figs. 2, 5, 8 and 10 from specimens preserved in alcohol; all other figures from dried specimens, August 1938 by

BLANCHE AMES





between one specimen and another in the basal lobes or auricles. (cf. plate on p. 177) At first these differences are very perplexing. An attempt to utilize them in the recognition of two species, one American, the other Eurasian, would almost certainly necessitate the admission of several additional species separable by characters so slight and trivial that an attempt to make them clear by a description would be extremely difficult even if possible. Asa Gray originally thought there was a difference between the auricles or lateral lobes; those of the Eurasian plant being directed forward, those of the American plant being rounded and inrolled. The flowers of the Japanese specimen I have examined do not justify this view and between "triangular-hastate" and a distinctly three-lobed labellum, and between a short triangular terminal lobe and an elongated linear terminal lobe, every gradation may be traced. If the differences in the lobes are diacritical I think their value might be varietal at most. (cf. plate on p. 177)

All in all I believe the variation in the labellum and the differences emphasized by Professor Fernald would be regarded as inconsequential if they were to be observed among plants growing together in the same geographical area. Nevertheless, the position of the labellum is extraordinarily interesting, especially so, if leaning toward the conclusion that *M. brachypoda* and *M. monophyllos* are after all conspecific, we disregard slight dimensional dissimilarities in other parts of the flower: dissimilarities such as might originate in alliances that had been separated geographically for a long time. The position of the labellum in view of what has happened in *Malaxis paludosa* takes on fascinating significance. It arouses curiosity with regard to biological phenomena that have prevailed in widely separated regions where the influential association with unlike insects may have

caused the labellum to assume directly opposite positions. It arouses curiosity with regard to the taxonomic worth of resupination in the Orchidaceae. It aroused my curiosity very much as long ago as 1905, when I studied specimens of *Malaxis monophyllos* and *Microstylis brachypoda*, so-named, in the British Museum of Natural History. At that time I regarded resupination as being a weak character for the segregation of species in the Orchidaceae.⁶

Of course one might argue that resupination or its opposite is a strong and reliable diagnostic character because the orchid flower tends to become resupinate or otherwise when, through unusual circumstances, the perianth is so disposed that the labellum is forced away from its accustomed position. However, there is something here suggesting the strength of a sexual urge or a tropistic response rather than a deep-seated structural change. Indeed, there has not been any marked structural change in the perianth itself in *Malaxis monophyllos* or its variety. The change has occurred in the pedicel. Furthermore the instability of the resupinate condition as evinced by the evolutionary history of *Malaxis paludosa* should not be overlooked in the consideration of resupination in our taxonomic studies of the Orchidaceae, because in contemplating the significance of the twisted pedicel perhaps our imaginations are sufficiently vivid to conceive of a time when *Malaxis paludosa* had non-resupinate flowers; of a time when the flowers were resupinate; of a time, when by additional torsion of the pedicel, the flowers returned to their primitive position. But it would require

⁶ Professor Fernald in *Rhodora* 28 (1926) 92 has assumed gratuitously that since Asa Gray described *Microstylis brachypoda* in 1835, students of the orchids have overlooked the difference between the plants of eastern America and the Old World, simply because they have not reinstated a species which subsequent to 1835 Gray himself reduced to synonymy under *Microstylis monophyllos*.

a very vivid imagination indeed to regard these states as specific, especially so should there be an untwisting action during the ripening of the capsule. If we turn once more to Darwin we find that he observed this phenomenon in *Malaxis paludosa* and referred to it as follows: "In all Orchids the labellum is properly directed upwards, but assumes its usual position on the lower side of the flower by the twisting of the ovarium; but in *Malaxis* the twisting has been carried so far that the flower occupies the position it would have held if the ovarium had not been at all twisted, and which the ripe ovarium afterwards assumes, by a process of gradual untwisting." (l.c. p. 131) The untwisting of the pedicel or ovary during the ripening of the fruit rather belittles resupination as a specific character.

As I have previously stated, the flowers of the Eurasian *Malaxis monophyllos* have been turned completely round by a twist of 360 degrees in the pedicel. *M. monophyllos*, therefore, would seem to have had an evolutionary background comparable to that of *M. paludosa*, and at one stage in its history it had resupinate flowers similar in this respect to those of the American plant recognized as a distinct species by Professor Fernald. If, as Darwin suggested for *M. paludosa*, there is a process of untwisting as the capsule matures, it may well be that *M. monophyllos*, in so far as torsion is concerned, even now may become equivalent (if only for a brief time) to *M. monophyllos* var. *brachypoda*. In any event we should not overlook the fact that the labellum is adaxial in the bud in the American var. *brachypoda* and therefore non-resupinate and comparable in this respect before anthesis to the Eurasian *M. monophyllos*. It would certainly be stretching a point to argue that a single plant could be one species in the bud and quite another species in the expanded flower.

With regard to the untwisting of the pedicel as the fruit matures, I am unable to speak with assurance because I have not been sufficiently fortunate to have observed either *Malaxis paludosa* or the Eurasian *M. monophyllos* in the field. It would be hazardous to rely on the evidence furnished by herbarium specimens in attempting to decide this matter one way or the other. But it would be strange indeed if, regarding the untwisting of the capsule in *Malaxis paludosa*, Darwin made his statement gratuitously.

In the American plants of *M. monophyllos* var. *brachypoda* the pedicel of the flower is "straight" before anthesis. In other words, in the incipient stages of development the labellum is adaxial. As the buds swell the pedicels undergo gradual torsion and the perianth finally becomes resupinate with the labellum adjacent to the subtending floral bract. There is hardly any torsion in the ovary, however, traces of spirality being confined to the basal tissues. The twist in the pedicels persists as the capsule matures and the persistence of the twist is indicated by the labellum being the lowermost member of the shriveled perianth even when the capsules are ripe. I have not observed any tendency toward untwisting in the American plants of *M. monophyllos* var. *brachypoda* that I have studied in which torsion appears to be an irreversible condition, as is the case with *Corallorrhiza maculata* and other species in which torsion is more or less confined to the pedicels.

In *Goodyera pubescens*, untwisting of the ovaries is a conspicuous post-floral occurrence. Even before the last traces of white have faded from the withering sepals, the ovary will have untwisted 90 degrees or more and the labellum once again begins to incline toward the rachis of the raceme.

Resupination is a purely physiological phenomenon

which should be treated with circumspection in taxonomic work. Here and there it may serve the useful purpose of setting apart puzzling concepts from equally puzzling concepts in which the primitive position of the labellum has been retained. But the residue in such attempts at isolation should be carefully scrutinized to avoid the continued mingling of incongruous genera. In the Neottiineae for which Mansfeld argues extreme simplicity among monandrous orchids, the labellum is sometimes uppermost throughout a genus or group of genera, as, for example, in the Cranichideae. This is exactly what we should expect to find in what may be termed formative genera; yet, even in the Neottiineae such symbiotic relationships as those revealed by *Cryptostylis* and the ichneumonid wasp, *Lissopimpla*, seem to emphasize the point that floral position in the orchids is largely a physiological response rather than a symbol of taxonomic trends. Sometimes in our efforts at simplification we ignore the intergradation of fundamental characters and seize on some trivial difference to serve as a guide toward differentiation. Surely this is unwise, unless we are to treat taxonomy as a game of minor differences and lightly scatter among several subtribes, genera or species the difficulties we should encounter in one. Surely it is unwise to disregard the significance of similarities. To do this is not only to belittle in the minds of thinking people a necessary science but to encourage the submergence of evolutionary symbolism, the very soul of taxonomy.





Set 2120

in *Hintonella*

BOTANICAL MUSEUM LEAFLETS

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HINTONELLA, A NEW GENUS OF THE ORNITHOCEPHALEAE FROM MEXICO

BY
OAKES AMES

IN FEBRUARY, 1938, I received for study from the Royal Botanic Gardens, Kew, two packets containing specimens of a Mexican orchid collected by George Hinton in the District of Temascaltepec. These specimens were clearly referable to the Ornithocephaleae, but the pollinia were imperfect. Subsequently twenty-three specimens (*Hinton 8928*) were received and these made possible a thoroughgoing study of the generic characters.

In May 1938, my colleague Dr. Louis O. Williams, collected fruiting specimens of this species in the mountains northwest of Cuernavaca. The withered remains of the perianth were still in perfect condition and not only made identification possible but furnished additional evidence regarding the later stages of development of the vegetative and fruiting organs.

Hintonella is a member of the Ornithocephaleae as interpreted by Rudolf Schlechter. It is closely allied to the Brazilian genera *Phymatidium* and *Chytroglossa*. I have interpreted the column as being produced into a fleshy bilobed foot to which the lateral sepals are adherent. The point of union is just below the basal, stigmatic orifice. In some of the better preserved flowers the presence of a distinct foot to which the labellum is rigidly

attached is very clear, but in other specimens the labellum appears to arise from the column just below the stigmas and to bear the lateral sepals on its base. As the presence or absence of a column-foot is structurally important for the recognition of sections in the Ornithocephaleae, I have emphasized this point.

The genera of the Ornithocephaleae are prevalently Brazilian. Only *Cryptarrhena*, *Ornithocephalus* and *Zygostates* are known to occur in Middle America. From these genera *Hintonella* is markedly distinct. To find more closely allied genera it is necessary to bridge the great geographical gap between Mexico and Brazil. True, *Sphyrastylis*, at present known only from Antioquia in Colombia, and *Dipteranthus*, reported from Peru by Rudolf Schlechter, indicate the presence of allies in the intervening space. But these genera are also markedly different from *Hintonella* and emphasize the significance of geographical isolation.

***Hintonella* Ames gen. nov.**

Divisio: Acrotonae. Tribus: Kerosphaerae. Subtribus: Ornithocephaleae. Perianthii partes liberae. Sepala subconniventia, extus per medium conspicue carinata. Petala sepalis similia, membranacea. Labellum leviter trilobum, cum columnae basi continuum, prope basim leviter saccatum. Discus per medium carinatus, medio lamina transversa membranacea ornatus, prope junctionem cum columna callo recurvato instructus. Columna prope medium constricta, exalata, in pedem producta; stigma infra medium columnae. Anthera subglobosa, imperfecte bilocularis, in appendicem brevem producta. Pollinia quattuor, cerea, distincta, stipiti longiusculo membranaceo affixa. Ovarium hexalatum. Capsula globosa, leviter alata.

Herbae pusillae, epiphyticae, dense caespitosae, pseu-

dobulbosae, caulibus abbreviatis, pseudobulbo minuto unifoliato terminatis. Folia sub pseudobulbo pauca, disticha, articulata, coriacea, ensiformia. Scapi sub pseudobulbo axillares, laxe pauciflori, foliis breviores.

Hintonella mexicana *Ames sp. nov.*

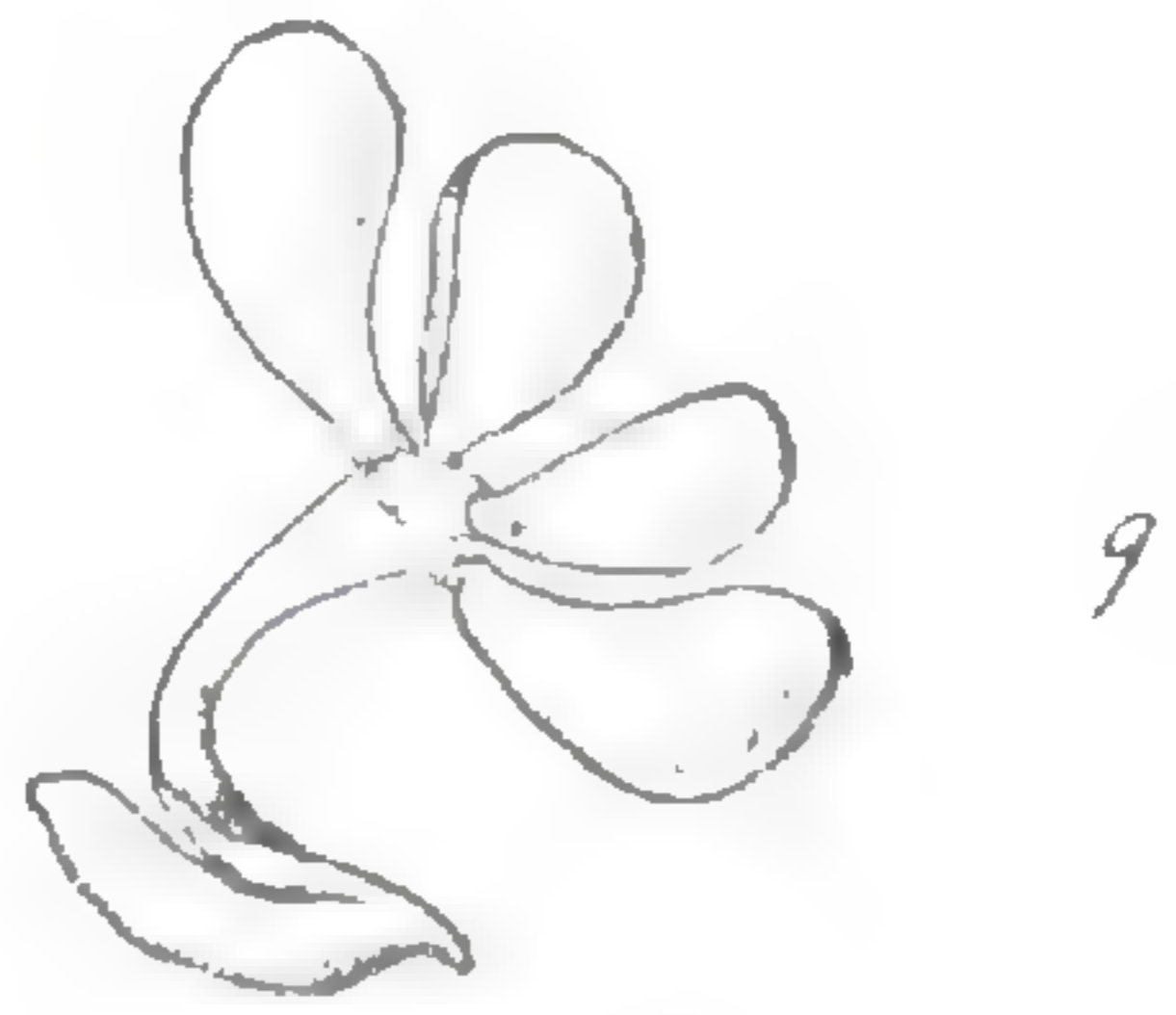
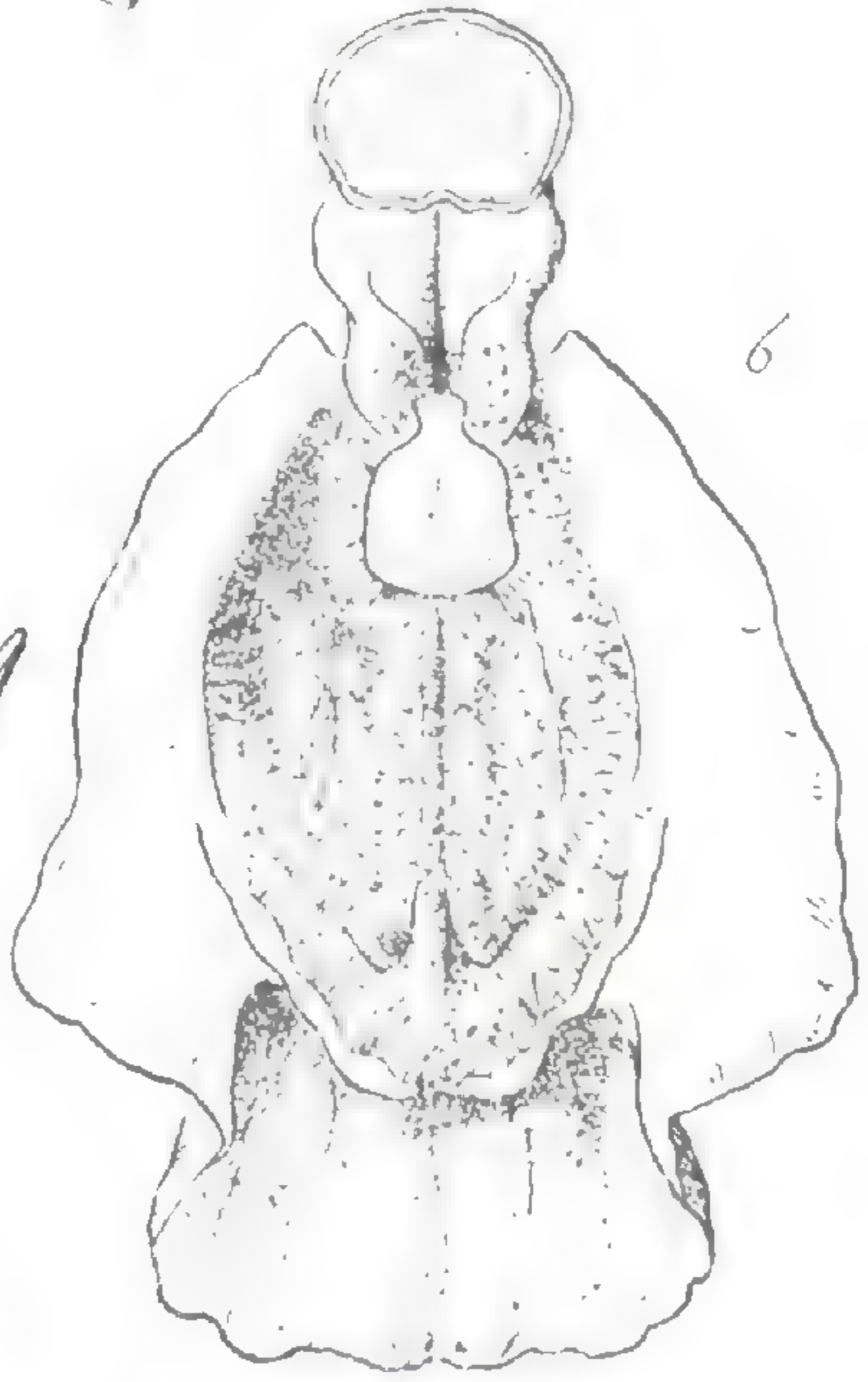
Herba perpusilla, epiphytica. Radices fibratae, albidae. Caules abbreviati, pseudobulbo unifoliato minuto terminati. Folia sub pseudobulbo pauca, disticha, ensiformia. Scapi foliis breviores, pauciflori, sub pseudobulbo axillares. Pedicellus cum ovario alatus, glaber. Sepala lateralia oblonga, usque ad apicem attenuata, extus per medium carinata. Sepalum dorsale simile. Petala oblonga vel cuneato-oblonga, usque ad basim leviter attenuata, uninervia, apice apiculata, extus per medium leviter carinata. Labellum sepala lateralia aequans, leviter trilobatum; lobi laterales rotundati; lobus medius quadratus. Discus infra medium dense glandulosus, prope medium callo transverso glanduloso membranaceo ornatus, intus infra medium carinatus, prope columnae basim callo vel processu pedicellato reflexo ornatus. Columna prope medium valde constricta, basi in pedem bilobum producta; stigma infra columnae medium. Pollinia anguste pyriformia, stipiti longiusculo affixa.

An epiphytic herb up to 2.3 cm. tall at anthesis. Roots spreading, whitish, about 1.5 mm. in diameter. Stems ascending from the rhizome and terminating in small ellipsoid or globose pseudobulbs which are 2.3–5 mm. long, monophyllous at the summit with several distichous cataphylls. Leaves ensiform, 1–2.3 cm. long, 2 mm. wide, jointed to winged distichous sheaths. Peduncles lateral, 4–13 mm. long, arising in the axils of the equitant leaf-sheaths, commonly 2-flowered, shorter than the leaves. Bracts of the inflorescence 1.5 mm. long, conuplicate. Pedicels including the ovary about 4 mm.

EXPLANATION OF THE ILLUSTRATION

HINTONELLA MEXICANA *Ames gen. et sp. nov.* Plant natural size (2 and 8), the fruiting specimen drawn from *Williams 3799*. 1, 3 and 4, flower much enlarged. 5 and 6, labellum and column much enlarged. 7, column, anther, base of labellum showing basal callus much enlarged. 9, pollinia much enlarged.

*Drawn with the aid of the camera lucida,
October 1938, by* BLANCHE AMES





long, hexagonal. Ovary conspicuously 6-winged, becoming spherical at maturity; ripe capsule lightly winged, 4 mm. long. Flowers about 5.5 mm. long with the perianth segments more or less connivent (yellowish when dry). Lateral sepals 5 mm. long, about 1.5 mm. wide, oblong, abruptly tapering to the subacute apex, conspicuously keeled along the middle on the outer surface, membranaceous. Dorsal sepal similar. Petals 5 mm. long, 2 mm. wide, oblong or somewhat oblong-cuneate, rounded at the apex, obscurely acute, keeled externally along the mid-nerve. Labellum about 5 mm. long, about 3 mm. wide, lightly saccate at the base, obscurely 3-lobed with the lateral lobes rounded and the terminal lobe quadrate. Disc of the labellum copiously glandulose with a reflexed callus near the base from which a conspicuous keel extends to a centrally situated, crescentiform, glandulose, transverse membranous callus. Column constricted below the middle, produced into a bilobed foot, free portion 2 mm. long; clinandrium oblique; stigmatic orifice basal and near the point of origin of the bilobed foot. Anther semiglobose, shortly produced in front into a triangular point. Pollinia 4, in pairs at the summit of a narrowly oblong stipe.

MEXICO: epiphyte on *Ternstroemia Pringlei*, La Labor, District of Temascaltepec, February 21, 1936, *George B. Hinton 8928* (TYPE in Herb. Ames No. 49612. DUPLICATE TYPE in Herb. Kew); Comunidad, January 3, 1936, *Hinton 8951*; epiphyte, near Tepeyte, mountains northwest of Cuernavaca, Morelos, at 2200-2600 meters altitude, May 15, 1938, *Louis O. Williams 3799*.

A CORRECTION

BY

LOUIS O. WILLIAMS

DR. VICTOR S. SUMMERHAYES of the Royal Botanic Gardens, Kew, has called my attention to an error that I made in describing a plant which I thought to be an *Orchis*. Dr. Summerhayes has noted the similarity of my *Orchis constricta* to the much older *Habenaria camptoceras* Rolfe.

Dr. Summerhayes considers the plant as belonging to Schlechter's genus *Neottianthe* (a genus which we have not accepted as distinct from *Habenaria*), remarking that "This appears to be a true *Neottianthe* although very aberrant in its large single flower."

The synonymy of the species is as follows:

***Habenaria camptoceras* Rolfe** in Journ. Linn. Soc. 29 (1892) 319.

Gymnadenia camptoceras Schlechter in Fedde Repert. Beihefte 4 (Orch. Sino-Jap. Prodr.) (1919) 104.

Neottianthe camptoceras Schlechter in Fedde Repert. 16 (1919) 292.

Orchis constricta L. O. Williams in Bot. Mus. Leaflet. Harv. Univ. 5 (1938) 164.

120, 96.

BOTANICAL MUSEUM LEAFLETS

HARVARD UNIVERSITY

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VOL. 6, No. 10

PLANTAE MEXICANAE I

BY

RICHARD EVANS SCHULTES

A NEW LEPANTHES FROM OAXACA

Lepanthes Rekoii *R. E. Schultes* sp. nov.

Herba epiphytica, laxe caespitosa. Caules secundarii gracillimi, apice unifoliati, plus minusve quadrivaginati, vaginarum ostiis infundibuliformibus hispidis. Folium late ellipticum, marginatum, obtusum vel subacutum. Inflorescentiae folium superantes. Flores pauci, succedanei, in racemis brevibus. Sepala lateralia late lanceolata, binervia, oblique acuminata, apice acuta. Sepalum dorsale late lanceolatum, acuminatum, trinervium. Petala transverse elliptica inter lobos cum apiculo. Labellum trilobatum; lobi laterales anguste elliptici, apice incurvati; lobus medius lobis lateralibus multo brevior, dense glandulosus. Columna superne dilatata.

Epiphytic herb, up to 4.5 cm. high. Secondary stems erect, 1.5–2.5 cm. long, concealed by about 4 closely appressed, more or less hyaline sheaths of which each one terminates in an infundibuliform mouth; sheaths hispidulous along the prominent nerves and on the thickened margin of the mouths. Uppermost sheath enclosing the petiole of the leaf. Leaves broadly elliptic, marginate, obtuse or subacute, 1–1.5 cm. long, about 7 mm. wide. Flowering stems overtopping the leaves. Flowers few,

borne in succession in abbreviated racemes. Lateral sepals coherent for about one half their length, broadly lanceolate, narrowing asymmetrically to an acute tip, 5 mm. long, 1.5 mm. wide, 2-nerved, the inner nerve more prominent. Dorsal sepal broadly lanceolate, narrowing to an acute tip, 5 mm. long, 2 mm. wide, 3-nerved. Petals transversely elliptical in outline, much wider than long, with a pronounced apicule between the lobes, 2 mm. wide. Labellum 3-lobed; lateral lobes narrowly elliptic, less than 1 mm. long, distally incurved; middle lobe much shorter than the lateral lobes, narrowly triangular, densely glandulous, concealed by the column. Column dilated upwards.

I take pleasure in naming this plant in honor of Dr. Blas Pablo Reko of Tacubaya, D. F., Mexico, who was co-collector with me on my 1938 trip to Oaxaca and who has been an enthusiastic collector and student of Mexican plants for more than a quarter of a century.

Only two specimens of *Lepanthes Rekoii* were found, one in fruit, and one in flower. It is an extremely inconspicuous plant, growing imbedded in dense moss and lichen growth on the limbs of oak trees in excessively damp, cool rain-forests. The flowers are very small, predominantly yellow, but with slightly reddish veins in the sepals, red petals, and dark red labellum.

Another collection referable to this species was made by Juan Gonzales in Puebla, not far from the type locality in northern Oaxaca. This collection differs from the type in having smaller flowers.

The only species which seems closely allied to *Lepanthes Rekoii* is *L. Dawsonii* Ames ex Yuncker (in Field Mus. Nat. Hist., Bot. Ser. 17 (Contrib. Fl. Honduras) (1938) 327 (Publ. 405)) from Honduras. The sepals of this Honduranian plant agree in shape and size, but not in neuration, with those of *L. Rekoii*, and there are important

similarities in the labellum and column, as well as in the size and form of the vegetative parts. The petals, however, are quite different from those of *L. Rekoii* in lacking the pronounced apicule. The flowers of *L. Dawsonii* are yellow and have an amethyst-purple labellum, while the labellum of *L. Rekoii* is deep red.

MEXICO: epiphytic on mossy oaks in cool rain-forest near Cerro del Fraile, Huautla de Jimenez, Oaxaca, at about 7,500 feet altitude, August 2, 1938, *Richard Evans Schultes & Blas Pablo Reko 336* (TYPE in Herb. Ames No. 50775); north of Teziutlan, Mt. Tiguayapán, Puebla, at 1480 meters altitude, June 30, 1933, *Juan G[onzales] 2415*.

NOTES ON THE GENUS SOBRALIA

BY

CHARLES SCHWEINFURTH

THE FOLLOWING NOTES on *Sobralia* include reductions occasioned by a critical study of Peruvian orchidaceae and the description of a new species of that genus from Costa Rica.

Sobralia dichotoma Ruiz & Pavon Syst. Veg. Fl. Peruv. et Chil. (1798) 232—Poeppig & Endlicher Nov. Gen. ac Sp. Pl. 1 (1835) 54.

Sobralia Mandonii Reichenbach filius Xen. Orch. 2 (1873) 175, t. 175, fig. I, 1.

In erecting his new concept, *Sobralia Mandonii*, Reichenbach used as his major point of distinction from *S. dichotoma* the fact that the peduncles were simple and straight, whereas those of *S. dichotoma* were dichotomous and fractiflex. To be sure, the inflorescences in the isotypes of *S. Mandonii* in the Herbarium of Oakes Ames and in the Gray Herbarium are simple, as well as in several Peruvian collections apparently referable to that species. One Peruvian collection of this complex (*F. L. Herrera 3230*), however, bears one simple peduncle and one dichotomous peduncle, thus indicating that the character is a variable one. Furthermore, in all collections of this complex, whether they have a simple or dichotomous inflorescence, the rachis is more or less fractiflex.

In both concepts the petals appear to have a more or less undulate upper margin.

In his description of *S. Mandonii* Reichenbach says that the lip is simple, whereas he implies that the lip of *S. dichotoma* is 3-lobed, a character which is definitely imputed to *S. dichotoma* by Lindley. (Fol. Orch. *Sobralia* (1854) p. 2) However, Poeppig and Endlicher (l.c.) make

no mention of such a character in the lip of *S. dichotoma*. Certainly no definite lobing is shown in the lip of the plants which are reasonably identified with *S. dichotoma*, although the plicated margin of the lips of both species frequently make the outline appear somewhat 3-lobed.

It is significant that a flower of a specimen doubtless referable to *S. dichotoma* (with a much branched inflorescence) appears to be nearly identical with a flower of the isotype of *S. Mandonii*.

***Sobralia scopulorum* Reichenbach filius Xen.**
Orch. 2 (1873) 176, t. 175, fig. II, 2-3.

Sobralia alstroemeroides Schlechter in Fedde Repert. Beihefte 9 (1921) 43; 57 (1929) t. 102, Nr. 398.

From a careful study of the descriptions of the two species illustrated by floral analyses, there seems to be no doubt that they are conspecific and that the collection attributed by Kränzlin (in Weberbauer Pflanzenw. Peruv. And. (1911) 239) to *S. scopulorum* was correctly interpreted. In fact the difference in the structure of the lips, which is relied upon for the separation of the two concepts, appears to be inconsequential. The flowers are practically identical in appearance.

The only significant difference to be noted is that the stem of *S. scopulorum* is said to be "spithamaeus" (about 17.7 cm. high) while that of *S. alstroemeroides* Schltr. is described as "c. metralis" (about 100 cm. high), but in *Sobralia* the height of the flowering stem is very variable.

***Sobralia undatocarinata* C. Schweinfurth sp. nov.**

Herba robusta, terrestris vel epiphytica. Caulis elatus, inferne vaginis tubularibus et superne foliis ornatus. Folia elliptico-lanceolata, valde acuminata. Flores e bracteis erectis imbricantibus nonnullis erumpentes. Sepala similia, lanceolato- vel elliptico-oblonga. Petala sepalis sim-

ilia, tenuiora. Labellum in circuitu oblongo-ovatum, apice bidentatum; discus carinis undulatis novem ornatus. Columna pergracilis, arcuatus, apice cum brachiis binis triangulari-lanceolatis.

Plant stout, terrestrial or epiphytic. Stem present up to about 13.7 dm. tall, about 7 mm. in diameter near the base, woody, provided below with remote close tubular sheaths which are 8.3 cm. or less long and above by about four leaves. Leaves elliptic-lanceolate, up to 23.5 cm. long and 7.9 cm. wide, long-acuminate to an acute point, cuneate below, chartaceous when dry, with about eleven conspicuous nerves beneath. Inflorescence consisting of one or more showy flowers emerging from a cluster of erect imbricating bracts, the lowermost and largest bract consisting of an ovate-lanceolate blade about 8.2 cm. long which is articulated to a sheath about 3.8 cm. long. Flowers nodding before expansion, white with the lip striped with purple. Dorsal sepal connate with the lateral sepals at the base, lanceolate-oblong, free part about 4.5 cm. long and 13 mm. wide, obtuse with a dorsal mucro, comparatively firm in texture, 11-nerved. Lateral sepals similar to the dorsal sepal, elliptic-oblong, the free portion about 4.5 cm. long and 13 mm. wide, acute and mucronate, 11-nerved. Petals oblong-elliptic, obtuse, about 4.5 cm. long and 14 mm. wide, 9-nerved, thinner in texture than the sepals. Lip oblong-ovate in outline with the basal third round-dilated and the apex strongly bilobed, about 4.7 cm. long from the base to the tip of an apical lobule and 2.8 cm. wide across the dilated basal portion. Disc provided near the base with a small fleshy transverse keel and in front with nine thin longitudinal keels; the outermost keel consists of a relatively high thin plate extending about to the middle of the disc; the next inner keel is similar but diminishes in height and extends as a wavy keel to about one third the distance to the apex;

the two pairs of keels on either side of the center are low and undulate running nearly to the apex of the lamina; the central keel appears to originate near the anterior third of the disc and, increasing in height, to extend as an undulate ridge nearly to the apex. Column very slender, arcuate, about 3.1 cm. long, dilated above, with a pair of triangular-lanceolate arms.

Another collection (*Manuel Valerio 2412*) is referable to this species. However, it is rather more slender than the type. Its leaves are slightly longer and narrower, up to 26 cm. long and 7 cm. wide. Its flowers are rather smaller, the sepals, petals and lip being about 3.5–3.8 cm. long and the outer keels on the disc of the lip are reduced in size.

Sobralia undatocarinata appears to be related to *S. luteola* Rolfe from which it differs in having ecarinate lateral sepals and in the lip lacking fimbriate-pilose nerves.

COSTA RICA: La Estrella de Cartago, "Flor blanca con el labelo listado de púrpura. . . . Comprada a un campesino", August 22, 1933, *A.M. Brenes 206* (TYPE in Herb. Ames No. 46367); La Palma, at 1500 meters altitude, "Flor blanca, lustrosa, con el centro interior del petalo central lila morado—Una o mas flores en cada inflorescencia—Florece en agosto y setiembre—Confinada a determinada zona en La Palma—Epifita o terrestre-", August 16, 1937, *Manuel Valerio 2412*.

NOMENCLATORIAL NOTES. VIII

BY

CHARLES SCHWEINFURTH

Pleurothallis lancilabris (*Reichb.f.*) *Schlechter*
var. **oxyglossa** (*Schltr.*) *C.Schweinfurth comb. nov.*

Pleurothallis oxyglossa *Schlechter* in *Fedde Repert.*
10 (1912) 354.

Pleurothallis Schulzeana *Schlechter* in *Beihefte Bot.*
Centralbl. 36, Abt. 2 (1918) 396.

Pleurothallis oxyglossa differs from the older *P.lancilabris* in having a usually strongly fractiflex rachis together with more elongate-acuminate floral segments. These differences, however, are not always well-marked, certain intergrades being evident. The differences are embodied in the following varietal diagnosis:

Haec varietas a specie rhachide plus minusve valde fractiflexa atque perianthii segmentis longe acuminatis differt.

Moreover, it seems clear from a careful study of copious Central American material, as well as from the type descriptions and drawings of the types made under the supervision of Dr. *Schlechter* that the Costa Rican *Pleurothallis Schulzeana* is conspecific with the Guatemalan *P.oxyglossa*, the only variation being inconsequential differences in measurements.