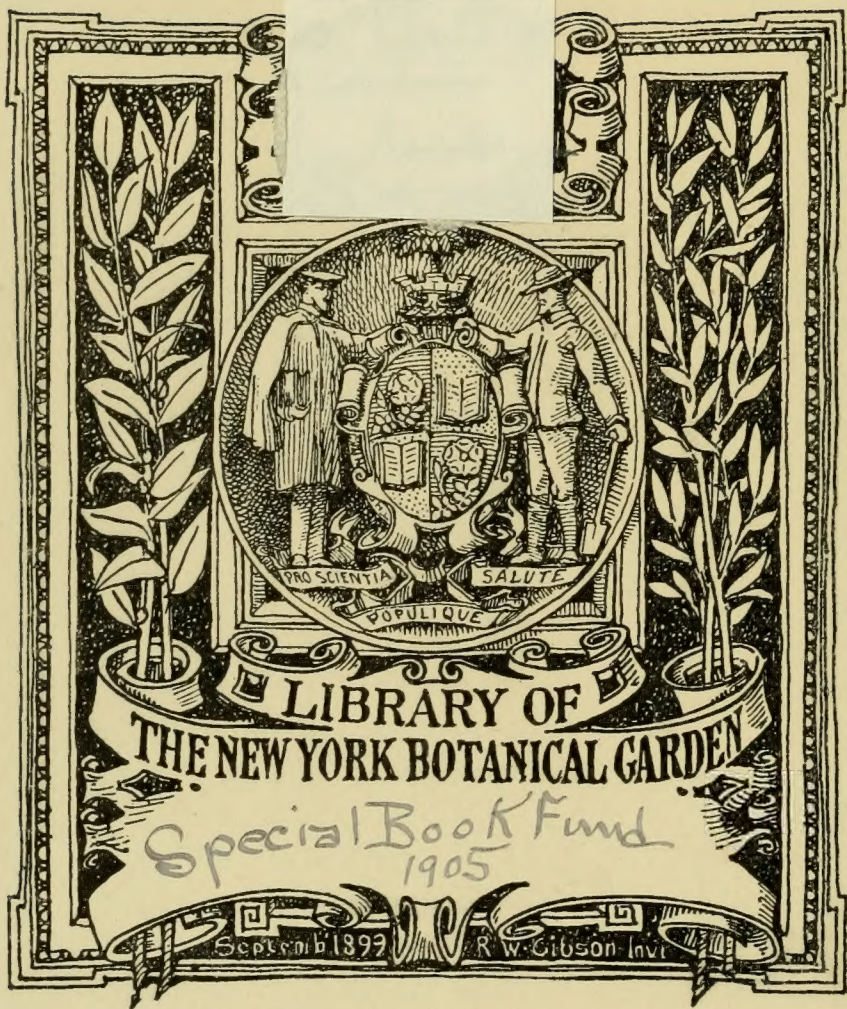


**STUDIES IN THE FAMILY
ORCHIDACEÆ**

BY

OAKES AMES, A. M.



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ORCHIDACEÆ

ILLUSTRATIONS AND STUDIES
IN THE FAMILY ORCHIDACEÆ
ISSUING FROM THE AMES
BOTANICAL LABORATORY

FASCICLE I

BY OAKES AMES, A. M.

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CONTENTS. Illustrations and monographs of 19 species of North American and Philippine Orchids; a descriptive list of orchidaceous plants collected in the Philippine Islands by botanists of the United States government; an *Oncidium* new to the United States; contributions toward a Monograph of American *Spiranthes*.

A MERICAN BOTANISTS will find the concluding paper indispensable for a proper understanding of *Spiranthes* in the United States and Canada. The species of this genus are admittedly difficult and poorly understood. In the new light here thrown upon them, after prolonged study in the largest American herbaria, as well as afield, and a reëxamination of types at home and abroad, many of the difficulties are removed and misapprehensions are corrected. A clear Key distinguishes the species recognized by the author. The geographical range of each is minutely recorded by citation of specimens examined in the preparation of the paper.

L OVERS OF HORTICULTURE will appreciate the artistic beauty and faithfulness of the plates, which present in a most attractive form members of the orchid family — a group which has always held first place in the esteem of those whose delight is to grow rare and beautiful plants. The curious habit and mode of life of some of the orchids depicted, *e. g.*, *Campylocentrum* and *Dendrophylax*, both from southern Florida — will be interesting to those who already know something of orchid life, but whose observation has been confined to the

varieties in cultivation. No doubt many will be surprised to learn the presence in lower Florida of the vigorous epiphyte, *Cyrtopodium punctatum* (plate 15), an orchid bearing long sprays of large and beautifully colored flowers and floral bracts, and suited to cultivation, though almost unknown in American collections.

NEW SPECIES. Twenty-one species from the Philippines, new to science, are described for the first time. These with the enumeration and description of orchids collected in the course of the botanical exploration of the islands, now being prosecuted by government botanists, form an important contribution to the flora of the Orient.

FUTURE FASCICLES of the series initiated by the present number will appear at irregular intervals.



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- A descriptive list of orchidaceous plants collected
the Philippine Islands by botanists of the United
States Government
- An *Oncidium* new to the United States
- Contributions toward a monograph of the American
Species of *Spiranthes*

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ORCHIDACEÆ

ORCHIDACEÆ:

ILLUSTRATIONS AND STUDIES OF THE FAMILY ORCHIDACEÆ

ISSUING FROM

THE AMES BOTANICAL LABORATORY
NORTH EASTON, MASSACHUSETTS

FASCICLE I

BY

OAKES AMES, A. M.



BOSTON AND NEW YORK
HOUGHTON, MIFFLIN AND COMPANY

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1905

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Published April 8, 1905

INTRODUCTION

THE purpose of the serial of which this fascicle is the initial number is to illustrate, from type material when possible, new or recently described orchid species, and species heretofore inadequately figured; to publish the original descriptions of all species so figured, with additional characterizations, full synonymy, and geographical distribution; to furnish descriptions and descriptive lists of orchidaceous plants, which may prove useful in the study of regional floras; and to communicate the results of critical investigations among special genera.

The first of these objects when properly fulfilled is of unquestioned benefit, as a careful drawing more quickly brings to mind the character of a plant than does the most skilful and lucid word-picture, especially when the distinctions an author may wish to accentuate are subtle or based on comparative values. Furthermore, portraits of types with analytical figures to show generic and specific characters are most serviceable in the absence of authentic material, and reduce to a great extent the tedious research and endless perplexity which often attend the determination of an unknown plant.

Original descriptions are of necessity widely scattered in monographic works, floras, and periodical literature, so that to consult them is not always possible or convenient. To assemble the original descriptions of even the few species treated of in this serial will, it is hoped, prove serviceable. The additional observations must frequently take the form of redescriptions based on extensive collections, and are intended not only to amplify, where this is necessary, the work of the author of a given species, but

also to stand for a fresh interpretation of those characters which recent investigations have proved to be of diacritical value. The descriptive lists which will appear from time to time will be offered as contributions toward regional floras.

As the work progresses, it is hoped that studies other than those of a purely systematic nature may appear, as additions to the morphology, physiology, and ecology of the Orchidaceæ.

Throughout the series all papers, unless otherwise indicated, will be from the author of the first fascicle.

OAKES AMES.

NORTH EASTON, MASS.,

February, 1905.

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ORCHIDACEÆ

ACORIDIUM SPHACELATUM

ACORIDIUM SPHACELATUM, *sp. nov.* Fibræ radicales crassæ, albæ. Caules breves, cæspitiosi, junciformes. Folia linearia, filiformia, coriacea, pedunculos amplectentia. Bracteæ marginibus sphacelatis, ante anthesim distiche imbricatæ, persistentes, flores sub-includentes. Flores distichi, parvi, breviter pedicellati. Sepala lateralia ovato-lanceolata, acuta. Petala rhomboideo-spathulata, ad basim attenuata. Labellum ad basim bituberculatum, trilobatum; lobi laterales parvi, oblongo-falcati; medius oblongus, apiculatus, deflexus. Columna minutissima, antice apud apicem prominentia tenui truncata. Pollinia 4, per paria cohærentia.

Roots fibrous, whitish. Plants cæspitose, slender, sedge-like. The monophyllous stems minutely pseudobulbous or thickened at base, sheathed basally by imbricate scarious bracts. Leaves linear, filiform, about 3 dm. long, grooved longitudinally when dry, emerging from an elongated tubular bract. Peduncle enclosed by, and appearing to arise from, the leaf, free below. Raceme about 6 cm. long. Lowermost bracts of the inflorescence closely imbricate, empty. Floral bracts distichous, pentagonal (when spread out), 2.5–3 mm. long, about as broad as long, margin sphacelate. Pedicel and ovary together about 1 mm. long. Flowers about 2.5 mm. long. Lateral sepals ovate-lanceolate, acute, about 2.5 mm. long. Upper sepal broader near the summit than below, obtuse. Petals rhomboid-spathulate, slender near the base, cuneate below. Lip 3-lobed, lateral lobes oblong-falcate, longer than the middle lobe; middle lobe oblong, with a strongly and rigidly deflexed apex, apiculate; apicule so declined that, from above, the middle

lobe appears emarginate; near the sinus of the lobes a callus, and at the concave base of the lip a thickening of the tissues. Column minute, with a rostellar projection in front below the clinandrium. Pollinia 4, pyriform.

A. sphacelatum is closely related to *A. tenellum*, Nees & Meyen, but is distinguished from it by the accumulation of slight differences to be observed throughout the inflorescence. The form of the floral bracts, larger size of the flowers, very different lip, and the more slender column are all distinctive characters which show clearly the identity of the new plant. The lip of *A. sphacelatum* is difficult to study on account of the rigidly deflexed apex of the mid-lobe, and when forcibly straightened out becomes torn. The lip of *A. tenellum*, on the other hand, spreads out easily and the mid-lobe is less decurved at the apex. Habitally there is very little dissimilarity between *A. tenellum* and *A. sphacelatum*, and the two species might readily be confused. In my dissections I have been unable to find the arms or wings of the column which are so characteristic of the related genus *Platyclinis*.

The type was collected by A. D. E. Elmer on June 1, 1904, on Mt. Santo Tomas, Province of Benguet, Luzon, Philippine Islands (No. 6554). According to field notes the plants form large tufts chiefly on living trees and produce pendulous or recurved racemes of light brown or yellow flowers.

ACORIDIUM TENELLUM

Acoridium tenellum, Nees & Meyen, *Nov. Act. Nat. Cur.* **19** (Suppl. 1): 131 (1843). — Rolfe, *Orchid Review* **12**: 220 (1904).

Dendrochilum junceum, Reichenbach, f., *Otia Bot. Hamb.* 54 (1878).

Ceratostylis gracilis, Blume, according to Naves, *Blanco Fl. Filip.* ed. 3, *Nov. App.* 245.

“PHILYDRACEÆ R. BR.

“I. ACORIDIUM N. et Meyen.

“Dioicum (?). Spicula distiche imbricata, squamis latis truncatis basi cucullatis. Stamina . . . Pistillum unum stylo simplici crasso, basi nudum, in angulo squamæ sessile. Capsula globosa, rigida, trivalvis, unilocularis. Placentæ 3, valvularum dorso adnatæ, filiformes. Semina numerosissima, scobiformia, minima; testa laxissima, in medio semen ovale continens.

“Inflorescentia: spica exigua, arcta, linearis, longe pedicellata, pedunculo in culmi (vel potius folii filiformis arcte convoluti) centro adscendente, ad basin usque observabili, sed hac parte connato, sursum libero, toto a spatha recepto, ut spica denique e folii fissura simplici emergere videatur, Acorique exigui reddatur effigies.

“Rhachis compressa, ex utroque latere denticulo alterna serie prædita.

“Specimina non sufficiunt, cum spicæ aliæ tenerrimæ non nisi prima fructificationis rudimenta, aliæ fructus maturos ostendant; sed distinctissimæ sunt notæ, quæ coram habemus, neque ulli, quod scirem, generi communes.

“*Acoridium tenellum*.

“In Manilla. 4

“Fibræ radicales crassæ, flexuosæ, albæ. Culmi cæspitosi, capillares, ad unum latus incurvi, compresso-angulati, striati, glabri,

basi fibris e vaginalum solutione, vaginisque duabus arctis membranaceis acutis aphyllis striatis ferrugineo-punctatis præditi, cæterum aphylli; alii (primum florentes) 3–4 pollices longi, alii (maturo fructu præditi) pedales, nec vero illis crassiores. Spica (feminea?) tenera 2–3 lineas longa, $1\frac{1}{2}$ pollicis spatio infra apicem culmi compressum emergens, linearis, angusta, pallida. Squamæ distiche imbricatæ, membranaceæ, pallidæ, fusco-irroratæ, subquadratæ, truncatæ, denticulatæ, basi contracta rhachin amplectentes, alternæ, obsolete striatæ. Perianthium nullum apparuit. Stamina non inveni. Pistilli initia ex ovata basi conico-apiculata, nuda, rhacheos lateri appressa. Fructus maturi in rhachi sesquipollicari, culmi apicem æquante, incurva compressa, alternatim ad latera planiora dentataque sessiles, seminis coriandri magnitudine, globosi, læves, suturis tribus e linea gemina impressa constantibus notati, mucrone obtuso crasso in tres partes cum valvulis solubili coronati, læves, straminei, cartilaginei, capsulares, ad basin usque loculicido-trivalves, uniloculares. Placentæ ventrales, tenues. Semina creberrima, minuta, fusiformia, medio incurva, infero fine truncato, supero acuto. Testa laxa, reticulata; nucleus ovalis, luteus." — Nees & Meyen, *loc. cit.*

To the generic description should be added: Sepals oblong-lanceolate. Petals rhomboid-spathulate. Lip concave at the base, 3-lobed, lateral lobes erect. Column without wings, but with a rostellar projection or beak in front, below the clinandrium. Margin of the clinandrium entire. Pollinia 4.

Plants cæspitose. Roots fibrous, whitish. Stems thickened at base, clothed below with scarious acute bracts, striate and angled. Leaves nearly terete, linear, sedge-like, about 3 dm. long, emanating with the peduncle from an elongated tubular bract. The slender peduncle free below, mostly concealed, appearing to arise from near the summit of the leaf. Lowermost bracts of the rhachis approximate, imbricate, those subtending the flowers about 1 mm. apart, 1 mm. long, half as long as the flowers, concealing the pedicels and ovaries, scarious, broader than long, deltoid-ovate, obtuse, obscurely denticulate, persistent. Pedicel and ovary .5 mm. long.

Raceme 5–6 cm. long, arcuate. Flowers distichous, minute, about 2 mm. long. Perianth spreading. Sepals 2 mm. long, the lateral ones oblong-lanceolate, acute, the upper one obtuse. Petals rhomboid-spathulate, obscurely apiculate, 2 mm. long. Lip minute, concave at base, 3-lobed; the lateral lobes erect by the sides of the column, ovate-falcate, acute, slightly exceeding the acute, round-apiculate, or triangular mid-lobe when the lip is spread out; apex of mid-lobe scarcely recurved; calli 3, 2 lateral, 1 central, obtuse, yellowish. Column minute, with a rostellar projection below the clinandrium in front. Pollinia 4. Fruit a globular capsule, 4 mm. long.

Although the identity of this interesting species was lost sight of for many years, it has turned up frequently in recent collections received from the Philippine Islands. It was originally described as a Philydraceous plant by Nees and Meyen. The material which furnished the first description was in fruit only, and therefore insufficient to establish certainty as to the ordinal position of the plant. Bentham and Hooker's *Genera Plantarum* places it among the doubtful or excluded genera under Cyperaceæ, while *Index Kewensis* gives *Acoridium tenellum* as a synonym of *Ceratostylis gracilis*. In the *Orchid Review* 12: 219 (1904), Mr. R. A. Rolfe says that he has recently studied the type specimen of *Acoridium tenellum*, found by Mr. C. B. Clarke among the Cyperaceæ of the Berlin Herbarium. Mr. Rolfe recognized the plant to be a species which Naves had referred to *Ceratostylis*. Later, with additional material, he concluded that *Acoridium* and *Platyclinis* are the same. The former genus has priority over the latter, in case of reduction, and therefore Mr. Rolfe renamed some 32 species of *Platyclinis* (or *Dendrochilum* in part). Although *Acoridium* is closely allied to *Platyclinis*, the absence of arms of the column, the very different clinandrium, and the rostellar process above the stigma convince me that further investigations should be made before the two genera are united. Mr. Rolfe has kindly examined a specimen of the material upon which the above description and the accompanying plate are based.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following localities :

Philippine Islands : Lamac River, Mt. Mariveles, Prov. Bataan, Luzon, October, 1903, *E. D. Merrill* (no. 3209). — Lamac River, Mt. Mariveles, Prov. Bataan, Luzon, May 11, 1904, alt. 1050 m., "native name 'Dapo,'" *Thos. E. Borden* (no. 742). — Lamac River, Mt. Mariveles, Prov. Bataan, Luzon, May 11, 1904, alt. 3200 ft., on trees and rocks, very common, *H. N. Whitford* (no. 233).

The species has also been ascribed to the following localities :

Philippine Islands : Manila, Meyen, *loc. cit.*; Baños, Luzon, *Wilkes* "(etiam Mahahai, *Wallis*)," *Rchb.*, *loc. cit.* — Alt. 3000 ft., Mt. Maquiling, *Señor Vidal*. — Alt. 4500 ft., in fruit, Naguliang, Prov. Benguet, *Loher*.

EXPLANATION OF THE PLATE

PLATE 1 : ACORIDIUM SPHACELATUM, SP. NOV., and ACORIDIUM TENELLUM

The plate was prepared from dried specimens. Details of the floral parts were drawn with the aid of the camera lucida.

- | | |
|---|--|
| 1. Flowering plants of <i>A. sphacelatum</i> , life size. | |
| 2. Fruit of <i>A. tenellum</i> , enlarged. | |
| 3. Terminal part of the raceme of <i>A. tenellum</i> . | |
| 4. Terminal part of the raceme of <i>A. sphacelatum</i> . | |
| 5. Pollinia of <i>A. sphacelatum</i> . | |
| 6. Anther of <i>A. sphacelatum</i> . | |
| 7. Bract, <i>A. tenellum</i> . | 8. Bract, <i>A. sphacelatum</i> . |
| 9. Dorsal sepal, <i>A. tenellum</i> . | 10. Dorsal sepal, <i>A. sphacelatum</i> . |
| 11. Petal, <i>A. tenellum</i> . | 12. Petal, <i>A. sphacelatum</i> . |
| 13. Sepal, <i>A. tenellum</i> . | 14. Sepal, <i>A. sphacelatum</i> . |
| 15. Front view of lip, <i>A. tenellum</i> . | 16. Front view of lip, <i>A. sphacelatum</i> . |
| 17. Side view of lip, <i>A. tenellum</i> . | 18. Side view of lip, <i>A. sphacelatum</i> . |
| 19. Column, <i>A. tenellum</i> . | 20. Column, <i>A. sphacelatum</i> . |



BLANCHE AMES del.

AGORIDIUM SPHACELATUM, SP. NOV. A. TENELLUM, N. & MEYER

CESTICHIS PHILIPPINENSIS

CESTICHIS PHILIPPINENSIS, *sp. nov.* Pseudobulbi approximati, pyriformes. Folium oblongo-lanceolatum. Pedunculus bialatus. Flores aurantiaci. Sepala reflexa, lanceolata, carinata. Petala reflexa, linearia, sub-acuta. Labellum lanceolatum, acuminatum, 8 mm. longum, ad basim callo cucullato instructum. Columna breviuscula, apice incrassata. Anthera sub-quadrata, antice late marginata.

Roots fibrous, about 1 mm. thick. Pseudobulbs approximate, swollen, 1.5–2 cm. long, concealed by elongated chartaceous bracts, monophyllous. Leaves nervose, linear-oblong, acute, 20–30 cm. long, 12–20 mm. wide, narrowed below, deciduous from an elongated persistent base. Scape equalling or exceeding the leaves, strongly winged, compressed, 3–5 mm. wide, 14–33 cm. long, terminal. Raceme 1.5–6 cm. long. Bracts distichous, approximate, conduplicate, carinate, oblong-lanceolate, acute, 9–13 mm. long, deciduous, leaving the naked rhachis somewhat zigzag. Flowers orange-yellow, borne on elongated pedicels which exceed the bracts, few open at a time. Perianth strongly reflexed. Lateral sepals lanceolate, about 10 mm. long, acute, strongly keeled near the apex, margins revolute. Upper sepal narrower, similar. Petals linear, 9 mm. long, sub-acute, 1-nerved, margin revolute. Labellum broadly lanceolate, acuminate, sub-acute, 8 mm. long, at the base in front of the short claw a cucullate appendage, on either side of which is a rounded protuberance. Column thick, 4.5 mm. long. Anther rounded in front. Pollinia 4, pyriform. Fruit an ellipsoidal capsule, 2 cm. long.

The plant which I have called *Cestichis philippinensis*, and which so far as I can ascertain has not heretofore been described, was collected May 25, 1904, on Mt. Mariveles, Province of Bataan,

Luzon, Philippine Islands, by Mr. Thomas E. Borden (no. 799), and subsequently near the same locality on August 8, 1904, by Mr. Elmer D. Merrill (no. 3856), and again the following day by Mr. T. E. Borden (no. 1597). It is an interesting addition to Ridley's section *Distichæ* of *Liparis*, recently transferred to *Cestichis*, Thou., by Dr. E. Pfitzer. It is a much more robust plant than *Cestichis disticha*, Pfitz., from which species it is easily distinguished by its juxtaposed pseudobulbs. From *Cestichis compressa* (Lindl.), *C. Cumingii* (Ridley), and *C. divergens* (J. J. Smith), all closely allied species, it is at once separated by its lanceolate lip.

EXPLANATION OF THE PLATE

PLATE 2 : *CESTICHIS PHILIPPINENSIS*, SP. NOV.

The drawing was made from a dried specimen. Details of floral parts were drawn with the aid of the camera lucida.

1. Lip.
2. Side view of lip.
3. Petal.
4. Lateral sepal.
5. Dorsal sepal.
6. Pollinia.
7. Anther.
8. Column.



BLANCHE AMES, del

CESTICHIS PHILIPPINENSIS, SP. NOV.

CESTICHIS BENGUETENSIS

CESTICHIS BENGUETENSIS, *sp. nov.* Pseudobulbi approximati pyriformes. Folium oblanceolatum, apiculatum. Pedunculus bialatus. Flores flavo-virentes. Sepala lanceolata, carinata. Petala linearia. Labellum lanceolatum, 5 mm. longum, ad basim callo cucullato. Columna breviscula, apice incrassata, anthera oblonga.

Roots fibrous. Pseudobulbs 16–24 mm. long, pyriform, approximate, sheathed by scarious bracts. Leaves narrowly oblanceolate, apiculate, 11–14 cm. long, 12–16 mm. wide, broadest near the rounded apex, deciduous, articulated, with an elongated persistent base. Peduncle as long as, or usually longer than, the leaves, ebracteate, compressed, strongly bialate. Floral bracts distichously arranged, 7–10 mm. long, conduplicate, carinate. Spike 2–6 cm. long, 10–14 mm. across. Pedicels of the flowers 9–12 mm. long, slender. Lateral sepal lanceolate, strongly keeled, conduplicate at the apex, 7 mm. long. Upper sepal similar, narrower. Petals linear, obtuse, or only sub-acute, about 5 mm. long. Lip lanceolate, 5 mm. long, with three basal calli, the middle one cucullate. Column fleshy, stout, 3 mm. long. Anther transversely oblong, about 2 mm. wide. Pollinia pyriform.

Cestichis benquetensis is most nearly allied to *C. philippinensis*, from which it is well distinguished by its smaller flowers, oblanceolate leaves, transversely oblong anther, and by its peduncle, this being as a rule longer than the leaves. The sepals are strongly keeled as in *C. philippinensis*, but near the apex are conspicuously conduplicate and apparently fused along the inner opposed surfaces. The flowers open in succession and are, according to field notes, greenish and inconspicuous.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following locality :

Philippine Islands: "in small colonies on trees," Mt. Santo Tomas, Prov. Benguet, Luzon, July 1, 1904, *A. D. E. Elmer* (no. 6552).

CESTICHIS ELMERI

CESTICHIS ELMERI, *sp. nov.* Rhizoma diu repens. Pseudobulbi pyriformes, remoti. Folium lineari-oblongum, acutum. Sepala ovato-lanceolata, acuta, carinata. Petala linearia, sub-acuta. Labellum 7 mm. longum, sub-orbiculare, basi cuneato, ad basim callo cucullato instructum. Columna brevis, ad imum complanata, apice incrassata. Anthera antice rotunda.

Roots fibrous. Pseudobulbs pyriform, about 3 cm. apart, 1.5–2 cm. long, sheathed by triangular-lanceolate bracts. Bracts of the new shoots distichous, acuminate, acute. Rhizome 3 mm. thick. Leaves narrowly oblong, attenuate below, 14–20 cm. long, 9–11 mm. wide, deciduous, articulated, with the elongated persistent base. Peduncle compressed, strongly winged, shorter than or equalling the leaves, ebracteate. Inflorescence distichously bracted. Bracts conduplicate, carinate, 6–7 mm. long, acute, from 2 to 4 mm. apart, not contiguous. Pedicels slender, about 9 mm. long. Lateral sepals ovate-lanceolate, acute, carinate, 7–8 mm. long. Upper sepal similar. Petals linear, sub-acute, about 7 mm. long, slightly shorter than the upper sepal. Lip 7 mm. long, orbicular from a cuneate base, apiculate, on each side near the base a slight thickening or protuberance, posterior to which is a conspicuous somewhat cucullate appendage. Column 3 mm. long, broad, complanate. Anther rounded in front, not emarginate. Fruit an ellipsoidal or somewhat pyriform capsule, 13 mm. long.

This species is readily distinguishable from *C. Merrilli* by its very different lip, which is orbicular-apiculate, by its non-emargi-

nate anther, and by its looser inflorescence. The lip is scarcely retuse on each side of the prominent apicule, while at base the lateral thickenings, which seem to be accentuated by indentations from below, are sometimes obscure. According to field notes the flowers are yellowish red. They appear one or two at a time.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following locality :

Philippine Islands: "forming colonies on trees," Mt. Santo Tomas, Prov. Benguet, Luzon, July 1, 1904, *A. D. E. Elmer* (no. 6553).

CESTICHIS MERRILLI

CESTICHIS MERRILLI, *sp. nov.* Rhizoma diu repens. Pseudobulbi pyriformes remoti. Folium oblongum, acutum. Pedunculus bialatus. Flores aurantiaci. Sepala ovato-lanceolata, acuta. Petala linearia, subacuta. Labellum cuneato-obovatum, margine minutissime crenulato, cuspidate medio brevi, ad basim callo cucullato. Columna breviuscula, incrassata. Anthera antice emarginata. Capsula elliptica.

Roots fibrous. Pseudobulbs 5 mm. long, 2–5 cm. apart, monophyllous. Rhizome 3 mm. thick. Leaves 20–27 cm. long, 1.5–2 cm. wide, narrowly oblong, attenuated at both ends, acute, deciduous, articulated, with an elongated persistent base. Peduncle as long as, or shorter than, the leaves, ebracteate, compressed, strongly winged. Floral bracts distichous, approximate, conduplicate, carinate, about 8 mm. long. Flowers orange-yellow. Pedicels about 1 cm. long, slender. Upper sepal ovate-lanceolate, acute, 6.5 mm. long. Lateral sepals similar. Petals linear, sub-acute, 1-nerved, about 6 mm. long, less than half as broad as the sepals. Lip cuneate-obovate, margin somewhat crenulate, emarginate or 2-lobed at the apex, with a terminal obtuse cusp; near the base on each side an erect rounded callus intramarginally situated, and poste-

rior to these an erect cucullate appendage. Column 3.5 mm. long, complanate below, subulate on each side above. Anther emarginate in front, 2-celled. Fruit an ellipsoidal capsule, 12 mm. long.

This species was collected on Mt. Mariveles, Province of Bataan, Philippine Islands, by Mr. Elmer D. Merrill, on January 1, 1904. The plants were found epiphytic on trees growing on exposed ridges. In May, 1904, the species was again collected, presumably near the type locality, by H. N. Whitford. As the flowers appear in succession, only one or two are open at a time. In dried specimens the sepals and petals are strongly reflexed and somewhat pendent. As the inflorescence matures, the lowermost bracts become scarious and eventually fall away.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following locality :

Philippine Islands: Mt. Mariveles, Prov. Bataan, Luzon, alt. 1200 m., January 1, 1904, *E. D. Merrill* (no. 3736); May, 1904, *H. N. Whitford* (no. 317).

KEY TO THE SECTION *DISTICHÆ*, RIDLEY

The distichous arrangement of the closely set floral bracts gives the species of this section a very marked aspect, dissimilar to that of other members of the genus. The first identification of a member of the section was du Petit-Thouars's, who defined *Malaxis* (*Liparis*) *disticha* by a plate (Orch. Afr. t. 89). To this species, if those described in the present fascicle are included, eight more have since been added. The following key may be of service in distinguishing them.

Sepals oblanceolate, obtuse.

Lip quadrate.

Lip 3-lobed.

Sepals lanceolate, acute.

Lip quadrate, bilobed, lobes divergent.

Lip suborbicular — cuneately flabelliform, often mucronate.

1. *C. disticha*, Pfitzer.

2. *C. araneola* (Ridley).

3. *C. divergens* (Smith).

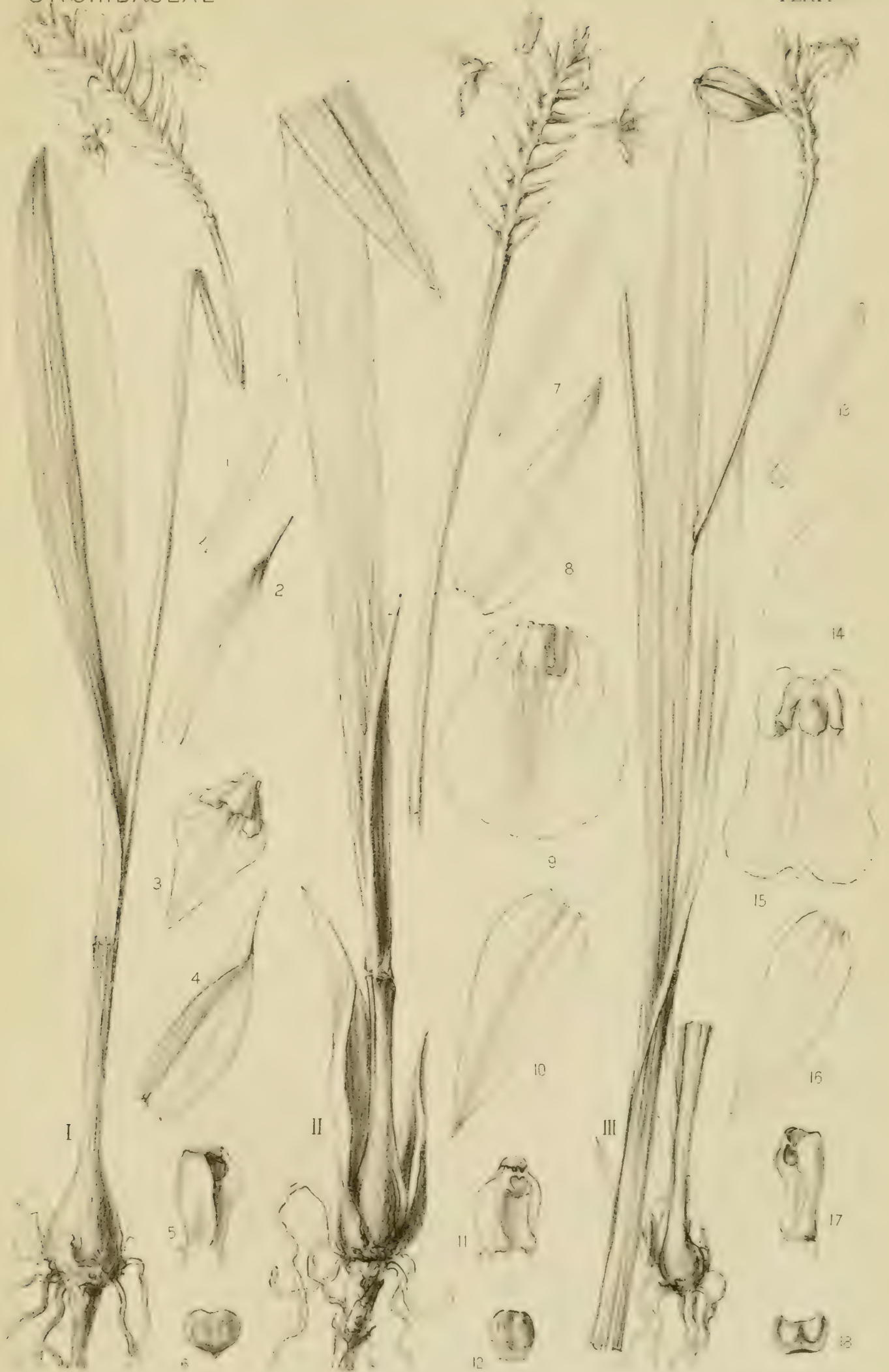
- | | |
|-----------------------------|-------------------------------------|
| Column slender, incurved. | |
| Leaf 2-2.5 cm. wide. | 4. <i>C. compressa</i> (Lindl.). |
| Leaf 11 mm. wide. | 5. <i>C. Cumingii</i> (Lindl.). |
| Column stout. | 6. <i>C. Elmeri</i> , Ames. |
| Lip obovate, mucronate. | 7. <i>C. Merrilli</i> , Ames. |
| Lip lanceolate, emucronate. | |
| Leaves oblanceolate. | 8. <i>C. benguetensis</i> , Ames. |
| Leaves oblong-lanceolate. | 9. <i>C. philippinensis</i> , Ames. |

Mr. Ridley in his Monograph of the genus *Liparis* places *Liparis mucronata*, Lindl., under *L. disticha* as a synonym, and this treatment is followed by Sir J. D. Hooker in the Flora of British India. The latter author in the same work expresses the opinion that *L. Cumingii*, a plant (collected in Bopol, — Bohol? — one of the Philippine Islands) erroneously ascribed by Mr. Ridley to Malacca, is hardly different from *L. compressa*.

EXPLANATION OF THE PLATE

PLATE 3 : I. CESTICHIS BENGUETENSIS, SP. NOV. II. C. ELMERI, SP. NOV.
 III. C. MERRILLI, SP. NOV.

<i>C. benquetensis.</i>	<i>C. Elmeri.</i>	<i>C. Merrilli.</i>
1. Petal.	7. Petal.	13. Petal.
2. Dorsal sepal.	8. Dorsal sepal.	14. Dorsal sepal.
3. Lip.	9. Lip.	15. Lip.
4. Lateral sepal.	10. Lateral sepal.	16. Lateral sepal.
5. Column.	11. Column.	17. Column.
6. Anther.	12. Anther.	18. Anther.



BLANCHE AMES. del.

I. CESTICHIS BENGUETENSIS. SP NOV II C. ELMERI, SP NOV III C. MERRILLI. SP NOV

CAMPYLOCENTRUM PORRECTUM

Campylocentrum porrectum, Rolfe, *Orchid Review* **11**: 247 (1903).

Aëranthus porrectus, Reichenbach, f., *Flora* **48**: 279 (1865). — Grisebach, *Cat. Pl. Cub.* 265 (1866). — Sauvalle, *Fl. Cub.* 230.

“*Aëranthus porrectus*: aff. *A. filiformi* radicibus intricatis filiformibus, foliis —, pedunculis erectis aggregatis tenuissimis distanter vaginatis, bractea vaginæformi pedicello ovarii turbinati bene breviori, sepalis triangulo ligulatis, omnibus obtuse acutis, labello ovato acuto cochleari, linea incrassata a basi in discum, calcaris brevi apice vesicato, labello breviori, columna brevi, androclinio obtuse bifido. 3302.” — Reichenbach, *loc. cit.*

Stems leafless, very short, concealed by numerous glaucous rambling roots. The latter about 1 mm. thick. Peduncle 4.5 cm. or less high, erect, slender, jointed, with a minute scarious acute bract at each joint, branched or simple above, bearing from one to three or more small, shortly pedicellate, yellow-green flowers, 2–3 mm. long. Scapes of previous years persistent. Sepals similar, the lateral 2.5 mm. long, longer and narrower than the upper sepal, ovate, acute or obtuse, spreading slightly. Petals similar to the sepals, narrowly ovate. Lip orbicular-apiculate when flattened out, in life ovate, semiglobular (like that of *Goodyera pubescens*), with a spreading sub-acute tip, the lateral lobes incurved; near the apex of the lip an erect tubercle; spur bulbous, saccate, joined to the lip by a short neck. Column very short, with obscure divergent wings near the summit. Pollinia 2, globular. Ovary glandular (glands inconspicuous in dried specimens). Fruit a trigonal capsule, 5 mm. long, dull orange (yellowish or brownish when dry). Flowers in August, September.

This species was first described by H. G. Reichenbach in 1865, as an *Aëranthus*. The genus *Aëranthus* as now understood comprises several species confined to Madagascar and the Mascarene Islands. The American species which it formerly included, but which are quite distinct, have been removed to the genus *Campylocentrum*. The known species of *Campylocentrum*, about twenty, are distributed through the American tropics and subtropics, the most northern habitat being peninsular Florida. The species may be divided into two sections, one with leafy, the other with leafless, plants; or, as in *Campylocentrum Pœppigii*, species of the second section may possess minute fleshy terete leaves. In the latter section there are about seven species, including *C. porrectum*.

Campylocentrum porrectum was discovered by Charles Wright in Cuba between 1860 and 1865. That it is a native of Florida was first made known to me by Mr. T. L. Mead, who found plants near the nursery of Reasoner Brothers at Oneco, Manatee County. Later, plants were collected in the same locality, and in Lee County, about 125 miles farther southward. The plants are epiphytic on *Juniperus barbadensis*, *Acer rubrum*, and *Cephalanthus sp.* near Oneco, and on *Fraxinus caroliniana* near Everglade. The glands on the ovary are often few, and in dried specimens obscure. The bulbous swelling of the pedicel where it is articulated with the stalk of the ovary, the vesiculous spur seemingly composed of two coalescent bladders, and the erect tubercle on the lip, are peculiar characters which should render this species distinguishable from its congeners.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from localities indicated, as follows:

Cuba: 1860-64, *Charles Wright* (no. 3302).

Florida: Oneco, 1902, *T. L. Mead* (sketch only); June 4, 1904, *A. A. Eaton* (no. 232); September, 1904, *E. N. Reasoner*. —

Everglade (Fahkahatchie Swamp), June 10, 1904, *A. A. Eaton*
(no. 1130).

Yucatan : Port Silam, *G. F. Gaumer, M. D.* (no. 660).

The species has also been ascribed to the following locality :

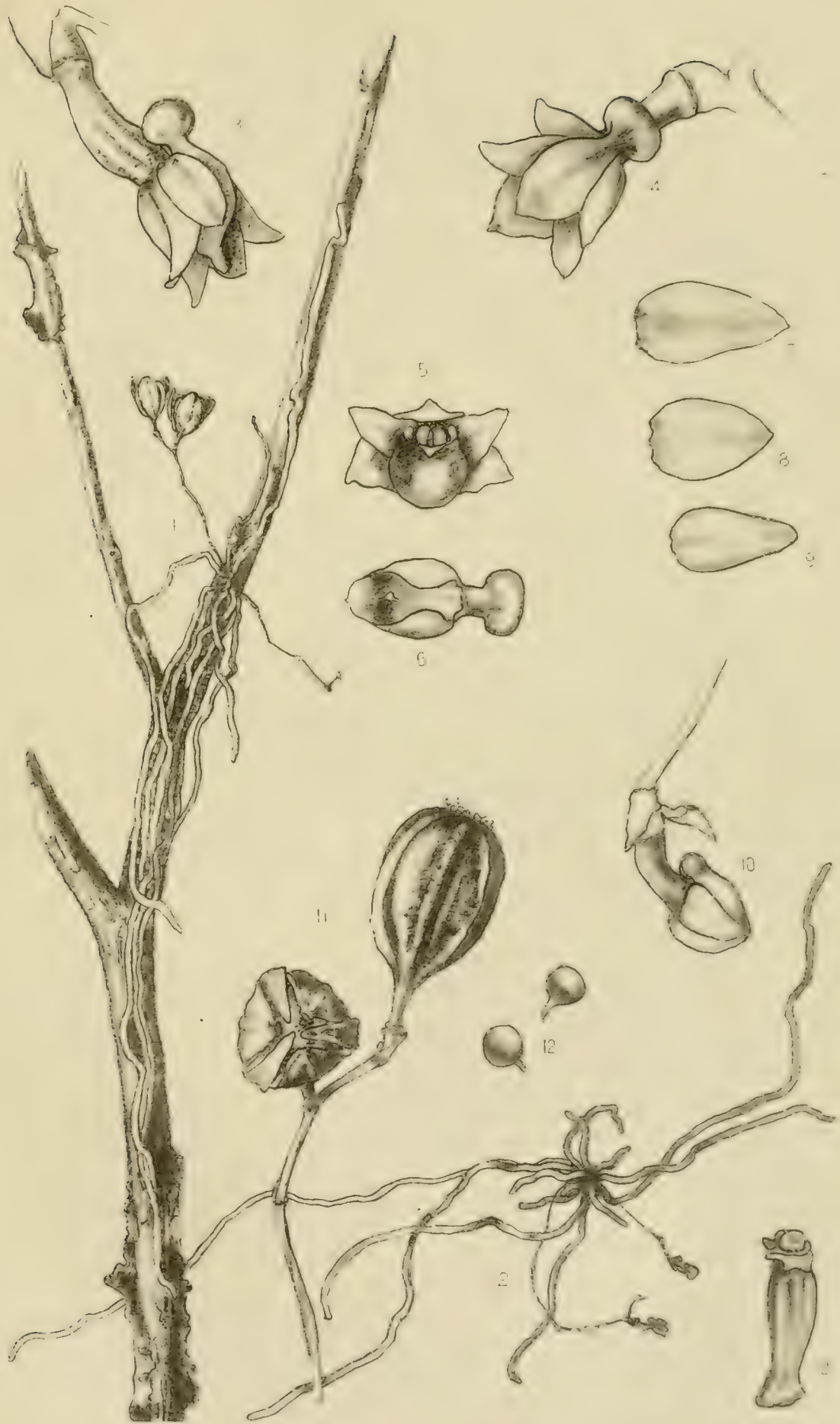
Jamaica : Rolfe, *Orchid Review* **11** : 247.

EXPLANATION OF THE PLATE

PLATE 4: CAMPYLOCENTRUM PORRECTUM

Drawings were made from living plants secured at Oneco, Fla. ; the enlarged details, by aid of the camera lucida.

1. Fruiting plant *in situ*.
2. Flowering plant detached.
3. Flower, side view.
4. Flower, under side.
5. Flower, front view.
6. Lip from above.
7. Lateral sepal.
8. Dorsal sepal.
9. Petal.
10. Unopened flower.
11. Fruit enlarged.
12. Pollinia.
13. Column.



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CAMPYLOCENTRUM PORRECTUM. Rolfe

IONOPSIS UTRICULARIOIDES

Ionopsis utricularioides, Lindley, *Coll. Bot.* t. 39 (A) (1821); *Orch. Pl.* 194 (excl. syn.); *Folia Orchidacea*, Ionopsis 5. — Reichenbach, f., *Walp. Ann.* 6: 684; *Beitr. Orch. Cent. Am.* 72. — Grisebach, *Fl. Brit. W. I.* 636; *Cat. Pl. Cub.* 267. — Sauvalle, *Fl. Cub.* 231. — Hemsley, *Biol. Cent. Am., Bot.* 3: 290. — Nicholson, *Dict. Gard.* 2: 190. — Stein, *Orchideenb.* 282. — Veitch, *Man. Orch. Pl.* 8: 132. — Bois, *Orch.* 185. — Williams, *Orch. Grow. Man.* ed. 7, 424. — Linden, *Orch. Exot.* 791; *Jour. des Orch.* 2: 158, 4: 96. — Autran & Durand, *Hort. Boissier.* 338. — Duss, *Fl. Phan. Antill. Franç.* 601. — Sander, *Orch. Guide* 93. — Urban, *Symb. Antill.* 4: 180. — Rand, *Orchids* 294. — White, *Book of Orch.* 76 (cult.). — *Orch. Rev.* 2: 135 (1894). — Lyons, *Treat. Man. Orch.* 167 (cult.). — Cogniaux, *Martii Fl. Bras., Orch.* 3: 174. — Ames, *Proc. Biol. Soc. Wash.* 17: 116 (1904).

Epidendrum utricularioides, Swartz, *Prodr.* 122 (1788).

Dendrobium utricularioides, Swartz, *Nov. Act. Ups.* 6: 83 (1799); *Fl. Ind. Occ.* 3: 1531. — Willdenow, *Sp. Pl.* 4: 133. — Persoon, *Syn. Pl.* 2: 522. — Meyer, *Nov. Act. Leop.* 12 (2): 774 (1825).

Cybelion Utriculariæ, Sprengel, *Syst. Veg.* 3: 721 (1826).

Ionopsis tenera, Lindley, *Bot. Reg.* 22: t. 1904 (1836); *Paxt. Fl. Gard.* 2: 12, fig. 141; *Folia Orchidacea*, Ionopsis 6. — Drapiez, *Encycl. Règn. Végét.* 4, November, 1836 (Bot. Reg.), fig. 4. — *Fl. des Serres* 7: 294, cum ic (1851-52). — Richard, *Fl. Cub.* 2: 247. — Du Buysson, *L'Orchid.* 352. — *L'Orchidophile*, 1885, 317, cum ic. — Linden, *Orch. Exot.* 791. — *Orch. Rev.* 9: 165 (1901). — Lyons, *Treat. Man. Orch. Pl.* 167 (cult.).

Ionopsis Gardneri, Lindley, *Ann. and Mag. Nat. Hist.* ser. 3, 1: 332 (1858); *Orch. Wright* 8; not in *Paxt. Fl. Gard.* 2: 13 (1851).

“E[pidendrum] foliis lanceolatis lineatis planis, scapo paniculato, labio magno cordato, cornu brevissimo.” — Swartz, Prodr. 122.

“*Herba* parasitica acaulis. *Folia* circiter 4, disticha, lanceolata, subcomplicata, coriacea, subnervia, discolora, scapo breviora, cum basibus suis articulata. *Scapus* erectus, filiformis, teres, biramis, coloratus, glaberrimus. *Panicula* flexuosa, pauciflora, floribus erectis, albis, rubido tinctis. *Bracteæ* minimæ, ovatæ, sphacelatæ. *Ovarium* teres, subangulatum, basin versus attenuatum. *Perianthium* connivens, sepalorum exteriorum superiore recto, parvo, oblongo, obtuso, lateralibus labello suppositis et suboccultis, carinatis, antice basibus saccatis approximatis cum basi saccato labelli connatis; interioribus obtusis, erectis, oblongis, superiore paulo longioribus, margine altero sepalo superiori appresso, altero labelli ungui extus adhærente. *Labellum* sepalis multo majus, limbo albo cuneato bilobo patente, ungue plano basi saccato, faciei columnæ applicito, subbarbato, in medio callis duobus conicis subincurvis. *Columna* ungue labelli duplo brevior, semiteres: *stigmatæ* excavato sursùm repando, ferè totam faciem columnæ occupante. *Anthera* terminalis, opercularis, decidua, 1-ocularis, subcarnosa, antice in rostro brevi obtuso producta. *Pollinia* 2, globosa, postice biloba: caudiculâ planâ, oblongâ, glandulæ obovatæ brunneæ stigmatis affixâ.” — Lindley, *Coll. Bot.* t. 39 (A).

Roots copious, fibrous, whitish. Leaves rigid, about 3, oblong-lanceolate or linear-ligulate, acute, approximate, articulate, attenuated at base, keeled, shorter than the elongated peduncle, 5–12 cm. long, about 1 cm. wide. Peduncle 10–40 cm. long, jointed. Bracts sheathing, closely appressed, prominently nerved, about 3 mm. long. Inflorescence simple or paniculate, loose, branches slender, from 5 to 12 flowered. Flowers about 1 cm. long, erect, whitish or pale magenta-crimson, veined with a more intense shade of magenta, long pedicellate. Pedicels slender, 9–12 mm. long. Floral bracts triangular acute, about 1.5 mm. long. Sepals oblong, ligulate, acute, about 6 mm. long, the lateral united at base and produced into a short gibbosity. Petals ovate-oblong, equalling the upper sepal, abruptly acute, about 6 mm. long, broader than

the sepals. Lip obcordate, deeply emarginate, about 1 cm. long; claw obscurely biauriculate, with two thin calli near the base. Column rather stout, about 2 mm. long.

Ionopsis utricularioides, Lindl., was described by Swartz toward the end of the eighteenth century and referred by him to the genus *Epidendrum*. Early in the nineteenth century it was cultivated in European gardens under several names. In the American tropics it is widely distributed, its most northern range being in Florida, where it is exceedingly rare. On March 12, 1904, I found ten or more plants near Naples on the Florida west coast; there the species grew mingled with other epiphytic orchids in a densely wooded swamp several miles inland. The flowers bear some resemblance to those of *Utricularia* species, and to this fact the specific name of our plant is due. The lip, which is the most conspicuous part of the flower, has been variously described as obovate-obcordate with apex deeply emarginate, cuneate-bilobed, and obcordate-emarginate. While these different descriptive terms may indicate a variance in opinion as to the actual outline of this organ, they also show the lip itself is variable. In *Folia Orchidacea*, Dr. John Lindley described *I. tenera* as distinct from *I. utricularioides*, but subsequent authors have considered the two conspecific. Under *I. tenera*, Lindley assigned to our plant four varieties, and to this number Cogniaux, in his work on the orchids for Martius's *Flora Brasiliensis*, added two others.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from localities here named:

- Peninsular Florida: Naples, March 12, 1904, *O. Ames* (no. 6).
Cuba: Gavelan, May 1, 1904, *R. M. Grey* (hb. O. A. no. 5035).
— Soledad, Santa Clara Province, 1901, *R. M. Grey* (hb. O. A. no. 5036). — Cieneguita, June 7, 1895, *R. Combs* (no. 127).
— Prope villam *Monte Verde* dictam, Cuba orientali, January–July, 1859, *C. Wright* (no. 667).
Porto Rico: September 8, 1885, *P. Sintenis* (no. 2493 — fruit).

— May 22, 1886, *P. Sintenis* (no. 4407). — October 7, 1886, *P. Sintenis* (no. 4505). — Yauco, 1880, *A. P. Garber*.
 St. Vincent: March, 1890, *H. H. & G. W. Smith* (no. 794).
 Guatemala: Cubilquitz, Depart. Alta Vera Paz, alt. 350 m., *H. von Türckheim* (no. 8001).

The species with its varieties has also been ascribed to the following localities:

Cuba: *Eggers* (no. 5409). — *Read* (no. 672). — On old Coffee-trees of Yatera and Mt. Liban, *Linden* (no. 1760).

Jamaica: *Swartz*, Prodr. 122.

Porto Rico: *Heller* (no. 1311). — *Krug* (no. 1222). — *Sintenis* (nos. 2691, 4387, 4867, 6815, 6986). — *Stahl* (no. 5701).

San Domingo: *Eggers* (no. 2304).

Martinique: *Duss* (no. 377).

Trinidad: *Lindl.*, Orch. Pl. 194.

Mexico: *Lindl.*, *loc. cit.* — *Pavon.* — Sochiapan, frontiers of Oaxaca and Vera Cruz, *Hartweg.* — Prov. Chiapas, *Linden* (no. 1234).

Guatemala: Oratorio, *Wendland.*

Colombia: Between Cartagena and Buga, alt. 2928 ft., *Humb. & Bonpl.* — Carabobo, *Wagener.*

Peru: Tarapoto, *Spruce.*

Venezuela: Caracas, near Guarenes, *Funck & Schlim.*

Brazil: Serra Jacobine, Prov. Bahia, *Blanchet* (no. 3427). — Prov. Rio de Janeiro, *Gaudichaud.* — Between Rio Grande and Diamantina, Prov. Minas Geraes, *Burchell* (no. 5203). — Between Diamantina and Paranahyba, *Burchell* (no. 5922). — Cavalcante, Prov. Goyaz, *Burchell* (no. 7389).

EXPLANATION OF THE PLATE

PLATE 5: IONOPSIS UTRICULARIOIDES

The plate was drawn from a living plant secured near Naples, Fla. Details were made with the camera lucida.

1. Pollinia and pedicel.
2. Lip.
3. Lateral sepals.
4. Petal.
5. Dorsal sepal.
6. Column and anther.



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IONOPSIS UTRICULARIOIDES, Lindl.

CORALLORRHIZA WISTERIANA

- Corallorrhiza Wisteriana**, Conrad, *Jour. Phil. Acad.* 6: 145 (1829). — Britton & Brown, *Illus. Fl.* 1: 478. — Gray, *Manual*, ed. 1, 467 (1848). — Small, *Fl. Se. U. S.* 326. — Lindley, *Orch. Pl.* 535. — Kearney, *Bull. Torr.* 21: 261 (1894). — Britton, *Manual* 305. — Mohr, *Pl. Life Ala.* 458.
- Corallorrhiza odontorrhiza**, Chapman, *Fl. S. U. S.* ed. 1, 454 (1860); ed. 2, 454 (1884); ed. 3, 479 (1897); not Nuttall.

“Aphylla; floribus pedicellatis, petalis exterioribus linearibus, interioribus lanceolatis, labello subrotundo recurvo maculato, apice emarginato, calcare perspicuo, adnato.

“*Description.* — Scape purplish red, from 7 to 12 inches high, generally flexuose near the top, furnished with from 3 to 4 deeply striated sheaths of a paler colour. Flowers pedicelled, (12 to 16 on a scape) the three exterior petals dark red, linear, and slightly spreading, the two interior ones broader, lanceolate, paler, and spotted; lip white, crystalline, and spotted with red, broad, somewhat rounded, recurved, and notched at the apex. Spur short, conspicuous, adnate to the germen. Root somewhat bulbous, with short branching coralloid radicles. Flowers the beginning of the 5th month.” — Conrad, *loc. cit.*

Plants 15–39 cm. high. Rhizome coralline, fleshy, brittle, annulated, branched, each segment emitting a short tubercle or branch. Scape tumid at base, sheathed, the sheaths 4, elongated, 2–7 cm. or more long, yellowish or madder-purple. Flowers in a loose raceme. Lateral sepals linear-lanceolate, 6–7 mm. long, about 1 mm. wide, 3-nerved. Upper sepal similar to the laterals. Petals 5–6 mm. long, about 2 mm. wide, oblong, sub-acute, 3-nerved. Labellum 5.5 mm. long, 4 mm. broad, 3-nerved, oval or suborbicular, retuse, short clawed, with 2 intra-marginal linear callosi-

ties near the base, margin denticulate, or undulate. Column compressed, somewhat winged, about half as long as the upper sepal. Anther operculate, 4-celled. Pollinia 4.

Corallorrhiza Wisteriana, Conrad, may be distinguished from *C. odontorrhiza*, Nutt., with which it is often confused, by its larger flowers with more or less spreading perianth, laxer inflorescence, oblong-elliptic capsules, and by its period of anthesis, which ranges from February to May, the plants blooming earlier in the year as the southern limit of distribution for the species is approached. It is not a common plant northward, and in herbaria is represented principally by specimens from the Southern States. *C. Wisteriana* appears to be identical with specimens determined as *C. odontorrhiza* by A. W. Chapman, and it is perhaps owing to this confusion that Chapman redescribed *C. odontorrhiza* as a new species, namely *C. micrantha*. Specimens of *C. micrantha*, Chapm., agree so well with *C. odontorrhiza*, and Chapman's description of *C. micrantha* describes *C. odontorrhiza* so clearly, that quite evidently *C. micrantha* was named because *C. Wisteriana*, Conrad, was unknown to Chapman as such. Furthermore, Chapman gives the blooming season of *C. micrantha* as August and September, and of his *C. odontorrhiza* as February and March.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following localities :

Florida : Hibernia, March, 1869, *Wm. M. Canby*. — Merritt's Island, Indian River, February, 1881, *A. H. Curtiss* (no. 2816). — Gainesville, March, 1876, *A. P. Garber*, *M. D.* — Oviedo, February 3, 1904, *T. L. Mead*. — June, 1904 (in fruit), *A. A. Eaton*.

Tennessee : Knoxville, April 21, 1889. — Rich woods, May, 1897, *A. Ruth* (no. 10018) ; June, 1898, *Ruth* (no. 151). — Woods, Jackson, March 28, 1893, *S. M. Bain* (no. 456).

Alabama : *Hatch*.

Georgia : Bordering rich shaded woods, Thomasville, February 23, 1904, *Mrs. Augustus P. Taylor*.

Texas : *Chas. Wright*.

The species has also been reported from the following localities :

New England : *Robbins*.

Pennsylvania : near Philadelphia, *Wister, Carsons* ; Mercersburg, *Porter*.

Delaware : Wilmington, *Canby*.

Ohio : Cincinnati, *Lee*.

Tennessee : Dandridge, *Rugel* ; Knoxville, *Kearney*.

Georgia : *Chapman*.

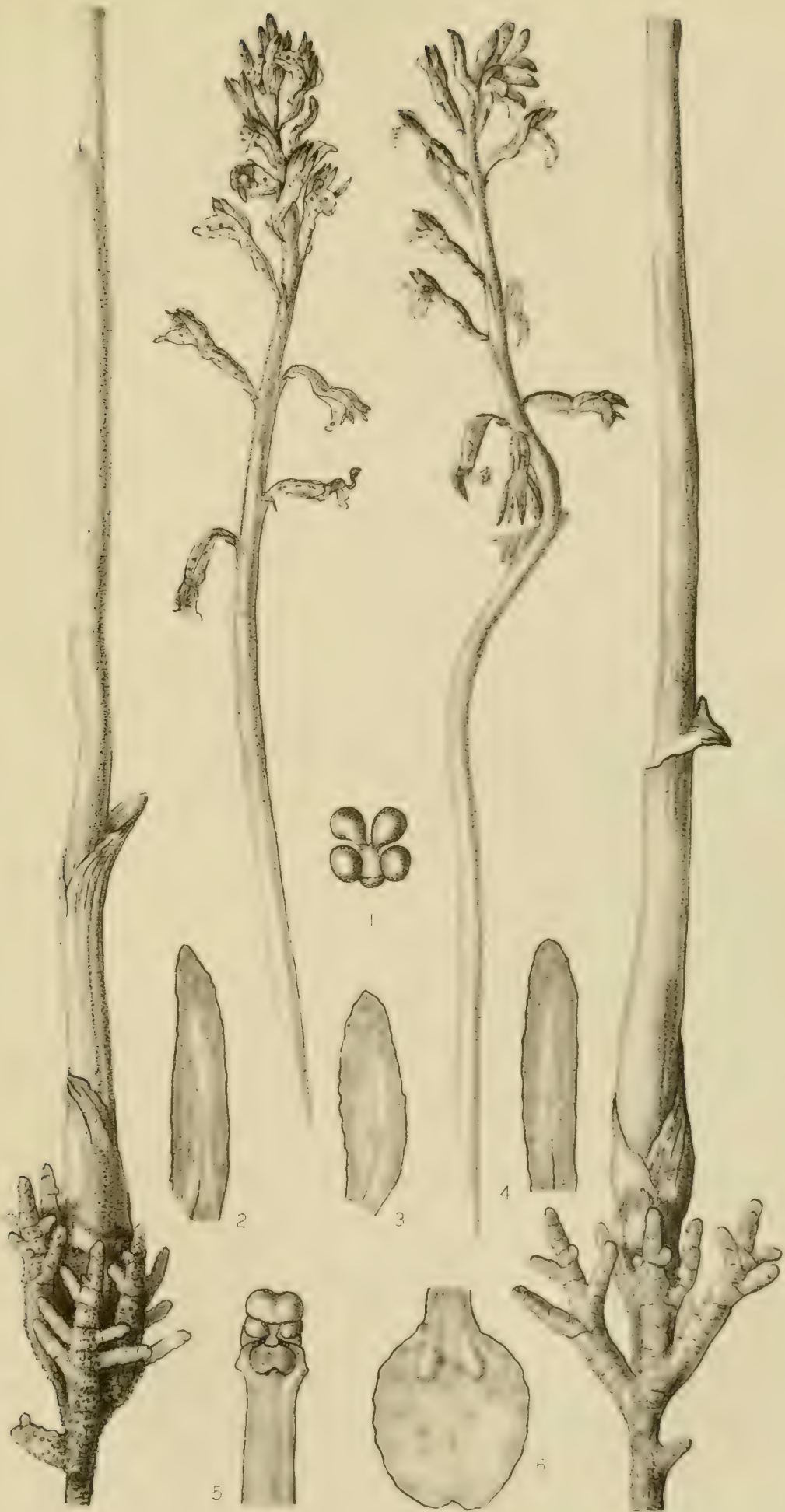
Alabama : Tuscaloosa, *Johnson*.

EXPLANATION OF THE PLATE

PLATE 6 : CORALLORRHIZA WISTERIANA

The plate was prepared from living plants secured in Oviedo, Fla., by Mr. T. L. Mead.

1. Pollinia.
2. Lateral sepal.
3. Petal.
4. Dorsal sepal.
5. Column.
6. Lip.



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CORALLORRHIZA WISTERIANA, Conrad

EPIDENDRUM PRINGLEI

Epidendrum Pringlei, Rolfe ex Ames, *Proc. Biol. Soc. Wash.* **17**: 120 (1904).

“Densely tufted; pseudobulbs ovoid-oblong, 7–10 lines long, 1–2-leaved; leaves linear-oblong, subobtuse, coriaceous, 2–3 inches long; scapes slender, erect, 2½–4 inches long, 1–2 flowered; bracts ovate, apiculate, 1 line long; pedicels 6–8 lines long; sepals broadly lanceolate, acute, 5 lines long, reflexed; petals linear-lanceolate, acute, 5 lines long, reflexed; lip free from column, very shortly stalked, limb dilated into a transversely oblong or suborbicular blade, about 5 lines long by 7 broad, thickened at the base into a two or three-keeled callus from which three slender nerves extend toward the apex; column 2 lines long, broadly clavate. — Mexico, State of Morelos, near Cuernavaca, on tops of mountains, at 8000 ft. altitude; C. G. Pringle, May 12, 1898 [no. 7629].

“A species of the *Encyclium* section, nearly allied to *E. hastatum* Lindl., but more slender and smaller in all its parts. The sepals and petals are somewhat fleshy, and appear to have been dusky brown in colour, while the limb of the lip is membranaceous and white. Of known species it can only be compared with the one mentioned, but it is well characterised by its very slender habit. Type in herbarium of the Ames Botanical Laboratory.”

Since the above description was written I have examined more material collected by Mr. Pringle at the same time with the type, and find the following additions necessary: peduncles up to (5½ inches) 14 cm. high; lip white, sometimes if not always irregularly dotted with crimson-magenta.

In May, 1904, Mr. Pringle visited the type locality of this *Epidendrum*, but after diligent search over the lava fields on the moun-

tain-sides where the plants grew epiphytic, failed to find a single specimen. Since 1898 the oak trees on which the original plants were found have been pollarded and the conditions for epiphytic orchids rendered unfavorable.

EXPLANATION OF THE PLATE

PLATE 7: EPIDENDRUM PRINGLEI

The accompanying illustration was prepared from dried material, the plant figured on the left having been drawn from a specimen on the type sheet. Details were drawn with the aid of the camera lucida.

1. Petal.
2. Upper sepal.
3. Lateral sepal.
4. Lip.
5. Anther.
6. Pollinia.
7. Column.



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EPIDENDRUM PRINGLEI, Rolfe

EPIDENDRUM TAMPENSE

Epidendrum tampense, Lindley, *Edwards's Bot. Reg.* **33**, sub t. 35 (1847); *Folia Orchidacea*, Epidendrum 34. — Rolfe, *Gard. Chr.* ser. 3, **4**: 150 (1888). — Britton, *Tr. N. Y. Acad.* **9**: 13 (1889). — Trelease, *Rep. Mo. Bot. Gard.* **9**: 137, t. 38 (1898). — Veitch, *Man. Orch. Pl.*, Epidendrum, p. 121. — Chapman, *Fl. S. U. S.* ed. 3, 480. — Hansen in *Cycl. Am. Hort.* (Bailey) **2**: 534. — Small, *Fl. Se. U. S.* 327. — Ames, *Contr. Orch. Fl. Fla.* 16.

Epidendrum venosum, Chapman, *Fl. S. U. S.* ed. 1, 455 (1860), not Lindley.

“*E. tampense* (Encyclium); pseudobulbis anguste ovatis acuminatis teretibus, foliis linearibus apiculatis paniculâ racemosâ sparsâ duplò brevioribus, sepalis petalisque oblongo-linearibus acutis, labelli tripartiti laciniis lateralibus linearibus obtusis intermediâ basi obscure 3-nerviâ oblongâ acutâ paulò longiore.” — Lindley, *Bot. Reg.* **33**, sub. t. 35 (1847).

Pseudobulbs clustered, 2–7 cm. or more long, clothed with scarious bracts, smooth or rugose, rounded or pyriform, terete, green, often suffused with madder-purple, shining or glossy, mono- or diphyllous. Leaves linear, or linear-oblong, mostly rigid, acute or sub-acute, straight or slightly twisted, recurved, 8 mm.–2 cm. wide, 9–30 cm. or more long. Peduncle terminal, slender, rough with scattered warts or smoothish, terminated by a loose few to many-flowered raceme or panicle. Bracts closely appressed. Flowers fleshy, 30–38 mm. across. Sepals all similar, oblong, narrowed toward the base, or obscurely spatulate, sub-acute, 6–7 mm. wide, about 19 mm. long, broader than the petals. Petals about 17 mm. long, 7 mm. broad above, spatulate. Lip 15 mm. long, 3-lobed; the lateral lobes directed obliquely forward, 9 mm. long

and about 5 mm. broad near the base, oblong to lanceolate, obtuse, rounded; the middle lobe variable, rounded, retuse or obscurely apiculate, 8–10 mm. broad; the disc bicostate from the base with a third short costa between the others near the apex. Column about 1 cm. long, with two incurved wings near the apex. Pollinia 4, in pairs. Fruit an ellipsoidal capsule. — Flowers variable in coloration; sepals yellowish-green, more or less faintly veined and suffused with madder-purple; lip white, variously marked or stained with crimson-magenta, the apical lobe sometimes entirely crimson-magenta, sometimes white; lateral lobes with several crimson-magenta basal nerves or entirely suffused with the same color; column most often white, sometimes marked or dotted with dull crimson-magenta.

Epidendrum tampense, Lindl., is one of the few endemic epiphytic orchids of the southern United States. It is confined as far as I know to peninsular Florida. It seems to have been discovered first by Dr. John Torrey, who sent plants collected near Port Tampa to Dr. Lindley as early as 1846–47. Subsequently plants were obtained by many collectors, so that the species is well represented in herbaria. According to the characterization in the Botanical Register, the original specimens were monophyllous and undersized, but there is no doubt as to the species described by Lindley. It is common on various kinds of trees both in shaded hammocks and in open sunny forests, and in all parts of southern Florida is abundant. Before the disastrous frosts of 1895, according to Mr. T. L. Mead, it was to be found farther north than Oviedo. Throughout its range it varies greatly, and while extreme forms might readily pass as distinct species, there are no constant characters by which they can be critically separated. As in the Cuban *Epidendrum fucatum*, the vegetative parts are very variable, and plants both with large and with small pseudobulbs grow intermingled so that it seems impossible to account for differences in size on purely ecological conditions. Monophyllous and diphyllous forms also occur intermingled, and are frequently misleading

when the plants are without flowers. The flowering season is late spring and summer, although the plants flower spasmodically during the winter months.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from localities here named :

Peninsular Florida: Key West, on trees (spec. in hb. Gray). — Planter, December 12, 1903 (in flower and in fruit), *A. A. Eaton*. — Snapper Hammock, May 26, 1904, *A. A. Eaton* (no. 976). — Breckell Hammock, May 18, 1904, *A. A. Eaton* (no. 915). — Miami, November 12, 1903 (in fruit), *A. A. Eaton*; July, 1877, *A. P. Garber*. — Orange Glade, May 26, 1904, *A. A. Eaton* (no. 977). — Alapattah, May, 1904, *A. A. Eaton* (no. 1015). — Biscayne Bay, 1874, *Edward Palmer* (no. 540). — Merritt's Island, Indian River, on *Quercus virens*, July 24, 1896, *A. H. Curtiss* (no. 5723). — Eustis, Lake Co., June 16-30, 1894, *G. V. Nash* (no. 1098). — Fakahatchie, June 9, 1904, *A. A. Eaton* (no. 1116). — Marco, June 8, 1904, *A. A. Eaton* (no. 1112). — Naples, March, 1904, *O. Ames* (no. 6050, hb. O. A.). — Meyers, saltmarsh-thicket, July 6, 1900 (in fruit), *A. S. Hitchcock*. — Oneco, June 4, 1904, *A. A. Eaton* (no. 1171). — Manavista, June 3, 1904, *A. A. Eaton* (no. 1070). — Palmetto, Manatee Co., August 21-23, 1894, *G. V. Nash* (no. 459). — Hillsboro River, Hillsboro Co., June, *A. H. Curtiss* (no. 2805).

EXPLANATION OF THE PLATE

PLATE 8: EPIDENDRUM TAMPENSE

The drawings were made from living material.

1. Fruit.
2. Pollinia.
3. Column and lip.



EPIDENDRUM TAMPENSE. Lindl

EPIDENDRUM FUCATUM

Epidendrum fucatum, Lindley, *Edwards's Bot. Reg.* **24**: Misc. 15 (1838); *Bot. Reg.* **28**: Misc. 31; *Folia Orchidacea*, Epidendrum 36. — Lindley & Paxton, *Paxt. Fl. Gard.* **1**: 150. — Moore, *Illustr. Orch. Pl.*, Epidendrum 25. — Veitch, *Man. Orch. Pl.*, Epidendrum, p. 101. — Grisebach, *Cat. Pl. Cub.* 262. — Sauvalle, *Fl. Cub.* 227. — Linden *et al.* *Orch. Exot.* 760. — Lyons, *Treat. Man. Orch. Pl.* 147 (fls. said to be green and blue!). — Richard, *Fl. Cub.* **2**: 236; *Ic. Fl. Cub.* pl. 76. — Autrun & Durand, *Hort. Boissier.* 301 (1896). — Reichenbach, f., in *Walp. Ann.* **6**: 330.

“*E. fucatum*; pseudobulbis subrotundo-ovatis cæspitosis monophyllis, foliis ligulatis coriaceis obtusis scapo brevioribus, paniculâ nutante multiflorâ, bracteis ovatis acutis squamiformibus, sepalis petalisque lineari-oblongis tessellatis æqualibus obtusis conniventibus, labelli liberi tripartiti lobis lateralibus erectis linearibus apice rotundatis intermedio acuto ovali multò brevioribus, callo sulcato plano elevato basi lobi intermedii.” — Lindley, *Bot. Reg.* **24**: Misc. 15 (1838).

Pseudobulbs clustered, narrowly or broadly pyriform or rotund, smooth or furrowed, the more recent ones clothed with scarious sheaths, mono- or diphyllous, 1–6 cm. long. Leaves linear-oblong, obtuse or acute, thick, rigid, often stained or suffused with madder-purple, 17–35 cm. long, 1–2 cm. wide, with margins slightly deflexed. Peduncle terminal, slender, rigid, 3 dm. or more long. Bracts closely appressed, acute or obtuse, scarious. Inflorescence paniculate, loose or dense. Rhachis smooth. Flowers 2–2.5 cm. across, 3–10 on each branch of the panicle, subtended by minute, scale-like bracts. Pedicel and ovary together 11–22 mm. long. Sepals and petals tawny yellow with deeper colored veins, lip white, becoming yellow with age, mid-lobe streaked along the

middle with magenta-purple, side-lobes with several similarly colored veins which fork near the tips. Sepals all alike, narrowly spatulate, thickened near the tips, 10–15 mm. long, 3 mm. wide. Petals sub-similar, slightly shorter. Lip 3-lobed, about 1 cm. long. Lateral lobes ovate-oblong, obtuse, enclosing the column, 6 mm. long; mid-lobe various, oblong-elliptic and acute to wedge-obovate and obtuse, or apiculate; between the lateral lobes a whitish, purple-marked, smooth, channelled, longitudinal callus, narrowly oval in outline, longer than the column. Column 5 mm. long, exalate, triangular in cross-section, streaked dorsally with dull purple. Anther orange-yellow. Pollinia 4.

According to the account which accompanies the original description of this species, *Epidendrum fucatum* was first imported from Havana to England by Captain Sutton in 1835. The species was cultivated in the collection of Sir Charles Lemon at Carelew, where it flowered in 1837. In 1838 Dr. Lindley described the plant, alluding by the specific name *fucatum* to the brownish reticulations on the petals of his specimen.

This species has a wide range of distribution in Cuba, where it grows under various conditions. Most of my specimens were collected from Royal Palms and Eriodendron trees, both in shaded and in exposed situations, sometimes in open savannahs, sometimes in densely wooded places near streams of water. The vegetative parts are quite similar to those of *Epidendrum tampense*, Lindl., and exhibit the same remarkable variability. The pseudobulbs range from “about the size of a large marble,” as described by Mr. Booth in his account of the species (*Botanical Register, loc. cit.*), to that of a hen’s egg. The panicles may be either loose or dense, the flowers may be few or many, and either strongly or faintly odorous. The species is nearly allied to *E. odoratissimum*, Lindl., from which it is readily distinguished by its white and magenta lip. From *E. tampense* it differs in its smaller flowers and in the callus of its lip, which is not 3-lobed at the apex. In Cuba it is a common plant, and in this respect parallels *E. tampense*, which in southern Florida is so plentiful.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the localities here named :

Cuba: Santa Clara Prov., Limones, May 25, 1904 (hb. O. A. no. 3694), June 1, 1904 (no. 3693), June 20, 1903 (no. 3698), *R. M. Grey*. — Soledad, 1901 (no. 3691), July 20, 1903 (no. 3690), *R. M. Grey*. — Soledad, 1902 (no. 6122), *O. Ames*. — Pinar del Rio Province, Cayajabos, February, 1903, *O. Ames* & *R. G. Leavitt* (no. 6069). — January, 1903 (no. 3689), February, 1901 (no. 3697), November, 1901 (no. 6039) — all collected by *O. Ames*.

EXPLANATION OF THE PLATE

PLATE 9: EPIDENDRUM FUCATUM

The drawings were made from living plants collected in Santa Clara Province, Cuba, by Mr. R. M. Grey.

1. Lip from above.
2. Front of column.
3. Side of column.
4. Pollinia.
5. Fruit.



BLANCHE AMES del

EPIDENDRUM FUCATUM, Lindl.

EPIDENDRUM STROBILIFERUM

Epidendrum strobiliferum, Reichenbach, f., *Nederl. Kruidk. Arch.* 4: 333 (1858); *Walp. Ann.* 6: 399. — Grisebach, *Fl. Brit. W. I.* 618; *Cat. Pl. Cub.* 263. — Sauvalle, *Fl. Cub.* 228. — Duss, *Fl. Phan. Antil. Franç.* 592. — Ames, *Proc. Biol. Soc. Wash.* 17: 116 (1904). — Cogniaux, *Martii Fl. Bras., Orch.* 2: 174.

Isochilus ramosus, Focke, *Tijdschr. Natuurk. Wetensch.* 4: 69 (1851).

“*Isochilus* (Elleanthus PRESL.) *ramosum* n. sp. caule tereti ramoso folioso vaginato, foliis distichis carnosis ovato-lanceolatis apice oblique bidentatis, spicâ distichâ terminali strictâ compressâ, floribus bracteis inclusis, sepalis lateralibus ovatis subfalcatis basi obliquis concavis acutis superiore oblongo plano latioribus, petalis paullo angustioribus linguæformibus basi obliquis, labello cordato-hastato acuto concavo, ovario ventricosus.

“*Radices* filiformes, viridescens. *Caules* teretes, ramosi, foliosi, vaginati. *Folia* disticha, vaginantia, ovata, oblongo-ovata vel ovato-lanceolata, apice oblique bifida vel emarginata, carnosus, uninnervia, 1–2 centim. longa, 6–8 millim. lata. *Spica* disticha, terminalis, stricta, 3–4-flora, bracteata, compressa. *Bracteæ* membranaceæ, amplæ, subtriangulares, plicato-cucullatæ, amplexicaules, persistentes floris longitudine. *Perianthium* clausum. *Sepala* æquilonga, lateralia ovata acuta inæquilatera, basi obliqua, concava, superiore oblongo obtuso plano erecto latiora. *Petala* paullo angustiora, sepalis æquilonga, linguæformia, basi obliqua. *Labellum* unguiculatum, unguiculo columnæ basi adnatum, cordato-hastatum, acutum, concavum, cum columna parallelum, marginibus conniventibus. *Columna* brevis, cum ovario continua, semiteres, marginata, apice bicornis. *Anthera* opercularis, 4-ocularis. *Pollinia* 4 subrotunda, compressa, per paria caudiculis brevibus replicatis adfixa. *Ova-*

rium sub labello ventricosum. *Capsula* globosa, rostello obtuso terminata. Herba epiphyta perennis, in Crescentiâ Cujete non rara. Flores albi, inconspicui. Floret Augusto." — Focke, *loc. cit.*

"*Epidendrum strobiliferum*: aff. *Epidendro* ramoso Jacq. foliis abbreviatis ligulatis, bracteis apice retusis (nec acutis), vesicula dimidio ovarii adnata, sepalis ovato-ligulatis acutis, labello cordiformi abbreviato, ima basi callis geminis triangulis, gynostemio utrinque unifalcato.

"Ab *Epidendro* ramoso Jacq. planta mexicana ac antillana, quæcum confunditur, diversissimum. Rami ancipites, flexuosi. Vaginæ pulchre arpothyllacæ. Folia vix ultra pollicaria, duas lineas tantum longa. Racemus 4- usque 8-florus inflorescentiam Evelynæ graminifoliæ prope mentiens. Bracteæ carinatæ flores parvos subæquantas." — Reichenbach, f., *Nederl. Kruidk. Arch.* 4: 333 (1858).

Plant 3–8 cm. high or more, branching. Stems compressed above, terete or nearly so below, concealed by the greenish or dull purplish sheathing leaf-bases. Leaf blades rigid, slightly carinate with a median purple-madder stripe on the under side, oblong-lanceolate, obtuse, bifid, deep green, all but the uppermost ones twisted so that the surfaces become vertical, 1–3 cm. long, 5–8 mm. broad, 2 mm. thick. Flowers two to ten, yellowish-white, in close racemes. Bracts scarious, longer than the ovaries, imbricate, obtuse, strongly nerved, carinate, about 5 mm. long. Sepals oblong-lanceolate, acute, the lateral ones asymmetrical, obscurely falcate, 4 mm. long. Petals linear-spatulate, acute or sub-acute, about as long as the sepals, 3-nerved. Lip ovate-cordate, sub-acuminate, entire, adnate to the short column by a narrow claw, concave, unicostate, with 2 basal laminæ. Column short, with a projecting horn or tooth on each side and two small teeth between them at the back. Anther with two more or less divergent horns, two-celled. Pollinia 4, in pairs. Ovary slender, ventricose beneath the lip and lateral sepals. Fruit an oval capsule.

Although widely distributed, this species was first discovered

in the United States in 1904, near Naples, on the west coast of Florida, where it was found growing on a large Sweetbay tree in an exposed situation. Only ten plants were collected, all of them in fruit. Later in the same year, another station was found near Everglade, but the species is rare in Florida. It grows on various kinds of trees, often concealed by other epiphytes.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the localities here named :

Florida : Naples, Lee Co., March 19, 1904, *O. Ames*. — Everglade, Lee Co., June 10, 1904, *A. A. Eaton* (no. 1125).

Cuba : Near Cienfuegos, Prov. Santa Clara, 1902, *H. Bohnof*. — 1904, *R. M. Grey*.

St. Vincent : March, 1890, *H. H. & G. W. Smith* (no. 1145).

The species has also been ascribed¹ to the following localities :

Cuba : In Cuba occidentali, *Wright* (no. 3323). — Matanzas, ins.

Cuba supra arbores in littore scopuloso, *Poeppig*.

Jamaica : *Dr. Morris* (no. 2014).

Dominica : Inter Batey et Jamao, altit. 500 m., *Eggers* (no. 2620).

Martinique : In sylvis humidis haud frequens, altit. 300–500 m., *Hahn* (no. 1473). — *Duss* (no. 1033).

Grenada : In collibus prope montem “Felix” ad arbores, altit. 500 m. *Eggers* (no. 6051).

Trinidad : *Fendler* (no. 786); *Crueger*; *Dr. Bradford*.

Venezuela : Prov. Caracas prope coloniam Tovar, *Fendler* (no. 1434).

British Guiana : *Parker*.

Dutch Guiana : In sylvis ad truncos vetustos prope plantationem Tourtonne, *Kegel* (no. 449). — In arboribus prope Paramaribo, et ad Paulus Kreek, *Wullschlaegel* (no. 565 et 566). — Surinamo ad ramos Crescentiæ prope plantationem Jagdlust, *Splitgerber* (no. 426).

French Guiana : Poiteau, *Mélinon*. — Prope Cayenne, *Martin*.

Brazil : Prov. Para inter S. João et S. Anna, *Burchell* (no. 9159).

¹ Cogniaux, Martii Fl. Bras., Orch. 2: 175.

EXPLANATION OF THE PLATE

PLATE 10: EPIDENDRUM STROBILIFERUM

The plate was prepared from living plants found near Marco, Fla., by Mr. Oakes Ames.

1. Dorsal sepal.
2. Petal.
3. Lateral sepal.
4. Lip.
5. Anther.
6. Pollinia.
7. Column from above.
8. Column, side view.
9. Inflorescence, enlarged.



BLANCHE AMES del

EPIDENDRUM STROBILIFERUM, Rchb.f.

DENDROBIUM MICHOLITZII

Dendrobium Micholitzii, Rolfe *ex* Ames, *Proc. Biol. Soc. Wash.*
17: 119 (1904).

“Densely tufted; pseudobulbs erect, slender at the base, somewhat thickened upwards and quadrangular, 3–4 inches long, diphyllous at the apex; leaves oblong or ovate-oblong, obtuse, coriaceous, $1\frac{1}{4}$ – $2\frac{1}{4}$ inches long; flowers terminal, several, from the axils of a cluster of imbricating oblong bracts, creamy yellow with a greenish orange blotch on the lip, sometimes with purple veins on the flower; pedicels slender, 8–10 lines long; dorsal sepal oblong-lanceolate, acute, $2\frac{1}{2}$ lines long; lateral pair triangular, acute, prolonged behind into a stout obtuse somewhat curved mentum $4\frac{1}{2}$ –6 lines long; petals linear, acute, $2\frac{1}{2}$ lines long; lip 5–6 lines long, the basal part oblong and somewhat curved, the apex dilated into an obovate obtuse limb, bearing a small oblong crest in the centre; column stout, scarcely over $\frac{1}{2}$ line long. — German New Guinea, Micholitz.

“An interesting addition to the small section *Bolbodium*, allied to *D. pumilum* Roxb., but far larger in all its parts, and the pseudobulbs distinctly quadrangular upwards, as in the Burmese *D. quadrangulare* Parish, which, however, has smaller flowers and a proportionately shorter mentum. The remaining species is the Philippine *D. hymenanthum* Rchb. f. Type in herbarium of the Ames Botanical Laboratory.”

This *Dendrobium* was discovered by W. Micholitz anterior to 1899; and although it is highly probable that he sent living plants to England, the species seems never to have been successfully cultivated. The plant on which Mr. Rolfe based his description was among dried specimens which Micholitz sent to F. Sander & Co. of St. Albans, England, commercial dealers in horticultural orchids.

The specimen in question was given to me by Mr. Sander, and remained among the unnamed *inserendæ* of my herbarium for four years. The only data with the specimen were as follows: "Dendrob. sp. Flowers creamy yellow, lip with a greenish orange blotch. There are two varieties; one has purple veins on the flower. Micholitz." On the same scrap of paper with these remarks is written in a different hand and with blacker ink, "Germ. New Guinea." Unable with material at hand to identify the species, I sent it to the Royal Gardens, Kew, where it was described by Mr. R. A. Rolfe, and returned with the manuscript description which was published June 9, 1904. The accompanying plate was prepared from the type, and is a faithful restoration.

EXPLANATION OF THE PLATE

PLATE 11: DENDROBIUM MICHOLITZII

The drawing is a restoration from type specimens.

1. Upper sepal.
2. Petal.
3. Lateral sepals, lip, and column.



BLANCHE AMES, del.

HELIOTYPE CO., BOSTON

DENDROBIUM MICHOLITZII, Rolfe

SAUROGLOSSUM CRANICHOIDES

Sauroglossum cranichoides, Ames, *Proc. Biol. Soc. Wash.* **17** : 117 (1904).

Pelexia cranichoides, Grisebach, *Cat. Pl. Cub.* 269 (1866).

Spiranthes Storeri, Chapman, *Fl. S. U. S.* ed. 3, 488 (1897).

Beadlea Storeri, Small, *Fl. Se. U. S.* 319 (1903).

“PELEXIA CRANICHOIDES Gr. foliis ovatis v. ovato-subrotundis breviter apiculatis petiolo subæquilongis (1''–2'' longis), spica laxiflora glanduloso-puberula : bracteis lanceolato-acuminatis ovarium vix æquantibus, perigonio deorsum curvato (2''' longo) : segmentis lateralibus exterioribus oblongo-lanceolatis labello subjectis, dorsali et interioribus supra medium connatis apice obtusiusculis, labello perigonio æquilongo oblongato inferne columnam amplexante supra medium in laminam trapeziformem nudam apice truncato obsolete trilobam dilatato : calcare brevi adnato. — Humilior, quam *P. spiranthoides* Lindl., 8''–15'' alta, ovarium duplo brevius, flos minor. — Cuba occ. (Wr. 3293). E.” — Grisebach, *loc. cit.*

Roots tuberous, about 3.5 cm long and 1 cm. thick. Plants 16–37 cm. high. Leaves subradical, petiolate, petioles 1.5–5 cm. long. Leaf-blades 4–6.5 cm. long, 2.5–4 cm. wide, ovate, acute, green, often purplish beneath. Scape slender, greenish or purplish, pubescent above, with 6 to 8 sheathing, white-spotted bracts. Raceme 2.5–10 cm. long, rather loosely flowered, floral bracts lanceolate, acuminate, maculate, pubescent at base, as long as the ovaries or longer. Ovaries 6 mm. long, pubescent. Flowers 5–7 mm. long, lateral sepals oblong-lanceolate, obtuse, about 6 mm. long. Upper sepal lightly adherent to the petals, narrowly ovate-lanceolate, about 5 mm. long. All the sepals greenish, tinged with madder-purple, often flecked with white, pubescent

below. Petals 4 mm. long, spatulate, somewhat apiculate, greenish at base and along the margins, otherwise whitish. Lip 5–6 mm. long, white, at about the middle adherent to the column, 3-lobed; lateral lobes rounded, forming with the disc a cuneate-oblong lamina; apical lobe trapezoidiform, apiculate; at base two thickened callosities, one on each side. Column 4 mm. long. Stigma crescent-form. Rostellum triangular-lanceolate. Anther ovate-apiculate.

Of this rare plant there are few representatives in American herbaria. The Gray Herbarium contains two specimens collected by Charles Wright in Cuba, while the original Florida specimens collected by Storer, on which Chapman based *Spiranthes Storeri* and Dr. Small the new genus *Beadlea*, are in the Chapman Herbarium at Biltmore, N. C. Apparently the second collection of the species in Florida was made in December, 1903, by Mr. A. A. Eaton, who found about thirty plants near Miami. One of these specimens was sent to Kew and another to the New York Botanical Garden.

John Lindley described the genus *Sauroglossum* in 1833, ascribing to it a Brazilian species, *S. elatum*, the type of the genus. In 1818 Richard published *Spiranthes elata* (Mém. Mus. Par. 4: 59). As *Spiranthes elata*, Rich., seems properly to belong to *Sauroglossum*, and as the specific designation *elata* is already preëmpted by the type species, I propose for Richard's plant the name *Sauroglossum Richardi*. Although *Sauroglossum* as represented by *S. cranichoides*, *S. elatum*, Lindl., and *S. Richardi* is very near *Spiranthes*, it is clearly distinguished from that genus by the loose untwisted inflorescence, by the more slender column, and by the petiolate, ovate, or ovate-lanceolate, radical persistent leaves. I have removed *S. cranichoides* from *Pelexia*, to which genus Grisebach referred it, because of great discrepancies between its characters and those of any *Pelexia* known to me.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the localities here named :

Cuba : Monte Lebano, 1860-64, *Chas. Wright* (no. 3293).

Florida : Breckell Hammock, Miami, in decaying leaves, December 24, 1903, *A. A. Eaton*. — E. Florida, *Storer* (hb. Biltmore). *Chapman* (*loc. cit.*) reports the species from near Enterprise, Fla.

EXPLANATION OF THE PLATE

PLATE 12 : SAUROGLOSSUM CRANICHOIDES

The drawings were made from fresh material obtained at Miami, Fla., by Mr. A. A. Eaton.

1. Lip spread out.
2. Upper sepal.
3. Lateral sepal.
4. Petal.
5. Front view of the flower.
6. Side view of the flower.
7. Front view of the column.
8. Side view of the column.



BLANCHE AMES, del.

HELIOTYPE C. BOSTON

SAUROGLOSSUM CRANICHOIDES, Ames

LIPARIS ELATA, VAR. LATIFOLIA

Liparis elata, Lindley, *Bot. Reg.* **14**: 1175 (1828); *Orch. Pl.* **27** (excl. syn.). — Loddiges, *Bot. Cab.* t. 1558. — Rodriguez, *Struct. Orchid.* t. 4, fig. 11. — Warming, *Symb. Fl. Bras. Centr.* part 29, 843. — Ridley, *J. L. S.* **22**: 259. — Grisebach, *Cat. Pl. Cub.* 261; *Fl. Brit. W. I.* 612. — Eggers, *Fl. St. Croix & Virg. Isl.* 112. — Ames, *Proc. Biol. Soc. Wash.* **17**: 116 (excl. auth.). — Cogniaux, *Martii Fl. Bras., Orch.* **1**: 286. — Autran & Durand, *Hort. Boissier.* 285.

Sturmia bituberculata, Reichenbach, f., *Bonplandia* **2**: 22 (1854) (excl. syn.).

Liparis bituberculata, Reichenbach, f., *Walp. Ann.* **6**: 218 (1861) (non Lindl.); *Beitr. Orch. Cent. Am.* 98 (excl. syn.); *Ber. deut. bot. Ges.* **3**: 278 (1885). — Hemsley, *Biol. Centr. Am., Bot.* **3**: 212 (excl. syn.).

Leptorchis elata, Kuntze, *Rev. Gen. Pl.* part II., 671 (1891).

Liparis elata, var. *latifolia*, Ridley, *J. L. S.* **22**: 260. — Cogniaux, *Martii Fl. Bras., Orch.* **1**: 287.

“*L. elata*; foliis oblongo-lanceolatis acuminatis undulatis plicatis, bracteis foliaceis reflexis, labello obcordato bituberculato, caulibus ovatis.

“Herba terrestris, caules ovatos, breves, cicatrizatos efformans. Folia oblongo-lanceolata, acuminata, undulata, plicata, glabra, basi vaginantia, pedales v. circiter. Scapus erectus, simplex, bipedalis, angulatus, angulis alatis. Spica cylindræa, sensim elongata, apice nutans. Bracteæ ovatæ, virides, reflexæ, ovario breviores. Perianthium patens; sepala exteriora fusca, supremo lineari apice recurvo, inferioribus brevioribus, oblongis, obtusis, labello suppositis, collateralibus, basi connatis, apice recurvis; interiora linearia, convexa, divaricata, supremi longitudine. Labellum carnosum, ungue viride, suberecto, canaliculato, bicorni, disco reflexo, obcordato, fusco. Columna erecta, arcuata, semi-

teres, antice antè stigma parvum concavum alata. Pollinia 4, cereacea, glandulâ retinaculoque nullis." — Lindley, *Bot. Reg.* 14: 1175 (1828).

"Var. LATIFOLIA. Caulis magis dilatatus ad basin; folia plura, late ovata, 6–9 uncias longa, 2–3½ uncias lata, obtusa vel acuta; scapus elatus angulatus et breviter alatus; flores fusco-virides vel flavi, labello fusco; sepalum posticum lanceolatum ligulatum obtusum, lateralia lanceolata latiora subacuta haud falcata." — Ridley, *loc. cit.*

The following is a fuller description of the above-named variety: Pseudobulbs 2–8 cm. high, 1–3 cm. thick, concealed at first by the leaf-sheaths, elongated-pyriform or conical, compressed, arising from a whitish rhizome; each year the last formed pseudobulb shrivels as the new one forms, so that each plant is usually composed of a leafless pseudobulb and a new growth. Roots numerous, fibrous. Leaves 3–5, 7–12 cm. long, 1.5–9 cm. broad, ovate to elliptic-lanceolate, acute, smooth, plicate, broadly petiolate. Peduncle terminal, strongly winged, suffused with madder-purple. Bracts triangular-lanceolate, acute, 1 cm. or less long. Floral bracts 7–8 mm. long, shorter than the ovaries. Racemes many-flowered, lax. Lateral sepals ovate-oblong, sub-acute, margins strongly revolute, 6 mm. long, about 4 mm. broad. Upper sepal linear-oblong, obtuse, about 8 mm. long. Petals linear-oblong, margins revolute, about 7 mm. long, obtuse. Lip obcordate, emarginate, bituberculate near the base. Flowers green suffused with madder-purple. Ovary strongly winged, more or less tuberculate. Column arcuate above, about 3 mm. long, winged, with a small tooth on each side at the summit. Pollinia 4, in pairs, unappendaged, somewhat reniform. Anther 2-celled. Fruit a turbinate or obovoid capsule, 1–1.5 cm. long.

That *Liparis elata* should have been confused with *L. bituberculata*, Lindl., shows clearly that the two species are closely allied. The latter is a native of the Eastern hemisphere, where it has been found in India, Ceylon, and Formosa. It is at once distinguish-

able from the American species by its slender pseudobulbs, which are leafy near the top, and by its much smaller floral bracts. Messrs. King and Pantling in their work on the Orchids of the Sikkim Himalaya are inclined to consider the two conspecific, but rely more on circumstantial evidence than on a comparison of authentic material, and their suggestion that Lindley's plant, of which a plate was published in the Botanical Register, really came from the Himalaya, and not, as reported, from Brazil, is not at all acceptable. That Lindley should have reduced the *Cymbidium* ? *bituberculatum* of Hooker's Exotic Flora to *L. elata* is not sufficient evidence that the two are really conspecific as Messrs. King and Pantling are led to believe. The plates in the Botanical Register and in the Exotic Flora are both faithful characterizations so far as the habit is concerned of the species they represent, and while there may be reasons, along broad lines, to combine the Asiatic and the American species, their differences are sufficient to prevent confusion, while their geographical position accentuates their individuality.

The first plants of *Liparis elata* found in the United States were collected in 1903 by James E. Layne, who discovered the present variety near Everglade, on the last expedition he made before his death. These plants were sent to North Easton, but failed to mature the flower shoots which were just pushing up, so that only a provisional determination of the species could be attempted. In 1904 another collection of plants was made, presumably from the same locality visited by Layne, and from these the material was drawn which renders a sure diagnosis possible, and furnishes the accompanying plate.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the localities here indicated :

- Florida : Fahkahatchie Swamp, near Everglade, July, 1903, *J. E. Layne* ; June 11, 1904, *A. A. Eaton* (no. 1133½).
Porto Rico : Prope Faburoa in sylvâ primæva ad Guayabota, September 26, 1896, *P. Sintenis* (no. 5150). — Prope Utuado in

sylva primæva montis Mameyes ad Vega Grande, March 20, 1887, *P. Sintenis* (no. 6606).

The variety has also been ascribed to the following localities:

Cuba: *Poeppig*; *Wright* (no. 1495).

Porto Rico: *P. Sintenis* (nos. 497, 1879, 2355, 2884, 5716, 5963, 6071).

Colombia: Prope Tolima ad Rio Paêz et Rio de la Plata, alt. 1000–1600 m., *Lehmann* (no. 2782).

Brazil: Prov. Rio Janeiro, locis petrosis ad Gavea prope Boa Vista, *Glaziou* (no. 5702). — Secus flum. Paquequer ad Carmo, *Neves-Armond* (no. 121). — Ad Suruhy, *J. de Moura* (no. 310). — Prov. Minas Geraes, locis umbrosis supra saxa ad Caldas, *Regnell* (ser. III., no. 1144).

EXPLANATION OF THE PLATE

PLATE 13: LIPARIS ELATA, VAR. LATIFOLIA

The living plants here represented were collected by Mr. A. A. Eaton at Fahkahatchie, Fla.

1. Petal.
2. Lateral sepal.
3. Pollinia.
4. Flower enlarged.
5. Front view of the flower.



LIPARIS ELATA, Lindl. VAR. LATIFOLIA, Ridley

HABENARIA REPENS

- Habenaria repens**, Nuttall, *Gen. N. A. Pl.* 2: 190 (1818).
 — Elliott, *Bot. So. C.* 2: 489. — Eaton & Wright, *No. Am. Bot.* 260. — Lindley, *Orch. Pl.* 310. — Chapman, *Fl. S. U. S.* ed. 1, 461; ed. 3, 487. — Darby, *Bot. So. Sts.* 527. — Cogniaux, *Martii Fl. Bras., Orch.* 1: 91. — Hemsley, *Biol. Centr. Am., Bot.* 3: 306. — Kränzlin, *Engl. Bot. Jahrb.* 16: 135 (1893); *Orch. Gen. Sp.* 1: 317. — Small, *Fl. Se. U. S.* 315. — Ames, *Contr. Orch. Fl. Fla.* 11. — Mohr, *Pl. Life Ala.* 455.
- Habenaria tricuspis**, Richard, *Fl. Cub.* 2: 249. — Grisebach, *Cat. Pl. Cub.* 271.
- Habenaria radicans**, Grisebach, *Cat. Pl. Cub.* 271 (synonym merely, without characterization, applied to Wright's no. 3309 and attached to *H. tricuspis* for no discoverable reason).

“Root creeping; leaves and bractes lanceolate, acute; lip 3-parted, lateral segments setaceous; spur scarcely the length of the germ, adscendent; inner petals biparted, the lower segment setaceous. HAB. On the margins of ponds near Savannah in Georgia and in Carolina; subaquatic. OBS. Root perennial, fibrous, creeping, base of the stem also radicant; fibres lanuginous. Stem leafy, about 12 inches high. Leaves oblong-lanceolate, approximate, in the spike diminishing to bractes, which are about equal with the flowers. Spike linear, 3 to 5 inches long. Flowers yellowish-green, numerous, but not dense. Outer segments of the calix glandularly mucronulate, upper segments vaulted; the 2 inner petals bifid nearly to the base, with the divisions so unequal and divaricate as to appear unconnected, the upper one linear and acute, the lower setaceous; lip 3-parted, the central portion shorter and linear, the 2 lateral setaceous.” — Nuttall, *loc. cit.*

Plant 15–65 cm. high, stout or slender, leafy. Roots elongated, fibrous. Leaves linear-oblong to oblong-lanceolate, acute, 5–20 cm. long, 5–20 mm. broad. Bracts oblong-lanceolate, acute, nearly equalling or exceeding the ovaries. Flowers 12 mm. across, in loose or dense racemes, often numerous. Racemes 4–28 cm. long, 1.5–3 cm. through. Lateral sepals about 6 mm. long, 3 mm. across, ovate-lanceolate. Upper sepal 5 mm. long, apiculate, nearly orbicular, concave. Petals bipartite; posterior division erect, falcate, oblong-lanceolate, acute, 4 mm. long; anterior division longer, setaceous, acute, falcate, curved, erect. Labellum tripartite to within 1.5 mm. of the base, strongly deflexed, 5–7 mm. long; lateral divisions nearly parallel with the broader central one, setaceous. Spur filiform, 9–13 mm. long, about as long as the ovary, variable.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from localities here named:

Georgia: Fresh marshes of Altamaha River, just below Darien, McIntosh Co., September 17, 1903, *R. M. Harper* (no. 2002).

Florida: Low pine woods, Oviedo, Orange Co., May 31, 1904, *A. A. Eaton* (no. 1025). — Ft. Lauderdale, Dade Co., November 19, 1903, *A. A. Eaton*.

Cuba: 1860–64, *C. Wright* (nos. 3305, 3307).

The species has also been ascribed to the following localities:

North Carolina: Chapman, *Fl. S. U. S.* 461. — M. A. Curtis, *Geol. & Nat. Hist. Surv. N. C., Bot.* 54.

South Carolina: "I have found it also near Beaufort and Charleston." — Elliott, *loc. cit.*

Alabama: Mohr, *loc. cit.*

Louisiana: Small, *loc. cit.*

Antilles and tropical America in general: Kränzlin, *Orch. Gen. Sp.* 1: 318; Cogniaux, *loc. cit.*

Guatemala: Duenas, 4950 ft. (*Salvin*), Hemsley, *loc. cit.*

Brazil: "Prov. Goyaz (*Gardner*, N. 3990!)," Kränzlin, *loc. cit.*

— Ad. Blumenau, Prov. S. Catharina (*E. Ule*, n. 873), Cogniaux, *loc. cit.*

EXPLANATION OF THE PLATE

PLATE 14 : HABENARIA REPENS

The drawing was prepared from living plants collected by Mr. A. A. Eaton, May 31, 1904, at Oviedo, Fla. Two plants are represented natural size, with a detached flower, enlarged, and an enlarged petal between them.



BLANCHE AMES. C.

HABENARIA REPENS, Nutt.

CYRTOPODIUM PUNCTATUM

- Cyrtopodium punctatum**, Lindley, *Orch. Pl.* 188 (1833); *Sert. Orch.* t. 12. — Drapiez, *Encyclogr.* 4: August, 1836, fig. 1. — W. Hooker, *Bot. Mag.* t. 3507. — Mutel, *Mém. Orch. Nouv.* 2: 13. — Reichenbach, f. *Linnæa* 18: 404 (1844); *Bonplandia* 2: 19 (1854); 3: 67 (1855); *Walp. Ann.* 6: 666. — Beer, *Prakt. Stud. Fam. Orch.* 226, t. C, fig. 8. — Duchartre, *Man. Gen. Pl.* 4: 520. — Grisebach, *Cat. Pl. Cub.* 265. — Sauvalle, *Fl. Cub.* 230. — Du Buysson, *L'Orchid.* 299. — J. E. Planchon, *Fl. des Serres* 22: 179, t. 2352 (1877). — Hemsley, *Biol. Centr. Am., Bot.* 3: 249. — Warner & Williams, *Orch. Alb.* 5: t. 202 (1886). — Godefroy, *L'Orchidophile* 1885, 270, cum tab. col. — Veitch, *Man. Orch. Pl.*, *Cyrtopodium*, p. 38, cum ic. — Stein, *Orchideenb.* 181. — *Gard. Chr.* ser. 3, 12: 396 (1892). — Rolfe, *Lindenia* 8: 19, t. 344. — Bois, *Orch.* 125; *Dict. d'Hort.* 418. — Williams, *Orch. Grow. Man.* ed. 7, 320. — Linden, *Orch. Exot.* 722. — *Gard. Chr.* ser. 3, 21: 232 (1897). Cogniaux, *Dict. Orch.*, *Cyrtopodium*, t. 1. — Ames, *Contr. Orch. Fl. Fla.* 20. — De Puydt, *Orchideés* 191. — Cogniaux, *Martii Fl. Bras., Orch.* 2: 358.
- Heleborine ramosissima cauliculis et floribus maculosis**, Plumier, *Cat.* 9 (1703); *Pl. Amer. Burm.* 182, t. 187.
- Epidendrum punctatum**, Linnæus, *Syst. Nat.* 2: 1246 (1760); *Sp. Pl.* ed. 2, 2: 1349 (1763). — Swartz, *Nov. Act. Ups.* 6: 68; *Schrad. Jour. Bot.* 2: 211 (1799). — Willdenow, *Sp. Pl.* 4: 116. — Persoon, *Syn. Pl.* 2: 518.
- Cymbidium trinerve**, Meyer, *Prim. Fl. Essequib.* 258 (1818). — Lindley, *Orch. Pl.* 169.
- Epidendrum gigas**, Velloso, *Fl. Flum. Ic.* 9, t. 20 (1827). — *Text. ed. Netto, Arch. Mus. Nac. Rio.* 5: 361 (1881).
- Cyrtopodium Willmorei**, Knowles & Westcott, *Fl. Cab.* 1: t. 4 (1837).
- Oncidium palmophilum**, Mart. *Herb. ex Lindley, Sert. Orch.* sub. t. 12 (1838).

Cyrtopodium speciosissimum, Hort. ex Du Buysson, *L'Orchid.* 299 (1878). — *Fl. des Serres* 22: 179 (1879).

Cyrtopodium tigrinum, Linden, *Ill. Hort.* 28: 95 (1881). — *nomen tantum*.

Cyrtopodium Saintlegerianum, Reichenbach, f., *Flora* 68: 301 (1885); *Gard. Chr.* n. ser. 23: 756 (1885); ser. 3, 4: 180, fig. 20 (1888); *L'Orchidophile*, 1885, p. 195; *Jour. Hort.* 12: 255, fig. 46 (1886); *Kew Bull.* add. ser. 4: 140.

Cyrtopodium punctatum, var. **Saintlegerianum**, Hort., Stein, *Orchideenb.* 181 (1892). — Williams, *Orch. Grow. Man.* ed. 7, p. 320.

This species was first described in 1703 by Plumier as follows: "Helleborine ramosissima cauliculis & floribus maculosis," and later, in January, 1833, published by John Lindley in *The Genera and Species of Orchidaceous Plants*, p. 188, as *Cyrtopodium punctatum*, with the following characterization: "C. foliis lanceolatis plicatis, scapo paniculato, vaginis maximis laxis membranaceis, sepalis petalisque undulatis acutis maculatis, labelli lobis lateralibus cuneatis intermedio rotundato papiloso. . . . Discus labelli inter lobos laterales tuberculatus."

Pseudobulbs 17–30 cm. or more high, 1.5–3 cm. thick, elongated fusiform with about fourteen articulations; the old pseudobulbs naked or clothed with whitish scarious bracts, the more recent ones leafy. Leaves linear-lanceolate, acute, plicate, distichous, spreading, at length drooping, distinctly 3–5 nerved, 1–6 dm. long, 1–3 cm. wide. Scape lateral and basal, stout, jointed, inflorescence paniculate above. Bracts 5–12 cm. long, sheathing, oblong-lanceolate, undulate margined, similar in coloration and maculation to the sepals. Sepals oblong-lanceolate, acute, similar, margins strongly undulate, greenish-yellow, irregularly marked with oblong, madder-brown spots; the upper one 8–25 mm. long, 8–11 mm. wide, lateral ones 15–20 mm. long, 7–9 mm. wide. Petals obovate, shortly clawed or sessile, inserted at the base of the column, where it curves into the foot, bright yellow,

sparsely and irregularly spotted with madder-brown, 15–21 mm. long, 9–12 mm. wide. Lip with a narrow claw inserted on the long exserted foot of the column and articulated with it, about 1.5 cm. long, 3-lobed; lateral lobes larger than the middle one, asymmetrical, rounded, erect, arching over the column, madder-brown, yellow at the base; middle lobe much broader than long, with a verrucose rigid margin, narrowly sub-reniform, yellow in the centre, otherwise madder-purple; from the base of the lip to midway between the lateral lobes is a narrow grooved callus which terminates in a verrucose tubercle. Column wingless, semiterete, dilated above, narrowed below, with a foot exserted at right angles to it. Anther operculate. Pollinia 2, contiguous, sessile on an ovate triangular disc.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from the following localities:

- Florida: Angell's Island, near Miami, November, 1903, *A. A. Eaton*. — Alapattah, on rotten wood, May 28, 1904, *A. A. Eaton* (no. 1005). — Miami, March, 1877, *A. P. Garber*, *M. D.* — Madeira Hammocks, southern Dade Co., December, 1903, *A. A. Eaton*. — Tiger Key, on decaying log, April 23, 1891, *J. H. Simpson* (no. 313). — Near Everglade, June 9, 1904, *A. A. Eaton* (no. 1121). — Cape Romano, April, 1887, *E. N. Reasoner*. — Naples, March, 1904, *O. Ames* (hb. Ames, no. 6053).
- Cuba: 1860–64, *Chas. Wright* (no. 3320). — Prov. Santa Clara, Cienguita, March 9, 1895, *R. Combs* (no. 640). — Prov. Santa Clara, Limones, March 5, 1902, *Hugo Bohnof* (no. 292). — Limones, March 10, 1904, and March 24, 1904, and April, 1904, *R. M. Grey*.
- Porto Rico: "Prope Utuado ad arbores vetustæ in scopulosis calcaris ad Caynso, March 25, 1887," *P. Sintenis* (*Plantæ Portoricensis*, no. 6559).

The species has also been attributed to the following localities:

- Cuba: In arboribus prope Monteverde, *Eggers* (no. 5115). — In arboribus savannæ de Mascariges, *Poeppig*.

San Domingo: *Mackenzie*.

Mexico: In rupibus ad Malpayo de Naulingo, *Schiede*; Jalapa, *Liebold*.

Guatemala: Hb. Kew.

Colombia: *Warszewicz, Wagener*. — Prov. Bogota near Pandi, *Bonpland*.

Venezuela: Locis aridis prope Merida, altit. 1700 m., *Linden*. — Near Caracas, *Wagener*.

British Guiana: *Pollard* (no. 112); *Parker*; *Appun* (no. 886); *Jenman* (nos. 1983, 5902). — Along the Essequibo, *Meyer*.

Dutch Guiana: Surinam, *Kegel*.

French Guiana: *Poiteau*. — Near Cayenne, *Leprieur*.

Peru: *Pavon, Haenke*. — Ad fontes flum., Marañon, *Warszewicz*.

Brazil: Prov. Piauhy, *Gardner* (no. 2762). — Prov. Pernambuco, *Gardner* (no. 1161). — Prov. Bahia, *Blanchet* (1424). — In palmis aliisque arboribus sylvæ Catingas ad Rio de Contas, *Martins* (no. 1965). — In arenosis ad Rio Belmonte, *Prince Max. Neuwied*. — Prov. Goyaz, *Gardner* (nos. 3458, 3459). — In campis aridis ad Sertao d'Amaroleite, *Weddell* (no. 2791). — Ad Serra dos Pyreneos, *E. Ule* (no. 3117). — Prov. Minas Geraes, *Glaziou* (no. 16367). — Ouro Preto, *Glaziou* (no. 15657). — Prov. Rio de Janeiro, *Riedel* (no. 20); *Glaziou* (15643). — Brasilia Austro-orientali, locis accuratis haud indicatis, *Sellow Weir*. — Territ. Missionis ad campo Grande Yubal, *Niederlein* (no. 233).

Paraguay: Paraguay centrali, *St. Léger*.

Argentine: Prov. Oran secus Rio Vermejo prope La Embarcacion, *Lorentz & Hieronymus* (nos. 289, 503, 539).

EXPLANATION OF THE PLATE

PLATE 15: CYRTOPODIUM PUNCTATUM

The plate was drawn from living plants collected in Florida.

1. Column and lip.
2. Column with foot.
3. Pollinia.



CYRTOPODIUM PUNCTATUM L.

DENDROPHYLAX LINDENII

Dendrophylax Lindenii, Rolfe, *Gard. Chr.* 1888, 2: 533. — Chapman, *Fl. S. U. S.* ed. 3, 482. — Small, *Fl. Se. U. S.* 327.

Aëranthus Lindenii, Reichenbach, f., *Walp. Ann.* 6: 902 (1861). — Grisebach, *Cat. Pl. Cub.* 264. — Sauvalle, *Fl. Cub.* 229.

Angræcum Lindenii, Lindley, *Gard. Chr.* 1846, 135; *Orch. Lindl.* 1846, 12.

“Mr. Linden’s Angurek, which he found in the dense forests of Sagua and Nimanima, in St. Jago de Cuba, in September, 1844, has flowers a foot long, including the spur, and of the purest white. The lobes of the lip and the spur being drawn out into very long narrow ribands at the point, each flower seems to have three tails.” — Lindley, *Gard. Chr.*, *loc. cit.*

Under Section *Aphylli* of *Aëranthus* Reichenbach gives (*Walp. Ann.* 6: 902) the following: “*Aëranthus Lindenii*. Huc: *Angræcum Lindenii* Lindl. *Gard. Chron.* 1846. p. 135. Lindl. *Orch. Lindl.* p. 12. N. 67. 1846:

“*Aphyllum*, acaule, radicibus numerosissimis intricatis, sepalis petalisque lanceolatis, labelli trilobi cucullati lobo medio bilobo mucronulo interjecto, laciniis longissimis caudatis divaricatis, calcare longissimo filiformi, capsula ovali laevi stipitata.

“This remarkable plant is a true parasite, if we can judge from the manner in which its roots are planted upon the bark of trees, to which they seem inherent. The flower of the purest white is sometimes a foot in length, including the spur up to the point. When out of flower it is difficult to discover the plant, so much do the roots assume the color of the bark in which they grow. Found September, 1840, at St. Yago de Cuba, in the dense forests of Sagna and Nimanima.”

Stem short, leafless, about 1 cm. long, nearly concealed by the rambling, glaucous roots which are 5 mm. wide. Peduncles rather stout, about 2 mm. thick, 6–15 cm. long, those of previous years persistent. Bracts approximate, obtuse, sheathing the scape, 5–7 mm. long. Inflorescence several-flowered, flowers blooming in succession. Lateral sepals linear-lanceolate, acute, 23–25 mm. long, 5 mm. wide. Upper sepal similar to the petals, 19–21 mm. long, 5 mm. wide. Petals linear-lanceolate, 21–24 mm. long. Body of lip 2.3–2.7 cm. long, cymbæform, with a thickened keel-like median callus within at the base, divided at the apex into two curved ligulate-lanceolate, acute lobes 4.5 cm. long; apiculate between the lobes, and with two small obtuse lobes posterior to them; spur slender, attenuate, 10.5–11.5 cm. long. Column short, 3 mm. long, with 2 acute prominent triangular wings which project down into the lip and conceal the stigmatic surface. Anther round-reniform, or merely emarginate in front, imperfectly 2-celled. Sepals and petals yellowish green, lip white. Fruit an elongated capsule, 6–8 cm. long, 6–7 mm. thick. Flowers fragrant, recalling the odor of *Convallaria majalis*.

Dendrophylax Lindenii is a variable species in the size of the flowers and in the length of the spur and peduncle, and sometimes produces a much-branched, many-flowered inflorescence. In my herbarium there is a specimen with seven flowers on a seven-branched peduncle, collected in Florida in June, 1904. The plants are leafless, and the roots, which are always dorsiventral and closely appressed to the bark over which they creep extensively, are provided with permeable places which permit the interchange of gases. The roots are provided with chlorophyll and serve as the only organs of assimilation, a phenomenon which also obtains in *Campylocentrum porrectum*, an orchid already described on another page. In the fresh state the roots show longitudinal broken lines of white, which indicate the permeable places just referred to. On the west coast of Florida where I have collected this species, the plants are often abundant, their roots reaching several feet in length and intermingling with the roots of adjacent *Dendrophylax* plants so

as to form compact masses. *Dendrophylax Lindenii* is not a parasite as some authors have supposed, but, as in the case of other leafless species such as those of *Tæniophyllum* and *Campylocentrum*, depends on chlorophyll-bearing roots for subsistence.

The genus *Dendrophylax* was erected by H. G. Reichenbach, f., to receive a Cuban species collected by Charles Wright (no. 1692), and later *Angræcum Lindenii* and another West Indian species, *A. funale*, Lindl., were referred to it. Pfitzer in Engler and Prantl's *Die natürlichen Pflanzenfamilien*, pt. 2, fascicle 6, p. 215, erected the genus *Polyrrhiza* to receive these species, leaving the original *Dendrophylax hymenanthus*, Rehb., f., as a monotypic genus. Although the characters used by Dr. Pfitzer to distinguish these genera may be generically valid, it has been deemed best to retain the arrangement adopted by Bentham, as sufficient material of *Dendrophylax hymenanthus* has not been obtainable from which to form a definitive opinion.

GEOGRAPHICAL DISTRIBUTION

I have seen specimens from localities indicated as follows :

Florida: Naples, 1892, *T. L. Mead* (photograph); March 12, 1904, *Blanche Ames & O. Ames* ; March 18, 1904, *O. Ames*.

— Everglade (Fahkahatchie Swamp), June 9, 1904, *A. A. Eaton* (no. 1122).

Cuba : *Chas. Wright* (no. 3303).

EXPLANATION OF THE PLATE

PLATE 16 : DENDROPHYLAX LINDENII

The plate was drawn from an undisturbed plant situated on the bark of a tree near Naples, Fla.



DENDROPHYLAX LINDENII, Rolfe

A DESCRIPTIVE LIST OF ORCHIDACEOUS
PLANTS COLLECTED IN THE PHILIPPINE
ISLANDS BY BOTANISTS OF THE UNITED
STATES GOVERNMENT

PAPHIOPEDILUM, Pfitzer¹

P. Argus, Pfitzer in Engler's Bot. Jahrb. 19: 40 (1894). — *Cypripedium Argus*, Rchb., f., Gard. Chr. 1873, 608: "(Coriifolia tessellata.) Pedunculo elongato; bractea ovarium longe non æquante; sepalo supremo impari a basi late oblonge triangulo, sepalis lateralibus connatis acutis labello bene brevioribus; tepalis ligulatis obtuse acutis porrecto divaricatis ciliatis; labelli sacco juxta ostium retusum utrinque angulato; staminodio semiorbiculari antice retuso medio apiculato utrinque argute unidentato."

Leaves elliptic or oblong-lanceolate, distichous, radical, 12–20 cm. long, pale green, variegated with dark green. Scape erect, pubescent, madder-purple, 3–4 dm. high. Ovary subtended by a ciliate bract 2.5 cm. long. Flowers 6–8 cm. in vertical diameter. Upper sepal broadly ovate, white, veined with green, often finely spotted near the base, margin ciliolate. Lower sepals coherent, smaller than the upper one. Petals slightly deflexed, oblong, about 5 cm. in length, 1 cm. wide, whitish at base, veined with green, madder-purple near the apex, spotted, margins ciliate. Lip inversely helmet-shaped, 3.5 cm. long. Staminodium crescent-shaped, with a tooth midway between the strongly incurved horns.

Closely allied to *P. ciliolare*, Pfitzer, from which species it may readily be distinguished by its petals' being spotted nearly to the apex. The petals of *P. ciliolare* are rarely spotted on the apical third.

¹ Genera follow sequence adopted by Engler & Prantl.

“From La Trinidad, where it grew in red clayey soil of southern grassy slopes in the pine region,” Baguio, Prov. Benguet, Luzon, May, 1904, *A. D. E. Elmer* (no. 6296).

HABENARIA, Willd.

H. muricata, Vidal, Phan. Cuming. Philipp. 80, 82, 83, 151 (1886). — *Dissorhynchium muricatum*, Schauer, Nov. Act. Nat. Cur., vol. 19, Suppl. I. 434 cum. t. 13 (A) (1843): “Herba pedalis paulloque altior, tuberibus testiculatis, habitum *Platantheræ* vel *Gymnadeniæ* quodam modo imitans. Vaginæ ad collum nonnullæ aphyllæ. Sequuntur folia 4–5 inferiora, approximata, caulinis multo maiora, membranacea, oblongo-lanceolata, acuminata, basi attenuata sessilia, costata, plurinervia, plana, 4–6 poll. longa; caulina sursum decrescentia, semiamplexicaulia, e basi ovata longe acuminata, superne continue in bracteas subscariosas trans-euntia. Caulis simplex, costis elevatis a foliis decurrentibus muricatis scaber, superne inter flores angulatus muricibusque longioribus crebrioribusque conspersus. Spica laxa, multiflora. Flores mediocres, ovario ultra 6 lin. longo in costis scabro apice attenuato insidentes, inversi; sepala lateralia trapezoidea reflexa, superius cucullato-fornicatum 2 lin. longum et cum petalis contiguis 2 lanceolatis erectum: quæ cuncta pallide rosei vel incarnati coloris fuisse videntur. Labellum circa gynostemii basin in faucem brevem infundibuliformem ampliatur, in calcar clavatum horizontale ovario conspicue longius decurrens; limbus dependens, saturatius tinctus, inæqualiter tripartitus, laciniis (4 lineas longis) linearibus involutis tortilibus apice sæpius circinatis. Pollinia clavata maiuscula, caudicula 2 lin. fere longa prædita. Rostelli crura et antheræ processus e flore effæto lamellarum 4 distinctarum instar fauci conspicue imminent.”

Stem 30 cm. or more high, muricate. Leaves 3–4, basal, elliptic. Bracts lanceolate. Raceme lax. Flowers small. Lateral sepals trapezoidiform, reflexed. Petals simple. Labellum tripartite, divi-

sions filiform, about 8 mm. long. Spur clavate. Ovary somewhat shorter.

In shaded forests, Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, October, 1903, *E. D. Merrill*. — In woods, Lagiamanoc, Prov. Tayabas, Luzon, October 15, 1904, *H. N. Whitford* (908).

MICROTIS, R. Br.

M. unifolia, Rchb., f., Beit. Syst. Pl. 62 (1871). — *Ophrys unifolia*, G. Forster, Prodr. Fl. Ins. Aus. 59 (1786): "O. *unifolia*, bulbo ovato, scapo tereti vaginato, folio tereti fistuloso reflexo, in medio pro emittendo scapo perforato." — *Microtis porrifolia*, Spreng., Syst. Veg. 3: 713 (1826).

Plant slender, 3 dm. high, monophyllous, from a small globular subterranean tuber. Roots fibrous. Leaf about 15 cm. long, terete, shortly opened out near the stem and continued in a closed sheath down the stem. Flowers minute, in a strict raceme, about 10 cm. long. Lip ligulate, obtuse, bicallose near the base, with a papillose protuberance near the apex; margin crisped or crenate.

Dry sunny knoll, Baguio, Prov. Benguet, Luzon, January 19–February 26, 1903, *D. LeRoy Topping* (no. 97).

CORYSANTHES, R. Br.

C. MERRILLI, *sp. nov.* Plantula nana, glabra. Tubera solitaria, globosa. Folium cordato-ovatum, acuminatum, utrinque glabrum, textura membranacea, 7–21 mm. longum. Pedunculus brevis. Bractea lineari-subulata. Flos fere sessilis, atropurpureus. Phylla perigonii lateralia exteriora et interiora filiformia longissima. Sepalum supremum ellipticum, maximum, galeatum, obtusum. Labellum gynostemium amplectens, ad imum scrotiformi-bicalcaratum, superne recurvum, limbus integerrimus. Columna brevis, bialata.

Bulb about 5 mm. in diameter, roundish. Stem up to 5 cm. high, bearing at the summit a cordate-ovate, shortly acuminate leaf,



CORYSANTHES MERRILLI, Ames

1, front of lip; 2, side of lip; 3, dorsal sepal;
4, column.

7–21 mm. long. Bract exceeding the ovary, lance-acuminate, 7–10 mm. long. Flower up to 1.5 cm. from the base of perianth to the tip of the upper sepal. Upper sepal cucullate or galeate, elliptic, obtuse, lateral sepals and petals filiform, similar, about equally (23 mm.) long, erect (?). Labellum with margins coherent near base, tubular, dilated into a broad limb strongly recurved at the apex and abruptly apiculate, at the base produced into two short saccate horns, the margin entire. Column short, bialate near the summit. This appears to be an extremely variable species in the size of the leaf and flower.

“On mossy shaded cliffs,” Mt. Mariveles, Prov. Bataan, Luzon, August 8, 1904, *E. D. Merrill* (no. 3871).

POGONIA, Juss.

P. (Nervilia) dilatata, Blume, *Fl. Jav., Orch.* 127, t. 10, fig. 4 (1858): *Coll. Orch. Arch. Ind.* 151, t. 10, fig. 4. Under *Pogonia punctata*, Blume, the following note in the passages cited constitutes the original description of this species: “Alia nova Species huic affinis e Borneo australi, cujus nihil præter scapum florigerum cognovi, est *P. dilatata*, cujus analysis in *Tab. 10. fig. 4* e specimine sicco facta est. Character specificus hic fere est: *P. dilatata*: scapo unifloro; labelli trilobi lobo medio majore obovato-spathulato obtusissimo venoso imberbi, lobis lateralibus obtusis. — Florem anthesi in scapo nutantem esse, satis probabile. Nervus

e basi labelli in axe assurgens in lobo medio majore dividitur in ramulos s. venulas magis teneras, e quibus ramuli primarii papillis minutissimis conspersi.”

Bulb globose, about 1 cm. in diameter. Scape 5–11 cm. long, 1–1.5 mm. thick, purplish, with 2 or 3 tubular acute bracts, 1.2–2.5 cm. long. Floral bracts obtuse, 2–5 mm. long, enclosing the pedicel. Sepals and petals similar, linear-lanceolate, acute. Upper sepal 9–13 mm. long, 2 mm. broad. Lateral sepals 8–12 mm. long, 1.5 mm. wide. Petals 8–10 mm. long, 2 mm. wide. Labellum trilobed; middle lobe rhombic-obovate or sub-orbicular, obtuse; lateral lobes triangular-lanceolate, acute, half as long as the lip, erect, enclosing the column (?); veins on the disc minutely papillose. Flowers pink-purple.

Sablan, Prov. Benguet, Luzon, April 18, 1904, *A. D. E. Elmer* (no. 6259).

STEREOSANDRA, Blume

S. javanica, Blume, Mus. Bot. Lugd.-Bat. 2: 176 (1852): “STEREOSANDRA BL. Perigonii erecto-conniventis phylla linearia, subæqualia, dorsale a reliquis nonnihil divergens. Labellum conforme, liberum, erectum, basi biglandulosum. Gynostemium breve, teretiusculum, erectum, ovario oblique insidens. Anthera terminalis, stipitata, arrecta, obtusa, carnosa, basi bilocularis, rostello brevi accumbens ac supra illud alte prominens. Pollinia 2, granulosa, caudiculæ communi affixa. — Herba javanica, terrestris, aphylla; rhizomate tuberoso; scapo vaginato, floribus racemosis, albidis, apice violaceis. * * *

“*Stereosandra javanica* Bl. — In umbrosis circa Harriang in provinciâ Bantam Javæ occidentalis.” — Plates 10 (3) and 11 (G), Blume Fl. Jav. (Orchideæ).

Plants slender, 2–3 dm. high, leafless, from a subterranean ellipsoidal tuber. Bracts sheathing, lanceolate, acute, closely appressed to the scape, streaked with purple. Raceme loosely flow-

ered, flowers 7–12, drooping. Floral bracts linear-lanceolate, 4–8 mm. long, with purple veins. Pedicel slender, wiry, 2 mm. long. Ovary ellipsoidal, 5–7 mm. long. Segments of the perianth subconnivent, 7.5 mm. long, whitish, tipped with mauve. Sepals and petals linear-lanceolate. Lip sessile, broader than the sepals and petals, oblong-oblongeolate, obtuse, bicallose at the very base. Column erect, rather slender below, dilated above. Anther large, erect, 2.5 mm. high, oblong. Pollinia 2, granulose. Fruit an ellipsoidal capsule, 9 mm. long.

“Erect from fleshy tubers in deep hard woods. Flowers pendulous from short ascending pedicels, the subtending bracts as well as those on the stem purplish streaked: corolla segments purplish, the upper one recurved, the lower one (lip) broadest,” Twin Peaks, Prov. Benguet, Luzon, June 11, 1904, *A. D. E. Elmer* (no. 6458).

EPIPOGUM, Gmel.

E. nutans, Rchb., f., in *Bonplandia* 5: 36 (1857). — *Galera nutans*, Blume, *Bijdr.* 416 (1825):

“GALERA.

“*Perianthii* sepala conniventia; interiora latiora. *Labellum* basi obtuse calcaratum, concavum; limbus indivisus, undulatus. *Gynostemium* breve, crassum, fornicatum. *Anthera* interne infra apicem affixa, turbinata, carnosa, bilocularis, loculis bilocellatis. *Massæ pollinis* duæ, subbilobæ, granulosæ, pedicellatæ, pedicellis arcuatis, ad latus exterius antheræ affixis. *Ovarium* sub flore coarctatum.

“Affinis videtur *Arethusæ*.

“Herba terrestris, caulescens. Radix tuberosa. Caulis aphyllus, stipulatus, apice spicato-multiflorus. Flores pedicellati, bracteati, nutantes.

"GALERA NUTANS.

"*Crescit*: in sylvis altioribus montis Salak. *Floret*: Decembri."

Plants about 3 dm. high, fleshy, whitish, bracteose. Bracts distant, membranaceous. Pedicels filiform. Flowers drooping. Perianth about 1 cm. long. Sepals and petals narrowly lanceolate, acuminate. Labellum concave, enclosing the gynostemium, at base produced into a short, blunt spur; limb ovate, acuminate, somewhat erose undulate, upper surface papillose. Column short, fleshy. Anther large, sub-quadrate. Pollinia 2.

"Terrestrial, waxy white," Todaya, Davao, Mindanao, April 25, 1904, *E. B. Copeland* (no. 1241). — Nueva Viscaya, Luzon, May 28, 1902, *E. D. Merrill* (no. 231).

SPIRANTHES, Rich.

S. australis, Lindl., Bot. Reg. sub. t. 823. — *Epipactis foliis plerisque ex lineari lanceolatis*, Gmelin, Fl. Sib. 1: 13, 14: "Structura et hirsutia floris omnino eadem, ac priori. Tria cuculli petala interius, duo alarum exterius disposita, omnia ex ovato acuta, concava. Labellum nectarium carinatum, acutum, anterius crenulatum, lineare, album, vel saltem vix ulla rubedine tinctum, cum petala suave rubeant, aut purpurascant. Radix tribus, quatuor et quinque crassiusculis albicantibus fibris, diversæ longitudinis, uncialibus et triuncialibus, sæpe leviter bifidis, componitur.

"Folia radicalia multa, pleraque ex lineari lanceolata, prælonga, longisque petiolis alatis innata, quædam etiam latiuscula et breviora, caulina omnia ex lineari lanceolata, venis longitudinalibus uti in lino, prædita, lætissime viridia.

"Caulis dodrantalis et pedalis, sæpe leviter tortus, rotundus et viridis, versus superiora et in scapo brevibus pilis hirsutus.

"Nescio, an cucullus tripetalus ad distinctionem generis sufficiat. De eo dubitasse videtur STELLERUS, qui priorem huius generis speciem cum RUPPIO ad *Helleborinen* retulit.

“In pratis humilioribus *Ircutiæ* et in muscosis *Catharinopolis* ibi sub medium Iulii, hic sub initium Augusti florentem vidi.”

Plants 17–30 cm. or more high, slender. Leaves linear-oblong, acute, 6–14 cm. long. Stem smooth above. Rhachis smooth or sometimes sparsely pubescent. Floral bracts longer than the ovaries. Perianth pink-purple, about 4 mm. long, deflexed. Lateral sepals triangular-lanceolate, acute, 3-nerved, 4 mm. long. Petals oblong, slightly sigmoid, obtuse, 3.5 mm. long. Lip dilated above, sub-truncate, irregularly crenulate on the margin, constricted near the middle; basal half rounded, with two obtuse, short calli at base. A variable, widely distributed species, sometimes producing white flowers. Plants are not infrequently found to be glandular pubescent near the top of the stem. In habit they resemble *S. tortilis*, Richard, of tropical America.

Baguio, Prov. Benguet, Luzon, June, 1904, *A. D. E. Elmer* (no. 6623).

HETÆRIA, Blume

H. oblongifolia, Blume, Fl. Jav. 4: 85 (1858). — *Etæria oblongifolia*, Blume, Bijdr. 410 (1825): “E: foliis ovato-oblongis, floribus laxè spicatis externe glanduloso-puberulis, labelli limbo ovato-fornicato.”

Rhizomes creeping. Plants 3–5 dm. high, puberulous above, leafy. Leaves 4–9 cm. long, elliptic-lanceolate, acuminate, chartaceous, petiolate. Petioles winged, dilated-tubular where they sheath the stem. Bracts linear-subulate, tinged with purple (?), those of the inflorescence equalling or exceeding the ovaries. Raceme spicate, slender, 9 cm. long, about 5 mm. in diameter. Flowers small. Perianth 2–2.5 mm. long, pubescent. Lateral sepals ovate. Upper sepal orbicular-ovate. Petals narrower than the sepals, gradually broadened toward the summit, then asymmetrically acuminate. Lip strongly concave, ovate-oblong, with several lateral setiform appendages near the base along the nerves,

apiculate; margin at the apex involute, thickened, pubescent, apicule cymbiform. Anther rounded at base, triangular-acuminate. Fruit an elliptic capsule, 8 mm. long.

“Terrestrial,” Mt. Mariveles, Prov. Bataan, Luzon, January, 1904, *E. B. Copeland* (no. 272). — “Growing in shade; flowers very small, pink color; alt. 90 m.,” Island of Ticao, Prov. Masbate, March 16, 1904, *Willard W. Clark* (no. 1042).

CŒLOGYNE, Lindl.

C. sparsa, Rchb., f., Gard. Chr. n. ser. 19: 306 (1883): “Erectæ. Pseudobulbis pyriformi-fusiformibus demum falcatis aggregatis diphyllis; foliis cuneato-oblongis acutis; racemo erecto uni-quadrifloro; bracteis ovatis acutis ovaria pedicellata paulo superantibus; sepalis tepalisque ligulatis acutis; sepalis dorso carinatis; labello trifido, laciniis lateralibus semirotondis basi semicordatis antice obtusangulis, lacinia antica semiovata cum seu sine apiculo; carinis ternis per discum subparallelis, nunc rectissimis, nunc flexuosis; androclinii limbo integro. Ex. ins. Philippin. introd. cel. merc. Londini, F. Sander.”

Allied to *Cœlogyne lentiginosa*, Lindl., a Burmese species. Pseudobulbs pyriform-fusiform, 3–4 cm. high, diphyllous. Leaves narrowly elliptic to oblanceolate-acuminate, papyraceous. Raceme erect, several-flowered. Sepals lanceolate-acute, about 2 cm. long, the lateral ones strongly keeled. Petals linear, acute. Labellum 1.8 cm. long, 3-lobed; lateral lobes oblong, obtuse; middle lobe sub-quadrate, obtuse, disc with 3 raised lines, or laminæ. Flowers not fully expanding, whitish, with a brown blotch on the middle lobe of the lip, and with brown marks on the lateral lobes. “The three-lobed lip has brownish hieroglyphical signs and spots on the lateral lacinia, a larger brown lobed dash in front of the keels, darker outside, pallid in the centre, with a small yellow spot on the base of the lip.”—Reichenbach, *loc. cit.*

Mt. Mariveles, Prov. Bataan, Luzon, May 6, 1904, *H. N.*

Whitford (no. 140). — January 30, 1904, *E. B. Copeland* (no. 254). — On mossy rock ledges near streams and on living trees, Baguio, Prov. Benguet, Luzon, March 9, 1904, *A. D. E. Elmer* (no. 5842). — Alt. 350 ft., Mt. Mariveles, Prov. Bataan, Luzon, January 31, 1904, *E. B. Copeland* (no. 273).

PHOLIDOTA, Lindl.

P. imbricata, Hook., *Exotic Flora* 2: t. 138: “*Parasitic. Root* a few simple or branched fibres. *Stems* short, clustered, when young subcylindrical, and clothed with sheathing large scales, brown and membranaceous at the border, in the old plant constituting a rather large, ovato-oblong, subtruncated and sulcated fleshy bulb, partially clothed with the old scales: at the summit bearing only a single broadly lanceolate, acute, erect, striated *leaf*, attenuated and convolute at the base, somewhat waved at the margin.

“From the extremity of the stem, and within the convoluted base of the leaf, arises the solitary flower-stalk, almost a foot in length, slender, pendent, naked, having at the extremity a long, crowded, distichous spike of flowers, which, in the state of bud, are so closely imbricated and concealed with the ovate bractees, that the spike bears an apt resemblance to the tail of some species of serpent. When the flowers expand, the bractees are more apart, the spike becomes much longer, and the flowers are protruded, of a dingy yellow brown or tawny colour.

“The *petals* are nearly equal in size, ovate, subconnivent, the three outer ones broad, very concave, and keeled at the back, the two inner ones smooth, slightly concave. *Lip* equal in length with the petals, standing forward, of a roundish figure, remarkably ventricose, gibbous at the base, 3-lobed, lateral lobes erect, intermediate one reflexed and subtrifid, its colour paler than the petals. *Column* white, rather shorter than the petals, oblong, dilated upwards, and subcucullate. *Anther* fixed just below the summit in front, dark brown, 2-lobed, 2-celled, each cell opening

transversely, and containing a double pollen-mass, united at the base by a granulated gland, each portion obovate, yellow.”

Pseudobulbs 5 cm. or more long. Leaf 14–30 cm. long. Flowers distichous, about 7 mm. long. Capsule ellipsoidal.

Mt. Mariveles, Prov. Bataan, Luzon, January, 1904, *E. B. Copeland*. Although the specimens collected by Dr. Copeland were in fruit, there seems to be no reason to doubt their identity.

This species is figured in Part XII., plate 24, of Van Rhede's *Hortus Malabaricus* and described on page 47. I have given Hooker's description, as it is the first under the correct combination, and as the original description is rather more lengthy than useful.

ACORIDIUM, N. & Meyen

A. sphacelatum, Ames. — *Vide t. 1.*

A. tenellum, N. & Meyen. — *Vide t. 1.*

A. WHITFORDII, Rolfe, *sp. nov.* “Rhizomes stout, woody. Pseudobulbs about $\frac{1}{2}$ inch apart, ovoid-oblong, $\frac{1}{2}$ – $\frac{3}{4}$ lin. long, monophyllous. Leaves petiolate, blade narrowly oblong-lanceolate, apiculate, $2\frac{1}{2}$ –3 in. long, 3 lin. broad. Scape terminal, about 4 inches high, basal half very slender, and bearing a pair of ovate acute sheaths at the base of the inflorescence; spike narrow, many-flowered. Bracts broadly ovate-oblong, obtuse, striate, about a line long. Pedicels shorter than the bracts. Dorsal sepal elliptical, obtuse, 1 lin. long; lateral pair ovate, subobtuse, 1 lin. long. Petals very broadly obovate, 1 lin. long by nearly as broad. Lip broadly oblong, fleshy, apex tricuspidate with obtuse lobes, $\frac{1}{2}$ lin. long. Column very short. — On Mt. Mariveles, Lamao River, in the Prov. Bataan, Whitford, n. 139. Apparently most allied to *A. pumilum*, Rolfe (*Dendrochilum pumilum*, Rehb., f.), which is much larger in all its parts, and has flowers about four times as large. The flowers are not in good condition, the lip being missing

in most cases. Their colour appears to have been dark brown.”
— R. A. Rolfe *in MS.*

PLATYCLINIS, Benth.

P. glumacea, Hemsley, Gard. Chr. n. ser. 16: 655 (1881). — *Dendrochilum glumaceum*, Lindl., Bot. Reg. 1841, Misc. 23: “spicâ conicâ elongatâ apice nutante, bracteis imbricatis distichis glumaceis, sepalis petalisque acuminatis, columnâ apice pectinatâ dentibus lateralibus æquali, labelli trilobi basi bilamellati lobis lateralibus abbreviatis inflexis acutis intermedio orbiculari.”

Pseudobulbs ovoid. Leaves lanceolate, about 3 dm. long. Peduncles filiform, bearing a pendulous raceme of yellowish-white fragrant flowers. Bracts lanceolate. Sepals and petals linear-oblong, acuminate, acute; sepals 8 mm. long, petals 6 mm. long. Labellum 3-lobed, 3 mm. long; the lateral lobes basal, small, acute or obtuse, entire; middle lobe sub-orbicular with two thickened lamellæ on the disc, the lamellæ a deeper yellow than the rest of the perianth. Column short, pectinate at the summit and with two erect horns or arms, one on each side. Pollinia elongated-pyriform.

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, October, 1903, *E. D. Merrill* (no. 3211). — Same locality, “very fragrant, all parts pure white,” September 16, 1904, *T. E. Borden* (no. 1901).

P. latifolia, Hemsley, Gard. Chr. n. ser. 16: 656 (1881). — *Dendrochilum latifolium*, Lindl., Bot. Reg. 1843, Misc. 56: “foliis oblongo-lanceolatis coriaceis trinerviis, pedunculis elongatis apice longè spicatis, labelli lævis lobis basalibus lineari lanceolatis acuminatis ciliatis, laciniis columnâ dentatâ brevioribus setaceis e basi ortis.”

Pseudobulbs about 4 cm. long. Petiole slender, 1 dm. long. Leaves 24 cm. long, lanceolate, broadest above the middle, acu-

minate. Peduncle slender, longer than the leaves. Raceme distichously flowered, about 16 cm. long. Bracts cuneate-pentangular, acute. Sepals and petals oblong-lanceolate, acute, about 8 mm. long. Labellum 4 mm. long, 3-lobed; middle lobe oblong-obtuse; lateral lobes basal, falcate, acute, sparsely ragged-fimbriate. Column arcuate, short, blunt-toothed at the apex, the lateral arms basal, setaceous.

Mt. Arayat, Prov. Pampanga, Luzon, May, 1904, *E. D. Merrill* (no. 3840). — Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, *H. N. Whitford* (no. 242).

CESTICHIS, Thouars

§ DENSIFLORÆ

C. longipes, *comb. nov.* — *Liparis longipes*, Lindl. ex Wall., Pl. As. Rar. 1: 31: "Pseudobulbis longissimis, teretibus, diphyllis; foliis ensiformi-lanceolatis, racemo stricto, multifloro brevioribus; scapo ancipite; labello ovato, acuto, ecalloso, columnæ longitudinæ; petalis linearibus."

Antipolo, Prov. Rizal, Luzon, February, 1904, *Ahern's collector* (no. 469). Specimen in fruit. Raceme densely flowered, 15 cm. long. Pedicels about 6 mm. long. Bracts shorter than the pedicels, linear, acute. Capsule obovoid or obovoid-pyriform. Leaves shorter than the peduncle and raceme, or equalling them, oblong-lanceolate, acute, 15–24 cm. long, 1.5–2.5 cm. wide, conspicuously veined (when dry). Pseudobulbs elongated, clavate, diphyllous, about 4 cm. long.

§ DISTICHÆ

C. benguetensis, Ames. — *Vide t. 3.*

C. Elmeri, Ames. — *Vide t. 3.*

C. Merrilli, Ames. — *Vide t. 3.*

C. Philippinensis, Ames. — *Vide t. 2.*

C. compressa, Ames, supra, p. 8. — *Malaxis compressa*, Blume, Bijdr. 390, tab. 54 (1825): "foliis in bulbo ovato compressiusculo solitariis lanceolato-linearibus basi carinatis, pedunculo compresso, bracteis bifariam imbricatis (pectinatis), limbo orbiculato retuso cum mucrone. (flores aurantiaci.)"

Rhizome creeping. Pseudobulbs monophyllous, 2–4 cm. apart, pyriform, about 3 cm. long. Leaf oblong-lanceolate to linear-lanceolate, acute, 4.5–16 cm. long, 1.5–2.1 cm. wide. Peduncle



CESTICHIS COMPRESSA, Ames
1, anther; 2, column; 3, lip.

slender, about 10 cm. long, shorter than or equal to the leaf, conspicuously bialate, ebracteate. Inflorescence 1.8–3.7 cm. long. Bracts bifarious, approximate, carinate, lanceolate, acute. Pedicels exceeding the bracts, about 1 cm. long, flowers large. Sepals lanceolate, acute, 9 mm. long, about 3 mm. wide. Petals linear-acute, about 1 cm. long. Lip large, orbicular-flabelliform, nearly 1 cm. long, broader than long, margin irregularly dentate, with a dentate mucro at the apex and a bilobed callus in the middle of the short cuneate claw. Column slender, arcuate, thickened above and below the middle.

According to field notes the lip is golden at base and pink tipped, and the sepals, petals, column, and petiole are pink. — Rocky mountain ridge, 3200 ft. above sea level, Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, September 16, 1904, *T. E. Borden* (no. 1816).

OBERONIA, Lindl.

O. iridifolia, Lindl., Orch. Pl. 15 (1830). — *Cymbidium iridifolium*, Roxburgh, Fl. Ind. 3: 458 (1832): "Parasitic, stemless. Leaves bifarious, ensiform. Spikes filiform, drooping. Flowers sub-verticelled. Lip round-reniform, laciniate.

"A very elegant species, found growing on trees in the forests of Silhet; it flowers during the cold season. Here the spikes are solitary from the bosom of the exterior leaf, supported in a pretty long, two-edged peduncle. The flower-bearing part drooping and crowded in a somewhat verticelled form, with innumerable, very minute, beautiful yellow flowers; the five petals oval, and nearly equal; the lip two-lobed, roundish-reniform, with the whole of the margin deeply jagged, and the inside tomentose."

Leaves broadly ensiform, acute, 5–24 cm. long, 1–3 cm. wide, equitant. Inflorescence longer than the leaves, decurved. Peduncle winged, much shorter than the elongated, densely flowered, cylindrical spike. Floral bracts minute, elliptic, erose-ciliate. Flowers very small, subverticillate. Sepals and petals nearly equal, reflexed, the latter erose-margined, the former entire. Lip undivided, emarginate or indistinctly 3-lobed, pectinate-erose. Column minute. Flowers yellowish or greenish, about 2 mm. long. A variable species.

Lamao River, Prov. Bataan, Luzon, January, 1904, *P. T. Barnes* (no. 130).

O. cylindrica, Lindl., Bot. Reg. 1840, Misc. 20: "spicâ densâ cylindrâ, bracteis canaliculatis subciliatis, sepalis petalisque reflexis intùs labelloque cordato truncato fimbriato pubescentibus."

Leaves up to 14 cm. long, about 1 cm. wide, falcate, ensiform, acute, equitant. Raceme about 11 cm. long, longer than the peduncle, cylindrical, exceeding the leaves. Flowers somewhat verticillate, pedicellate. Floral bracts lanceolate, acute, margins

erose. Sepals entire. Petals irregularly and finely toothed, elliptic, obtuse. Labellum somewhat 3-lobed, lateral lobes dentate, apical lobe shortly toothed, cuneate.

Baguio, Prov. Benguet, Luzon, January 19–February 16, 1903, *D. LeRoy Topping* (no. 69).

O. rufilabris, Lindl., Sert. Orch. t. 8, A (1838): “foliis subfalcatis acutis, spicâ sub-verticillatâ completâ, bracteis ovatis aristatis floribus duplò longioribus, petalis lineari-lanceolatis acutis integerrimis, labello trilobo basi tuberculato sepalis longiore: laciniis lateralibus setaceis intermediâ oblongâ bipartitâ lobis acutis divergentibus.”

Leaves 12–52 mm. long, 5–13 mm. wide. Peduncles short, aristate-bracteate. Bracts nearly 1 cm. long. Spike about three times as long as the leaves. Floral bracts lanceolate at base, setaceous, much longer than the flowers, the lower ones nearly 1 cm. long, those at the extremity of the inflorescence shorter and not so conspicuously aristate. Flowers verticillate, light red in color. Sepals ovate, acute, concave, spreading, about 1 mm. long. Petals oblong, entire, spreading. Lip rather fleshy, about 2 mm. long, deeper colored than the rest of the perianth, the upper surface scaberulous, with a minute depression at base under the column; basal lobes filiform; middle lobe deeply cleft into two falcate divergent oblong-lanceolate divisions, separated by a blunt-apexed sinus. Column short, minute; clinandrium toothed. Anther cuspidate. Capsule elliptic, brownish, 3 mm. long. The divergent apical divisions of the lip and the basal filiform lobes (separated by an oblong disc), together with the column, give the appearance of a manikin very much as in the case of the European *Aceras anthropophora*, R. Br., which species has a similar lip.

“Growing on large living hard-wood trees,” Baguio, Prov. Benguet, Luzon, March, 1904, *A. D. E. Elmer* (no. 5839).

O. anceps, Lindl., Sert. Orch. sub. t. 8 (1838): “caule elongato ancipiti, foliis distichis ovatis incurvis obtusis densè imbricatis,

spicâ cylindrâ densissimè imbricatâ, bracteis subrotundo-ovatis erosis, sepalis ovatis, petalis ovato-lanceolatis serrulatis, labello truncato subquadrato obscure 4-lobo : laciniis subæqualibus acutis. — A plant with the foliage of *Aporum anceps*.”

Specimens in fruit. Stems up to 16 cm. high. Leaves 2–3 cm. long, 8 mm. wide, obtuse, conduplicate, imbricate. Raceme about 5 cm. long. Fruit a broadly ellipsoidal sessile capsule, 2 mm. long.

Pagbilao, Prov. Tayabas, Luzon, April, 1903, *E. D. Merrill* (no. 1966) (date on field notes is given as 2/3/03). — “On trees, in shaded ravines,” Culion Island, December 24, 1902, *E. D. Merrill* (no. 569).

CERATOSTYLIS, Blume

C. PHILIPPINENSIS, Rolfe, *sp. nov.* “A dwarf much-branched tufted herb, 4–6 inches high. Stems rather slender, clothed with imbricating striate sheaths, which are tubular below, and oblong-lanceolate and acute above. Leaves terete, fleshy, subacute, $\frac{3}{4}$ – $1\frac{1}{2}$ inches long. Flowers in terminal, few-flowered fascicles. Peduncles slender, 1-flowered, somewhat villous. Bracts ovate, apiculate, concave, $1\frac{1}{2}$ lines long. Pedicels somewhat villous, 1 lin. long. Sepals ovate-oblong, subobtuse, somewhat concave, $1\frac{1}{2}$ lin. long. Petals linear, acute, $1\frac{1}{2}$ lin. long. Lip subcordate-oblong, subacute, $1\frac{1}{2}$ lin. long; disc bearing three slender parallel keels. Column stout, $\frac{3}{4}$ lin. long. — Lamao River, Mt. Mariveles, Prov. Bataan, Merrill, n. 3247; Benguet, Loher. Allied to the Malayan *C. pendula*, Hook. f., but readily distinguished by its longer, more slender leaves, and differences in the structure of the flower.” — R. A. Rolfe *in MS.*

Roots fibrous, densely hairy. Plants of straggling habit, much branched, clothed with rufous, acute, striate bracts. Stem 1–1.5 mm. thick. Leaves solitary, linear, articulate at base. Flowers solitary, white, fragrant. Peduncles less than 1 cm. long, clothed below

with rufous bracts. Floral bracts sheathing at base, then spreading, concave, broadly ovate, acute, longer than the ovary. Lateral



CERATOSTYLIS PHILIPPINENSIS, Rolfe
1, flower with lip and column; 2, petal; 3, lateral sepal; 4, anther; 5, pollinia.

sepal sub-erect, oblong-lanceolate, sub-acute, 5 mm. long, 2 mm. wide, united basally, gibbous, forming a sac which is grooved and blunt. Upper sepal lanceolate, obtuse, 5 mm. long. Petals linear-lanceolate, sub-acute, 3-nerved, tapering gradually from base to apex, 5 mm. long, 1 mm. wide. Labellum entire; blade lanceolate to ovate-lanceolate, thickened on the apical half, 3-nerved, sub-acute, 4 mm. long; claw strongly deflexed, then shortly ascending to the foot of the column. Column exalate, expanded above into the two round lobules of the clinandrium, narrowed below into a distinct foot. Pollinia broadly pyriform.

— A most unattractive plant, which appears to be made up of confused leaves and imbricate, rust-colored bracts. From dried specimens it seems to be a decumbent or prostrate diffuse epiphyte with coriaceous leaves.

Mt. Mariveles, Prov. Bataan, Luzon, October, 1903, *E. D. Merrill* (no. 3247).

C. gracilis, Blume, Bijdr. 306 (1825): "caulibus simplicibus teretibus 1-phyllis, foliis lineari-subulatis semiteretibus, pedunculis 1-4 ovarisque villosiusculis."

A very variable species in the size of stems, foliage, and flowers. Plants rush-like. Stems cæspitose, 12-25 cm. high, erect, clothed at the base with appressed scarious sheaths. Leaf solitary, 4-5 cm. long, nearly terete, jointed with the stem at the point where

the bracteate heads arise. Bracts of the heads triangular, acute, scarious. Ovary oblong, clothed with arachnoid hairs, subtended by a scarious, sheathing, obtuse or acute bract. Lateral sepals united at base round the claw of the lip, forming a scrotiform sac; free portion 2–2.5 mm. long, 1–1.5 mm. wide, ovate-lanceolate; sac 2 mm. long, clothed with arachnoideous hairs. Dorsal sepal 2 mm. long, cucullate, elliptic. Petals lanceolate, about 2 mm. long, less than 1 mm. wide, 1-nerved. Lip 3 mm. long, entire, 3-nerved, cymbiform, fleshy-thickened at the apex; lamina elliptic when spread out, passing below into a distinct claw, jointed with the foot of the column. Column with two obovate, somewhat cucullate, erect stelidia, one on each side at the summit. Capsule elliptic, 9 mm. long. Flowers appearing several at a time.

“Tufted on living trees: flowers inconspicuous, dark red or reddish brown,” Mt. Santo Tomas, Prov. Benguet, Luzon, July 1, 1904, *A. D. E. Elmer* (no. 6555). — Epiphyte, alt. 4500 ft., Mt. Apo, Distr. Davao, Mindanao, April 24, 1904, *E. B. Copeland* (no. 1181).

CALANTHE, R. Br.

C. furcata, Batem., Bot. Reg. 1838, Misc. 28: “foliis ovato-lanceolatis profundè plicatis scapo densè capitato sub-æqualibus, labello columnæ omninò adnato tripartito basi glanduloso-cristato laciniis lateralibus semiovatis apice rotundatis intermediâ cuneatâ divaricatim bilobâ lobis apice serratis, calcare incurvo pubescente apice furcato labello breviorè.”

In habit similar to *C. veratrifolia*, R. Br. Spur slender, shorter than the pedicel, 2.5 cm. long, pubescent. Lateral lobes of the lip much larger than the divisions of the terminal lobe. — In *Folia Orchidacea* Dr. Lindley wrote of *C. furcata*: “Mr. Reichenbach has rightly pointed out the fact that the spur of this species is variable, sometimes being emarginate, sometimes not, and either longer or shorter than the lip.” The specimens I

have examined have both simple and forked spurs. The terminal lobes of the lip are merely crenate, not serrate as Bateman described them from the material collected in Luzon by Cuming. The lip and spur characters are variable, but the large, ovate obtuse lateral lobes of the lip, which are twice as broad and about twice as long as the terminal ones, clearly distinguish this species from the nearly allied *C. veratrifolia*.

Prov. Benguet, Luzon, May and June, 1904, *P. T. Barnes* (no. 976). — Mt. Arayat, Prov. Pampanga, Luzon, May, 1904, *E. D. Merrill* (no. 3839). — Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, October, 1903, *E. D. Merrill* (no. 3251). — Mt. Mariveles, Prov. Bataan, Luzon, August, 1904, *E. D. Merrill* (no. 3851). — Terrestrial in woods, rare, Antimonan, Prov. Tayabas, Luzon, August 23, 1904, *H. N. Whitford* (no. 719).

PLOCOGLOTTIS, Blume

P. acuminata, Blume, Mus. Bot. Lugd.-Bat. 1: 46 (1849): "acaulis; foliis breviter petiolatis elliptico-oblongis utrinque acuminatis; phyllis perigonii labelloque acuminatis." — Blume, Fl. Java, Orch. 51: "Petioli 4–6 poll., inferne fere ad dimidium usque cylindrico-incrassati. Folia 7–12 poll., 2½–4 poll. lata, elliptico-oblonga, acuminata, basi suboblique constricta, membranacea, nervosa, glabra. Scapus 1–2½ ped., erectus, teres, ex purpurascenti atropurpureus, puberulus, inferne vaginatus, superne laxe racemosus. Flores lutei, puniceo-punctati, singuli bracteâ semilanceolatâ acuminatâ purpurascente ovario tertiâ fere parte brevioris suffulti. Perigonii phylla longe acuminata; exteriora lanceolata, in his posticum fornicato-ascendens, utrumque laterale leviter carinatum sub labello reflexum; interiora angustiora, exterioribus paulo modo breviora, falcata, erecto-patentia. Labellum imâ cum basi gynostemii supra ovarium nonnihil porrectâ brevissime saccatum, sacculo antice in cristulam extuberante, ad latera utrinque expansione plicatâ gynostemio junctum; limbus erectus v. reclinatus, lato-ovatus, convexus, apice in cuspidem acuminatissimam circi-

nato-revolutam constrictus, pallide flavescens. In quibusdam floribus emollitis in anteriore margine labelli præter apicem subulatum revolutum denticulos duos laterales rotundatos inconspicuos animadverti. Gynostemium in ovario leviter reclinatum v. ei oblique incumbens, crassum, obtusum, semiteres, puniceo-variegatum, apice androclinio antherâ oblecto excavatum. Anthera ovoidea, convexa, obtusa, postice depressione obsoletâ, quâ margini androclinii affixa est, quadrilocularis. Pollinia 4, sublenticularia, cereacea, dura, vitellina, geminatim duabus caudiculis elasticis pulvereis sibi parallelis appositis lutescentibus agglutinata. Stigma cavum, mucosum, sub rostello nonnihil prominente apice glanduloso-tumescente occultum. Ovarium pedicellatum, elongato-clavatum, sulcatum, inferne distortum, ex viridi in sordide purpureum vergens, pube brevi densâ obsessum.”

Leaves elliptic, acuminate, petiolate, erect. Rhizome creeping, in my specimens clothed with the fibrous remains of the bracts. Peduncle erect, exceeding 3 dm. in length. Floral bracts lanceolate-acuminate, about 7 mm. long, pubescent. Pedicel and ovary together 12–14 mm. long, pubescent. Lateral sepals narrowly lanceolate-acuminate, acute, 1.5 cm. long, strongly deflexed beneath the labellum. Upper sepal similar, concave, incurved. Petals falcate, linear-lanceolate, erect. Labellum cuneate-quadrate, convex, the apex long-acuminate, circinnate, invisible from above, to base of circinnate apex 5 mm. long, the base slightly saccate. Flowers pubescent, yellowish, purple-dotted.

Gimogon River, Negros, January 5, 1904, *E. B. Copeland* (no. 134).

SPATHOGLOTTIS, Blume

S. plicata, Blume, *Bijdr.* 400, 401 (1825):

“SPATHOGLOTTIS.

“*Perianthii* sepala erecto-patentia; interiora exterioribus latiora. *Labellum* inferne bilobum (lobis conniventibus), supra basin

callo depresso pubente auctum; limbus erectus, spatulatus. *Gynostemium* erecto-incurvum, apice dilatatum. *Anthera* gynostemium interne terminans, 2-ocularis, rostello ad marginem glanduloso incumbens. *Massæ pollinis* duæ, quadrilobæ, clavatæ, farinoso-pulposæ, filis elasticis cohærentes, et demum rostello affixæ.

“Herbæ terrestres, radicibus fibrosis. Folia subradicalia, elongato-lanceolata, plicata, basi vaginantia; scapi radicales, inferne alterne vaginati, apice spicato-multiflori. Flores pedicellati, pedicellis basi bractea colorata instructis.

“SPATHOGLOTTIS PLICATA.

“*Crescit*: in locis sylvaticis.

“*Floret*: omni tempore.”

Leaves lanceolate-acuminate, 2–6 dm. long, 1.8–6 cm. wide, plicate, petiolate, arising from a thickened bulbous base. Scape lateral, arising from the base of the bulb, 3–7 dm. high. Bracts tubular, acute or obtuse, loosely sheathing. Inflorescence racemose, loose. Floral bracts lanceolate, acute, shorter than the pedicels, 9–15 mm. long. Pedicels slender, 1.5–2.5 cm. long, pubescent. Lateral sepals ovate-lanceolate, about 1.5 cm. long, about 8 mm. wide. Upper sepal similar, obtuse. Petals broadly elliptic, 17 mm. long, 12 mm. wide. Lip 3-lobed; the middle lobe slightly the longest; laterals asymmetrically spatulate, at right angles to the terminal one, nearly 1 cm. long, 5 mm. broad at the apex; terminal lobe a little over 1 cm. long, apical half cuneate-flabelliform, sometimes retuse, sometimes bluntly apiculate, narrowly clawed below, 7 mm. broad at the apex; at the base of this claw a thickened callus of two auriform lobes and an auricle on each side in front of the lateral lobes. Column slender, arcuate, 11 mm. long, winged, thickened above. Anther round-triangular, acuminate in front, obtuse.

“In damp clayey soil along roadsides. Flowers purple or deep pink,” Sablan, Prov. Benguet, Luzon, April 12, 1904, *A. D. E. Elmer* (no. 6207). — Dupax, Nueva Viscaya, Luzon, May 28, 1902, *E. D. Merrill* (no. 297). — On rocks, cliff, river cañon,

rare, "flowers lavender," Tinnan River, Prov. Tayabas (Infanta), Luzon, October 11, 1904, *H. N. Whitford* (no. 802).

EULOPHIA, R. Br.

E. exaltata, Rehb., f., *Bonplandia* 5: 38 (1857): "Pone Eulophiam Arundinæ Rehb. fil. calcari conico acuto, labelli trilobi lobis lateralibus semiovatis, apicibus antrorse productis, lobo medio ovali obtuso, carinis geminis antice abruptis inter lobos laterales in lineas tres elevatulas antrorsas exeuntibus. Planta bi- usque tripedalis arundinacea. Folia linearia acuta. Racemus pluriflorus laxus. Bracteæ lineares apice subulatæ ovaria pedicellata haud æquantes. Flos magnus illi *Cyrtoperæ* flavæ paulo minor. Sepalum dorsale cuneato oblongum cum apiculo. Sepala lateralia ligulata acuminata. Tepala cuneata oblonga apiculata. Labellum in calcar conicum extensum flabellatum trilobum: lobi laterales semiovati antice obtusanguli plica supra lobum medium transeuntes, lobus medius ovatus crispus apice obtusus: carinæ geminæ apice prærupto a fundo in discum, ibi in lineas elevatas exeuntes, interposita linea elevata tertia. Gynostemium clavatum utrinque carinis angulatum, antice igitur canaliculatum; androclinium postice extensum in laminam erectam emarginatam; rostellum minutissime denticulatum veli instar supra foveam magnam pendens. Pes gynostemii brevis. Pollini asemifissa supra caudiculam brevem ligulatam. Glandula triloba lobis obtusis. Perigonium sulphureum." — *Cyrtopodium ensiforme*, Vidal, *Phan. Cum. Philipp.* 78, 80, 150.

Leaves linear, nervose, acute. Sepals oblong, acute, broadest near the apex, about equal to the petals. The latter elliptic-oblong to broadly ovate, 2.8 cm. long, 1.1 cm. wide. Labellum 3-lobed, conically saccate, the sac pointed; lateral lobes rounded, erect; apical lobe round-triangular, margin crenulate; disc with 3 raised lines or crests. Flowers yellow.

Dupax, Prov. Nueva Viscaya, Luzon, May, 1902, *E. D. Merrill* (no. 298).

DENDROBIUM, Sw.

D. (§ SARCOPODIUM) **ACUMINATUM**, Rolfe, *sp. nov.* “Rhizome stout. Pseudobulbs elliptical-oblong, very smooth and shining, $1\frac{3}{4}$ inches long, diphyllous, the lower part clothed with large ovate striate sheaths. Leaves subsessile, very coriaceous, elliptical-oblong, obtuse, about $4\frac{1}{2}$ inches long, $1\frac{1}{4}$ inches broad. Scape terminal, $1-1\frac{3}{4}$ ft. long, 6–17-flowered. Bracts linear-oblong, obtuse, 7 lin. long. Pedicels $1\frac{1}{4}$ in. long, rather slender. Sepals and petals oblong-linear, attenuate upwards and acuminate at the apex, subequal, about $1\frac{1}{4}$ inches long. Lip strongly three-lobed, 7–8 lines long; front lobe ovate, somewhat recurved and very acuminate at the apex; side lobes broadly triangular-ovate, subacute, orange-yellow regularly striped with dark brown. Mentum obtuse, 3 lin. long. Column stout, 2 lin. long. — On Mt. Mari-veles, Lamao River, in the Province of Bataan, Whitford, n. 223. Allied to the Javan *D. cymbidioides*, Lindl. and *D. triflorum*, Lindl., but readily distinguished from both by its very acuminate segments, and very different lip. The collector describes the colour of the flowers as ‘white and yellow.’ The flower more nearly resembles *D. Treacherianum*, Rehb. f., in shape, but its colour is very different.” — R. A. Rolfe *in MS.*

Lamao River, Prov. Bataan, Luzon, May, 1904, *Thos. E. Borden* (no. 738).

D. atropurpureum, Miquel, Fl. Ind. Bat. 3: 644 (1855). — *Oxystophyllum atropurpureum*, Blume, Rumphia 4: 41, t. 193 (4) and t. 198 (c) (1848): “foliis carnosis rectis v. subfalcatis; labelli limbo retuso ad margines erosulo, tuberculo apicis acuto. — HABIT. In sylvis litoreis Novæ Guineæ in arboribus. *Caulis* 4 poll. ad sesquipedales, erecti, foliosi, interdum proliferi, basin versus attenuati et foliorum vaginis tubulosis oblique truncatis aridis striatis fuscis vestiti. *Folia* erecto-patentia, recta v. subfalcata, 2–2½ poll. longa, ensiformia, acutissima, carnosia, flexilia. *Flores* inter folia e paleis fuscis congestis v. bracteis dilaceratis emergentes, sessiles, mediocres, purpurei, bracteâ ovatâ acuminatâ

ovarium amplectente suffulti. *Perigonii phylla* subcarnosa, erecta, oblonga, acuta, leviter carinata; exteriora imâ brevissime connata, ex quibus anteriora basi suâ oblique ad unguem gynostemii decurrunt; duo interiora exteriore postico minora. *Label-lum* phyllis perigonii longius et crassius, ascendens, spathulato-oblongum, concavum, sine articulatione ungui gynostemii elasticè affixum, limbum versus medio crassius, in dorso sub apice retuso dente s. tuberculo acuto carnosio, marginibus lateralibus extenuatis recurvis erosulum. *Gynostemium* inferne in unguem applanatum elongatum, superne semiteres, obtusatum, postice in dentem subulatum incurvum antheriferum protractum; *androclinio* in apice gynostemii excavato, in anteriori margine supra stigma profunde exsculptum aliquantum glanduloso-callosio. *Anthera* opercularis, conica, dorso affixa, bilocularis. *Pollinia* in floribus a me exploratis jam emissa, sed, ut probabile, quemadmodum in aliis Speciebus, subglobosa, postice subangulato-depressa ac juxta sese invicem margini glandulosæ androclinii agglutinata. *Capsula* ellipsoidea, subtrigona, perigonio deinde emarcido coronata, fissuris lateralibus fenestratim dehiscens, unilocularis, intus stipposa, spermophoris tribus costalibus lateralibus. *Semina* creberrima, minutissima, formâ irregulari, pleraque elongato-ellipsoidea et recta, alia curvata; *spermodermide* relaxatâ, striolatâ, semipellucidâ, nucleum ellipsoideo-globosum includente."

Plants 7–8 cm. high, cæspitose. Leaves fleshy, distichous, linear, acute, channelled at base, compressed, 2 mm. thick, 2.5–5 cm. long, obliquely erect. Peduncle short, 3 times shorter than the leaf, mostly terminal. Bracts imbricate, about 4 mm. long, acute. Flowers (black when dry) 5 mm. in vertical diameter. Lateral sepals triangular-ovate, acute, forming with the lip and foot of column an obtuse mentum 3 mm. long. Upper sepal 4 mm. long, about 2 mm. wide, 3-nerved. Petals oblong apiculate, 3 mm. long, 1 mm. wide. Lip linear-oblong, margin ciliate; apex rounded or slightly retuse; disc with about 3 raised nerves, caruncled, very obscurely 3-lobed near the apex with an acute tubercle under the tip. Fruit an ellipsoidal capsule 5 mm. long. Flowers in bracteate heads.

Epiphytic on trees in Mangrove swamp, Halsey, Culion Island, December 25, 1902, *E. D. Merrill* (no. 592). — Gimogon River, Negros, January 5, 1904, *E. B. Copeland* (no. 136). (In Dr. Perkins's *Fragmenta Floræ Philippinæ*, Fasc. 1: 43, Merrill's no. 592 is given by R. Schlechter as *D. sinuatum*, Lindl.)

D. crumenatum, Sw., Schrad. Jour. Bot. 2: 237 (1799); Kongl. Vetens. Acad. Handl. 21: 246 (1800): "caule subramoso compressiusculo basi tuberoso; foliis ovato-lanceolatis; spicis erectis, floribus remotis alternis geminatis, processibus acuminatis. Angræcum crumenatum RUMPH. amb. 6. 47. 2. E. java Gröndahl."

Stems 3 dm. or more high, 6 mm. thick above, swollen below and fusiform, the fusiform swelling 9 cm. long, about 12 mm. thick. Stem branching above. Leaves ovate-lanceolate, emarginate, 6–8 cm. long, 2.5–3 cm. wide, coriaceous, becoming smaller above and then giving place to the flowers. Pedicels decurved with sheathing bracts at the base. Lateral sepals about 2 cm. long, triangular-lanceolate. Upper sepal and the petals narrower, 17 mm. long. Lip 23 mm. long, erect from the prolonged foot of the column, then spreading, 3-lobed; lateral lobes obtuse; middle lobe oblong, rounded; disc with several carunculate lamellæ. — The apical lobe of the labellum seems to be quite variable. In the Botanical Register Lindley figures it acute. Plate 4013 in the Botanical Magazine represents Dr. Copeland's material faithfully, as does the illustration of the flowers in fig. 2, plate 47, Rumph. Herb. Amb., which shows the lip to be emarginate, thus agreeing with some of the Philippine specimens. The flowers are white (sometimes pale purple) with yellow lamellæ on the lip. The swollen pseudobulbous base of the plant, which is contracted above into the slender elongated leafy stem, the white flowers borne on the leafless extremity of the stem, and the conical spur formed by the lip and lateral sepals seem to distinguish this species from its allies.

"Epiphyte at sea-level," Davao, Mindanao, March 6, 1904, *E. B. Copeland* (no. 377). — "Flowers white," Calapan, Mindoro, April, 1903, *E. D. Merrill* (no. VI.).

D. heterocarpum, Wallich ex Lindl., Orch. Pl. 78 (1830): "D. caulibus teretibus pendulis, foliis oblongis acutis planis, floribus geminatis odoratis racemum spurium formantibus, sepalis lineari-oblongis acutis, petalis ovatis acutis sepalo supremo majoribus, labello unguiculato, limbo subpanduriformi holosericeo medio elongato acuminato plano."

Stems attenuate at both ends when divested of leaves, 3–5 dm. high, yellow. Leaves linear-oblong, acute or obtuse. Basal bracts tubular. Flowers fasciculate, appearing after the leaves have fallen. Pedicels 2.5 cm. long. Ovary about 2 cm. long. Lateral sepals 3.5 cm. long, variable, oblong-lanceolate, acute. Petals ovate-oblong, obtuse. Lip with a broad convolute claw; blade about 2.5 cm. long, deltoid; disc velvety hairy, copiously so at the middle; spur funnel-shaped, obtuse. Sepals and petals cream-colored, lip yellow, intensely so near the base. Fruit an ellipsoidal capsule, 3.7 cm. long. — Here belong *D. aureum*, var. *philippinense*, Rchb., f., and *D. rhombeum*, Lindl., the latter characterized by smaller flowers. *D. heterocarpum* is a widely distributed polymorphic species; and while the material on which my determination is based agrees with *D. aureum*, var. *philippinense*, Rchb., f., it does not seem advisable to adopt a varietal name for a form which is apparently merely geographical.

Baguio, Prov. Benguet, Luzon, January 19–February 26, 1903, *D. LeRoy Topping* (no. 66). — March, 1904, *A. D. E. Elmer* (no. 5983).

D. Macræi, Lindl., Orch. Pl. 75 (1830): "D. caulibus flexuosis moniliformibus pendulis pseudo-bulbos turbinatos monophyllo gerentibus, foliis oblongis obtusis sessilibus, floribus 2–3 axillariibus fasciculatis subsessilibus, sepalis petalisque subæqualibus ovatis acutis, labello trilobo: lobo medio crenato plicato marginibus recurvis."

Stems glossy, 4 mm. thick, rigid, jointed. Secondary stems pseudobulbous, monophyllous, 6–8 cm. long. Leaves 9–12 cm.

long, elliptic-lanceolate. Flowers several, axillary, white. Sepals and petals similar. Lateral sepals about 15 mm. long. Lip 3-lobed; lateral lobes triangular-lanceolate, acute; middle lobe 9 mm. long, 13 mm. wide near the apex, flabelliform-cuneate; disc with 2 crests, these rounded in front and crenate-margined. Mentum 6 mm. long. — *D. flabellum*, Rchb., f., Bonplandia 5: 56 (1857); Xenia Orch. 2: 75, t. 118 (1874).

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, May, 1904, *H. N. Whitford* (no. 225).

D. superbum, Rchb., f., Walp. Ann. 6: 282 (1861): “Caulibus pendulis, foliis ovato oblongis obtusis nervosis basi subcordatis, sepalis lanceolatis lateralibus parum productis, petalis oblongis acutis, labello pubescente convoluto denticulato subunguiculato ovato, callo baseos elevato transverso obsolete trilobo.”

Stems weak, up to 3 dm. long, attenuated below. Leaves about 1 dm. long and 3 cm. broad, acute, deciduous. Flowers fasciculate, about 8 cm. across, variable. Lateral sepals oblong-lanceolate, acute, about 4 cm. long, upper one oblong-elliptic. Petals oval, about 2 cm. broad, margins finely ciliate-hairy. Lip shortly convolute-clawed, about as long as the petals, ovate, upper surface downy-pubescent in front of the claw, transversely expanded and obscurely 3-lobed at the apex. The shape of the lip and size of the flowers are extremely variable. Sepals and petals pale magenta-crimson; lip similarly colored, with transverse nerves of a deeper shade.

Taublay, Baguio, Prov. Benguet, Luzon, March 24, 1904, *A. D. E. Elmer* (no. 6062). “Growing on lower limbs of a large evergreen hardwood tree, so situated as never to receive the direct rays of the sun. The stems of the plant were hanging and some of the flowering stalks were as long as a man’s arm. Flowers strongly fragrant.”

D. taurinum, Lindl., Bot. Reg. 1843, t. 28: “*D. taurinum*; foliis oblongis obliquè emarginatis, racemo oblongo, sepalis ovatis obtusiusculis, petalis linearibus contortis duplò longioribus, labello

oblongo apice crispo per axin lineis 3 elevatis intermediâ apice flexuosâ aucto.”

Stems cylindric, 9–12 dm. long, about 1.5 cm. thick. Leaves ovate-oblong, emarginate. Racemes pseudo-terminal, 25–50 cm. long. Flowers numerous, large. Sepals ovate, obtuse, about 2.5 cm. long, reflexed, cream-white tinged with green. Petals linear, twisted, longer than the sepals, crimson-magenta. Lip about 3.5 cm. long, rhomboid-ovate, obtuse, crisped at the apex, with several raised lines on the disc. Spur conical, large.

“Epiphytic on *Antidesma ghæsembilla*, in open grass lands,” Davao, Mindanao, March 14, 1904, *E. B. Copeland* (no. 505).

D. uniflorum, Griff., Notul. 3: 305 (1851): “Caulis submoniliformibus, vaginis nempe basi apiceque sub-constrictis, et abbreviatis, fol. limbo $\frac{1}{2}$ amplexicaulibus, disticha oblongo-lanceolata, ascendente-recurva, coriacea apice inæqualiter bifida, limbo medium supra planiusculo.

“Flores oppositifol. solitarii longe pedicellati, folia excendent. (pedicellis ascendentibus, basi bracteolat.) ringent, bilabiat. majusculi albi.

“Sepala latiuscula ovata acute acuminata patente-reflexa, lateralia basi oblique cum pede columnæ in calcar spurium connat.

“Pet. late-ovatis apiculatis, sepalo postico subsimil. sed brevior.

“Labellum explanatum 3-lobum, lobis lateralibus spathulato-obovatis ascendentibus, central. magno late obcordato, medio costis carnosis 3–5, elevatis, initio horizontal. demum conduplicatis cum pede columnæ in calar spurium; *fauce angusta bigibba*, connata.

“Columna nana, pede longe, columna connata.

“Clinand. profundum, 3-dentatum, dente postice subulato anth. affingens. Rostellum anticum bipartitum, lacinea supera laminiformi-involuta. Pollinia 4, per paria collateralia. Anth. cap-shaped papillosa bilocularis.” — The species is figured in Griff. Ic. Pl. Asiat. t. 303.

Stem 3–4 dm. long. Leaves about 3 cm. long, ovate-oblong,

emarginate. Flowers solitary, 2.7 cm. across, opposite the leaves. Pedicels slender, about 7 mm. long. Sepals and petals revolute, acute, the lateral sepals broadest. Petals narrower than the upper sepal, oblong-lanceolate. Labellum 3-lobed, about 2 cm. long; lateral lobes spathulate-obovate; middle lobe obcordate, emarginate, slightly apiculate; disc with several raised nerves. Clinandrium 3-toothed, the posterior tooth subulate. Nearly related to *D. revolutum*, Lindl., but differing from it in the broad, obcordate lip and large spathulate lateral lobes. In The Flora of British India, Sir Joseph Hooker has given *D. uniflorum*, Griff., as a synonym of *D. revolutum*, Lindl. The species is variable, and the forms now recognized as distinct may be found to make up one polymorphic species.

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, May 21, 1904, *H. N. Whitford* (no. 302).

D. Victoriæ Reginae, A. Loher, Gard. Chr. ser. 3, 21: 399 (1897): "Pendulum, articulatum, articulis clavatis; foliis ovato-lanceolatis, acuminatis; flores pollicares in glomerulis, 3-12-floribus; sepalis lanceolatis, exterioribus basi in calcar obtusum connatis; petalis ovatis, obtusis breviter acuminatis, labello indiviso e basi angustata oblongo-ovato, acuminato, limbo expanso; columna brevi crassa, albida, anthera emarginata; corollæ phyllis labelumque violaceis, basi albis, calcare violaceo, germine viride."

Stems slender, branching, about 6 dm. long, jointed, swollen at the joints. Leaves oblong-lanceolate, 3-7 cm. long, 1-1.5 cm. wide, acute, deciduous. Flowers produced on the leafless stems, fasciculate, about 3 cm. long. Sepals oblong-lanceolate, acute. Petals elliptic, about 2.5 cm. long, obtuse. Lip undivided, obovate, apiculate. The apical half of the perianth organs and the base of the lip stained and suffused with mauve. In The Gardener's Chronicle, 1897, 2: 121, fig. 34, this species is illustrated with the flowers produced from a leafless stem; in the Dictionnaire Iconographique des Orchidées they are figured as arising from a leafy stem. The former agrees with the specimens I have

examined, and the species seems to belong to that section of *Dendrobium* which flowers after the fall of the leaves.

“Pendulous from hardwood trees,” Mt. Santo Tomas, Prov. Benguet, Luzon, May, 1904, *A. D. E. Elmer* (no. 6272).

ERIA, Lindl.

E. (§ HYMENERIA) *ELMERI*, *sp. nov.* Caules elongati, 2 dm. longa. Folia coriacea, elliptico-oblonga, obtusa, 5–8 cm. longa. Racemus nutans, rhachis puberulus. Sepala similia, oblonga, obtusa, trinervia. Petala oblonga, obtusa. Labellum ovato-lanceolatum, sub-acutum s. obtusum, ad basim bicallosum. Flores glabri.

Plants about 2 dm. high? Stems rather stout, leafy above, 5–7 mm. thick. Roots branching, villose-pubescent. Leaves about 7 in number, approximate near the summit of the stem, coriaceous, elliptic-oblong, obtuse, 5–8 cm. long, up to 3 cm. wide, many-nerved, shortly petiolate. Racemes several, slender, flexuous, about 1 dm. long, from the summit of the stems, many-flowered. Rhachis sparsely pubescent. Floral bracts conspicuous, oblong, sub-acute, about 6 mm. long. Pedicels about 5 mm. long, slender. Sepals similar, oblong, obtuse, 6 mm. long, 3-nerved. Petals shorter than the sepals, oblong, obtuse. Lip 3-nerved, articulated with the foot of the column by a short oblong claw, purplish, narrowly ovate, sub-acute or obtuse, 3 mm. long, 1.5 mm. wide just above the claw, with two short, keel-like, intramarginal calli, one on each side near the base of the expanded limb. Column 1.5 mm. long, produced into a distinct foot. Pollinia 8. Flowers yellowish or whitish with a purple-stained lip.

Baguio, Prov. Benguet, Luzon, March 21, 1904, *A. D. E. Elmer* (no. 6014).

E. (§ HYMENERIA) *GRACILISCAPA*, Rolfe, *sp. nov.* “Pseudobulbs terete, slender, 5–6 inches long. Leaves 3 or 4, terminal, lanceolate-oblong, subcoriaceous, $2\frac{1}{4}$ – $3\frac{1}{4}$ inches long, 6–8 lines broad. Scapes axillary near the summit of the stems, slender, arcuate,

many-flowered, $2\frac{1}{2}$ –3 inches long. Bracts oblong-lanceolate, acute or acuminate, $1-1\frac{1}{4}$ lin. long. Sepals oblong-lanceolate, acuminate, $2\frac{1}{4}$ lin. long. Petals lanceolate-linear, acuminate, $1\frac{3}{4}$ lin. long. Lip entire, ovate-lanceolate, acute, strongly 3-nerved, 1 lin. long. Column rather stout, about $\frac{3}{4}$ lin. long. Mentum very short.— On Mt. Mariveles, Lamao River, in the Province of Bataan, Whitford, n. 307. Allied to the Malayan *E. tenuiflora*, Ridl. (Journ. Linn. Soc. XXXII. p. 291), but the pseudobulbs and scapes longer and much more slender, and the flowers with much narrower segments.” — R. A. Rolfe *in MS.*

E. ornata, Lindl., Orch. Pl. 66 (1830).—*Dendrolirium ornatum*, Blume, Bijdr. 345 (1825): “bulbis ovalibus compressiusculis sub-3 phyllis, foliis oblongo-lanceolatis rigidis nervosis, spica radicali vaginata sepalisque exterioribus fusco-tomentosis, bracteis coriaceis margine recurvis, labello intus crispato-cristato, limbi lobo medio acuminato. (Bracteæ rubræ, demum aurantiacæ. Species pulcherrima.)” Huc: *E. armeniaca*, Lindl., in Bot. Reg. 1841, Misc. 38, t. 42: “pseudobulbis ovalibus compressis triphyllis, foliis oblongo-lanceolatis coriaceis lævibus, racemo tomentoso radicali basi vaginato stricto foliis æquali v. longiore, foliis scapi bracteis lanceolatis acuminatis subcoriaceis (armeniacis), labelli lobis lateralibus dentiformibus intermedio rhombeo crispo; lamellis 3 rectis haud crispatis lateralibus abbreviatis divergentibus intermediâ versus apicem labelli productâ.”

Tanay, Prov. Rizal, Luzon, May 20, 1903, *E. D. Merrill* (no. 2361).

E. (§ HYMENERIA) PHILIPPINENSIS, *sp. nov.* Rhizoma repens. Pseudobulbi remoti, foliati. Folia lineari-oblonga s. lineari-lanceolata, acuta, 12 cm. longa, approximata. Racemus nutans. Rhachis puberulus. Sepala lateralia oblonga, acuta. Sepalum dorsale oblongum. Petala oblonga sub-acuta. Labellum integer, ovatum, obtusum, ecallosum. Ovarium tomentosum. Flores glabri.

Rhizome woody, stout, creeping, bracteate. Bracts tubular,

loosely imbricating, obtuse. Leaves about five, linear-oblong or linear-lanceolate, acute, about 12 cm. long, 11 mm. wide, approximate upon remote, declined, pseudobulbous, contracted, thickened stems; each pseudobulbous stem subtended by a leaf. Racemes several from the summit of the short stems, about 1 dm. long, loosely many-flowered, tomentose. Bracts longer than the tomentose pedicels, smooth. Flowers exceeding 1 cm. in length, smooth. Lateral sepals oblong, acute, about 1.5 cm. long, 4 mm. wide. Upper sepal narrower than the laterals, about 1.5 cm. long. Petals oblong, sub-acute, 1.4 mm. long, 4 mm. wide. Lip entire, ovate, obtuse, ecallose, 7 mm. long. Column 2.5 mm. high. Ovary tomentose hairy. — Allied to *E. polystachia*, Rich., from which species it differs in habit, in the larger size of the flowers, and in the absence of calli on the lip.

Mt. Santo Tomas, Prov. Benguet, Luzon, March 2, 1904, *A. D. E. Elmer* (no. 5803).

E. polyura, Lindl., in Bot. Reg. 1841, Misc. 55: "caule elongato folioso, foliis lanceolatis acutis patentibus striatis, spicis oppositifoliis multifloris nutantibus foliis æqualibus v. brevioribus, bracteis ovario duplò brevioribus adpressis, sepalis petalisque ovatis acutis erectis lævibus, labello cordato ovato acuto basi bicarinato." The species is figured in Bot. Reg. 28: t. 32 (1842).

Stems elongated, ligneous, branched, slender below, thickened above, bracteate. Bracts about 1 cm. long, tubular, dilated, acute. Leaves elliptic-lanceolate, acute, 6–12 cm. long, 2–3 cm. wide, approximate at the summit of each growth, coriaceous, nervose. Peduncle short. Racemes nodding, slender, about 14 cm. long. Floral bracts about 3 mm. long, exceeding the pedicels. Flowers about 5 mm. long. Lateral sepals triangular-lanceolate. Upper sepal ovate-lanceolate, petals similar. Labellum cordate-ovate, obtuse or acute, with a purple tubercle on the disc near the base, bicarinate. Column arcuate. Perianth pale pink (?). Lip deep crimson-magenta.

Mt. Mariveles, Prov. Bataan, Luzon, January 1, 1904, *E. D. Merrill* (no. 3733).

PHREATIA, Lindl.

P. LUZONIENSIS, Rolfe, *sp. nov.* "Stems tufted, very short. Leaves linear, somewhat fleshy, subobtuse, $1\frac{1}{4}$ – $1\frac{1}{2}$ inches long. Scapes slender, arching, about half as long as the leaves, clothed with two or three lanceolate acute sheaths below. Bracts ovate-lanceolate, acuminate, $\frac{3}{4}$ –1 lin. long. Pedicels about $\frac{3}{4}$ lin. long. Flower 1 line in diameter. Sepals broadly ovate, subobtuse, somewhat concave. Petals ovate, subacute, rather shorter than the sepals. Lip nearly as long as the sepals, saccate at the base, limb broad and obtusely tricuspidate at the apex. Column short and stout. — On Mt. Mariveles, Lamao River, in the Province of Bataan, Whitford, n. 210. Allied to the Malayan *P. microtidis*, Lindl., in which the inflorescence is longer than the leaves, the bracts longer, and the lip orbicular." — R. A. Rolfe *in MS.*

Whitford's no. 115, collected in the same locality with no. 210, belongs here. Leaves distichous; lip sometimes obovate, retuse, with a blunt mucro in the sinus. Capsule ellipsoidal, 5 mm. long.

BULBOPHYLLUM, Thouars

B. BATAANENSIS, *sp. nov.* Rhizoma repens. Pseudobulbi remoti, sessiles, 2 cm. longi. Folium oblongo-ellipticum, obtusum, solitarium, coriaceum, rigidum, 5–8 cm. longum. Sepala lateralia triangulo-falcata, acuta. Sepalum dorsale oblongo-lanceolatum. Petala triangularia, elongata, acuta. Labellum cordato-ovatum, acutum.

Rhizome stout, creeping. Pseudobulbs 2 cm. long, about 3 cm. apart, monophyllous. Leaves elliptic-oblong, shortly petiolate, coriaceous, rigid, obtuse, 5–8 cm. long, 2.5 cm. wide. Peduncles slender, 1-flowered. Lateral sepals triangular-falcate, acute, 2–2.5 cm. long, 1.5 cm. wide at base. Upper sepal 3.5 cm. long, much narrower than the laterals. Petals triangular-lanceolate, 2–2.5 cm.

long, 8 mm. wide at base, acute. Lip cordate-ovate, 9 mm. long. Column stout, produced into an elongated foot, 1.4 cm. long, of which the terminal portion is free, upcurved, and articulated with the base of the lip. Flowers yellowish, striated with "brown," fragrant. Closely allied to *B. Lobbii*, Lindl., from which species it differs in the shorter, broader leaves, smaller flowers, and broader petals.

Lamao River, Mt. Mariveles, Prov. Bataan, May, 1904, *H. N. Whitford* (no. 163), *type*; May, 1904, *Thomas E. Borden* (no. 796); May, 1904, *H. N. Whitford* (no. 121).

B. COPELANDI, *sp. nov.* Rhizoma repens. Pseudobulbi remoti, sessiles, parvi. Folium ellipticum, coriaceum, obtusum, 11–15 cm. longum. Sepala lateralia oblongo-falcata, obtusa. Petala linearia, sub-acuta. Labellum trilobatum, eglandulosum, lobi laterales conniventes; medius integer, linearis, obtusus, 1.2 cm. longus. Flos purpureus, maximus.

Rhizome rather stout, creeping, with numerous simple or branched roots. Pseudobulbs small, 1–1.2 cm. long, about 8 cm. apart. Leaves coriaceous, rigid, shortly petiolate, 11–15 cm. long, elliptic-oblong, obtuse. Peduncle long and slender, 3–5.5 cm. long, bearing a solitary showy flower. Lateral sepals oblong-falcate, obtuse, tapering to the blunt apex, 3 cm. long, 1 cm. wide at base. Upper sepal narrowly oblong, 3.5 cm. long, about 6 mm. wide. Petals linear, as long as the lateral sepals, tapering to the sub-acute apex. Lip articulated with the elongated foot of the column; lateral lobes obtuse, erect, approximate; mid-lobe linear, obtuse, fleshy, rigid, 1.2 cm. long, 2 mm. wide, with a raised median longitudinal nerve on the under side. Column stout, erect portion 5 mm. high, the broad base passing into a foot, 15 mm. long, to which the lateral sepals adhere basally; the terminal portion of the foot free, up-curved, bearing at its apex the mobile lip. Capsule ellipsoidal, 5 cm. long. Flowers dark crimson, with the lip much darker colored than the rest of the perianth. — Closely allied to *B. Whitfordii*, Rolfe, from which it differs mainly in the

length of the mid-lobe of the lip, in the length and form of the sepals and petals, and in the color of the flowers.

Epiphyte in Mangrove swamp, Santa Cruz, Davao, Mindanao, April 28, 1904, *E. B. Copeland* (no. 1316).

B. (§ RACEMOSÆ) CUNEATUM, Rolfe, *sp. nov.* “Rhizome stout and woody, scandent, clothed with ovate brown imbricating scales. Pseudobulbs obsolete, approximate, monophyllous. Leaves petio- late, limb oblong, obtuse, cuneate at the base, very coriaceous, $2\frac{1}{2}$ – $2\frac{3}{4}$ inches long, 8–9 lines broad; petioles 1 inch long. Scapes about 5 in. long, with a single sheath above the base; spike re- curved, many-flowered. Bracts ovate, acute, concave, spreading, $\frac{1}{2}$ lin. long. Pedicels stout, $\frac{3}{4}$ lin. long. Dorsal sepal elliptical- oblong, obtuse, 3-nerved, 2 lin. long; lateral pair oblong, obtuse, 2 lin. long, connate to about the middle. Petals ovate, acute, den- ticulate, 1-nerved, 1 lin. long. Lip recurved, $1\frac{1}{4}$ lin. long, front lobe very fleshy, obtuse, its base terminating in an abrupt suberect fleshy callus, side lobes small and more membranaceous. Column stout, teeth oblong, minutely bidentate at the apex. — Mt. Mari- veles, in the Province of Bataan, Merrill, n. 3730. This has much of the general appearance of the Indian *B. globulus*, Hook. f., but the leaves are longer and more cuneate at the base, and the flowers are quite different in structure.” — R. A. Rolfe *in MS.*

B. (§ RACEMOSÆ) DASYPETALUM, Rolfe, *sp. nov.* “Rhizome creeping, stout. Pseudobulbs obsolete. Leaves long-petioled, blades lanceolate-oblong, subobtuse, about 5–6 inches long, 1 inch broad; petiole about 3 inches long. Scape erect, rather slender, about 10 inches high, clothed with four or five lanceolate acute sheaths, $\frac{3}{4}$ – $1\frac{1}{4}$ inches long, below the raceme, the lower ones tubular for the greater part of their length; raceme lax, many- flowered. Bracts lanceolate, acuminate, 2–3 lin. long. Pedicels slender, 1 lin. long. Dorsal sepal elliptical-lanceolate, shortly acu- minate, concave, $2\frac{1}{2}$ lin. long; lateral pair obliquely triangular- ovate, acuminate, broader than the dorsal. Petals linear-oblong, obtuse, somewhat thickened at the apex, $1\frac{1}{4}$ lin. long. Lip oblong,

obtuse, recurved, fleshy, smooth, about 2 lines long. Column stout and very short, with a pair of short subulate teeth. — On Mt. Mariveles, in the Province of Bataan, Merrill, n. 3720. An ally of the Javan *B. gibbosum*, Lindl. (Gen. & Sp. Orch. p. 54), which has a shorter inflorescence, more acuminate sepals, and the petals also acuminate and not thickened at the apex. The flowers of *B. dasypetalum* appear to have been greenish-yellow when alive." — R. A. Rolfe in *MS.*

Rhizome creeping, about 2 mm. thick, emitting at intervals long fibrous roots. Pseudobulbs none, or only indicated by swellings of the rhizome. Petiole 6–8 cm. long, lamina oblong, acute, coriaceous, 13 cm. long, about 2.5 cm. wide. Scape equalling or exceeding the leaf, slender, bearing a simple raceme of short-pedicelled yellowish fragrant flowers. Basal bracts elongated, tubular with a spreading acute tip. Floral bracts exceeding the ovary, lanceolate, acute, about 4 mm. long. Perianth about 6 mm. long, slightly spreading. Lateral sepals deltoid-lanceolate, acuminate, acute, 3-nerved. Upper sepal oblong-lanceolate, smaller than the laterals. Petals 3 mm. long, 1-nerved, oblong, constricted near, and thickened at, the apex. Lip tongue-shaped, obtuse; claw deflexed at right angles to the lamina; margins connivent. Column minute.



BULBOPHYLLUM DASYPETALUM, Rolfe
1, column; 2, lip; 3, lateral sepal; 4, petal; 5, anther.

No. 3719, *Merrill*, collected at the same time as the type, is perhaps only a variety with shorter leaves, the flowers smaller, with the petals scarcely thickened near the apex.

B. (§ RACEMOSÆ) LASIOGLOSSUM, Rolfe, *sp. nov.* "Rhizome stout. Pseudobulbs approximate, ovate, 7–8 lin. long, monophyllous. Leaves petiolate, blade elliptical-oblong, subacute, coriaceous, about 4 inches long, $1\frac{1}{4}$ lin. broad; petiole $\frac{3}{4}$ inch long. Scape suberect, slender, about 10–12 inches high, clothed with about three tubular sheaths on the lower part; raceme loosely many-flowered. Bracts ovate-lanceolate, acuminate, $\frac{3}{4}$ – $1\frac{1}{4}$ lin. long. Pedicels slender, 4 lin. long. Sepals oblong, subacute or apiculate, $4\frac{1}{2}$ lin. long; dorsal 3-nerved; lateral pair 5-nerved. Petals oblong-lanceolate, acuminate, pilose, $1\frac{1}{4}$ lin. long. Lip linear-oblong, subobtuse, cordate at the base, somewhat fleshy, 5-nerved, densely pilose on the margin, with spreading hairs. Column very short, teeth blunt; anther case 2-horned. — On Mt. Mariveles, Lamao River, Province of Bataan, Borden, n. 797. A very distinct species, well distinguished among its allies by the very hairy lip." — R. A. Rolfe *in MS.*

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, May 6, 1904, *H. N. Whitford* (no. 138).

B. (§ SESTOCHILUS) WHITFORDII, Rolfe, *sp. nov.* "Rhizome creeping, stout and woody. Pseudobulbs nearly obsolete, monophyllous. Leaves petiolate, blade elliptical-oblong, obtuse, coriaceous, about $4\frac{1}{2}$ inches long, by 16 lines broad; petiole 9 lines long. Peduncles slender, 1-flowered. Bract (not seen). Dorsal sepal oblong, obtuse; lateral pair very similar and somewhat falcate, $1\frac{3}{4}$ inches long. Petals oblong-linear, somewhat attenuate upwards and subacute, over $1\frac{1}{2}$ inches long. Lip (front lobe not seen), foot oblong, 6 lines long. Column stout, $3\frac{1}{2}$ lines long; teeth broad and obtuse. — On Mt. Mariveles, Lamao River, in the Province of Bataan, Whitford, n. 61. Allied to the Malayan *B. Lobbii*, Lindl., which has pseudobulbs over four times as large, the sepals relatively much broader, and the petals more acuminate." — R. A. Rolfe *in MS.*

Leaves up to 15 cm. long. Mid-lobe or tip of the lip linear, obtuse, 2 cm. long, 1.5 mm. wide. Capsule elliptic, 4.2 cm. long. Flower bright yellow, with the peduncle 6 cm. long.

CYMBIDIUM, Sw.

C. aloifolium, Swartz, Nov. Act. Soc. Sci. Upsala, 6: 73 (1799): "foliis radicalibus, lato-linearibus canaliculatis carnosis apice retusis; scapis multifloris, erectis." — *Epidendrum aloifolium*, L., Sp. Pl. 2: 953 (1753): "foliis radicalibus oblongis obtusis superne latoribus." — Kansijerum-Maravara, Rhede, Hort. Mal. 12: 17, tab. 8 (1703).

Plants stout. Stems pseudobulbous, 5–8 cm. long, sheathed by the bases of the lower leaves. Leaves distichous, asymmetrically emarginate, 5 dm. or more long, 4 cm. wide near the top, slightly narrowed toward the duplicative base, nerves obscure. Racemes shorter than the leaves, decurved or pendulous, many-flowered. Bracts minute, acute. Pedicels 2.5 cm. long, smooth. Flowers 5–5.5 cm. across. Sepals and petals oblong-spathulate, sub-acute. Labellum 3-lobed, middle lobe oblong-obtuse, scabrid, lateral lobes elliptic-lanceolate; between them on the disc two thick lamellæ. Column slender, arcuate, thickened above.

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, April 15, 1904, *H. N. Whitford* (no. 87, in part).

PHALÆNOPSIS, Blume

P. amabilis, Blume, Bijdr. 294 (1825). — *Epidendrum amabile*, L., Sp. Pl. 2: 953 (1753): "foliis radicalibus lato-lanceolatis, petalis lateralibus orbiculatis.

"Habitat in India. Osbeck.

"Radices crassæ, funiformes, supra arborea scandentes. Folia Crini s. Scillæ officinalis, lata, lanceolata, carnosâ, semipedalia. Culmus bipedalis, nudus, cinctus aliquot squamis acutis brevissimis. Flores nivei Orchidis Susannæ æmuli, s. magnitudine narcissi: constantes petalis 5, quorum 2 lateralia orbiculata, reliqua ovata. Cucullus alter triphyllus: lateralibus oblongis, intermedio hastato, bifido setis duabus subulatis."

Leaves broadly ovate-oblong, 14–30 cm. long, emarginate or mucronate. Peduncles variable in length, green, tinged with madder-purple, arching or erect, paniced or racemed, many-flowered. Flowers white, 7–10 cm. across. Lateral sepals ovate-lanceolate or oblong-lanceolate. Upper sepal elliptic. Petals broad, sub-rhomboidal, contracted at the base. Labellum 3-lobed; lateral lobes incurved, sub-quadrate, yellow at the base; middle lobe linear-hastate, with two basal auricles, the apex terminating in two filiform, tendril-like divisions; crest 2-lobed, yellow, spotted with red. Column short, sub-quadrate.

Lamoa River, Prov. Bataan, Luzon, May 2, 1904, *Thomas E. Borden* (no. 680).

P. rosea, Lindl., Gard. Chr. 1848, 671: "SP. CHAR. — Stemless. Leaves narrow oblong, leathery, sharp and recurved at the point (8–12 inches long). Flowers 12 or 13, about an inch in diameter, at the end of a stiff ascending lateral peduncle (18 inches long). Sepals spreading, oblong-lanceolate, rather acute, equal, white slightly tinged with pink. Lip ascending, deep violet, with the lateral segments linear-spathulate, oblique, incurved, the middle one ovate acuminate, slightly lozenge-shaped; crest thin, concave, lunate, rounded.

"The flowers are small, numerous, and arranged in a loose spike. The lip wants the tendrils so remarkable in *Ph. amabilis* and *grandiflora*, instead of which it is bright rose colour, with almost the shape of a trowel. It was found in Manila by Mr. T. Lobb."

"Epiphyte," alt. 3000 ft., Mt. Apo, Todaya, Davao, Mindanao, April, 1904, *E. B. Copeland* (no. 1228). — "Flowers pink and white, fragrant," alt. 75 m. above sea, Mt. Mariveles, Prov. Bataan, Luzon, August, 1904, *Elmer D. Merrill* (no. 3849). — Capiz, Panay, January 9, 1904, *E. B. Copeland* (no. 200).

CLEISOSTOMA, Blume

C. ionosmum, Lindl. in Bot. Reg. 1847, t. 41, in part: "foliis distichis coriaceis ensiformibus obliquè retusis, paniculâ patente, sepalis petalisque obovatis obtusis subæqualibus, labelli hastati carnosi pubescentis laciniâ intermediâ cordato-triangulari calcare conico, columnâ pubescente antice bidentatâ."

"The flowers are in an open panicle, about an inch across, flat, with five obovate equal obtuse lobes, yellow with cinnamon-brown blotches. The lip is white with a few red streaks, three-lobed, with the basal lobes acute and smaller than the middle one, which is cordate triangular acute, and much larger than they are. The flowers smell pleasantly of violets."

Stems stout, 11 mm. thick. Leaves 24 cm. long, 4 cm. wide, oblong, obtuse, emarginate, coriaceous. Flowers 2.5 cm. across. Sepals obovate or spatulate, 1.4 cm. long. Petals similar, shorter, smaller. Lip 8 mm. long; lateral lobes small, sub-acute; middle lobe triangular-cordate, acuminate, papillose hairy, with a depression on the disc from which a fleshy papilla protrudes, saccate at base; from the throat of the sac a pubescent plate lies obliquely forward. Pollinia 2. Viscid disc emarginate. Column pubescent with 2 lateral erect teeth. The flowers of this interesting species are well illustrated in the Botanical Register, Plate 41, but the foliage is incorrectly represented. Regarding the foliage Dr. Lindley says, "We have only seen the leaves and flowers separately."

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, May, 1904, *Thomas E. Borden* (no. 737).

VANDA, Jones

V. lamellata, Lindl., Bot. Reg. 1838, Misc. 66: "foliis distichis coriaceis obliquè et acutè bidentatis, spicâ multiflorâ, sepalis petalisque obovatis obtusis undulatis inferioribus subincurvis ma-

loribus, labello basi mammoso, limbo obtusato retuso auriculato bilamellato pone apicem bituberculato.”

Plants about 15 cm. high. Stem stout, emitting from the lower part long white roots, above concealed by the sheathing bases of the distichous leaves. Leaves 1–2 dm. long, conduplicate, linear-oblong, obtuse. Peduncles from the axils of the leaves, about 15 cm. long. Bracts remote, about 4 cm. long, closely appressed. Floral bracts triangular-acute. Pedicels slender, 2.5 cm. long. Flowers 3 cm. in vertical diameter. Sepals and petals clawed, obovate, the lateral sepals broadest. Lip 8 mm. long. Fruit an oblong capsule, attenuate at base, 6 cm. long.

“On trees, sepals yellowish, blotched with dull red-purple, centre very pale purple,” Culion Island, December 26, 1902, *E. D. Merrill* (no. 595). — “Epiphyte, on seashore. Plant 5 m. high,” Pagbilao, Tayabas, Luzon, April, 1903, *John W. Ritchie* (no. 2426). — “Epiphyte on Ficus over beach, odor faint but sweet, flowers bright yellow,” Capiz, Panay, January 10, 1904, *E. B. Copeland* (no. 135).

AERIDES, Lour.

A. quinquevulnera, Lindl., Sert. Orch. t. 30 (1838): “foliis ligulatis apice rotundatis obliquè emarginatis apiculo interjecto, racemis pendulis multifloris foliis longioribus, labelli cucullati infundibularis laciniis lateralibus erectis intermediâ oblongâ inflexâ denticulatâ calcare conico incurvo.”

Stems stout. Leaves oblong-ligulate, emarginate, 1–3 dm. long, 1.5–2.5 cm. wide, conduplicate at base. Peduncle 10–17 cm. long. Bracts lanceolate, about 1 cm. long. Racemes pendulous, exceeding the leaves. Floral bracts triangular-lanceolate, shorter than the pedicels, about 6 mm. long. Pedicel and ovary together 1.5 cm. in length. Flowers about 2 cm. across. Lateral sepals sub-orbicular, 8 cm. long, united at base to the front of the column. Upper sepal broadly obovate, similar to the petals and equal to

them. Lip 3-lobed; lateral lobes cuneate, 6 mm. long; middle lobe inflexed, margin irregularly denticulate. Column short. Anther drawn out in front into an obtuse beak. Perianth segments white, tipped and speckled with crimson-magenta; middle lobe of lip deep crimson-magenta.

Mt. Mariveles, Prov. Bataan, Luzon, August, 1904, *Elmer D. Merrill* (no. 3888).

RHYNCHOSTYLIS, Blume

R. violacea, Rchb., f., *Bonplandia* 2: 93 (1854). — *Vanda violacea*, Lindl., *Bot. Reg.* 1841, Misc. 12: "foliis canaliculatis obliquè abscissis rotundatis, racemis multifloris densis pedunculatis, sepalis obovato-oblongis obtusis planis incurvis, petalis multò angustioribus, labello oblongo apiculato plano: venis 5 crassis elevatis, sacco intus pubescente."

Stem short, 15–30 cm. high, emitting, at intervals below the leaves, thick elongated roots. Leaves 24–30 cm. long, emarginate, duplicative, distichous, approximate. Peduncle short, about 15 mm. long, with several sheathing bracts below. Raceme many-flowered. Labellum saccate, obtuse, with an oblong, obscurely apiculate blade in front; sac 6 mm. deep, pubescent within; blade crested along the veins, 9 mm. long. Capsule elliptic, slightly attenuate below, 1.9 cm. long. Material unsatisfactory for a sure diagnosis.

Lamao River, Mt. Mariveles, Prov. Bataan, Luzon, April, 1904, *H. N. Whitford* (no. 46).

TRICHOGLOTTIS, Blume

T. BATAANENSIS, *sp. nov.* Caulis tenuis flaccidus, elongatus. Vaginæ bene nervosae. Folia lineari-lanceolata, acuminata, remota. Pedunculi pauciflori. Flores parvuli, flavidi? Sepala

lateralia semi-hastata. Sepalum dorsale elliptico-oblongeolatum, sub-acutum. Petala oblongeolata. Labellum 3-lobatum, lobi laterales parvi, uncinati, obtusi, lamina suborbiculari-cordata, ad basim callo pilosiusculo. Ligula emarginata circinnata ante foveam. Columna brevis, crassa, anthera ovato-lanceolata, acuminata. Pollinia elliptica.



TRICHOGLOTTIS BATAANENSIS, Ames
1, flower; 2, dorsal sepal; 3, column and lip, showing lingulate process; 4, pollinia; 5, petal; 6, lateral sepal; 7, lip, column, ovary; 8, anther.

Plants 4 dm. or more high (only fragments 3 dm. long were collected). Stems 3 mm. thick, slender, clothed with the sheathing bases of the linear-lanceolate acuminate leaves. Leaves 10 cm. long, about 1 cm. wide, coriaceous, 2-2.5 cm. apart. Peduncles 7 mm. long, opposite the leaves or nearly so, few-flowered. Bracts scarious, obtuse. Lateral sepals 4 mm. long, 2 mm. wide, semi-hastate or oblong-obtuse with a

basal auricle. Upper sepal elliptic-oblongeolate, sub-acute. Petals oblongeolate, 4 mm. long. Labellum saccately spurred, 3-lobed; lateral lobes small, decurved, obtuse, situated near the foot of the column; middle lobe 3 mm. long; a sub-orbicular, cordate lamina with a pubescent or slightly pilose callus at base in front of a grooved claw which separates it from the saccate spur; from the back of the lip under the column arises a lingulate, furcate, pubescent plate with a circinnate apex. Column short, fleshy, truncate. Anther ovate-lanceolate-acuminate. Pollinia elliptic. Viscid disc furcate, divisions acute. Closely allied to *T. lanceolaria*, Blume.

Lamao River, Prov. Bataan, Luzon, May, 1904, *Thomas E. Borden* (no. 679).

T. FLEXUOSA, Rolfe, *sp. nov.* "Stem scandent, somewhat branched; internodes $\frac{3}{4}$ –1 inch long. Leaves oblong-lanceolate, obliquely subacute at the apex, coriaceous, 2–2 $\frac{1}{2}$ inches long, 6–8 lines broad. Racemes axillary, stout, flexuose, about 3 lines long. Bracts spreading, ovate, subobtuse, fleshy, under a line long. Pedicels 2 $\frac{1}{2}$ lin. long. Sepals oblong, obtuse, 2 lin. long. Petals similar but slightly narrower. Lip very fleshy, obtusely saccate, 2 lin. long; front lobe broadly ovate, obtuse, $\frac{3}{4}$ lin. long; side lobes very short and truncate; sac very broad. Column very stout, 1 lin. broad. At Capiz, in the Province of Panay, *Copeland*, n. 199. This species has much the general habit of *T. tetraceras*, Ridl., a native of Lankawi, which, however, has longer more acute leaves, much longer pedicels, and shorter broader floral segments." — R. A. Rolfe *in MS.*

Stems slender, 5 mm. thick, flexuose, sometimes branched, producing elongated branched roots 2 mm. thick. Leaves distichous, 2 cm. apart, oblong-lanceolate, 7–8 cm. long, 1–1.5 cm. wide, coriaceous, acute. Peduncles short, stout, about opposite the leaves. Lateral sepals ovate-lanceolate, sub-acute, 5 mm. long, 2.5–3 mm. wide. Upper sepal elliptic, obtuse, 3-nerved, 5 mm. long, 2 mm. wide. Petals oblanceolate, about as long as the sepals. Labellum affixed to the foot of the column, 3-lobed, saccately spurred; lateral lobes small, near the column, callus-like, erect, not curved, apical lobe or lamina suborbicular-cordate, 2.5 mm. long, carinate beneath, sessile, ecallose; beneath the column a lingulate pubescent plate with a circinnate apex arises posteriorly to the opening of the spur. Column short, 2 mm. long, stout, truncate; clinandrium entire. Anther round, acuminate in front. Pollinia 2, globose; pedicel elongated, nearly as long as the column when straightened out; viscid disc oblong-emarginate. After the removal of the viscid disc, the rostellum becomes a forked projection.

"Epiphytic in trees over beach," Capiz, Panay, January 10, 1904, *E. B. Copeland* (no. 199).

AN ONCIDIUM NEW TO THE UNITED STATES

Oncidium variegatum, Swartz, Fl. Ind. Occ. 3: 1483 (1806), not Lindl.: “*Epidendrum variegatum*, Prodr. p. 122. — *Helleborine foliis carnosis, carinatis et falcatis*. PLUM. Cat. 9. ic. 177. t. 182. 2.? — *Viscum delphinii flore albo guttato minus, radice fibrosa*, SLOAN. hist. 1. 251. t. 148. f. 2. — *Ophrys Guianensis*. — AUBL. Guian. 816.??

“*Radices* numerosæ, longæ, repentes, albidæ. *Caulis* nullus; sed *Sarmentum* subtus ad basin foliorum horizontaliter excurrens, apice prolem radicantem seu novæ plantæ originem proferens. *Folia* radicalia, distiche posita, basi vaginantia, lanceolata canaliculata, compressa, recurvata, rigida, carnosâ, in sulco atropunctata, extus glabra, marginibus et dorso carinato cartilagineo-serratis. *Vaginæ* carinatæ, margine membranaceæ, post casum foliorum persistentes, oblique truncatæ. *Scapus* (interdum plures) e sinu Vaginarum, filiformis, strictus, nudus, fuscus, glaber, squamis remotis, vaginantibus munitus, simpliciusculus l. rarius subdivisus, paniculatus: *ramis* flexuosis, multifloris. *Flores* subsessiles l. breviter pedicellati, majusculi. *Bracteæ* minutæ, ovato-lanceolatæ, membranaceæ, ad basin florum. *Petala* quatuor, cruciata: duo (inferius et superius) minora, basi attenuata, concava, rubra; altero apice emarginato; duo lateralia paullulum majora, spathulata, retusa, patentia, undulata, a basi ad medium sanguinea. *Labellum* petalis multo majus, patens, *disco* prope columnam oblongo, tuberculo cruciformi munito, margine trilobum: lobis lateralibus parvis oblongis falcatis; intermedio maximo, reniformi, patente, plano, toto candido, basi sanguineo-maculato. *Columna* minuta, erecta, alulis duabus falcatis conniventibus pallide sanguineis superne cincta, lutea, apice excavata pro *Anthera* ovata, biloculari, *Corpusculis pollinis* duobus ovatis, pedicellis propria vaginula inclusis adfixis. *Germen* tereti-filiforme. *Capsula* elongata, basi torta, sulcata.” — Swartz, *loc. cit.*

Leaves about four in number, distichous, ensiform, acute, about 3 mm. broad, up to 7 cm. long, margins finely scabrate. Peduncle sometimes branched from near the base and foliate, about three times longer than the leaves, purplish below, bracteate. Bracts scarious, or purplish tinged, 4–8 mm. long, sheathing, acute, the uppermost shorter than the lower ones and barely sheathing. Pedicel and ovary together about 12 mm. long. Lateral sepals coherent except at the tips, together forming a spathulate blade beneath the lip, 6 mm. long. Upper sepal similar to the united laterals, spathulate, retuse, apiculate, pale green or whitish obscurely barred with brown-purple. Petals 8 mm. long, orbicular, with an oblong claw, apical half white, faintly suffused with crimson-magenta, basal half greenish barred with brown or brown-purple. Lip 11 mm. long, 3-lobed; lateral lobes white, comparatively minute, obovate, recurved, separated from the white broadly reniform middle lobe by a serrated or dentate yellow-spotted isthmus; crest yellow, somewhat resembling a fleur-de-lis, several-tubercled, the posterior tubercles rounded, three in number, larger than the anterior ones. Wings of the column conspicuous, about 4 mm. long, obscurely lobed, truncate above, rounded below, purple-tinged. Anther crimson-magenta.



ONCIDIUM VARIEGATUM, Sw.

This *Oncidium*, which is closely allied to *O. Leiboldi*, Rchb., f., and to *Oncidium sylvestre*, Lindl., was sent to me from West Palm Beach, Fla., where it was collected by Mr. Frank Idner. It resembles a Bromeliaceous rather than an Orchidaceous plant, and is peculiar not only because of the scabrate margins of the leaves, but because of propagation by stolons. Two specimens were sent from Florida, one of which bloomed in late December,

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1904, with two flowers. The species of the section *Equitantia*, to which our *Oncidium* belongs, are variable, and are differently treated by different authors. The description given above and the accompanying cut are based on Mr. Idner's material.

Oncidium variegatum, Sw., has been reported from Cuba and Jamaica.

CONTRIBUTIONS TOWARD A MONOGRAPH
OF THE AMERICAN SPECIES OF
SPIRANTHES

SPIRANTHES VERNALIS, ENG. & GRAY

SINCE the publication in *Rhodora* (6: 30) of the description and plate of *Spiranthes neglecta*, I have been enabled, through extensive collections of *Spiranthes*, both in the field and in herbaria, to make careful studies of the genus with the end in view of investigating the comparative value of characters used to separate the species allied to *S. vernalis*, Eng. & Gray. Toward this end I have examined the type material of old and recently established American species, and while obliged to modify former views, I have arrived at conclusions which, if they should prove correct, will considerably alter the present status of the genus in the eastern United States. That the species offer more than ordinary difficulty when we attempt to place them properly or to refer them to their nearest of kin must in many cases be accounted for by the poor condition of the type specimens, some of these being scant or fragmentary, and by the wide range of variation in species occurring over large areas. Another circumstance which leads to confusion is the interpretation, often faulty, of the lip characters in species which exhibit little or no constancy in the outline or measurements of this important organ.

At the present time there are about twenty-four *Spiranthes* which have been named as natives of the United States and Canada, if we exclude the Floridian and Texan species of *Stenorhynchus* often regarded as members of the genus. This number includes several doubtful species which are poorly, if at all, represented in American herbaria, and which are wretchedly described in literature. Although the genus may be divided into two or more groups, the similarity between the species of each group is

often confusing and likely to lead to erroneous conclusions, so that more segregates have been made than is necessary. To describe the species in such a way that determination may be made without hesitation is extremely difficult, as the range of variation, as well as the extent of distribution, is often great; and species which are quite distinct when widely separated stations alone are considered, run together by imperceptible degrees when specimens from the entire range are compared. While *Spiranthes præcox*, Watson (of which a full account will be given farther on), tends toward the Mexican *S. graminea*, Lindl., on the one hand, *S. vernalis*, Eng. & Gray, approaches the Mexican species on the other.

The *S. graminea* or *S. vernalis* group, well characterized by oblong-lanceolate or linear-lanceolate leaves and by a single-ranked raceme during anthesis, is at present vaguely understood, and consequently the species are often confused. From *S. vernalis* several segregates have been made which can hardly stand the test of rigid examination, and the following notes, based on my investigations among these segregates, are offered with the hope that they may clear away difficulties.

Sixty years ago Engelmann and Gray described *Spiranthes vernalis* in the Boston Journal of Natural History 5: 236 (1845), erecting the species on material collected by F. Lindheimer near Galveston, Texas, on wet prairies in April and May, 1843. The type specimens are fragmentary, though still in a satisfactory condition for determination. They agree with certain other Texan *Spiranthes* examined, and are not unlike the New England plant described by me as *S. neglecta*, though more slender, with narrower, longer leaves, with auricled, hyaline-margined floral bracts, and with a slightly different lip. One of the specimens is very slender, and though devoid of flowers is without doubt pure *S. vernalis*, agreeing with its companions so far as vegetative parts are concerned. The collection on which *S. vernalis* was based comprised at least two species, one clearly referable to *Spiranthes præcox*, Watson. I have examined four sheets of this col-

lection, which was distributed as no. 191 of Lindheimer's Texan plants, and find that two among them agree with the type specimen and with the description published in the Journal of the Boston Society of Natural History. The description is as follows: "radice fasciculata; caule foliato; foliis linearibus, superioribus sensim minoribus vaginantibus lanceolato-subulatis; sepalis petalisque basi cohærentibus oblongo-linearibus, lateralibus angustioribus labellum reflexum crenulatum apice non dilatatum æquantibus vel superantibus."

In the Bulletin of the Torrey Botanical Club 25: 610 (1898), Dr. J. K. Small published the description of a new *Spiranthes* as *Gyrostachys Reverchoni*, and interpreted it as a homologue of *S. brevifolia*, Chapman, differing from that species in its longer, more numerous leaves and in the rhombic-ovate lip. The type material was collected on prairies at Lancaster, Dallas Co., Texas, in June, by Julien Reverchon. After an examination of the type material in the herbarium of the New York Botanical Garden, and of specimens in the Gray Herbarium, in the National Herbarium, in the herbarium of the Missouri Botanic Garden, and in the possession of Mr. Reverchon, it seems to me that this species is identical with the northern *Spiranthes* which has passed as *S. graminea*, var. *Walteri*, Gray, and as *S. præcox*, Watson, and is conspecific with *S. vernalis*, agreeing with it in the conformation of the lip and in every detail of taxonomic value. The plants collected by Mr. Reverchon are taller than any I have seen from New England, measuring 65 cm. in height, but in other respects are the same.

In Dr. Britton's Manual of the Flora of the Northern States and Canada, issued in 1901, Dr. P. A. Rydberg described as a new species *Gyrostachys linearis*. The type specimen comprises four plants, collected by C. F. Austin near Closter, Bergen Co., N. J., slender in habit, with narrow leaves, dense, short pubescence, and with lips more or less ovate-oblong in outline. This material is at once distinct from *Spiranthes præcox*, Watson, through the dense pubescence of the axis of the inflorescence and the pubescence and shape of the lip, and agrees well

with a slender form which extends from New Jersey to southern Florida.

In the Gray Herbarium there are three plants collected by Austin which are undoubtedly of the same collection as that on which Dr. Rydberg based his description of *Gyrostachys linearis*. The three specimens are very much alike, and much resemble, but are more slender in habit than, the type specimens of *Spiranthes vernalis*. Accompanying the sheet is a manuscript note by Austin which points out clearly the differences between his specimens and *S. cernua*, and in which he says, "I have seen this plant in Dr. Torrey's herbarium from the extreme South, but unnamed." He referred his material to *S. tortilis*, Richard, from which species it is to be distinguished by the dense pubescence of the rhachis and by the different inflorescence. This sheet is of especial interest, as it was determined by Dr. Gray as *Spiranthes graminea* with a query. Another sheet of this species in the same herbarium, representing a collection made by W. M. Canby in New Castle Co., Del., in 1863, was also determined by Dr. Gray as *S. graminea*, Lindl., and later named *S. præcox* by Dr. Sereno Watson, and leaves no doubt as to the identity of the material these botanists had in mind in their work on Gray's Manual.

Dr. Small, in his Flora of the Southeastern United States, described *Gyrostachys xyridifolia* from plants collected by A. H. Curtiss (no. 4856) near Jacksonville, Fla., in May, 1894. The type sheet shows four specimens, one of which is a stout plant with equitant leaves. The remaining specimens are slender, without leaves, and resemble closely *G. linearis*, Rydb. In my herbarium there are numerous specimens collected near Jacksonville which agree perfectly with Dr. Small's material in all essentials and pass gradually into the slender Florida form referred above to *G. linearis*, Rydb., on the one hand, and into *Spiranthes neglecta*, Ames, on the other, so that there seems to be no character of sufficient classificatory strength by which to separate these species from each other or from *S. vernalis*. Dr. Small in his key to *Gyrostachys* described the bracts of *G. xyridifolia* as without scarious margins, but this distinguishing mark is variable, and his

type material shows the bracts at least slightly hyaline along their basal margins. In addition to the type specimen and the material in my own herbarium I have examined several sheets of Curtiss's no. 4856, on which Dr. Small based *G. xyridifolia*, and cannot discover a single character by which to distinguish them from the Texan plants on which *G. Reverchoni* was based.

Plants referable to all of the species mentioned above have been treated by most authors as identical with *Limodorum præcox*, Walter, though differing from it in the outline of the lip and in several other traits of undoubted taxonomic value. In spite of the fact that they exhibit a wide range of variation and pass from the stout New England to the slender Florida form, there seem to be no valid differences by which to separate them.

SYNONYMY

The following (based on a critical study of material in herbaria) will show what I consider to be the correct synonymy of *S. vernalis*.

Spiranthes vernalis, Engelmann & Gray in Boston Jour. Nat. Hist. 5: 236 (1845), not *G. vernalis*, Small, Fl. Se. U. S. 319; *S. graminea*, var. *Walteri*, Gray, Manual, ed. 5, 505 (1867), as to charac. and pl. descr.; *S. præcox*, Watson, Gray, Manual, ed. 6, 503 (1890), as to charac. and pl. descr.; *S. graminea*, var. *præcox*, B. S. P. Cat. Anth. Pteridoph. N. Y. 52 (1888); *Gyrostachys Reverchoni*, Small, Bull. Torr. Bot. Club 25: 610 (1898); *G. linearis*, Rydb. in Britton's Manual 300 (1901); *G. xyridifolia*, Small, Fl. Se. U. S. 318 (1903); *Spiranthes neglecta*, Ames, Rhodora 6: 30, pl. 51 (1904).

Spiranthes vernalis is widely distributed, although, if we may depend on its scarcity in herbaria, it is comparatively rare. Dr. Gray ascribed to it a range reaching from southern New England to Virginia and southward; Dr. Small extended this range definitely to Jacksonville, Fla., while my studies show that it extends from Massachusetts southward to Dade and Lee Cos., Fla., and westward through the Gulf States to New Mexico and northward through the Mississippi Valley to Illinois.

LIMODORUM PRÆCOX, Walter

The identity of *Limodorum præcox*, Walter, now remains to be determined; and for assistance in this work I am indebted to Mr. Spencer Moore, who has kindly compared my material with the type specimen in Walter's herbarium preserved at the British Museum. To Mr. Moore a collection was sent of all the species which have a simple-spiralled inflorescence, known to occur in the United States, with the exception of *S. longilabris*, Lindl. Notes accompanied the specimens, which described the characteristics of each species as at present understood; the points of difference between *S. vernalis* and the specimens supposedly *Limodorum præcox*, Walter, were clearly defined. Mr. Moore made careful comparisons, and concluded that without doubt a Georgian *Spiranthes* collected by Mrs. Augustus P. Taylor near Thomasville, which I had determined provisionally as "*S. præcox?*" is identical with *Limodorum præcox*, Walter. The Georgian plant in question is representative of a species widely distributed in the Southern States, commonly though incorrectly called *S. tortilis*, Richard. Mr. Moore in his letter, which was addressed to Dr. R. G. Leavitt, says in part: "You will be glad to learn that the type of *Limodorum præcox* in the Walter herbarium is a thoroughly serviceable one, and that a careful comparison of your plant with it leaves no doubt as to the absolute identity of the two. To make assurance doubly sure, I asked Dr. Rendle, who is the orchid authority at the Museum, to give me his opinion, which he kindly did in the above sense. This was, of course, with flowers of the two moistened and set side by side."

SPIRANTHES GRAMINEA, Lindl.

On a previous page I have mentioned *Spiranthes graminea*, Lindl., as a species nearly allied to *S. vernalis*. My studies have been confined to a single sheet in the Gray Herbarium which represents Hartweg's Mexican collection numbered 224, and to

Pringle's and Nelson's collections from Mexico, distributed as *S. graminea*, Lindl. That the Mexican species is the same as that from the United States is not at all clear. Dr. Gray, however, must have regarded the two closely related, as his *S. graminea*, var. *Walteri*, indicates. In the fifth edition of the Manual the synonymy and remarks given by Dr. Gray are as follows: "(*Limodorum præcox*, Walt. *Neottia tortilis*, Pursh, Barton, Fl., etc. *S. tortilis*, Chapm.) — Wet, grassy places, S. New England to Virginia, and southward. July, August, at the north. — Root of fleshy or somewhat tuberous thickened fibres. Perianth 3" long. — The original, West Indian *S. tortilis* (Swartz), Richard, has a smoother much less twisted spike, smaller bracts, and more leafless scape, the root-leaves seldom present at flowering-time: it is very like *S. brevifolia*, Chapm. (*S. longilabris*, Lindl.?). Our plant has a more acute tip to the anther and stigma than the Mexican."

Lindley's description of *Spiranthes graminea* in Bentham's *Plantæ Hartwegianæ*, p. 25 (1840), is as follows: "foliis linearibus acutis basi angustatis caule vaginato multo brevioribus, spica densa pubescente, bracteis ovatis acutis florum longitudine, sepalis acuminatis obtusissimis cum labello sessili oblongo obtuso apice crispo parallelis, callis adnatis." And in his *Genera and Species of Orchidaceous Plants*, p. 466, he added a note, in which he said: "The nearest affinity of this species is with *Sp. ovalis*, from which it differs, not only in the characters above given, but in its greater stature, (my specimen is nearly 1½ foot high) narrow leaves, and much more simply twisted spike, which in *S. ovalis* seems to have several spires as in *S. odorata* and its allies." In the description published in the same work Lindley assigned to *S. graminea* a tomentose pubescence. In the specimens I have examined this character is quite conspicuous, the hairs of the rhachis being long and somewhat matted, thus differing from *S. vernalis*, which has a shorter less matted pubescence.

SPIRANTHES LACINIATA (Small)

In addition to *S. vernalis*, Eng. & Gray, there is another *Spiranthes* from the southern United States which belongs in the same section. It was described by Dr. J. K. Small in his Flora of the Southeastern United States in 1903. It grows in moist ground, where water stands for the greater part of the year, the flowers expanding after the water recedes in the dry season. Although this species does not, so far as known, come into the northern United States, it has been found as far north as Georgia, where it was collected by Roland Harper in moist places.

The type station of this species is near Eustis, Lake Co., Fla., where G. V. Nash collected it in June, 1895. When fresh it is strikingly distinct from *S. vernalis*, as the leaves at base have an inflated appearance and persist through the flowering season.

S. laciniata is an extremely variable species, and some of its forms approach *S. præcox*, Watson, so closely that they are well-nigh indistinguishable from it. On the other hand, some forms are more unlike the type than the type is unlike *S. præcox*, and resemble luxuriant leafy forms of *Spiranthes vernalis*. After an examination of several hundreds of specimens from Texas, Louisiana, Georgia, and Florida, my conclusion is that *S. laciniata* and *S. præcox*, while at times they approach each other in such a manner that to discriminate between them becomes extremely difficult, are yet distinct species. The specimens collected near Miami by A. A. Eaton, numbered 975, represent the species in a high state of luxuriance, while the specimens collected near Eustis by G. V. Nash, and in Sumter Co., Ga., by R. M. Harper, appear to be intermediate between the Miami specimens and *S. præcox*. The arrangement of the leaves, however, affords a fairly safe though not an entirely satisfactory distinction; for in *S. laciniata* the leaves are basal and cauline, some of them extending up the stem and passing gradually into the elongated bracts, while in *S. præcox* the leaves are mostly basal and only exceptionally cauline. The pubescence on the under surface of the lips in *S. laciniata* is often conspicuous, rarely absent. In *S. præcox*

the lips are generally smooth. The lips too in *S. laciniata* are considerably shorter than the sepals, while in *S. præcox* the lip and sepals are about equally long. The following will serve to characterize the species and to amplify the brief description published by Dr. Small.

Spiranthes laciniata (*Gyrostachys laciniata*, Small). Roots numerous, fascicled, fleshy, elongated; plants 3 dm. to 1 m. high, smooth below, densely pubescent above, sometimes sparsely so; pubescence mostly capitate; leaves linear-lanceolate to narrowly oblanceolate, acuminate, 2–20 mm. wide above, 1–3 dm. long, acute, mostly basal, a few extending up the stem, sheathing at base, of thickish, almost fleshy texture when fresh, somewhat equitant, the margins erect and nearly touching; cauline bracts sheathing, acuminate-acute, floral bracts ovate-lanceolate, acuminate, not at all hyaline margined or faintly so, longer than the ovaries; inflorescence paucispiral, often secund, 8–24 cm. long (average 14 cm.); perianth pubescent, tubular in appearance, 8–11 mm. long, whitish; sepals similar, obtuse, ciliate-margined, linear-oblong, tapering gradually towards the apex, 3-nerved, 7.5–11 mm. long; petals oblong falcate, obtuse, 3-nerved, 7–9 mm. long; lip oblong, sometimes from a broadened base, tapering gradually or imperceptibly to the rounded, denticulate-laciniate apex, 7–8.5 mm. long, shorter than the sepals, pubescent beneath, callosities elongated, curved, apparently marginal, the lip broadest where they arise; gynostemium as in *S. vernalis*. — One important distinctive character is the pubescence of the rhachis. In *S. laciniata* the tips of the short hairs are capitate, while in *S. vernalis* the hairs are longer and have tapering obtuse or slightly capitate tips, and are slender from base to apex. This distinction, however, is not infallible, as the characters in question are probably subject to physiological variation.

A SYNOPSIS OF THE GENUS SPIRANTHES NORTH OF MEXICO

THE following synopsis of the genus *Spiranthes* as it occurs in the United States will, it is hoped, clear away some of the difficulties experienced in the study of the species. It is not intended that this synopsis should stand as an exhaustive research, but rather as a contribution towards clarification in a genus at present encumbered with perplexing problems which have arisen from negligence of types and a misunderstanding of diagnostic values. Although the synonymy is more involved than here shown, I have considered a brief treatment advisable, as it is my intention to give a more detailed account of my investigations in a future paper.

The first specific name of each species under the correct generic interpretation, whenever this could be determined with reasonable surety, or employed without leading to complications, has been revived. The process by which I have arrived at my conclusions is indicated by the citations of literature under each species. A mere compilation of synonymy has been avoided as extremely unsafe, especially in *Spiranthes*; and except in those cases where brief descriptions were the only clue to the identity of doubtful species, every citation has been verified and the plant indicated studied from herbarium material or from plates.

In his *Revisio Generum Plantarum*, Otto Kuntze affords us a startling example of the dangers which surround a purely literary investigation of plant synonymy. In his reference of *S. tortilis*, Rich., to *Ophrys peruviana*, Aublet, he has apparently followed the synonymy which John Lindley gave under *S. tortilis* in the *Genera and Species of Orchidaceous Plants*, without consulting the plate in Plumier's *Plantarum Americanum* to which Aublet referred *Ophrys peruviana*. Again, *Spiranthes Beckii*, Lindl., is made by Kuntze synonymous with *Limodorum præcox*, Walter, the only basis for such a conclusion being the synonymy employed by

Lindley in his *Genera and Species of Orchidaceous Plants*. This is absolutely wrong, and a most unfortunate disregard of literature as well as of specimens, as a thoroughgoing study of all the circumstances will demonstrate.

I have included *Spiranthes simplex*, Gray, under *S. Beckii*, Lindl., as I can detect no constant difference between Drummond's plants, numbered 332, collected in New Orleans, on which Dr. Lindley based his description of *S. Beckii*, and the type specimens from Nantucket and New Jersey, on which Dr. Gray based *S. simplex*. The southern plants are usually taller than the northern ones, though there is no constant difference that can be based on this character. In my judgment the floral structure of plants from the entire range shows no specific nor even varietal characters which will sustain *S. simplex*, Gray.

S. brevilabris, Lindl., seems to be a pubescent form of *S. gracilis*, Beck. In the Gray Herbarium there are three specimens of what I take to be *S. brevilabris*, two of which are so marked in Dr. Gray's handwriting. Aside from the pubescence, which is a variable character, the persistent leaves seem to be the only point of distinction. I have studied many specimens from the Southern and Middle States, and find much variation.

In referring *S. brevifolia*, Chapm., to *S. longilabris*, Lindl., I have based my understanding of the latter species on four plants preserved in the Gray Herbarium, which were collected by T. Drummond at New Orleans in 1833. The specimens have secund racemes, smooth bracts, and long lips, and agree well with Lindley's description. These specimens were previously determined as *S. longilabris* by Gray, and agree with the type specimens of *S. brevifolia*, Chapm.

Gyrostachys constricta and *G. triloba*, which Dr. Small described in the Bulletin of the Torrey Botanical Club as new species from the South, appear to be identical with *Spiranthes odorata*, Lindl. Flowers taken from two specimens on the type sheet of *G. triloba* agreed with authentic material of *Spiranthes odorata*, and did not show the trilobed character to which the specific name of the plant refers. *G. constricta*, which Dr. Small consid-

ered a near relative of *S. vernalis*, is not unlike typical *S. odorata*; it was compared by him with supposed *S. vernalis*, but the material in the herbarium of the New York Botanical Garden labelled *S. vernalis* (which I have studied) proves to be *S. odorata* erroneously determined.

The distribution of species as given below is entirely based on specimens examined by me in the preparation of this synopsis. For the loan of material I am chiefly indebted to Dr. B. L. Robinson of the Gray Herbarium, to Dr. N. L. Britton of the New York Botanical Garden, to Professor William Trelease of the Missouri Botanic Garden, to Mr. C. D. Beadle of the Biltmore Herbarium, to Dr. J. N. Rose of the National Herbarium, and to the following gentlemen who have kindly placed their own herbaria or those of the institutions with which they are identified, at my disposal; viz., Professor Samuel M. Bain, Mr. C. H. Bissell, Dr. E. H. Eames, Mr. O. A. Farwell, Mr. M. L. Fernald, Mr. E. B. Harger, Mr. F. Tracy Hubbard, Mr. C. N. Lochman, Professor C. V. Piper, Mr. E. A. Rau, Mr. J. Reverchon, Professor L. M. Umbach, Mr. S. Hart Wright.

KEY TO THE SPECIES

Flowers forming a single rank, often secund.

Leaves rarely persistent, ovate or elliptic, lamina rarely exceeding 4.5 cm. in length.

Root solitary (or sometimes apparently of two tubers, the tuber of the past year persisting).

Lip quadrate, white.

1. *S. Beckii*.

Roots fasciculate.

Lip quadrate, green-centred.

2. *S. gracilis*.

Leaves fugacious or persistent, oblong-lanceolate to linear-lanceolate, some of them exceeding 4.5 cm. in length.

Basal leaves mostly wanting during anthesis.

Lip oblong-quadrate; flowers spirally secund.

3. *S. tortilis*.

Lip tapering to the obtuse tip; flowers secund, hardly spiral.

4. *S. longilabris*.

Leaves mostly persistent.

Lip oblong, sometimes from a broadened nearly quadrate base, shorter than the sepals and petals, lacinate at the tip, broadest where the callosities arise, pubescent beneath.

5. *S. laciniata*.

Lip ovate to ovate-oblong, usually equalling the sepals and petals; not lacinate at the tip, broadest in front of the callosities, pubescent beneath.

6. *S. vernalis*.

Lip oblong, often broadest at the distal end, as long as the sepals and petals or longer, rarely shorter, smooth beneath.

7. *S. præcox*.

Flowers forming a dense raceme, apparently in several ranks.

Lip constricted at the middle or near the apex. (In no. 8, 5 mm. in length, sometimes ovate-oblong.)

Plants southern (October).

8. *S. parviflora*.

Plants northern and western (Summer).

Lip orbicular at the base, strongly dilated at the apex, calli minute.

9. *S. Romanzoffiana*.

Lip oblong at the base, slightly dilated at the apex, calli prominent.

10. *S. porrifolia*.

Lip not conspicuously constricted, or only rarely so.

Lip quadrate, yellow (June and July).

11. *S. latifolia*.

Lip ovate-oblong.

Leaves mostly radical, the lowermost longest.

12. *S. cernua*.

Leaves extending up the stem.

13. *S. odorata*.

1. SPIRANTHES BECKII, Lindl., Orch. Pl. 472 (1840) (exclude synonyms). — *S. simplex*, Gray, Manual, ed. 5, 506 (1867), not Grisebach. — *S. Grayi*, Ames in Rhodora 6 : 44 (1904). — *Gyrostachys simplex*, Kuntze, Rev. Gen. Pl., part II., 664 (1891). Specimens of Drummond's no. 332, collected at New Orleans, on which Lindley based his description of *S. Beckii*, may be found in the Gray Herbarium and in the Herbarium of the Boston Society of Natural History. This species has been reported from Fairfax Co., Va., by William Palmer (Proc. Biol. Soc. Wash. 17 : 165, 1904).

Massachusetts, Norfolk Co.: Holbrook, September 12, 1900, Arthur Clark. Bristol Co.: Easton, September 2, 1903, A. A. Eaton; Short St., September 10, 1903, A. A. Eaton. Plymouth Co.: Gray Gables, August 28, 1895. Barnstable Co.: Dry fields, Barnstable, September 5, 1898, J. M. Greenman (no. 365). — Centreville, September 9, 1874. — Truro, September 5, 1891, W. Faxon. Nantucket Co.: Nantucket, August 20, 1865, J. W. Robbins; moors, September 9, 1885, Walter Deane; August 13, 1880, Mrs. M. L. Owen; Squam, August 21, 1896, M. L. Owen; dry meadows, August 22, 1897, F. N. Vasey; September 5, 1871, Wm. Boott.

Rhode Island: South Kingston, 1874, J. W. Congdon.

Connecticut, New London Co.: Dry open sandy fields near shore in short grass, Crescent, August 28, 1903, R. G. Leavitt. Middlesex Co.: Old Saybrook, September 9, 1904, C. H. Bissell. New Haven Co.: Oxford,

- September 22, 1901, *E. B. Harger*. Hartford Co. : South Glastonbury, September 4, 1892, *Frances Wilson*. Fairfield Co. : Dry fields, Stratford, September 1, 1891, *L. N. Johnson*. — Bridgeport (infrequent), August 20, 1895, *E. H. Eames*.
- New York, Suffolk Co. : Open dry sandy soil, Southampton, Long Island, August 22, 1899, *John Hendley Barnhart* (no. 2802).
- New Jersey : The barrens, September 16, 1879, *George Engelmann*. Camden Co. : Sandy soil near Camden, September 21, 1868, *C. F. Parker* (no. 7830). Atlantic Co. : Egg Harbor, September 3, 1888, *J. B. Brinton, M. D.*
- Maryland, Wicomico Co. : Salisbury, *W. M. Canby*; dry sand, August, 1894, *W. M. Canby*; September 12, 1878, *J. W. Chickering, Jr.* Worcester Co. : Dry open woodlands near Snow Hill, September, 1872, *W. M. Canby*. Montgomery Co. : Woodside, September 11, 1898, *Henry W. Olds*. — Great Falls, July 4, 1879, *L. F. Ward*. Prince George Co. : Below Bladensburg, September 14, 1879, *L. F. Ward*. — Ardwick, September 6, 1897, *E. S. Steele*.
- District of Columbia : Copse land, etc., Washington, September 6, 1897, *E. S. Steele*. — Garrett Park, September 1, 1895, *D. LeRoy Topping*.
- North Carolina, Swain Co. : Oak barrens in sandy soil, August 28, 1891, *H. C. Beardslee & O. A. Kofoid*. Buncombe Co. : Blue Ridge, south of Asheville, September 1, 1876, *Geo. Engelmann*. Bladen Co. : June 10, 1901 (hb. Biltmore, no. 970). Alamance Co. : Rock Creek, September 22, 1873, *Geo. Vasey*.
- Georgia, Thomas Co. : Thomasville, 1903, *Mrs. Augustus P. Taylor*. Laurens Co. : Dry pine barrens southeast of Dublin, June 24, 1902, *R. M. Harper* (no. 1371). Telfair Co. : Sandy soil, Lumber City, June 9, 1900 (hb. Biltmore, no. 970 a).
- Florida, Lake Co. : Eustis, March 12–31, 1894, *G. V. Nash* (no. 83).
- Mississippi, Jackson Co. : Ocean Springs, May 18, 1895, *J. Skehan*.
- Tennessee, Cocke Co. : Within three miles of Wolf Creek Station, August 30, 1897, *Thos. H. Kearney* (no. 901). Davidson Co. : Nashville, *Dr. Gattinger*; September 2, 1877, *W. M. Canby*. — Siliceous soil, hills near Nashville, August, *Dr. Gattinger*.
- Kentucky : Green River region, August 21, 1895, *J. N. Rose*.
- Arkansas, Pulaski Co. : Little Rock, May, 1886, *Dr. H. E. Haase*.
- Louisiana, Orleans Co. : New Orleans, 1832, *T. Drummond* (no. 332). Rapides Co. : Alexandria (hb. Gray).
- Texas, Harrison Co. : Common in woods, Marshall, August 8, 1901, *B. F.*

Bush (no. 636). Harris Co.: Houston, woods, *Elihu Hall*; common in woods, June, 1872, *Elihu Hall* (no. 628).

2. *S. GRACILIS*, Beck, Botany 343 (1833); Hook., Fl. Bor. Am. 2: 202, t. 203; Lindl., Orch. Pl. 472 (exclude synonyms). — *S. brevilabris*, Lindl., Orch. Pl. 471 (1840). — *Neottia gracilis*, Big., Fl. Bost. ed. 2, 322 (1824). — *N. gracilis*, var. *secunda*, Big., l. c. — *N. tortilis*, β *gracilis*, Torrey, Comp. 320 (1826). — *Gyrostachys gracilis*, Kuntze, Rev. Gen. Pl., part II., 664 (1891).

British North America, Nova Scotia: Gravelly open woods, Sydney, Cape Breton, August 17, 1902, *M. L. Fernald*. — Baddeck, Cape Breton, August 26, 1896, *F. Tracy Hubbard*. — Canso, August 2, 1901, *J. Fowler*. — Dry knoll in field, Pictou, July 12–18, 1901, *C. D. Howe & W. F. Lang*. — Metaghan, July 22, 1896, *E. Brainerd*. Ontario: Gravenhurst, August 3, 1897 (hb. Biltmore, no. 35186). Manitoba: Crevices of rocks, Blood Vein, Lake Winnipeg, August 14, 1884, *J. M. Macoun*.

Maine, Penobscot Co.: Orono, August, *F. L. Scribner*. — Dry thicket, Orono, July 13, 1889, *M. L. Fernald*; dry woods, Orono, August 18, 1897, and July 15, 1889, *M. L. Fernald*. Franklin Co.: dry woods, Strong, August 1, 1902, *C. H. Knowlton* (no. 374). — Dry thicket, Wilton, August 11, 1894, *M. L. Fernald*. Oxford Co.: Hilly woods and sandy plains, Hartford, July, 1885, *J. C. Parlin*. Hancock Co.: Orland, *Helen G. Atkins*. — Meadows above Long Pond, Mt. Desert, August 26, 1901, *J. H. Redfield*. Kennebec Co.: Augusta, July 20, 1886, *E. C. Smith*. Androscoggin Co.: Dry sandy soil, Auburn, August, 1895, *E. D. Merrill* (no. 3006). — Livermore Falls, *J. M. Haskell*. Lincoln Co.: Field, Bristol, July 24, 1897, *E. B. Chamberlain*. — Highway bog, Southport, August 1, 1894, *M. L. Fernald*. Cumberland Co.: Westbrook, July 5, 1899, *P. L. Ricker* (no. 570). — Brunswick, August 20, 1897, *P. L. Ricker* (no. 315).

New Hampshire, Coos Co.: Roadside, Shelburne, August 5, 1883, *Walter Deane*. Belknap Co.: Banks of Lake Winnipisaukee, September 18, 1856, *Geo. Engelmann*. Rockingham Co.: Seabrook, September, 1903, *A. A. Eaton*. Hillsborough Co.: Milford, August 26, *John A. Wheeler*. — South Lyndeboro, August, *Putnam*. Cheshire Co.: Woods, Jaffrey, August 11, 1890, *Walter Deane*. — Old clearing, Jaffrey, July 15, 1897, *B. L. Robinson* (no. 226).

- Vermont, Orleans Co.: Willoughby Lake, July 20, 1887, *Faxon*. — Willoughby, August 31, 1892, *H. H. Rusby*. Caledonia Co.: Barnet, August 8, 1883, *F. Blanchard*. Addison Co.: Middlebury, July 5, 1880, *Thos. E. Boyce*. — Silver Lake, Salisbury, August, 1882, *F. H. Knowlton*. Windsor Co.: Queechee Gulf, Hartford, July 31, 1900, *W. W. Eggleston* (no. 2098). Windham Co.: Newfane, July 24, 1895, *A. J. Grout*. — Westminster, 1901, *W. H. Blanchard*. Bennington Co.: Manchester, August, 1898, *H. E. Day*.
- Massachusetts, Berkshire Co.: Open dry field, Adams, August 28, 1901, *M. A. Day*. Franklin Co.: Shelburne, September 1, 1872, *Miss S. E. Anderson*. Hampshire Co.: Amherst, August 31, 1895, *C. L. Pollard*. Hampden Co.: Woods, Monson, August, 1892. Middlesex Co.: Malden, August 14, 1880, *R. Frohock*. — Tewksbury, August 15, 1884, *J. R. Churchill*. — Bank in woods near north end of South Reservoir, Stoneham, July 23, 1894, *Wm. P. Rich*. — Wakefield, July 27, 1897, *Chester C. Kingman*. — Sherborn, July 13, 1890, *E. L. Sturtevant*. Essex Co.: Beverly, August (hb. Gray). — Lynn, August 18, 1889, *Hitchings*. — Bay View, Cape Ann, in a dry upland field, September 3 and 7, 1902, *O. Ames*; September 7, 1903, *O. Ames*. Suffolk Co.: West Roxbury, September 2, 1888, *Faxon*. — Revere, July 27, 1879, *Herbert A. Young*. Norfolk Co.: Wellesley, July, 1884. — Wellesley, July, 1890, *Grace E. Cooley*. — Houghton Pond, Milton, August 11, 1895, *Faxon*. — Hyde Park, August 27, 1887, *Faxon*; Muddy Pond woods, September 6, 1888, *Faxon*. — Blue Hills Reservoir, August 11, 1895, *E. F. Williams*. — Grass land, Walpole, September 26, 1897, *E. F. Williams*. Bristol Co.: North Easton, September 3, 1901, *R. G. Leavitt*; October 11, 1897, *C. Blomberg*; North Easton, 1895, September 11, 1898, July 17, 1899, *O. Ames*. — Easton Center, September 6, 1903, *A. A. Eaton*; September 17, 1904, *O. & B. Ames & R. G. Leavitt*. — In pascuis siccioribus ad Fair Haven, August 22, 1865, *J. W. Robbins*. — Nonquit, August 25, 1888, *E. L. Sturtevant*. Barnstable Co.: Sandwich, August 13, 1895, *L. H. Elwell*. — Dry fields, Barnstable, September 5, 1898, *J. M. Greenman* (no. 364). — Hyannisport, August 30, 1888, *J. R. Churchill*. — Centreville, damp ground, July 5, 1899, *Clara Imogene Cheney*; sandy soil, September 10, 1900, *C. I. Cheney*. — Truro, August 16, 1890, *Faxon*. — Provincetown, August 16, 1889, *Fritchey*.
- Rhode Island, Providence Co.: East Providence, August 22, 1878, *J. W. Congdon*. — Fields by Cat Swamp, Providence, September 4, 1892, and Providence, September 10, 1893, *J. F. Collins*.

- Connecticut: *D. C. Eaton*; *Chas. Wright*. New London Co.: Black Point, Crescent [Lyme], August 28, 1903, *R. G. Leavitt*. Tolland Co.: Low pasture, Union, August 20–25, 1902, *C. H. Bissell*. Hartford Co.: Plainville, August 23, 1883, *A. B. Seymour*. — Hartford, August 28, 1900, *A. W. Driggs*. — Field, Granby, July 10, 1903, *C. H. Bissell*. — Southington pasture, August 26, 1898, *L. Andrews* (no. 322); sandy, shaded ground, plains near Jude Lane, August 8, 1889, *C. H. Bissell*; Berlin St., September 19, 1901, *C. H. Bissell*; moist meadows near Hobart St., September 1, 1902, *C. H. Bissell*. Middlesex Co.: Old Saybrook, September 9, 1904, *C. H. Bissell*. — Middletown, 1831, *S. B. B.* Litchfield Co.: Torrington, August 21, 1901, *A. W. Driggs*. — Swamp, State Line, Salisbury, September 6, 1902, *C. H. Bissell*. Fairfield Co.: Fields, Bridgeport, September 7, 1895, *E. H. Eames*. — Green's Farms, August 25, 1894, *C. L. Pollard* (no. 255). — Meadows, Sandy Hook, August, 1890, *I. Percy Blackman*.
- New York: Pine Plains, Oneida Lake. — New York, 1885, *O. E. Pearce*. Washington Co.: East Greenwich, 1867, *Dr. Asa Fitch*. — Dry hilly woods, September 4, 1892, *Stewart H. Burnham*. Sullivan Co.: August, 1873, *H. Eggert*. Tompkins Co.: Danby, August 6, 1885, *F. V. Coville*. — Ithaca, July 25, 1885, *F. V. Coville*. — Sandy border of peat bog, Ithaca, *Prof. W. R. Dudley*. Yates Co.: Penn Yan, *T. Marshall Fry*. Suffolk Co.: Sayville, August 13, 1891, *Hermann Schrenk*. — Southampton, September 16–22, 1899, *John H. Barnhart* (no. 2790).
- New Jersey: Franklin, August, 1879, *H. H. Rusby*. Hudson Co.: New Durham, August 25, 1895, *Wm. VanSickle*. Essex Co.: Roseland, September, 1875, *H. H. Rusby*. Morris Co.: Parsippany, August 11, 1877, *Wm. Trelease*. Monmouth Co.: Farmingdale, September 1, 1884, *O. E. Pearce*.
- Pennsylvania, Northampton Co.: Open grassy place in woods, Redington, September 4, 1892, *C. N. Lochman*. Lehigh Co.: Salsburg, September 11, 1882, *C. N. Lochman*; September, 1878, *E. A. Rau*. Chester Co.: West Chester, August 25, 1864, *John H. Redfield*. Lancaster Co.: Smithville Swamp, August 30, 1889, *A. A. Heller*. Adams Co.: Little Round Top, battlefield of Gettysburg, August 21, 1878, *John H. Redfield*.
- District of Columbia: *Vasey*, 1873. — Copse land, August 15, 1896, *E. S. Steele*; August 26, 1897, *Steele*. — September 8, 1878, and September 28, 1879, *L. F. Ward*. — Two miles north of Tahoma Park, July 10, 1895, *C. L. Pollard* (no. 466).

- Virginia, Fairfax Co.: Great Falls, July 4, 1879, *L. F. Ward*. Northumberland Co.: Walnut Point, August 17, 1897, *F. H. Knowlton*. — Coan River, August 19, 1897, *F. H. Knowlton*. Warren Co.: Mudhole Gap, September 28, 1897, *Gerritt S. Miller, Jr.* Craig Co.: Craig's, altitude 600 m., August 29, 1903, *Mr. & Mrs. E. S. Steele* (no. 90).
- North Carolina: Blue Ridge, September 1, 1876, *Geo. Engelmann*. Rowan Co.: Vicinity of Salisbury, June 21, 1890, *A. A. Heller* (no. 157). Polk Co.: Near Columbus, August 20, 1897, *E. C. Townsend*. Swain Co.: Oak barrens in sandy soil, August 28, 1891, *Beardslee & Kofoid*.
- South Carolina, Aiken Co.: Aiken, September, 1869, *H. M. R.*
- Georgia, Thomas Co.: Dry pine barrens, Thomasville, late March and April 1, 1903, *Mrs. A. P. Taylor*.
- Florida: Low grounds, April–May (hb. Chapman). Duval Co.: Jacksonville, April 23, *A. H. Curtiss*; Pine barrens near Jacksonville, April 19, 1894, *A. H. Curtiss* (no. 4672). Franklin Co.: Low marshy pine barrens, Appalachicola, May (hb. Chapman, Biltmore distr. 4654 a, in part). Lake Co.: Near Eustis, June and July, 1894, *A. S. Hitchcock*. Orange Co.: Oviedo, April 7, 1903, *T. L. Mead*. Hillsborough Co.: Grassy flats near St. Petersburg, March 25, 1901 (hb. Biltmore, no. 3518 d). Brevard Co.: Indian River, 1874, *Edward Palmer, M. D.* (no. 550).
- Mississippi, Jackson Co.: Ocean Springs, April 29, 1889, *F. S. Earle*. Wilkinson Co.: Holt Orchard, Woodville, September 7, 1897, *J. F. Joor*.
- Tennessee, Cocke Co.: Within three miles of Wolf Creek Station, August 24, 1897, *Thos. H. Kearney, Jr.* (no. 900). Knox Co.: Open woods, Knoxville, August, 1898, *Albert Ruth*. Coffee Co.: Barrens near Tullahoma, August 14, 1886, *A. Gattinger*; Tullahoma, September 20, 1887, *A. Gattinger*. Davidson Co.: Nashville, *Gattinger*; Mt. Olivet Cemetery, *Gattinger*; Cliffs at New Waterworks, *Gattinger*.
- Kentucky, Henderson Co.: Lexington, October, 1898, *E. A. Mearns*.
- Indiana, Lake Co.: Pine, swales, July 11, 1898, *L. M. Umbach*; moist sands, July 14, 1896, *Umbach*.
- Illinois, Lee Co.: Dixon, September 1, 1884, *Merton B. Waite*. Peoria Co.: Open woods near Peoria, September, 1840, *G. Engelmann*. Henderson Co.: Prairies near Oquawka, rare, *H. N. Patterson*. Cass Co.: Sandy soil, Beardstown, September, 1842, *Ch. A. Geyer*.
- Michigan: specimen in hb. Gray.

- Wisconsin: North Wisconsin, August, 1884 (hb. O. A. Farwell). Brown Co.: Wet sandy woods near the Big Suamico, Green Bay, July 22, 1883, *J. H. Schuette*; Big Suamico woods, near the shore, July 10, 1886, *J. H. Schuette*. Polk Co.: St. Croix, 1861, *T. J. Hale*.
- Minnesota: Wooded hillside, Torveo, August 22, 1889, *E. J. Hill*. Itasca Co.: Grand Rapids, dry woodlands, August 6, 1891, *J. H. Sandberg* (no. 724); pine barrens, August, 1891, *J. H. Sandberg*. Cass Co.: Lake Kilpatrick, July, 1893, *C. A. Ballard*. Hubbard Co.: July, 1891, *Geo. B. Aiton*. Winona Co.: Winona, August, 1883, *J. M. Holzinger* (in part); Cemetery, July, 1886, *Holzinger*.
- Iowa, Decatur Co.: Prairies, rare, August, 1898, *T. J. Fitzpatrick*.
- Missouri, Livingston Co.: Avalon Heights, August 16, 1891, *Blanchard*. St. Louis Co.: St. Louis, shady moist woods, September, 1845, *G. Engelmann*; dry flinty hills, mostly without leaves, 1875 (hb. Engelmann); dry woods, 1875, *H. Eggert*; September, 1874, *H. Eggert*. Jefferson Co.: Kimmswick, September, 1859, *G. Engelmann*. St. Genevieve Co.: Terre Bleu Creek, August 30, 1898, *Wm. Trelease*. Iron Co.: Pilot Knob, September 8; August 20, 1895. Stone Co.: Marble Cave, September 11, 1898, *Wm. Trelease*. Barry Co.: Eagle Rock, September 22, 1896, *B. F. Bush* (no. 201).
- Arkansas, Pulaski Co.: Little Rock, May, 1886, *Dr. H. E. Haase*.
- Indian Territory: Sapulpa, September 26, 1894, *B. F. Bush* (no. 570); September 27, 1894, *Bush* (no. 573).
- Texas: *Miss Y.* (no. 159, hb. J. F. Joor). Dallas Co.: Sandy woods, *J. Reverchon* (no. 942). — Dallas, October, 1874, *J. Reverchon*. Fayette Co.: 1892, *Crawford* (no. 26). Harris Co.: Houston, dry prairies, March, 1840, *F. Lindheimer*; woods, April 1, 1872, *Elihu Hall* (no. 626). — Near Houston, April, 1839, *Lindheimer*. — Four miles west of Houston, May 16, 1840, *Lindheimer* (no. 89). — Hockley, 1890, *F. W. Thurow*. Galveston Co.: May, 1843, *F. Lindheimer*.

3. *S. TORTILIS*, Rich., Mém. Mus. Par. 4: 59 (1818). — *Satyrium spirale*, Swartz, Prodr. 118 (1788), not *Ophrys spiralis*, Linn., Sp. Pl. 2: 945 (1753). — *Neottia tortilis*, Swartz in Schrad. neues Journ. 1: 51 (1805); Fl. Ind. Occ. 3: 1406 (1806). — *Gyrostachys peruviana*, Kuntze, Rev. Gen. Pl., part II., 663 (1891), not *Ophrys peruviana*, Aubl., Pl. Guian. 2: 816 (1775). That *Ophrys peruviana*, Aubl., is identical with *S. tortilis*, Rich., is highly improbable. The following is all that Aublet gives

regarding *O. peruviana*: "OPHRYS (*Peruviana*) bulbis filiformibus, caule subfolioso; floribus secundis, nectarii labio quinquefido. BURM. *Amer. p.* 178. *t.* 183. *f.* 1. Helleborine spiralis, flore albo, Plum. *Cat.* 9. *Epipactis* floribus uno versu dispositis. FEUILL. *Péruv. tom.* 2. *p.* 726. *pl.* 17." Plate 178, fig. 1, of Burman to which Aublet refers is certainly not to be confused with *S. tortilis*, Rich. The figure represents a remarkably tall species with flowers as large as those of *S. cernua*, Rich., and with broad, elliptic-oblong leaves. The amount of dependence to be placed on Burman's drawing is certainly not inconsiderable when it is realized that the other orchids represented are very faithfully portrayed in their macroscopic details. Plate 17 in Feuillée's work, referred to in the above extract from Aublet's *Histoire des Plantes de la Guiane Française*, represents a species similar to *S. Romanzoffiana*, though much stouter.

Spiranthes tortilis has recently been identified as a native of the United States and should not be confused with *S. tortilis* of authors, not Richard. It is difficult to distinguish from *S. gracilis* when leaves are wanting.

Florida: 1887, *A. H. Curtiss*. Dade Co.: Cocoanut Grove, in rocky pine woods, May 21, 1904, *A. A. Eaton* (no. 221); *J. K. Small & P. Wilson*. — Near Camp Long View, *J. K. Small & P. Wilson*. — Black Point Creek, May 22, 1904, *A. A. Eaton* (no. 951). — Rocky pine woods near Miami, May 26, 1904, *A. A. Eaton* (no. 979).

Louisiana: New Orleans, 1832, *T. Drummond* (no. 331, in part).

4. *S. LONGILABRIS*, Lindl., *Orch. Pl.* 467 (1840). Basing my conclusions on a specimen in the Gray Herbarium collected by T. Drummond in New Orleans in 1833, which agrees with Lindley's description of *S. longilabris*, I refer here *S. brevifolia*, Chapm., *Fl. S. U. S.* ed. 1, 462 (1860), and *Gyrostachys brevifolia*, Kuntze, *Rev. Gen. Pl.*, part II., 664 (1891). — *G. longilabris*, Kuntze, *loc. cit.*

Mississippi, Jackson Co.: Ocean Springs, November 11, 1889, *S. M. Tracy*.

Louisiana: Marshes, October, *Hale*; April-May, *Hale*. Orleans Co.: New Orleans, 1833, *T. Drummond*.

Florida: Hb. Chapman, no. 7816. — Open grassy swamps in the pine barrens, October–November (hb. Chapman, Biltmore distr., no. 4657). — Duval Co.: Moist pine barrens near Jacksonville, November, 1877, *A. H. Curtiss* (no. 2784). — Jacksonville, November 15, 1898, *A. H. Curtiss* (no. 6304); November 13, 1894, *A. H. Curtiss* (no. 5356); November 1, 1893, *A. H. Curtiss* (no. 4175). Columbia Co.: Lake City, April 30, 1893, *P. H. Rolfs* (no. 610). Franklin Co.: Low or marshy pine barren, Appalachicola, May (hb. Biltmore). Volusia Co.: Hammocks at Enterprise, 1887, *Storer*. Levy Co.: Pine barren ponds, October, 1877, *A. P. Garber*. Dade Co.: Sandy pine woods, Ft. Lauderdale, November 19 and December 31, 1903, *A. A. Eaton*. — Little River, December 6, 1903, *A. A. Eaton & John Soar*.

5. *S. LACINIATA*, Ames, supra, p. 120. — *Gyrostachys laciniata*, Small, Fl. Se. U. S. 318 (1903).

Georgia, Sumter Co.: Cypress pond near Cobb, July 11, 1901, *R. M. Harper* (no. 1044). Bryan Co.: Cypress pond about two miles west of Pembroke, June 20, 1903, *R. M. Harper* (no. 1843).

Florida, Dade Co.: Everglades, Miami, June, 1877, 1878, *A. P. Garber*; May 16, 1904, *A. A. Eaton* (no. 875); May 26, 1904, *A. A. Eaton* (no. 975). Manatee Co.: "Fragrant flowers, but not *S. odorata*. I found that in the fall; this is a spring species," Saraosta, 1878, *Garber*. Orange Co.: Cypress swamp and low pine woods among *Saururus*, *Pontederia*, etc., Oviedo, May 31, 1904, *A. A. Eaton* (no. 1032). Lake Co.: Eustis, June 16–30, 1895, *G. V. Nash* (no. 1967), type of *G. laciniata*. Duval Co.: Jacksonville, May 12, 1904, *A. A. Eaton* (no. 842, in part).

Alabama: *Prof. Alex. Winchell*.

Louisiana: Marshes, June, *Hale*.

Texas, Hardin Co.: May, 1892, *G. C. Nealley*.

6. *S. VERNALIS*, Eng. & Gray in Boston Jour. Nat. Hist. 5: 236 (1845). — *Ophrys aestivalis*, Mich., Fl. Bor. Am. 2: 157 (1803), not Poir. — *Neottia tortilis*, Muhl., Cat. 80 (1813); Barton, Comp. Fl. Phila. 2: 139 (1818); Elliott, Bot. S. Carol. 2: 491 (1824). — *S. graminea*, var. *Walteri*, Gray, Man. ed. 5, 505 (1867), as to charac. and pl. descr. — *S. graminea*, var. *præcox*,

Britton, Sterns & Poggenburg, Cat. Anth. Pteridoph. N. Y. 52 (1888). — *S. præcox*, Watson, in Gray's Man. ed. 6. 503 (1890), as to charac. and plant descr. — *S. neglecta*, Ames in Rhodora 6: 30, pl. 51 (1904). — *Gyrostachys præcox*, Kuntze, Britt. & Br. Ill. Fl. 1: 471 (1896), in part. — *G. Reverchoni*, Small, Torr. Bull. 25: 610 (1898). — *G. linearis*, Rydb. in Britton's Manual 300 (1901). — *G. xyridifolia*, Small, Fl. Se. U. S. 318 (1903). — *G. vernalis*, Kuntze, Rev. Gen. Pl., part II., 664 (1891).

Massachusetts, Bristol Co.: In dry fields, Easton, September, 1903, *A. A. Eaton* & *O. Ames*; in fruit, September 17, 1904, *R. G. Leavitt* & *O. Ames*. Barnstable Co.: Cape Cod, August, 1896.

Connecticut, New London Co.: Crescent, August, 1903, *R. G. Leavitt*; September 3, 1903, *H. D. Sleeper*. New Haven Co.: Oxford, August, 1879 and 1887, *E. B. Harger*. Fairfield Co.: Dry sterile fields, Stratford, August 13, 1895, and August 8, 1897, *E. H. Eames*. Middlesex Co.: Old Saybrook, September 9, 1904, *C. H. Bissell*. Hartford Co.: Granby, August 12, 1904, *C. H. Bissell*.

New York: Fire Island, August 12, 1891, *Hermann Schrenk*.

New Jersey, Ocean Co.: Near Barnegat Pier, August 22, 1892, *J. R. Churchill*. Atlantic Co.: Atlantic City, July, 1876, *E. A. Rau*. Monmouth Co.: Como, damp open ground, July 30, 1902, *M. W. Lyon, Jr.* Bergen Co.: Closter, August 20, *C. F. Austin*.

Pennsylvania: McMinn's collection.

Delaware, New Castle Co.: Low ground, June 27, 1863, *W. M. Canby*. Essex Co.: Upland meadows, Ellendale, July, 1893, *W. M. Canby*.

District of Columbia: Washington, August 14, 1896, *E. S. Steele*; August, 1897, *E. S. Steele*.

Maryland: Sandy beaches along the coast, "disappears after July," Ocean City, July 25, 1878, *A. Commons*. Anne Arundel Co.: Bay Ridge, July 13, 1897, *F. H. Knowlton*.

Virginia, Hanover Co.: Ashland, *De Chalmot*. Nansemond Co.: Suffolk, July 11, 1898, *Thos. H. Kearney, Jr.* (no. 1573). Norfolk Co.: Near Northwest, July 9, 1898, *Thos. H. Kearney, Jr.* (nos. 1507, 1555).

North Carolina, New Hanover Co.: Pine barren south of Wilmington, June 26, 1890, *F. V. Coville* (no. 110). — Swamps, Tar River, June 26, 1884, *McCarthy*.

Georgia, Screven Co.: Rather dry sandy soil, Millen, June 5, 1891,

- R. M. Harper* (no. 756). Burke Co.: Sandy bog between Millen and the Ogeechee River, June 5, 1901, *R. M. Harper* (no. 789).
- Florida, Lee Co.: April, 1903, *J. E. Layne*. — Open pine woods, near Naples, March 18, 1904, *O. Ames*. — Fahkahatchie, June 10, 1904, *A. A. Eaton*. — Fort Myers, June 5, 1904, *A. A. Eaton* (no. 1097). Dade Co.: Biscayne Bay, *W. S. Rusby*. Duval Co.: Jacksonville, May 12, 1894, *A. H. Curtiss* (no. 4856). — Jacksonville, low land, May 12, 1904, *A. A. Eaton* (no. 842). Franklin Co.: Low marshy pine barrens, Appalachicola, May (Chapman Herbarium, hb. Biltmore, no. 4654 a, in part).
- Alabama, Mobile Co.: Mobile, 1875, *A. H. Curtiss*.
- Louisiana: No. 2788, distributed by *A. H. Curtiss*.
- Illinois, St. Claire Co.: Cahokia, August 13, 1891, *E. Douglass*.
- Kansas: 1883, *Thos. Bassler*. Riley Co.: Wet soil, 1896, *G. L. Clothier* (no. 827).
- Missouri: August 21, 1886, *Frank Bush* (no. 20). Jasper Co.: Webb City, August, 1903, *E. J. Palmer* (no. 408). Jackson Co.: Low grassy meadows, September 5, 1891, *B. F. Bush* (no. 1461). — Courtney, August 11, 1892, *B. F. Bush*. Barton Co.: Prairie, July 25, 1873, *G. C. Broadhead*.
- Arkansas, Sebastian Co.: Fort Smith, 1853–54, *J. M. Bigelow*. — Upper Arkansas, *Dr. Woodhouse*.
- Indian Territory: 1868, *Dr. Edward Palmer* (no. 323). — Low ground, Atoka, June 23, 1891, *C. S. Sheldon* (no. 62). — Sapulpa, July 27, 1894, *B. F. Bush* (nos. 571, 572). — Between Neosho and Red Fork of the Arkansas, June–September, 1849, Marcy's Expedition. — Prairies ten miles from Limestone Gap, July 4, 1877, *Geo. D. Butler* (no. 11305). — "2–4 ft. high, fasciculate root," thickets, prairie, Limestone Gap, June 16, 1877, *Geo. D. Butler*.
- Texas, Galveston Co.: Galveston, April and May, 1843, *F. Lindheimer* (Fasc. I., no. 191, in part; *S. vernalis*, Eng., from herb. Engelmann). Dallas Co.: Black soil, prairie, *J. Reverchon*; June, 1883, *J. Reverchon* (no. 1410). Brazos Co.: Agricultural College, May, 1899, *H. Wees*. Harris Co.: Woods, Houston, June 1, 1872, *Elihu Hall* (no. 627, in part).
- New Mexico: Prairie, August 14, 1847, *A. Fendler*.

7. *S. PRÆCOX*, Watson, Gray's Manual, ed. 6, 503 (1890), as to syn. — *Limodorum præcox*, Walter, Fl. Car. 221 (1788). — *S. tortilis*, Chapm., Fl. S. U. S. ed. 1, 462 (1860), as to plant

descr., not Richard. — *S. graminea*, Lindl., var. *Walteri*, Gray, Manual, ed. 5, 505 (1867), as to syn. — *Gyrostachys præcox*, Kuntze, Rev. Gen. Pl., part II., 663 (1891); Britton & Brown, Illus. Fl. 1: 471, in part; Britton's Manual 300.

This species was published by A. W. Chapman in the first edition of the Flora of the Southern United States under the name *Spiranthes tortilis*. An examination of the material on which the work in his Flora was done proves conclusively that his interpretation of *S. tortilis* was based on specimens referable to *S. præcox*, Watson. In the third edition of the Southern Flora, Chapman changed his *S. tortilis* to *S. præcox*, Watson, with the understanding that his material was conspecific with that of Watson.

- New Jersey, Burlington Co.: Atsion, August 17, 1879, *E. A. Rau*.
 Camden Co.: Sandy plains, Winslow, September 27, 1877, *J. H. Redfield*. Atlantic Co.: Hospitality bridge at 8th St., Landisville, September 12, 1885, *C. A. Cross* (no. 2786).
 South Carolina: specimen in hb. Bost. Nat. Hist. Soc. Barnwell Co.: Allendale, May 23, 1901 (hb. Biltmore, no. 4654 c).
 Georgia, Chatham Co.: Moist soil, Savannah, May 24, 1901 (hb. Biltmore, no. 4654 d). Thomas Co.: Dry pine barrens, April, 1902, *Mrs. A. P. Taylor*; 1903, *Mrs. Taylor*.
 Florida: *S. H. Wright*. — Hb. Chapman, no. 4654. Duval Co.: Moist pine barrens, near Jacksonville, May, 1877, *A. H. Curtiss* (nos. 2736, 2786); November, *Curtiss* (no. 2784); April 15, 1893, *Curtiss* (no. 4174), May 21, 1894, *Curtiss* (no. 4731). South Jacksonville, April 6, 8, and 11, 1897, *J. R. Churchill*. Clay Co.: Hibernia, March, 1869, *Wm. M. Canby* (no. 7). Gadsden Co.: Dry soil, river junction, April 25, 1899 (hb. Biltmore, no. 4654). — Chattahoochee, April 12, 1881, *A. H. Curtiss*. Franklin Co.: Low or marshy pine barrens, Appalachicola, May (hb. Chapman, Biltmore distr. 4654 a, in part). Escambia Co.: Warrenton, May 26, 1903, *S. M. Tracy* (no. 8361). Volusia Co.: Marshy pine barrens, Lake Helen, *Mrs. M. A. Noble*. — Port Orange, April 30, 1895, *F. C. Straub* (no. 127); March 26, 1905, *F. C. Straub* (no. 83). Lake Co.: Wet ground, vicinity of Eustis, April 1-15, 1894, *Geo. V. Nash* (nos. 308, 410). Polk Co.: Marsh, May 12, 1894, *L. B. Ohlinger*. Hillsborough Co.: Clearwater, April 20, 1900, *S. M. Tracy* (no. 6665). De Soto Co.: Be-

tween Punta Gorda and Myer's Ferry, March 26, 1904, *O. Ames*. Lee Co.: Low pine woods, April, 1903, *J. E. Layne*. — Road to Rattlesnake Hammock, near Naples, March 12, 1904, *O. Ames*; Naples, March 22, 1904, *O. Ames*.

Alabama, Baldwin Co.: Ft. Morgan, May 23, 1903, *S. M. Tracy* (no. 8360). — Gateswood, May 6, 1903, *Tracy* (no. 8359). Mobile Co.: Mobile, May, 1845, *Sullivant*.

Mississippi: The glades of the seacoast counties, May, 1859, *E. Hilgard*. Jackson Co.: Ocean Springs, May 24, 1894, *F. S. Earle*; May 7, 1895, *J. Skehan*. Harrison Co.: Coopolis, April 24, 1898, *S. M. Tracy* (no. 5085).

Louisiana: April–May, *Hale*. Orleans Co.: New Orleans, *Drummond*.

Texas: 1843, *F. Lindheimer* (Fasc. I., no. 191, in part). Madison Co.: Low pine woods above Madisonville, April 14, 1888, *J. F. Joor*. Harris Co.: Houston, May, 1840, *Lindheimer?* — Woods, Houston, June 1, 1872, *E. Hall* (no. 627, in part).

8. *S. PARVIFLORA*, *comb. nov.* — *S. cernua*, var. *parviflora*, *Chapm.*, Fl. S. U. S. ed. 3, 488 (1897). — *Gyrostachys parviflora*, *Small*, Fl. Se. U. S. 318 (1903). I cannot place this species satisfactorily. Its affinity with *S. cernua*, *Rich.*, is not clear. The lip in my specimen from Mississippi is 5 mm. long, and has an orbicular base and an oblong obtuse tip.

Georgia, Floyd Co.: Rich oak woods near Rome, September, 1891 (hb. Chapman).

Alabama, Lee Co.: "Palmetto swamp," Auburn, October 6, 1900, *F. S. Earle*.

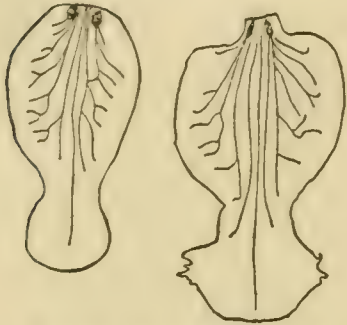
Mississippi: Saratoga, October 2, 1903, *S. M. Tracy* (no. 8362).

Tennessee, Madison Co.: Rich woods, Jackson Co., October, 1892, *S. M. Bain* (no. 312).

Missouri: "Shady grassy woods, American bottom, at Harber's," September, 1845, *G. Engelmann*. Mercer Co.: Creek bottoms, Saline, September, 1835, *G. Engelmann*. Jackson Co.: Courtney, September 29, 1892, *B. F. Bush*. — Rare in rich woods, Courtney, September 12, 1898, *Bush* (no. 354). St. Louis Co.: Shady moist woods, St. Louis, September, 1845, *G. Engelmann*. Lincoln Co.: Owens Station, October, 1845 (hb. Engelmann).

Indian Territory, Sapulpa, rare, September 25, 1895, *B. F. Bush* (no. 1315).

9. *S. ROMANZOFFIANA*, Cham. (& Schlecht) in Linnæa 3: 32 (1828). — *Neottia gemmipara*, Smith, Eng. Fl. 4: 36



FORMS OF LABELLUM IN
S. Romanzoffiana

(1828). — *S. gemmipara*, Lindl., Syn. Brit. Fl. ed. 1, 257 (1829). — *S. cernua*, Hook., Bot. Mag. 5277 (1861); Benth., Brit. Fl. 2: 816, fig. 982 (1865), not Rich. — *Gyrostachys Romanzoffiana*, McM., Met. Minn. 171 (1892). — *G. stricta*, Rydberg, Fl. Montana, 107 (1900); in Britton's Manual 299 (1901). — *Orchiastrum Romanzoffianum*, Greene, Man. Bot. San Fran.

Bay, 306 (1894). Some forms closely approach *S. cernua*, Rich.

British North America, Newfoundland: Banks of Badger Brook, August 13, 1894, *B. L. Robinson & H. Schrenk*. — Marsh, Holyrood, August 23, 1894, *B. L. Robinson & H. Schrenk* (no. 128). — September 4, 1879, *H. L. Osborn*. — Bay of Islands, 1895, *A. C. Waghorne*. Nova Scotia: Canso, August 2, 1901, *J. Fowler*. Cape Breton: Baddeck, August 26, 1896, *F. Tracy Hubbard*. — August 7, 1898, *John Macoun*. Prince Edward's Island: Brackley Point, August 5, 1888, *John Macoun*. Labrador: Square Island, August 16, 1882, *J. A. Allen* (no. 67). New Brunswick: Open spruce woods, Grand Falls, August 14, 1901, *M. L. Fernald*. — St. Andrew's, August 4, 1900, *J. Fowler*. — Little Branch, Miramichi, August 26, 1890, *J. Fowler*. — Charlo, Restigouche, July 30, 1894, *J. Fowler*. — Quebec: Common in sandy and low damp ground, flowers white, Mingan Islands, August 11, 1887, *W. Palmer*. — Dry hillside, St. Ingalls, July 23, 1904, *A. A. Eaton* (no. 213). Little Metis, *E. C. Jeffrey*. — Open places, Arbor Vitæ swamps, New Richmond, August 1, 1904, *Collins, Fernald & Pease*. — Wet places, Kamouraska, August, 1879, *C. G. Pringle*. — Rivière du Loup, August, 1902, *W. W. Eggleston* (no. 3007). Ontario: Bethesda, August 14, 1892, *C. W. Armstrong*. — Peat bogs, Galt, August 17, 1899, *L. M. Umbach*. — Wingham, August 6, 1892, *J. A. Morton*. — Guelph, August 11, 1903, *A. B. Klugh*. — London, August 22, 1903, *W. E. Sanders*. — Killean, August 21, September 2, 1904, *A. B. Klugh*. — Gravenhurst, August 7, 1897. Assiniboia: 1903, *T. N. Willing*. Alberta: Bow River, Fort Calgary, September 1, 1879, *J. Macoun* (no. 212). — Moist banks, Calgary, August, 1884, *J. M. Macoun*. — Near Banff, Lat. 50° 11', Long. 115°

34', July 24, 1891, *John Macoun* (no. 4398). — Crow Nest Pass, Lat. 49° 30', August, 1897, *John Macoun* (no. 25018). — Alt. 4500 ft., in deep moss in stream below Cave and Basin, Banff, August 22, 1899, *W. C. McCalla* (no. 2229). — Rocky Mt. Park, Banff, *N. B. Sanson*. British Columbia: *Rothrock*, 1865-66 (no. 74). — Vancouver Island, near Lake Shawnigan, August 18, 1897, *Wm. M. Canby* (no. 280); August 5, 1897, *Ezra Brainerd*; Vicinity of Victoria, August 20, 1893, *John Macoun*.

Unalaska: *Chamisso in itin.*, ex herb. Acad. Petrop.

Maine, Aroostook Co.: Sandy shore, Allaguash Plantation, August 11, 1893, *M. L. Fernald* (no. 103). — Dry bank by roadside, Fort Kent, July 19, 1904, *A. A. Eaton* (no. 171). — Gravelly beach, Boundary Lake, August 12, 1902, *W. W. Eggleston & M. L. Fernald*. — St. Francis, 1881, *Kate Furbish*. — River-bank, Van Buren, September 18, 1900, *M. L. Fernald*. — Arbor Vitæ swamp, Ft. Fairfield, July 19, 1902, *Williams, Collins & Fernald*. — Ledgy river-bank, Masardis, September 8, 1897, *M. L. Fernald*. — Crystal, Caribou bog, September 23, 1899; August 16, 1900, *M. L. Fernald*. — Wet ledges, Island Falls, September 8, 1897, *M. L. Fernald*. Piscataquis Co.: Mt. Kineo, August 18, 1867, *Charles E. Smith*. — Gravelly river-bank, Dover, August 15, 1895, *M. L. Fernald*. — Intervale, Dover, September 3, 1894, *M. L. Fernald*. Somerset Co.: Penobscot River, September 1, 1882, *Chas. E. Smith*. — Sandy river-bank, Madison, August 1, 1892, *M. L. Fernald*. — Dry soil, Dead River, August 19, 1896, *M. L. Fernald*. Penobscot Co.: Moist fields, Bangor, 1844, *Aaron Young, Jr.* — Growing in sphagnum moss in peat bogs, Hermon, July 25, 1904, *O. W. Knight*. — Alder swamp, Orono, August 2, 1890, *M. L. Fernald*. Washington Co.: Roque Bluff, August 7, 1897, *P. L. Ricker* (no. 299). Franklin Co.: Moist field, Chesterville, August 15, 1902, *Clarence H. Knowlton*. — Wet meadow, Farmington, August 14, 1894, *M. L. Fernald*. Hancock Co.: Long Pond meadows, Seal Harbor, Mt. Desert, August 8, 1893, *J. H. Redfield* (no. 16764). Waldo Co.: Dark Harbor, Islesboro, July 23, 1897, *F. Tracy Hubbard*. Kennebec Co.: Roadside, Fayette, August 31, 1903, *Lillian O. Eaton*. Lincoln Co.: Highway road, Southport, August 1, 1894, *M. L. Fernald*. — Oxford Co.: High bogs, Hartford, August, 1885, *J. C. Parlin*. — Lake Umbagog, Gaspy Point, September 10, 1897, *H. A. Purdie*. York Co.: Low rich grounds, North Berwick, July 21, 1903, *J. C. Parlin* (no. 1590). — Dry mountain side, Cornish, July 22, 1891, *M. L. Fernald*.

- New Hampshire: White Mts., *William Oakes*. Coos Co.: Between Fabyan's and Crawford's, July 11, 1889, *Faxon*. — Dixville Notch, July 25, 1887, *Faxon*. — Old woods in bog, Randolph, July 31, 1896, *E. F. Williams*. — Randolph, July 18, 1878, *Faxon*. — Grafton Co.: Coal Hill, Franconia, July 26, 1891, *Faxon*. — Carroll Co.: Brook Kedron (near Willey's), August 2, 1879, *Faxon*. Cheshire Co.: Riverbank, Walpole, July 28, 1901, *M. L. Fernald*.
- Vermont: Bristol Pond bog, August 13, 1876, *C. G. Pringle* (no. 7824). Orleans Co.: Willoughby, July 21, 1887, *Faxon*. — Willoughby Lake, July 20, 1887, *Faxon*; August 22, 1895, *Mrs. A. F. Stevens*. — South of Willoughby Lake, August 14, 1889, *Faxon*. — Damp grassy knoll by roadside, Willoughby, July 26, 1896, *Emile F. Williams*. — Bog and dry roadside, Brownington, July 26, 1904, *A. A. Eaton* (no. 236). Lamoille Co.: Stowe, July 22, 1886, *Faxon*; July 26, 1868, *J. H. Redfield* (no. 7818). Caledonia Co.: Peacham, July 20, 1902, *Mrs. A. F. Stevens*. Windham Co.: Windham, August 30, 1902, *W. H. Blanchard* (no. 3). — West Brattleboro, August 18, 1902, *W. H. Blanchard* (no. 4). Bennington Co.: Perch Pond bog, Pownal, July 29, 1898, *W. W. Eggleston & J. R. Churchill* (no. 390). — Pownal, July 29, 1898, *J. R. Churchill*. — Westminster, 1901, *W. H. Blanchard*.
- Massachusetts, Berkshire Co.: Hinsdale, *H. L. Moody* (hb. New Eng. Bot. Club).
- Connecticut, Litchfield Co.: Bog, 1200 ft. above sea, Norfolk, August 10, 1889, *J. H. Barbour*.
- New York, Essex Co.: Keene Valley, August 2, 1891, *Hermann Schrenk*. Herkimer Co.: Border of Hidden Lake, Litchfield, August 3, 1901, *J. V. Haberer*. Oneida Co.: New Hartford, August 8, 1900, *J. V. Haberer*. Tompkins Co.: Near Freeville, August 9–18, 1881, *W. R. Dudley*.
- Michigan: Isle Royale, August 17, 1873, *Henry Gillman*; August 2, 1865, *T. L. Porter*. Keweenaw Co.: 1863, *J. W. Robbins*. — Keweenaw Point, June, 1885, *O. A. Farwell*; low grounds, common, September 12, 1886, *O. A. Farwell* (no. 488).
- Wisconsin, Brown Co.: Green Bay, July 22, 1883, *J. H. Schuette*. St. Croix Co.: 1861, *T. J. Hale*.
- Illinois, Peoria Co.: Peoria.
- Minnesota, Hennepin Co.: Minneapolis, 1861, *T. J. Hale*. Cottonwood Co.: August 1, 1881, *J. M. Holzinger* (in part).
- South Dakota, Custer Co.: Alt. 5500 ft., Ruby Glen near Custer, August 19, 1892, *P. A. Rydberg* (no. 1030).

- Montana: Bogs, Lake McDonald, August 29, 1903, *L. M. Umbach* (no. 790). — Bogs, foot of Kootenai Mts., Big Fork, August 10, 1901, *Umbach*. — Alt. 7000 ft., Forks of the Madison, July 26, 1897, *P. A. Rydberg & Ernst A. Bessey* (no. 3908). — Alt. 8000 ft., mountains near Indian Creek, July 22, 1897, *P. A. Rydberg & Ernst A. Bessey* (no. 3910). Flathead Co.: Columbia Falls, August 20, 1894, *R. S. Williams* (no. 520). Teton Co.: Fields, Midvale, August 7, 1903, *L. M. Umbach* (no. 625). Missoula Co.: Alt. 200 m., Head of Bear Creek, Bitter Root Forest Reserve, August 28, 1897, *John B. Leiberg* (no. 2943). Meagher Co.: Alt. 6000 ft., Elk Mts., near Castle, August 1, 1896, *J. H. Flodman* (no. 363). Gallatin Co.: Spanish Basin, August 25, 1899, *J. W. Blankinship*.
- Wyoming: Laramie River, August 10, 1895, *Aven Nelson* (no. 1663). — North side of Laramie Mts., August 17, 1899. Yellowstone Park: Cache Creek, August, 1885, *Frank Tweedy*. — On open slopes, moist ground, Yellowstone Lake, August 6, 1899, *A. & E. Nelson* (no. 6351). — August 13, 1893, *J. N. Rose* (no. 514). — Geyser Basin of the Thumb, July 10, 1899, *J. W. Blankinship*. — Near Yellowstone Lake, September, 1893, *F. H. Burglehaus*. — Upper Geyser Basin, August 19, 1892, *A. Isabel Mulford*. Big Horn Co.: Moist meadows, Doyle Creek, July 26, 1901, *Leslie N. Goodding* (no. 363). Uinta Co.: Marshy ground, Snake River, August 18, 1881–82, *W. H. Forwood*. Albany Co.: Centennial Valley, August 17, 1896, *Aven Nelson* (no. 2860).
- Colorado: 1862, *C. C. Parry* (no. 441). — Cabin Cañon, alt. 2800 m., July 24, 1901, *F. E. & E. S. Clements* (no. 352). — On Grand River, August 1, 1881, *G. Engelmann*. Summit Co.: Alt. 9800 ft., near Breckenridge, August, 1901, *Kenneth K. Mackenzie* (no. 14). Clear Creek Co.: Alt. 8500 ft., dry places in Clear Creek Cañon, Georgetown, 1885, *H. N. Patterson*. — Grassy places, Empire, August 5, 1874, *G. Engelmann*. Lake Co.: Twin Lakes, August, 1873, *Prof. John Wolf* (no. 939). Gunnison Co.: Alt. 8280 ft., Jack's Cabin, region of the Gunnison Watershed, July 26, 1901, *C. F. Baker* (no. 618). Dolores Co.: Moist soil, Rico, August 13, 1896.
- Utah: Alt. 4300 ft., Salt Lake City, August 17, 1880, *Marcus E. Jones* (no. 1908). — Alt. 9000 ft., Fish Lake, August 9, 1894, *M. E. Jones* (no. 5790 R). — Alt. 9000 ft., vicinity of Clayton Peak, Wahsatch Mts., August 12–26, 1903, *S. G. Stokes*. Cache Co.: Moist meadows, August 13, 1897, *Jas. H. Linford*.
- Nevada, Elko Co.: Ruby Valley, alt. 6000 ft., September, 1862, *Sereno*

- Watson* (no. 1156). Washoe Co.: Lake Washoe, 1865, *J. Torrey* (no. 508).
- Idaho, Kootenai Co.: Granite Station, July 30, 1892, *J. H. Sandberg* (no. 797). — Dry pine woods, St. Mary's River, August 8, 1894, *L. F. Henderson*. Shoshone Co.: Alt. 950 m., low meadows, Mullan, August 2, 1895, *John B. Leiberger* (no. 1438). Latah Co.: In moist meadows, Collins, August 6, 1896, *A. D. E. Elmer* (no. 211). Custer Co.: Alt. 7150 ft., marshy ground near mouth of Pettit Lake Creek, August 16, 1895, *B. W. Everman* (no. 502). Blaine Co.: Alt. 7200 ft., borders of Salmon River near Redfish Lake, July 30, 1895, *L. F. Henderson* (no. 3761). Elmore Co.: Alt. 3400 ft., South Boise River, July 13, 1895, *L. F. Henderson* (no. 3349).
- Washington: *Dr. Cooper*. — 1889, *G. R. Vasey* (no. 76). — Moist rocky slopes, alt. 2200 ft., Bridge Creek, Washington Forest Reserve, October 15, 1897, *M. W. Gorman* (no. 767). Jefferson Co.: Sandy soil, vicinity of Pt. Townsend, August 3, 1899, *M. A. Barber* (no. 160). Klickitat Co.: On meadows, Falcon Valley, August 22, 1902, *W. N. Suksdorf*.
- Oregon: 1871, *Elihu Hall* (no. 509). — Cascade Mts., 1881, *L. F. Henderson*. — Alt. 1600 m., Quartz Valley, August 4, 1896, *F. V. Coville & John B. Leiberger* (no. 236). Clatsop Co.: August 20, 1902, *E. P. Sheldon* (no. 11203). Wallowa Co.: Meadows, alt. 6000 ft., south slope of mountains, September 2, 1899, *W. C. Cusick* (no. 2337). Crook Co.: Alt. 1370 m., Big Meadows, July 26, 1894, *J. B. Leiberger* (no. 529). Coos Co.: Marshfield, August 13, 1880, *G. Engelmann*. Klamath Co.: Bogs, Lake-of-the-Woods, August 25, 1895, *Elmer I. Applegate* (no. 695).
- California: High mountains near Donner Pass, Sierra Nevada, 1865, *J. Torrey* (no. 509). — Marshy shores, Webber Lake, 1875, *J. G. Lemmon*. — 1868-69, *Dr. A. Kellogg & W. G. W. Harford* (no. 964). Siskiyou Co.: Mt. Shasta and vicinity, July 13-27, 1892, *Dr. Edward Palmer* (no. 2570 a). — Alt. 3800 ft., Dietz' Spur, August 17, 1903, *E. B. Copeland* (*Baker's Plants of the Pacific Coast*, no. 3927, in part). — South side of Mt. Shasta, July 15-31, 1897, *H. E. Brown*. Butte Co.: Colby, July, 1896, *Mrs. C. C. Bruce* (no. 18). Placer Co.: Meadows, Lake Tahoe, August 31, 1872, *J. H. Redfield* (no. 7829, in part). Sonoma Co.: Near Mark West Springs, July 28, 1902, *A. A. Heller*. Mariposa Co.: Meadows, Yosemite, August 17, 1872, *J. H. Redfield* (no. 7829, in part). — Hopkins Creek above Yosemite, 1873, *J. G. Lemmon*. Fresno Co.: Region of Dinkey Creek, June

25–July 15, 1900, *H. M. Hall & H. P. Chandler* (no. 569). Tulare Co.: Wet meadows, Little Kern River, April–September, 1897, *C. A. Purpus* (no. 5266). — Along the North Fork of the Kern River, Sierra Nevada, August 25, 1891, *Vernon Bailey* (no. 1713). Alt. 2850 m., Whitney Meadows, Sierra Nevada, August 20, 1891, *F. V. Coville & Frederick Funston* (no. 1633). San Bernardino Co.: San Bernardino Valley, July, 1882, *S. B. & W. F. Parish* (no. 1523).

Ireland, Kerry Co.: Bear Haven, *Dr. Armstrong*. Kilrea Co.: Londonderry, July, 1895, *R. L. Praeger*.

10. *S. PORRIFOLIA*, Lindl., Orch. Pl. 467 (1840). — *Gyrostachys porrifolia*, Kuntze, Rev. Gen. Pl., part II., 664 (1891). — *Orchiastrum porrifolium*, Greene, Man. Bot. San. Fran. Bay 306 (1894). — Closely allied to *S. Romanzoffiana*, Cham.

Washington: Meadows, Falcon Valley, September 3, 1881, *W. N. Suksdorf*.

Oregon: June 24, 1888, *Joseph Howell* (no. 788).

California: Alt. 2500 ft., Aqueduct, Sequoia gigantea region, July 7, 1896, *Geo. Hansen* (no. 1817). — Whipple's

Exploration, 1853–54, *Hartweg* (no. 1975).

Siskiyou Co.: Alt. 5000–10,000 ft., south side Mt. Shasta, July 15–31, 1897, *H. E. Brown* (no. 546). — Alt. 3800 ft., Dietz' Spur,

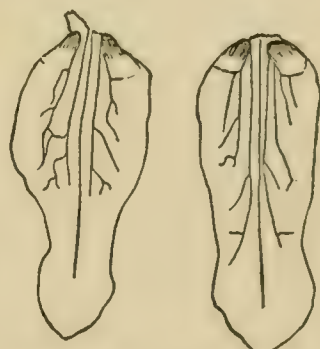
August 17, 1903, *E. B. Copeland* (Plants of the Pacific Coast, distributed by C. F. Baker, no. 3927, in part). Shasta Co.: Alt. 3500–

8000 ft., near the south side of Mt. Shasta, June 10, 1897, *H. E. Brown* (no. 546). Sierra Co.:

Sierra Valley, *J. G. Lemmon*. Mendocino Co.:

Little Lake Valley, July 7, 1901, *W. N. Suksdorf*. Amador Co.: 2500

ft., pine grove, July, 1893, *Geo. Hansen* (no. 248). San Bernardino Co.: San Bernardino, 1880, *J. R. Vasey* (no. 623).



FORMS OF LABELLUM IN
S. porrifolia

11. *S. LATIFOLIA*, Torr. ex Lindl., Orch. Pl. 467 (1840). — *S. plantaginea*, Torr., Fl. N. Y. 2: 284 (1843), not Lindley. — *Neottia plantaginea*, Raf., Am. Month. Mag. 2: 206 (1818). — *N. (Gyrostachys) lucida*, H. H. Eaton, Transyl. Journ. Med. 1832. — *Spiranthes æstivalis*, Oakes in Thomp. Hist. Vermont

(reprint), 28 (1842), not Rich. — *S. cernua*, var. *latifolia*, Torr., Comp. 320 (1826). — *Gyrostachys latifolia*, Kuntze, Rev. Gen. Pl. 9, part II., 664 (1891). — *G. plantaginea*, Britton & Brown, Ill. Fl. 1: 470, fig. 1122 (1896).

Ontario: Wingham, June 23, 1892, June 24, 1893, *J. A. Morton*. — Point Abino, June 13, 1889 (hb. Parke, Davis & Co.). — Wet meadows and woods, Niagara Falls, July 6, 1882, *John Macoun*.

Maine, Piscataquis Co.: Sangerville, gravelly river-bank, June 26, 1895, *M. L. Fernald* (no. 237); alluvium-covered ledges, June 29, 1894, *M. L. Fernald*. — Dover, June 28, 1894, *M. L. Fernald*. Somerset Co.: Banks of river, Skowhegan, July 2, 1903, *A. A. Eaton*. — Wet shore, branch of Kennebec, two miles below Skowhegan, June 30, 1903, *A. A. Eaton*. York Co.: In low ground, rare, North Berwick, June, 1896, *J. C. Parlin* (no. 688).

Vermont: Greenshore Pond, July 3, 1894, *A. J. Grout*. Chittenden Co.: Gravelly shores, Charlotte, June 20, 1878, *C. G. Pringle*. Addison Co.: Ferrisburg, July, 1884, *Ezra Brainerd*. — Middlebury, June 22, 1892, *Ezra Brainerd*.

New Hampshire, Sullivan Co.: Sumner's Falls, Plainfield, July 27, 1900 (partly in fruit), *W. W. Eggleston* (no. 2099). — Sumner's Falls, June 25, 1902, *W. W. Eggleston* (no. 2854). Cheshire Co.: Common in alluvial thicket by the Connecticut just below Bellows Falls Bridge, Walpole, July 31, 1899 (in fruit), *M. L. Fernald*.

Massachusetts, Middlesex Co.: Martin's Pond, North Reading, August 8, 1882. Franklin Co.: Shelburne, June 15, 1873, *Miss S. E. Anderson*. Hampshire Co.: Pomeroy Mt., Southampton. Berkshire Co.: "Sand Springs," Williamstown, June 17, 1901, *J. R. Churchill*. — Hoosac River, Williamstown, June 22, 1901, *J. R. Churchill*.

Connecticut, Hartford Co.: Bank of Farmington River, Windsor, May 20, 1903, June 6, 1903, *C. H. Bissell*; *E. B. Harger*. — Bank of Farmington River, nine miles north of Hartford, June 30, 1901, *H. S. Clark*. New Haven Co.: Wet bank of the Housatonic River, Oxford, June 10, 1899, June 23, 1901, *E. B. Harger*.

New York, Washington Co.: Bogs (rare), Vaughns, June 21, 1897, *Stewart H. Burnham*. Herkimer Co.: Sloping wet meadows, Litchfield, July 12, 1903 (partly in fruit), *J. V. Haberer*. — Banks of streams, Frankfort, June 27, 1903, *J. V. Haberer*. Oneida Co.: Banks of cold spring stream, 5 miles south of Utica, June 27, 1903, *J. V. Haberer*. Madison Co.: Sandy shores, Oneida Lake, Lenox, June 22, 1900,

- June 24, 1901, *J. V. Haberer*. Oswego Co.: McMullen's Pond, five miles west of North Hannibal, June 23, 1884, *O. E. Pearce*. Onondaga Co.: Syracuse, 1891, *F. C. Straub*. Tompkins Co.: Six-Mile Creek, Ithaca, June 10, 1892, *E. J. Durand*. Yates Co.: Penn Yan, *Sartwell*. Erie Co.: Buffalo, June 20, *G. W. Clinton*. Schuyler Co.: Watkins, June 14, 1884, *F. V. Coville*. — Watkins' Glen, June 14, 1884, *O. E. Pearce*.
- New Jersey, Sussex Co.: Dingman's Ferry, June 1, 1895, *W. M. Van Sickle*.
- Delaware, New Castle Co.: Newcastle Bog, shores of Delaware River, June 6, 1866, *W. M. Canby* (no. 4).
- Pennsylvania, Northampton Co.: Near Bethlehem (hb. E. A. Rau). — Bog near Easton, June 6, 1896, *Thos. C. Porter*. Lehigh Co.: Limeport, June 8, 1890, *C. N. Lochman*. Lancaster Co.: Meadows around Millersville, June 10, 1863, *Thos. C. Porter*.
- Virginia, Smyth Co.: Middle Fork of Holston River, near Marion, alt. 2100 ft., June 6, 1892, *J. K. Small*. — Hutton's Branch, East Marion, alt. 2500 ft., June 6, 1892, *Small*.
- Ohio: Bredina, May, 1895, *Stair*. Cuyahoga Co.: Berea, June, 1896, *G. B. Ashcroft*. Muskingum Co.: Deserted quarry, Blue Rock, May 26, 1894, *L. D. Stair*.
- Michigan: *W. M. Beauchamp*, 1891. Ionia Co.: Hubbardston, 1878, *C. F. Wheeler*.
- Wisconsin: Bluffs, Devil's Lake, August 23, 1900, *L. M. Umbach* (no. 12288).

12. *S. CERNUA*, Richard, *De Orch. Eur. Ann.* 59 (1818). — *Ophrys cernua*, L., *Sp. Pl.* 2: 946 (1753). — *Limodorum autumnale*, Walt., *Fl. Car.* 221 (1788). — *Neottia cernua*, Swartz in *Schrad. neues Journ.* 1; 52 (1805); Willd. *Sp. Pl.* 4: 75 (1805). — *Gyrostachys cernua*, Kuntze, *Rev. Gen. Pl.*, part II., 664 (1891).

S. CERNUA, var. *OCHROLEUCA* (Rydb.). — *Gyrostachys ochroleuca*, Rydb. in *Brit. Man.* 300 (1901). Distinguished from the species by its flowers' usually possessing a yellowish tinge, and by its longer bracts. An upland form of the species. (Var. *major* is described in Eaton's North American Botany.) *S. cernua* is a variable species, some extreme and rare forms having an inflorescence with a one-ranked spiral.

- British America, Ontario, Leeds Co. : Fairfield, Canada West, September 14–15, 1867, *E. A. Rau*. York Co. : Toronto Island, August 29, 1898 (Biltmore hb. no. 3517 b). Wentworth Co. : Dry sand soil, Hamilton, 1889, *Dr. Burgess*. Middlesex Co. : London, August 25, 1903, *W. E. Saunders*. Elgin Co. : Aylmer, July 4, 1899, *R. T. Anderson*.
- Maine, Piscataquis Co. : Sandy plain, Milo, September 20, 1900, *M. L. Fernald*. — Overflowed intervale, Milo Junction, September 12, 1896, *M. L. Fernald*. Somerset Co. : E. Mercer, *Abbie E. Packard*. Penobscot Co. : In fields, Hermon, bloom without odor, September 4, 1904, *O. W. Knight*. — Dry fields, Mattawamkeag, September 14, 1898, *M. L. Fernald*. — Orono, sandy barren, September 14, 1897, *M. L. Fernald*; field, October, 1896, *O. W. Knight* (no. 3013). Franklin Co. : Swales, South Chesterville, September 11, 1903, *L. O. Eaton*. — Cream-colored, fragrant form, roadside, damp soil, August 31, 1903, *L. O. Eaton*. Oxford Co. : Wet places, Hartford, September, 1885, *J. C. Parlin*. Hancock Co. : Town Hill Road, Mt. Desert, September 2, 1895, *Faxon*. — Seal Harbor, Mt. Desert, September 8, 1890, *J. H. Redfield*. Kennebec Co. : Dry woods, Monmouth, September 25, 1896, *M. L. Fernald*. — Augusta, September 3, 1885, and July, 1886, *E. C. Smith*. — Roadside, Mt. Vernon, August 31, 1903, *Lillian O. Eaton*. — Swale in pasture near base of Mt. Pisgah, Winthrop, August 28, 1903, *C. H. Knowlton & Lillian O. Eaton*. Androscoggin Co. : Peat moss, East Livermore, August 28, 1903, *C. H. Knowlton & Lillian O. Eaton*. — Livermore Falls, *J. M. Haskell*. — Wet banks, East Auburn, August 18, 1896, *E. D. Merrill* (no. 3004). Cumberland Co. : Portland, 1870, *Susan M. Hallowell*. — Cape Elizabeth, August, 1895, *E. E. Yayle* (nos. 657, 657 a). — Westbrook, September, 1897, *A. H. N.* — Stroudwater, near Portland, September 23, 1900, *Dr. D. W. Fellows*.
- New Hampshire, Grafton Co. : Franconia, Echo Farm, October 24, 1891, *Faxon*; Notch road, September 19, 1893, *Faxon*. Carroll Co. : Tamworth, August, 1888, *C. W. Swan*. Belknap Co. : Roadsides, Sanbornton, *Mrs. L. A. Carter*. — Grassy bank of Lake Winnipisaukee, September 18, 1856, *G. Engelmann*. — Wiers, August 24, 1856, *Engelmann*. Rockingham Co. : Seabrook, September 15, 1896, *A. A. Eaton*. Hillsborough Co. : Dry open woods, Pelham, September 13, 1902, *C. H. Knowlton*. — Milford, August, 1902, *John A. Wheeler*. Cheshire Co. : Jaffrey, low grassy places, common, September, 1897, *B. L. Robinson* (no. 395); sandy shores of Gilmore Pond, common, August 28, 1898, *B. L. Robinson* (no. 655); border of Wesselhoeft Pond, September 11, 1898, *Walter Deane*.

Vermont, Orleans Co.: Willoughby, September 19 and 22, 1898. Lamoille Co.: Stowe, August 20, 1877, *Faxon*. Caledonia Co.: Peacham, July 21, 1892, *Alice F. Stevens*. Addison Co.: Middlebury, August 17, 1896, *E. Brainerd*. Rutland Co.: Meadows, Brandon, September 5, 1886, *F. H. Knowlton*. Bennington Co.: Manchester, August 26, 1898, *H. E. Day* (no. 401).

Massachusetts, Essex Co.: Gloucester, wet meadows, Dogtown Commons, September 1, 1903, *O. Ames*; September 8, 1903, *O. Ames & A. A. Eaton*; ledge under oaks, September 8, 1903, *Ames & Eaton*. — Bay View, Cape Ann, in dry upland situations beside a road in shade of shrubs, August 28, 1902, *O. Ames*; September 7, 1903, *O. Ames*; dry sun-baked poor soil, September 3, 1902, *O. Ames*. — On real dry ground, flowers greenish-white or cream-color, Beverly, September 25 and 30, 1866, *C. L. Tuckerman*. — Wet margins of tracks, flowers pure white, September 25, 1866, *Tuckerman*. — Saugus, September 14, 1887, *Faxon*. Middlesex Co.: Fells, September, 1885, *F. S. Collins*. — Swamps, Chelmsford, September 20, 1902, *C. H. Knowlton*. — Tophet Swamp, Carlisle, September 6, 1902, *C. H. Knowlton*. — Reading, August, 1880, *R. Frohock*; September 18, 1897, *C. C. Kingman*. — Stoneham, meadow southeast of Bear Hill, September 20, 1894, *Wm. P. Rich*. — Lowell, *S. O(rdway?)*. — Woods, Malden, September, 1892, *M. L. Fernald*. — Wet field, Woburn, September 9, 1888, *Walter Deane*. — Flowers yellowish, dry hills, Melrose, 1888, *E. H. Hitchings*. — Lexington, September 15, 1868, *Wm. Boott*. — Cambridge, Fresh Pond swamps, September 20, 1868, *Wm. Boott*; open grassy ground, October 3, 1894. — South Framingham, September 5, 1888, *E. L. Sturtevant*; Boggy woods, September 1, 1890, *Sturtevant*. — Waltham, September 2, 1889, *Wm. P. Rich*.

Suffolk Co.: Revere, September 7, 1879, *Herbert A. Young*. — Bussey Farm, Jamaica Plain, September 19, 1887, *Faxon*. Norfolk Co.: Wellesley, *Wm. Edwards*. — Muddy Pond woods, Hyde Park, September 26, 1887, *Faxon*. — Readville, October, *Faxon*. — Dedham, September 19, 1891, *J. R. Churchill*. — Blue Hill summit, Milton, September 18, 1884, *J. R. Churchill*. — Blue Hills, September 3, 1894, *W. H. Manning*. — Blue Hill, Milton, August 27, 1896, *Sydney Harris*. Bristol Co.: North Easton, September 3, 1898; dry woods, near a wood road, October 7, 1901; wet ground, open, unshaded, October 12, 1901; in water and very wet ground, October 8, 1901; open wet meadow, after first cut of hay, September, 17, 1902; open cranberry bog, September 17, 1902, *O. Ames*; Sep-

tember 25, 1900, *R. G. Leavitt*; October, 1890, *C. Blomberg*; September 5, 1903, *A. A. Eaton*. — Dry ground, Easton, September 7, 1903, *A. A. Eaton*. — Norton, September 16, 1903, *A. A. Eaton*. — Nonquit, August 29, 1888, *E. L. Sturtevant*. Plymouth Co.: Meadows, Duxbury, September 16, 1889, *J. H. Redfield*. Barnstable Co.: Moist ground, Centreville, September 12, 1899, and September 8, 1900, *Clara Imogene Cheney*. — Shores of Wequawket Pond, Centreville, September 6, 1896, *E. F. Williams*. — Shores of pond, Osterville, September 7, 1896, *Williams*. — Nine-Mile Pond, Cape Cod, September 4, 1898, *J. M. Greenman* (no. 419). — Truro, September 5, 1891, *W. Faxon*. Nantucket Co.: Nantucket, September, 1871, *Wm. Boott*. Worcester Co.: Shrewsbury, September 10, 1891, *Gertrude Hakes*. Franklin Co.: Leverett, September 7, 1891, *L. H. Elwell*. — Shelburne, September 21, 1872, *Miss S. E. Anderson*. Hampshire Co.: Amherst, August 31, 1895, *C. L. Pollard*. — South Hadley, 1887. Hampden Co.: Granville, August, 1889; September 4, 1883, *A. B. Seymour*. Berkshire Co.: Oak Hill, Williamstown, August 28, 1901, *M. A. Day* (no. 63).

Rhode Island, Providence Co.: Old bog, Adelaide Ave., Providence, September 12, 1892, *J. F. Collins*. — East Providence, September, 1871, *J. W. Congdon*. — Old peat bog, Elmwood, August 13, 1892, *J. F. Collins*.

Connecticut: *Chas. Wright*. Tolland Co.: Old pasture, Blue Hill, October 16, 1904, *C. H. Bissell*. — Rich woods, Union, August 20–25, 1902, *C. H. Bissell*. Hartford Co.: Moist pasture, Windsor, September 11, 1904, *C. H. Bissell*. — South Windsor, September 24, 1901, *A. W. Driggs*. — Low field, South Windsor, September 17, 1904, *Bissell*. — Moist grass land, Southington, September 2, 1895, *C. H. Bissell* (no. 584); low ground, Woodruff St., September 19, 1897, *Bissell*; September 5, 1899, *Bissell*; wet ground, Southington, September 11, 1894, *Bissell*. — Hartford, August 30, 1900, *A. W. Driggs*; September, 1900, "*H. J. K.*" Litchfield Co.: Low field, Litchfield, September 19, 1903, *C. H. Bissell*. — Plymouth, September 4, 1904, border of a pond; September 9, 1904, *Bissell*. — Wet ground, Hancock, Plymouth, September 6, 1903, *C. H. Bissell*. — "Muck, border of pools formed by springs in peat bogs, in full bloom, July 29, flowers greenish yellow, very fragrant; had all disappeared September 5th," Norfolk, July 29, 1904, *Bissell*. — Wet meadows, Norfolk, September 5, 1904, *Bissell*. — Swamps, Norfolk, September, 1887, *J. H. Redfield*. — Middlesex Co: Low meadow, Old Saybrook, September 9, 1904,

Bissell. New Haven Co.: Dry ground, Oxford, September 15, 1901; wet ground, Oxford, November 3, 1901, *E. B. Harger*. Fairfield Co.: Monroe, open swamp, September 17, 1895, frequent, *E. H. Eames*; wet open ground, September 6, 1903, *E. B. Harger*. — Bridgeport, dry rich woods, fls. cream tinted, September 22, 1897, *E. H. Eames* (no. 1350); open swamp, September 6, 1894, *Eames*.

New York: Lake George, September, 1882, *Dr. Vasey*. Jefferson Co.: Le Ray place ad Evans Mills, September 5, 1888, *Lester F. Ward*. Oswego Co.: Fulton, August 20, 1888, *W. W. Rowlee*. Washington Co.: Pastures, September 6, 1895, *Stewart H. Burnham*. — Moist places, Ft. Ann, October 6, 1896, *Stewart H. Burnham*. — Ft. Ann, September, 1892, *Burnham*. Oneida Co.: Sandy barrens, Deerfield, October 5, 1900, *J. V. Haberer* (no. 898). — Sphagnum marsh, three miles east of Utica, September 14, 1900, *J. V. Haberer* (no. 900 a). — Open upland marsh, four miles south of Utica, September 22, 1900, *J. V. Haberer* (no. 900 b). — Border of Oneida Lake, August, 1903, *J. V. Haberer*. Onondaga Co.: Near Syracuse, 1891, *F. C. Straub*. Madison Co.: Moraine, Cazenovia, *F. C. Straub*. Yates Co.: Penn Yan, *Dr. Sartwell*. Tompkins Co.: Larch swamp, Ithaca, September 13, 1878, *Wm. Trelease*. Delaware Co.: Fleischmann's, August, 1892 (hb. Jos. Schrenk). Sullivan Co.: Monticello, September 20, 1890, *H. H. Rusby*. Westchester Co.: Wet meadows near Tarrytown, September 24, 1898, *Marion Jessup Wright*. Queens Co.: Hempstead Plains, L. I., September 16, 1893 (hb. Jos. Schrenk). — Meadow Brook bog, Hempstead Plains, September 7, 1892, *Hermann Schrenk*. Suffolk Co.: Eastport, L. I., September 14, 1894, *Jos. Schrenk*. — Low sandy shores, Shinnecock Bay, L. I., July, 1896, *T. M. Fry*.

New Jersey, Morris Co.: Parsippany, 1896, *Wm. Trelease*. Essex Co.: Verona, August, 1879, *H. H. Rusby*. Hudson Co.: Guttenberg, August 25, 1895, *Wm. VanSickle*. — New Durham, August 25, 1895, *Wm. VanSickle*. Middlesex Co.: Woodbridge township, September 24, 1890, *Rev. L. H. Lighthipe*. Ocean Co.: West Creek, October 21, 1885, *Wm. P. Haywood*. Camden Co.: Atco, October 5, 1888, *J. B. Brinton*. Salem Co.: Marshy place, Alloway to Mower, September 17, 1890, *J. H. Holmes* (no. 531).

Pennsylvania: *C. J. Moser* (*Unio itiner.*), 1832. — Broad Run, September, 1838, *McMinn*. — Salsburg, 1878, *E. A. Rau*. Lackawanna Co.: Crystal Lake, Carbondale, September 19, 1895, *D. LeRoy Topping*. Luzerne Co.: Long Pond, September 20, 1890, *J. K. Small & A. A. Heller*. Northampton Co.: Easton, September 23, 1869, *Thos. C.*

- Porter*. — Deily's, near Bethlehem, September, 1878, *E. A. Rau*. — Near Bethlehem, September 11, 1882, *C. N. Lochman*. Westmoreland Co.: October 9, 1877, *P. E. Pierron*. Lebanon Co.: Penryn, September 28, 1889, *A. A. Heller*. — South Mountain, near Penryn, September 26, 1891, *A. A. Heller & E. Gertrude Halbach* (no. 679). York Co.: McCall's Ferry, September 26, 1891, *J. K. Small*. Lancaster Co.: 1885, *Jas. Galen* (no. 2783). — 1891, *A. A. Heller & E. Gertrude Halbach*. — Peach Bottom, September 21, 1889, *J. K. Small*. — Schenk's Ferry, September 21, 1889, *A. A. Heller*. Chester Co.: West Chester, *W. W. Jeffries*. Philadelphia Co.: Germantown, September 14, 1879, *G. Engelmann*. — Philadelphia, *Morong*.
- Maryland, Baltimore Co.: Near Claremont Pond, suburbs of Baltimore, October 30, 1893, *Adam Steitz*. — South of Claremont, on B. & O. R. R., September 29, 1894, *Steitz*. Montgomery Co.: Woodside, September 25, 1895, *Henry W. Olds*. Prince George Co.: Laurel, September 20, 1897, *F. H. Knowlton*. Caroline Co.: Along wet low ditches, eastern shore, rich soil, September 19, 1889, *Fritchey*.
- District of Columbia: October 13, 1878, *L. F. Ward*; swampy ground, October 3, 1896, *E. S. Steele*. — Broadwater, October 18, 1896, *C. L. Pollard*. — Holmead swamp, September 22, 1878, September 27, 1897, *E. S. Steele*.
- Virginia, Fairfax Co.: Alexandria, *A. H. Curtiss*. Augusta Co.: E. Falls, Churchville, October 5, 1884, *L. F. Ward*. Chesterfield Co.: Manchester, November 1, 1892, *De Chalmot*. Wythe Co.: Wytheville, July 3, 1882, *E. C. Smith*. Alleghany Co.: Alleghany Station, alt. 545 m., September 15, 1903, *Mr. & Mrs. E. S. Steele* (no. 325).
- West Virginia, Preston Co. Abundant by the roadside, Brookside, 2500 ft., August 28, 1898, *H. W. Olds*. — Aurora, alt. about 3000 ft., September 10, 1898, *Mr. & Mrs. E. S. Steele*. Greenbrier Co.: Bogs, rather common, White Sulphur Springs, September 7, 1903, *Kenneth K. Mackenzie* (no. 501). Monroe Co.: Sweet Springs, September 12, 1903, alt. 634 m., *Mr. & Mrs. E. S. Steele* (no. 325).
- North Carolina, Buncombe Co.: Biltmore, 1894. — Wet meadows near Biltmore, September 30, 1897 (hb. Biltmore, no. 3517 a); Biltmore estate, September 29, 1899, *H. M. Packard & Carrie Harrison*.
- Georgia, Thomas Co.: Thomasville, October, 1902, and November 10, 1903, *Mrs. A. P. Taylor*.
- Alabama, Lee Co.: Auburn, October 21, 1897, *F. S. Earle & C. F. Baker* (no. 1575); October 15, 1896, *C. F. Baker*.
- Tennessee, Cocke Co.: Wolf Creek, August 5, 1897, *Miss H. P. Allen*.

- Wet meadows and marsh grounds, Wolf Creek, July, 1898, *A. Ruth* (no. 152). — Grassy places near mountains, July, 1898, *A. Ruth* (no. 160). Coffee Co.: Oak barrens, Tullahoma, October 15, 1880, *A. Gattinger* (no. 2783).
- Ohio, Cuyahoga Co.: Near Cleveland, *Wm. Krebs*. — Berea, September, 1896, *G. B. Ashcroft*. Lorain Co.: Camden Lake, September 25, 1892, *Alfred E. Ricksecker*. Summit Co.: Akron, August 15, 1888, *Dr. K. O. Foltz* (no. 6680). Wayne Co.: Brown's Lake, near Wooster, September 7, 1899, *J. W. T. Duvel* (no. 3).
- Indiana, Lake Co.: Low ground east of Miller's, September 4, 1897, *W. S. Moffatt* (no. 446); Swales, Miller's, September 9, 1896, and August 26, 1898, *L. M. Umbach*. — Moist places, Pine, August 31, 1895, *L. M. Umbach*. Steuben Co.: Drained swamp meadow, a quarter of a mile north of Clear Lake, September 11, 1904, *Chas. C. Dean*. Jefferson Co.: Hanover, September, 1875, *A. H. Young*.
- Illinois, Lake Co.: Skohie, Highland Park, September 15, 1900, *L. M. Umbach*. — Grassy shores of Lake Michigan at Waukegan, September 7, 1882, *G. Engelmann*. Cook Co.: August, 1870, *Henry H. Babcock*. — Wet soil, Chicago, October, 1898, *N. L. T. Nelson*. — Fields, Riverside, September 11, 1900, *L. M. Umbach*. — Lake View, September 9, 1887, *L. H. Pammell*. — South Chicago and McHenry, August and September, 1881, *A. B. Seymour*. Ogle Co.: Oregon, September 8, 1884, *Merton B. Waite*. Henderson Co.: Prairies near Oquawka, *H. N. Patterson*. — Oquawka, *Patterson*. Cass Co.: Beardstown, *Chas. A. Geyer*. St. Clair Co.: French Village, September 10. Randolph Co.: Wheaton, September, *R. E. Blount*.
- Michigan, Keweenaw Co.: Swamps, September 12, 1886, *O. A. Farwell*. — Wet places, August, 1887, *Farwell*. Muskegon Co.: Marshes, Lake Harbor, August, 1896, *W. S. Moffatt* (no. 364). Kent Co.: Grand Rapids, September 3, 1899, *Emma J. Cole*. Ionia Co.: Tamarack swamp, near Hubbardston, September 6, 1892, *C. F. Wheeler*. Oakland Co.: Swamps at Orion, August 29, 1895, *O. A. Farwell*. Wayne Co.: Low ground at Detroit, October 4, 1893, *Farwell*. Berrien Co.: Bertrand, October, 1890, *Caleb Whipple*.
- Wisconsin: 1889, *F. F. Wood*. — Hills of Embarras River, Upper Mississippi, September, 1838, *Lieut. Fremont*, Nicollet's Expedition. St. Croix Co.: 1861, *T. J. Hale*. Brown Co.: Marsh, Preble (?), August 13, 1881, *J. H. Schuette*.
- Minnesota: Abundant in boggy elevated prairies on the upper St. Peter's (Minnesota) River, August 20, 1839, *Chas. A. Geyer*, Nicollet's Expe-

- dition (no. 56). Traverse Co.: Lake Traverse, September, 1893, *E. P. Sheldon*. Winona Co.: Winona, August, 1883, August, 1884, *J. M. Holzinger*. Mower Co.: Le Roy, 1861, *T. J. Hale*.
- South Dakota, Sanborn Co.: Low prairies, common, September 4, 1891, *E. A. Wilcox*.
- Iowa, Muscatine Co.: September 10, 1898, *L. H. Pammell & Ferd Reppert* (Ag. Col. dist. no. 1257). Story Co.: Ames, August 20, 1896 (Ag. Col. dist. no. 183). — Ames, *A. S. Hitchcock*.
- Nebraska: South fork of Platte, Lieut. Bryan Expedition, September, 1856, *H. Engelmann*. North Platte, a wet bottom one hundred miles below Laramie, white flower, sweet odor, September 22, 1859, *H. Engelmann*. Cedar Co.: St. Helena, *Th. A. Bruhin*. Brown Co.: Bone valley, August 30, 1893, *Fred Clements* (no. 2930). Thomas Co.: Wet meadow near Plummer Ford, Dismal River, August 23, 1893, *P. A. Rydberg* (no. 1719). Saunders Co.: Sandy flats in Platte, 1200 ft., Ashland, September, 1890, *Tom A. Williams*. — Wet sandy places, Ashland, September 22, 1890, *Tom A. Williams* (no. 444).
- Kansas, Riley Co.: Wet soil, 1896, *G. L. Clothier* (no. 827). — High prairie, September, 1896, *Clothier* (no. 1140). Leavenworth Co.: Low prairie nine miles south of Ft. Leavenworth, *Fendler* (no. 119). Kiowa Co.: Meal's farm, near Belvidere, September 17, 1897, *L. F. Ward*.
- Missouri, St. Louis Co.: Dry hills, St. Louis, September, 1878, *H. Eggert*. Barry Co.: Eagle Rock, September 22, 1896, uncommon, *B. F. Bush* (no. 199). Taney Co.: Rare in woods, Swan, October 8, 1899, *B. F. Bush* (no. 795).
- Arkansas, Pulaski Co.: Little Rock, October, 1835, *G. Engelmann*. Hempstead Co.: Common in swamp, Fulton, September 18, 1900, *B. F. Bush* (no. 910).
- Texas, Dallas Co.: Dallas, October, 1874, *J. Reverchon*. Erath Co.: Wolf Creek, five miles above Bluff Dale, October, 1891, *Lester F. Ward*. Pecos Co.: Mountain terraces, Comanche Spring, October, November, 1849, *F. Lindheimer* (no. 203). Harrisburg Co.: Harrisburg, October 28, 1875, *J. F. Joor, M. D.* (no. 319).
- New Mexico: Upper Rio Grande, Whipple's Expedition, 1853-54, *Dr. J. M. Bigelow*.

13. *S. ODORATA*, Lindl., Orch. Pl. 467 (1840). — *Neottia odorata*, Nutt., Journ. Acad. Phil. 7: 98 (1834). — *Gyrostachys odorata*, Kuntze, Rev. Gen. Pl., part II., 664 (1891). — *G. triloba*,

Small, Torr. Bull. **25**: 610 (1898). — *G. constricta*, Small, Torr. Bull. **25**: 609 (1898). — *G. vernalis*, Small, Fl. Se. U. S. 319 (1903), as to plant descr.; Torr. Bull. **25**: 610 (1898), not *S. vernalis*, Eng. & Gray. Closely allied to *S. cernua*, Rich., from which some forms are with difficulty distinguished.

Virginia, Fairfax Co.: Dyke Station, near Alexandria, September 17, 1898, *Arthur Howell*. Norfolk Co.: Near Northwest, November 8, 1898, *Thos. H. Kearney, Jr.* (no. 2388).

Georgia: Specimen in hb. Geo. Thurber. Thomas Co.: Thomasville, November, 1903, *Mrs. A. P. Taylor*.

Florida, Calhoun Co.: Banks of the Chipola, W. Fla., 1838 (hb. Chapman). Levy Co.: Gulf Hammock, October, 1877, *A. P. Garber*. Dade Co.: Border of river at Miami, November 9, December 12, December 17, 1903, *A. A. Eaton*; Orange Glade, west of Miami, December 7 and 29, 1903, *Eaton*. — Alapattah, near Miami, December 24, 1903, *Eaton* (no. 733). — Muddy soil at a grade, Lemon City, December 5, December 11, and December 27, 1903, *Eaton*. Lee Co.: Ft. Myers, December 11, 1891, *J. H. Simpson* (no. 368). — Palm Hammock, near Naples, March 19, 1904 (out of bloom), *O. Ames*.

Alabama, Baldwin Co.: Gateswood, November 2, 1903, *S. M. Tracy* (no. 8363).

Louisiana: Marshes, fall, *Hale* (no. 444). Terrebonne Co.: Bayou, Terrebonne swamp, five miles from Thibodaux, October 29, 1872, *J. F. Joor*. Boissier Co.: Alden Bridge, October 30 and November 1, 1898, *Wm. Trelease*. Rapides Co.: Dry soil, Alexandria, September and November. Plaquemines Co.: In swampy woods, fls. very fragrant, Point a la Hache, November 30, 1885, *A. B. Langlois*.

Texas, Wood Co.: Swamps, Mineola, October 18, 1900, *J. Reverchon* (no. 2174). Harrison Co.: Common in swamp, Marshall, October 8, 1901, *B. F. Bush* (no. 990). Harris Co.: Houston, October, 1842, *Lindheimer*.

HYBRIDS

14. *S.* × INTERMEDIA, Ames in *Rhodora* **5**: 262, 263, pl. 47 (*S. gracilis* × *S. vernalis*).

Massachusetts, Bristol Co.: Easton, dry fields, September 8, 10, 1903, *A. A. Eaton*.

I have seen a specimen, presumably a hybrid between *S. gracilis* and *S. Beckii*, in the herbarium of Dr. E. H. Eames.

DOUBTFUL SPECIES

15. *S. OVALIS*, Lindl., Orch. Pl. 466 (1840): “*S. glaberrima*, foliis radicalibus et caulinis lineari-ensiformibus acutis, spicâ ovali densâ multiflorâ, bracteis ovatis acutis, sepalis petalisque linearibus obtusis, labello oblongo membranaceo apice recurvo crispo; callis elongatis falcatis sagittam referentibus.

“Hab. in *Texas*, *Drummond*. (exam. s. sp. in herb. *Hooker*.)

“A plant from 6 to 9 inches high. Spike like that of *S. odorata*, but much smaller, and the flowers not larger than those of *S. gracilis*. A very distinct and apparently rare plant; for it seems that Mr Drummond found only three specimens, all preserved in *Hooker's Herbarium*.”

EXCLUDED SPECIES

Spiranthes Storeri, Chapm. = *Beadlea Storeri*, Small = *Pelelexia cranichoides*, Grisebach = *Sauroglossum cranichoides*, Ames. *Spiranthes orchioides*, Rich. = *Spiranthes jaliscana*, Hemsley = *Stenorrhynchus jaliscanus*, Nash = *Stenorrhynchus lanceolatus*, Rich. *Spiranthes cinnabarina*, Watson = *Gyrostachys cinnabarina*, Kuntze = *Stenorrhynchus cinnabarinus*, Lindl.

INDEX TO SYNONYMY OF SPIRANTHES

NOTE. — Numbers refer to the numbered species of *Spiranthes* in the Synopsis, under which the synonyms may be found.

<i>Beadlea</i> :		<i>gemmaipara</i> , Smith	no. 9
<i>Storeri</i> , Small	excl. sp.	<i>gracilis</i> , Bigelow	no. 2
<i>Gyrostachys</i> :		<i>gracilis</i> , var. <i>secunda</i> ,	
<i>brevifolia</i> , Kuntze,	no. 4	Bigelow	no. 2
<i>cernua</i> , Kuntze	no. 12	<i>lucida</i> , H. H. Eaton	no. 11
<i>cinnabarina</i> , Kuntze	excl. sp.	<i>odorata</i> , Nutt.	no. 13
<i>constricta</i> , Small	no. 13	<i>plantaginea</i> , Raf.	no. 11
<i>gracilis</i> , Kuntze	no. 2	<i>tortilis</i> , Muhl.	no. 6

ERRATA

Pages 154 and 156.

For *Spiranthes jaliscana*, Hemsley, read *Spiranthes jaliscana*, Watson.

For *Spiranthes cinnabarina*, Watson, read *Spiranthes cinnabarina*, Hemsley.

<i>stricta</i> , Rydb.	no. 9	<i>spirale</i> , Sw.	no. 3
<i>triloba</i> , Small	no. 13	<i>Sauroglossum</i> :	
<i>vernalis</i> , Small	no. 13	<i>cranichoides</i> , Ames	excl. sp.
<i>vernalis</i> , Kuntze	no. 6	<i>Spiranthes</i> :	
<i>xyridifolia</i> , Small	no. 6	<i>æstivalis</i> , Oakes	no. 11
<i>Limodorum</i> :		<i>Beckii</i> , Lindl.	no. 1
<i>autumnale</i> , Walter	no. 12	<i>brevifolia</i> , Chapm.	no. 4
<i>præcox</i> , Walter	no. 7 ; p. 118	<i>brevilabris</i> , Lindl.	no. 2
<i>Neottia</i> :		<i>cernua</i> , Hook.	no. 9
<i>cernua</i> , Sw.	no. 12	<i>cernua</i> , Rich.	no. 12

DOUBTFUL SPECIES

15. *S. OVALIS*, Lindl., Orch. Pl. 466 (1840): "*S. glaberrima*, foliis radicalibus et caulinis lineari-ensiformibus acutis, spicâ ovali densâ multiflorâ, bracteis ovatis acutis, sepalis petalisque linearibus obtusis, labello oblongo membranaceo apice recurvo crispo; callis elongatis falcatis sagittam referentibus.

"Hab. in *Texas*, *Drummond*. (*exam. s. sp. in herb. Hooker.*)

"A plant from 6 to 9 inches high. Spike like that of *S. odorata*, but much smaller, and the flowers not larger than those of *S. gracilis*. A very distinct and apparently rare plant; for it seems that Mr Drummond found only three specimens, all preserved in Hooker's Herbarium."

INDEX TO SYNONYMY OF SPIRANTHES

NOTE. — Numbers refer to the numbered species of *Spiranthes* in the Synopsis, under which the synonyms may be found.

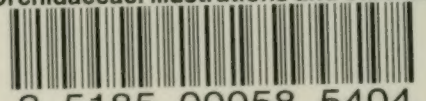
<i>Beadlea</i> :		<i>gemmipara</i> , Smith	no. 9
<i>Storeri</i> , Small	excl. sp.	<i>gracilis</i> , Bigelow	no. 2
<i>Gyrostachys</i> :		<i>gracilis</i> , var. <i>secunda</i> ,	
<i>brevifolia</i> , Kuntze,	no. 4	Bigelow	no. 2
<i>cernua</i> , Kuntze	no. 12	<i>lucida</i> , H. H. Eaton	no. 11
<i>cinnabarina</i> , Kuntze	excl. sp.	<i>odorata</i> , Nutt.	no. 13
<i>constricta</i> , Small	no. 13	<i>plantaginea</i> , Raf.	no. 11
<i>gracilis</i> , Kuntze	no. 2	<i>tortilis</i> , Muhl.	no. 6
<i>laciniata</i> , Small	no. 5	<i>tortilis</i> , Sw.	no. 3
<i>latifolia</i> , Kuntze	no. 11	<i>tortilis</i> , var. <i>gracilis</i> ,	
<i>linearis</i> , Rydb.	no. 6	Torr.	no. 2
<i>longilabris</i> , Kuntze	no. 4	<i>Ophrys</i> :	
<i>lucida</i> , H. H. Eaton	no. 11	<i>æstivalis</i> , Michx.	no. 6
<i>ochroleuca</i> , Rydb.	no. 12	<i>cernua</i> , L.	no. 12
<i>odorata</i> , Kuntze	no. 13	<i>peruviana</i> , Aubl.	no. 3
<i>parviflora</i> , Small	no. 8	<i>spiralis</i> , L.	no. 3
<i>peruviana</i> , Kuntze	no. 3	<i>Orchistraum</i> :	
<i>plantaginea</i> , Britton	no. 11	<i>porrifolium</i> , Greene	no. 10
<i>porrifolia</i> , Kuntze	no. 10	<i>Romanzoffianum</i> ,	
<i>præcox</i> , Kuntze	no. 7	Greene	no. 9
<i>Reverchoni</i> , Small	no. 6	<i>Pelexia</i> :	
<i>Romanzoffiana</i> , McM.	no. 9	<i>cranichoides</i> , Griseb.	excl. sp.
<i>simplex</i> , Kuntze	no. 1	<i>Satyrium</i> :	
<i>stricta</i> , Rydb.	no. 9	<i>spirale</i> , Sw.	no. 3
<i>triloba</i> , Small	no. 13	<i>Sauroglossum</i> :	
<i>vernalis</i> , Small	no. 13	<i>cranichoides</i> , Ames	excl. sp.
<i>vernalis</i> , Kuntze	no. 6	<i>Spiranthes</i> :	
<i>xylidifolia</i> , Small	no. 6	<i>æstivalis</i> , Oakes	no. 11
<i>Limodorum</i> :		<i>Beckii</i> , Lindl.	no. 1
<i>autumnale</i> , Walter	no. 12	<i>brevifolia</i> , Chapm.	no. 4
<i>præcox</i> , Walter	no. 7 ; p. 118	<i>brevilabris</i> , Lindl.	no. 2
<i>Neottia</i> :		<i>cernua</i> , Hook.	no. 9
<i>cernua</i> , Sw.	no. 12	<i>cernua</i> , Rich.	no. 12

<i>cernua</i> , var. <i>latifolia</i> , Torr.	no. 11	<i>latifolia</i> , Torr.	no. 11
<i>cernua</i> , var. <i>parviflora</i> , Chapm.	no. 8	<i>longilabris</i> , Lindl.	no. 4
<i>cernua</i> , var. <i>major</i> , A. Eaton	no. 12	<i>neglecta</i> , Ames	no. 6
<i>cernua</i> , var. <i>ochroleuca</i> , Ames	no. 12	<i>odorata</i> , Lindl.	no. 13
<i>cinnabarina</i> , Watson	excl. sp.	<i>orchioides</i> , Rich.	excl. sp.
<i>gemmipara</i> , Lindl.	no. 9	<i>ovalis</i> , Lindl.	no. 15
<i>gracilis</i> , Beck	no. 2	<i>parviflora</i> , Ames	no. 8
<i>gracilis</i> × <i>Beckii</i>	no. 14	<i>plantaginea</i> , Torr.	no. 11
<i>graminea</i> , Lindl.	p. 119	<i>porrifolia</i> , Lindl.	no. 10
<i>graminea</i> , var. <i>præcox</i> , B. S. P.	no. 6	<i>præcox</i> , Watson	nos. 6, 7
<i>graminea</i> , var. <i>Walteri</i> , Gray	no. 6; p. 119	<i>Romanzoffiana</i> , Cham.	no. 9
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