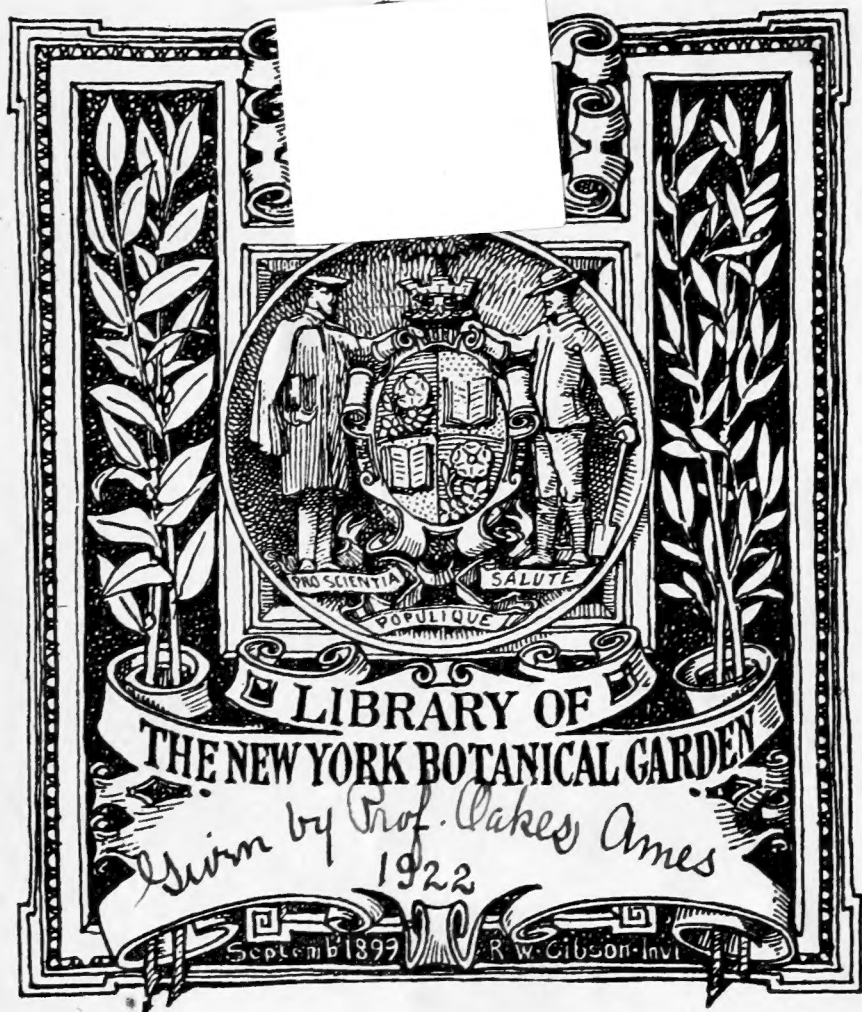


STUDIES IN THE FAMILY ORCHIDACEÆ

OAKES AMES A. M.



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VII



ORCHIDACEÆ

ILLUSTRATIONS AND STUDIES OF
THE FAMILY ORCHIDACEÆ

ISSUED FROM THE AMES BOTANICAL LABORATORY
NORTH EASTON, MASSACHUSETTS



POGONIA AND ITS ALLIES
IN THE NORTHEASTERN UNITED STATES
AND OTHER PAPERS

By OAKES AMES

WITH THIRTEEN PLATES BY BLANCHE AMES



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TO
GEORGE LINCOLN GOODALE, A.M., M.D., LL.D.
TEACHER AND FRIEND
THIS SEVENTH FASCICLE OF ORCHIDACEÆ
IS CORDIALLY DEDICATED



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PREFACE

IN the present volume of Orchidaceae I have brought together several short papers which represent studies of genera and species taken from a wide geographical range.

The paper on *Pogonia* and its Allies in the Northeastern United States may annoy those who are weary of the nomenclatorial instability which seems more and more inseparable from systematic botany; in fact, this paper may appear to be an attempt to justify a modern tendency that is positively dangerous in the realm of taxonomy. I have endeavored to show by plates of commendable completeness every structural character that seems important in the contemplation of generic cleavage. If these characters do not carry conviction, the plates that display them will, at least, furnish to opponents of change an accurate record on which to base objections and from which to draw conclusions.

The paper on *Otostylis* and *Cyrtopodium* does more than clarify a perplexing situation: it trenchantly reveals a difficulty that is always present when we attempt to identify plants. It indicates that many of our most carefully approached determinations may be faulty even when contrasted characters fit together with delightful ease.

OAKES AMES

Bussey Institution for Applied Biology

Harvard University

January, 1922

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A DISCUSSION OF POGONIA AND ITS ALLIES IN THE NORTHEASTERN UNITED STATES

WITH REFERENCES TO
 EXTRA-LIMITAL GENERA AND SPECIES

POGONIA taken in the broad sense is a group of rather sharply defined subgenera. That these subgenera should be raised to generic rank is, in the opinion of several authorities, very desirable. Consequently a diversity of treatment of Pogonia and its allies has resulted, not only in our local floras, but in more comprehensive works that deal with the flora of the world.

The present tendency is to make genera on rather narrower lines than prevailed when Bentham and Hooker published their *Genera Plantarum*, and to disregard the advantages that are offered by the maintenance of that very conservative though admirable category known as the subgenus. The advocates of this tendency use a variety of arguments to defend their practice, one argument being that large genera are unwieldy and difficult to monograph, and that careful cleavage along subgeneric lines results in opportunities for comprehensive investigations that will hasten the arrival of that taxonomic stability which, in the final analysis, must rest on conscientious monographic work.

Conservative systematists view with justifiable horror and distress the multiplication of synonyms that has attended recent activities in species making, and in their opinion the likelihood of an increase in this real evil is intensified by the difficulties that usually arise when critical species, owing to uncertainties as to their final resting-place, are passed from one genus to another. It is admitted by the conservatives that synonyms are unavoidable, but as they must always be with us it is argued that surely there is an advantage in the avoidance of generic synonyms by the

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maintenance of broadly characterized, easily defined and quickly recognized genera.

When we turn to *Pogonia* as usually defined and study it intensively, it becomes very evident that conservative systematists have carried to extremes the effort to keep the genus intact. Indeed, some of the subgenera are too clearly differentiated from one another to allow of any doubt as to the desirability of elevating them to higher rank. *Nervilia* and *Codonorchis* are no longer regarded as subgenera of *Pogonia*; they have been transferred to distinct subtribes, and there is no reason to question the treatment that has resulted in their removal from the *Pogonia* alliance. But there are other groups of species, those referred to *Cleistis*, *Psilochilus*, *Isotria* and *Triphora*, that cannot be so easily disposed of, and it is with regard to their treatment that opinions vary.

I propose to discuss here the subgenera of *Pogonia* that come within the range covered by the seventh edition of Gray's Manual and, by means of detailed plates, to make clear those characters that seem to be most important in considerations of generic segregation of the species.

The so-called extremists recognize *Pogonia*, *Isotria* and *Triphora*, but there is no thoroughgoing discussion of the characters on which these genera are based, although in a paper on the anatomy of our native *Pogonias* Theo. Holm¹ indicated differences that he regarded as of sufficient importance to necessitate the recognition of three clearly differentiated groups of species. In his observations of the subterranean system of *Pogonia trianthophora* he made very clear that there are morphological peculiarities that warrant the withdrawal of this species from *Pogonia* proper, and I believe for other reasons that it is wise to re-

¹ *American Journal of Science* ser. 4, 9 (1900) 13-19.

gard *P. trianthophora* as a representative of a very well defined group of which *Triphora gentianoides* (Sw.) Ames & Schltr. *comb. nov.* (*Arethusa gentianoides* Sw. Fl. Ind. Occ. 3 (1806) 1436), may be taken as an example.

Cleistos has been looked on as a group referable to *Pogonia*. As a subgenus it is represented in our range by *Pogonia divaricata*. If it should be deemed wise, as I believe it is, to treat *P. ophioglossoides* and its close allies in Asia as members of a distinct genus readily characterized by simple pollen grains, then *P. divaricata* and the neotropical species to which it is related would constitute the genus *Cleistos*. Under such circumstances *P. verticillata* and *P. affinis* of the Manual should be segregated as members of a distinct group and transferred to *Isotria*, the most conspicuous character on which to base segregation being the verticillate leaves and their behavior in veneration. (Cf. PLATE 105, fig. 9.)

Just how much reliance to place on the character of the pollen grains is, of course, a debatable question. It would seem that the tendency of the pollen tetrads to break down early as in *Cypripedium*, *Cephalanthera* and a few other orchid genera ought to be taken as a fundamental characteristic in the contemplation of generic differences. In *Pogonia ophioglossoides* the pollen tetrads disintegrate into simple grains comparatively early in the development of the flower; in fact, they may be found thoroughly separated in buds that are still green. We find the same condition in the Asiatic *P. japonica* Reichb. f. H. G. Reichenbach in his elaborate treatise on the structure of the pollen of the Orchidaceae figured the pollen grains of *P. ophioglossoides* as simple at flowering time, not compound.¹ In *P. ophioglossoides* var. *brachypogon* Fernald and in *P. japonica* var. *minor* Mak., the pollen

¹ *De Pollinis Orchidacearum Genesi ac Structura* (1852).

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grains are simple, so that this character would seem to be constant in the *Eupogonia* group and may well be regarded as a weighty bit of evidence in favor of restricting to *Pogonia* only those species of the alliance which produce simple rather than compound pollen grains. It is true that Wettstein in a paper on *Cephalanthera*, *Epipactis* and *Limodorum*,¹ in which he advocated the union of these genera under *Epipactis*, dismissed the evidence of simple pollen grains in *Cephalanthera* on the ground that in this genus they simply break down earlier than in *Epipactis*. Col. M. J. Godfery² in a discussion of this paper maintains that Wettstein has treated the subject of the pollen grains in a somewhat disingenuous manner and that, notwithstanding his conclusions, the differences between the pollen grains of *Epipactis* and *Cephalanthera* pointed out by Richard are undiminished in importance. In other words, Godfery is inclined to view the nature of the pollen as important in systematic work among the orchids, at least with regard to *Epipactis* and *Cephalanthera*.

Pogonia, *Cleistes*, *Psilochilus*, *Isotria* and *Triphora* are members of that large section of the Orchidaceae which is characterized by mealy or powdery pollen, a section recognized by L. C. Richard and recently adopted by Dr. Rudolf Schlechter as the *Polychondreae*. Together with *Pogoniopsis*, *Monophyllorchis*, *Xerorchis*, *Vanilla*, *Galeola*, *Eriaxis*, *Epistephium* and *Lecanorchis* they constitute the *Vanilleae*.

If we examine *Triphora*, *Pogonia*, *Cleistes*, *Isotria* and *Psilochilus* with a view to finding key characters to separate them clearly from one another, the following would stand out as the most weighty :

¹ *Oesterreiche botanische Zeitschrift* 39 (1889) 395-399, 422-430.

² *Journal of Botany* 58 (1920) 69-74.

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- I. Column denticulate or paucidentate at the apex. Anther decumbent with the loculi facing downward. Pollen grains simple or compound with the extine free from pits or reticulations.
 - A. Pollen grains simple, not cohering in tetrads. *Pogonia*
 - A. Pollen grains compound, cohering in tetrads.
 - a. Leaves solitary or alternate. *Cleistos*
 - a. Leaves (5 or 6) verticillate. *Isotria*
- II. Column entire at the apex or simply lobed. Anther erect, with the loculi facing outward. Pollen grains compound with the extine pitted or reticulated.
 - A. Anther rigidly attached to the top of the column. *Triphora*
 - A. Anther mobile at the top of the column and articulated with it. *Psilochilus*

A glance at the key reveals a very important point, namely, that *Triphora* is set apart, not only by means of an easily determined character found in the pollinia, but by a peculiar structure of the column that does not occur in any of its allies. This character, in my estimation, is indicative of deep-seated differences which are accentuated when we examine the vegetative structure of the plants.

The subterranean organs of the four genera that occur within our range offer some very interesting differences. I believe these were first noticed in detail by Theo. Holm in his paper already referred to. Aside from fundamental differences, the gross vegetative characters offer a means for dividing the alliance under consideration into two groups; *Triphora* possessing a most remarkable system of underground tubers and stolons which will receive attention on another page, *Pogonia*, *Cleistos* and *Isotria* propagating by means of root-shoots or successive buds, never by true stolons. I am unable to include *Isotria affinis* as a plant that propagates vegetatively by root-shoots, as this species is so rare that material is difficult to obtain in sufficient completeness to warrant conclusions regarding its vegetative system. The most

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complete specimens I have studied are clearly shown in the illustration. (PLATE 107.) From this material one is only justified in making assumptions. It would be strange, indeed, if *I. affinis* did not produce root-shoots, but conclusive proof that it does so is still wanting.

Although it is not the purpose of this work to survey the fifty or more species that might properly come within its scope, some mention should be made of the Asiatic species that bears a striking resemblance to *Pogonia ophioglossoides* and is sometimes referred to it. In 1858, when Asa Gray put forth his classic paper which contained observations upon the relations of the Japanese flora to that of North America,¹ he included in the list of species common to New England and Japan two orchids, *Liparis liliifolia*² and *Pogonia ophioglossoides*. More recent authors have found characters which they regard sufficiently significant to warrant the recognition of the Japanese *Pogonia* as a distinct species and the name *P. japonica* Reichb. f. has been accepted for it by the latest monographer of the Sino-Japanese orchid flora. I have examined herbarium material of the Chinese and Japanese *Pogonia* that has been referred to *P. japonica* and find that the most striking character is in the labellum. This organ is distinctly three-lobed. In our New England *P. ophioglossoides* the lip is sometimes obscurely three-lobed, but as a rule tendencies toward lobing are suppressed or obscured by a copious and deep fringe. Blume figured his *P. similis*, a species now merged with *P. japonica*, with a conspicuously three-lobed lip. Except for this lobing of the lip and a slight difference in the habit, and in the color of dried specimens, there is nothing to distinguish the Asiatic from the American species. Whether or not the dif-

¹ *Memoirs of the American Academy of Arts and Sciences* n. s. 6, pt. 2 (1858) 377.

² The Asiatic *Liparis* is now referred to *L. Makinoana* Schltr.

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ferences that are emphasized will prove diagnostic of two distinct species remains for further consideration. It is true, however, that the aura of these species, widely separated geographically, is distinctive.

If, at this point, we review the species of the northeastern United States included within the range covered by the seventh edition of Gray's Manual, we find that the Pogonia alliance has five representatives. In the following pages these are arranged for discussion in the order that seems best suited to an illuminating survey of their differentiating characters.

TRIPHORA *Nutt.*

Triphora trianthophora (*Sw.*) *Rydb.* in Britton's Man. (1901) 298. *Helleborine mariana* *Pluk.* Mant. (1700) 100, t. 348, f. 6. *Arethusa trianthophora* *Sw.* in K. Vet. Akad. Stockh. Nya Handl. 21 (1800) 230. *Arethusa parviflora* *Michx.* Fl. Bor. Am. 2 (1803) 160. *Triphora pendula* *Nutt.* Gen. 2 (1818) 193. *Pogonia pendula* *Lindl.* in Bot. Reg. (1825) t. 908. *Pogonia trianthophora* *BSP.* Prelim. Cat. N. Y. (1888) 52.

Triphora trianthophora is the only species of *Triphora* within the territory covered by Gray's Manual. In fact, with the exception of a species recently discovered in Florida that appears to be closely allied with *T. gentianoides* (*Sw.*) Ames & Schltr., it is the only representative of *Triphora* in the United States. Its nearest ally is the Mexican *T. mexicana* (*Wats.*) Schltr. It differs from all other New England orchids in its vegetative system, and has been very casually mentioned in botanical writings with regard to the subterranean phenomena that characterize it. Lownes studied the behavior of tubers in colonies under observation near Camp Algonquin, New Hampshire, and published a very illuminating note regarding them in *Rhodora* for

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March 1920. From my reading of Lownes's article, however, I was unable to decide whether or not his observations agreed with mine; his drawings, diagrammatic though they were, failed to bring out clearly just what happens in the sequence of vegetative multiplication. In the main, however, I believe the conclusions at which he arrived are correct.

When a colony of this species is dissected, a process that demands much care and extraordinary patience, as the stems and stolons are exasperatingly fragile and brittle, it is found that the flowering stem arises from the broad end of an obconical or egg-shaped tuber, and that from the lower part of the flowering stem, above the tuber, stolons originate and grow out in a more or less horizontal direction, bearing at their end miniature replicas of the mature tuber. (PLATES 102 and 103.) The exact significance of these miniature tubers is not at once apparent and perplexity may arise as to their function. If the mature tuber illustrated (cf. PLATE 102) is examined, a minute process will be observed at the basal end. This process is to be interpreted as the withered remains of a stolon and indicates the original point of attachment of the tuber to the stolon of the mother plant. This process is usually very distinct in fresh material, and yet might be passed over as of no consequence in a study of the life history of the species. If, now, we begin our study of development with a minute tuber that has been detached from a stolon, perhaps by frost or some other mechanical means, we are able to observe that it is at the distal end of this tuber that development takes place, and that the tissues in the apical region give rise first to a new stolon bearing a miniature tuber and then to a bud from which develops the new stem. This method of growth is clearly shown in the illustration (PLATE 103) and suggests what may be the early stages of development from a protocorm. The young

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tubers are provided with endotropic fungi (mycorrhiza), although the sections I have examined indicate that the fungal elements are restricted and are usually present only in the basal half, that is, near the end by which the tuber was originally attached to the stolon.

The flowers of *Triphora trianthophora* differ fundamentally from those of other New England orchids in their brief duration. The flowers seem to fade rapidly shortly after the sepals and petals expand, and it is very evident that floral perfection is a matter of hours rather than of days. The labellum is a very beautiful object, the brilliant green raised nerves, that traverse the middle longitudinally, forming a striking contrast with the whitish disc which seems to be composed of myriads of tiny crystals in piles of unequal density and depth. Shortly after anthesis the margin of the middle lobe becomes strongly involute, an indication of the passing of floral perfection. The lip of *T. trianthophora* is unlike the lip of its near allies, *Pogonia* and *Isotria*, and is devoid of calli or glands at the extreme base. In the flower the gynostemium or column is the structure of greatest interest, not only because it exhibits weighty characters for purposes of classification, but because it is very unlike the gynostemium of *Pogonia*, *Isotria* and *Cleistis*. At base it is semiterete; near the middle it becomes laterally dilated. The clinandrium has a strongly deflexed margin and is flat or slightly rounded above. (Cf. PLATE 102, figs. 4–6.) The most remarkable structure, however, is exhibited by the anther. This is subcylindrical, blunt at the apex and attached to the body of the column by an unjointed, rigid, semiterete base. From the white body of the anther the flanges of the cells that contain the pollinia extend forward. These are of a rich red-purple color, forming a strong contrast with adjoining tissues and making the structure comparable, when seen

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through a lens, to a ruby set in white enamel. The pollen coheres in masses as shown in the illustration (PLATE 102, fig. 9), and is violet or mauve, a very unusual color for this substance. The pollen tetrads are characterized by a reticulated or pitted extine. (Cf. PLATE 102, fig. 10.) I have observed germination of the pollen tetrads *in situ*. The stigma is extraordinarily long. In fruit the perianth often persists and sometimes is to be observed when the capsules are mature and at the point of dehiscence.

Triphora trianthophora is normally a woodland species occurring in colonies. It exhibits extraordinary periodicity, and in a given locality may be plentiful in one year and then rare or absent for one or more years. Undoubtedly this peculiarity of periodicity is in some way bound up with the phenomena of vegetative reproduction referred to above. My supposition has been that there is a maximum size for the tubers that bear flowering stems, and that when the maximum is reached the tuber dies; or there may be a period during which stolon production by immature stems overbalances flower production. From the plate (PLATE 103), in which the development of small tubers is illustrated, it will be seen that the formation of tubers capable of florification must require at least a growing season, and that a condition might exist in which numerous tubers approached the flowering age without any being present that were ready to produce flower-bearing stems, the mature tubers of preceding years having completed their period of activity.

CANADA

Douglas fide Lindley Genera and Species of Orchidaceous Plants p. 413.

MAINE

BROWNFIELD, *LeRoy Harris Harvey*, 1899.

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NEW HAMPSHIRE

WILTON, *Gray 505*. MEREDITH, *Edward H. Fogg*, August 20, 1904; *F. W. Batchelder*, August 12, 1895. BARTLETT, *W. L. W.*, August 18, 1879. CHOCORUA, *W. G. Farlow*, 1904. Tubers hidden among decaying beech leaves; August 1912; September 1913. INTERVALE, *Miss H. E. Freeman*, August 1905; *Miss Frances C. Prince*; *C. A. Hawes*, August 18, 1901. WIERS, *F. W. Batchelder*, August 18, 1901. ASQUAM LAKE, *A. E. Lownes*, August 2, 1917. In beech woods.

VERMONT

NEWFANE, *Howe*, August 30, 1897. WESTMINSTER, *W. H. Blanchard*, August 16, 1899. PUTNEY, *Blanchard*, August 24, 1899.

CONNECTICUT

GRANBY, *C. H. Bissell*, August 12, 1904. Rich woodland hillside growing in moist humus; *I. Holcomb*, August 8, 1903. In moist woods; *A. W. Driggs*, August 23, 1901. NEW HAVEN, Specimen from Herbarium D. C. Eaton (in Herb. Gray).

NEW YORK

CONQUEST, *L. Griscom & F. P. Metcalf 6263*, August 12, 1916. Rich soil in Botrychium woods, Spring Lake. SYRACUSE, *Miss E. G. Webster*, August 1902. VAUGHN, *S. H. Burnham*, August 1903. OLIVE, *H. M. Denslow*, September 5, 1920. In low woods. WESTERN NEW YORK, *Sartwell*.

NEW JERSEY

CLOSTER, *C. F. Austin*. FORT LEE, *William Bower*.

PENNSYLVANIA

CHESTER COUNTY, *J. Walton, Jr.*

MARYLAND

BRADLEY HILLS PARK, *E. T. Wherry*, August 29, 1920. HERZOG ISLAND, *E. T. Wherry & H. C. Skeels*, August 12, 1916. Low bank of Potomac above the island. PLUMMER'S ISLAND, *C. L. Pollard*, September 22, 1903. GREAT FALLS, Street car terminal, *H. C. Skeels*, August 28, 1916.

VIRGINIA

BEDFORD COUNTY, *A. H. Curtiss*, August 1873.

NORTH CAROLINA

SMOKY MOUNTAINS, *H. C. Beardslee & C. A. Kofoid*, August 18, 1891. Rich damp woods. MOUNT MITCHELL, August 7, 1897. Specimen distributed by

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Biltmore Herbarium (no. 781 b). MOUNT STERLING, *Albert Ruth 430*, August 20, 1897.

SOUTH CAROLINA

SANTEE CANAL, *H. W. Ravenel*, September. Damp shady woods.

FLORIDA

ALABAMA

Peters.

TENNESSEE

BURBANK, *Roland Thaxter*, September 1887. *Wilkinson*.

INDIANA

WHITING'S, *E. J. Hill*, August 6, 1886.

ILLINOIS

E. Hall. URBANA, *H. A. Gleason*, September 1902. Rich woods. CHICAGO. *Moffatt*, September 4, 1897. Tamarac swamp at the head of Lake Michigan. ATHENS, *E. Hall*, 1865.

MICHIGAN

CLARKSVILLE, *I. W. Stacey*, September 1901.

WISCONSIN

MADISON, *William Trelease*, August 13, 1885.

MISSOURI

DUNKLIN COUNTY, *B. T. Bush 131*, September 17, 1893. COURTNEY, *B. T. Bush 1788, 1877*, September 18, 1903. Rare in rich woods. ST. LOUIS, *H. Eggert*, August 5–September 14, 1892. Damp woods.

POGONIA *Juss.*

Pogonia ophioglossoides (*L.*) *Ker-Gawl.* in Bot. Reg. (1816) t. 148. *Arethusa ophioglossoides* *L.* Sp. Pl. 2 (1753) 951.

Pogonia ophioglossoides is too well known to deserve lengthy attention, but its means of vegetative reproduction differ so markedly from those of *Triphora trianthophora* that a detailed description is quite necessary for the purposes of this paper. In this species the rhizome is normally vertical, inconspicuous, and buried from view in deep sphagnum or boggy soil. From the

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vertical rhizome, root-shoots (cf. PLATE 104) extend widely in a nearly horizontal plane and eventually produce new plants. It will be understood at once that in multiplication by means of root-shoots *Pogonia ophioglossoides* is fundamentally different from *Triphora trianthophora* which multiplies by means of true stolons that terminate in tubers.

The secondary stems of *P. ophioglossoides* are usually described as monophyllous, although the bract subtending the flower may be foliaceous and properly regarded as a second leaf. If two or more flowers are produced, an occurrence which is not at all rare in the Southern States, each flower is subtended by a bract.

The flower differs from that of *Triphora trianthophora* in duration and may remain in perfection for several days. At the base of the labellum there are two glands or calli, structures which are present in the tropical species of *Cleistes* and in *Isotria verticillata* and *I. affinis*. (Cf. PLATES 104, 105 and 107.) These glands, as has already been stated, are wanting in *Triphora* which has a very different lip-base, and their absence is still another indication of generic differentiation between this genus and *Pogonia*. The column terminates in a deep clinandrium or excavation, and the anther is hinged in such a way that it is mobile and when in normal position hangs with the pollen cells looking at the floor of the clinandrium, not outward as in *Triphora* and *Psilochilus*. The margin of the clinandrium is toothed. In the structure of the anther, we find one of the most salient generic characters on which to rely in removing *Pogonia* from *Triphora*. The pollen of *Pogonia*, as is shown in the illustration (PLATE 104), differs fundamentally from the pollen of *Cleistes* and *Isotria*. The grains consist of single cells held together by some viscid substance. I have been very much impressed by the constancy of this character in all of the material I have examined, taken from the extremes of

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distribution. Furthermore I have observed that the tendency of the pollen of *Pogonia* to germinate *in situ* is very common, and pollen grains that have germinated within the anther may be observed even in dried material, when the grains are often in masses held together by pollen tubes. I have observed this phenomenon in Asiatic species as well as in our own *P. ophioglossoides*.

There is still another difference in addition to those described that serves to indicate generic distinction between *Pogonia* and *Triphora*; I refer to the behavior of the perianth after anthesis. In *Pogonia*, *Isotria* and *Cleistis* the perianth falls away shortly after the flowering season and is wanting at the time of dehiscence of the capsule. In *Triphora* the perianth persists and may often be found on fruiting specimens at the time dehiscence takes place.

Canada to Florida westward to Minnesota.

ISOTRIA Raf.

Isotria verticillata (Willd.) Raf. in Med. Repos. N. Y. 5 (1808) 357. Helleborine affinis, Planta Mariana, Herbae Paradis facie quinquefoliata. Pluk. Mant. (1700) 101, t. 348. *Arethusa verticillata* Willd. Sp. Pl. 4 (1805) 81. *Odonectis verticillata* Raf. in Med. Repos. 5 (1808) 357. *Pogonia verticillata* Nutt. Gen. 2 (1818) 192. *Arethusa medeoloides* Pursh Flora 2 (1814) 591. *Isotria medeoloides* Raf. Fl. Tellur. 4 (1838) 47.

If *Isotria verticillata* is studied in the field in late April or early May, it will be observed that the flower-bud is just pushing through the protective covering formed by a verticil of closely imbricating leaves. (Cf. PLATE 105, fig. 9.) The leaves at this stage of development closely resemble imbricating bracts and present a condition found in no other species, *I. affinis* excepted, of the *Pogonia* complex.

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Isotria verticillata, like *Pogonia ophioglossoides*, propagates by means of root-shoots. It has a vertical rhizome covered with fuscous pubescence. The root-shoots, in this species, may attain an extraordinary length. (Cf. PLATE 106.) The secondary stems are tubular with a few basal bracts and are terminated by a verticil of from five to six leaves, which at the time of anthesis are very slightly developed and only attain full size when the flowering season is drawing to a close. In the verticil two leaves are superposed. In seedlings (cf. PLATE 106) of this species the earlier stages are characterized by two, three or four leaves, and it would appear that vegetative maturity is not attained in the first two or three years of growth.

The attitude of the flower is characterized by several positions. At first the sepals, petals and lip point toward the zenith. This attitude owes its occurrence to the peculiar type of leaf verna- tion already mentioned. At this stage the upper sepal is bent sharply backward and the leaves are comparatively small, almost bract-like, but as the flower matures and the sepals and petals point toward the horizon, they develop rapidly and in a sur- prisingly brief time increase to their normal size. In a few days the flowers begin to droop, and if pollination has been effected and fertilization secured, the perianth falls away and the capsule assumes a vertical position; if pollination has not resulted in fer- tilization, the perianth together with the pedicel and ovary drops to the ground.

Germination of the pollen before transference to the stigma has been observed in this species, but that self-fertilization is effected by pollen tubes reaching the stigma while the grains are still *in situ* has not been demonstrated. In PLATE 105 a germi- nating tetrad is shown.

Isotria verticillata is a woodland species and is often associated

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with *Medeola virginiana*, a species which at certain stages of growth it resembles so closely, that references to the fact are very numerous. This association is observed not only in the New England States, but as far south as Virginia, and has been reported by Prof. Earle Jerome Grimes from Williamsburg, Virginia, where *Isotria verticillata* prefers soils that are medium acid to methyl red.

If the flower of *I. verticillata* is compared in detail with a flower of *Pogonia ophioglossoides*, it will be found that they differ markedly in the segments of the perianth. In the former the front of the clinandrium is smooth, in the latter it is conspicuously toothed. The differences that may be noticed in the lobing of the lip, in the nature and structure of the keel and in minor structures are specific rather than generic, therefore the weightiest character aside from pollen structure, on which to rely for generic distinction from *Pogonia*, is the verticillate leaves and the behavior of these in vernation.

Westward from New England to Wisconsin and Indiana, southward to Florida. Very much localized where found.

***Isotria affinis* (Aust.) Rydb.** in Britton's Man. (1901) 297. *Pogonia affinis* Aust. ex Gray Man. ed. 5 (1867) 507. *Odonectis affinis* Schltr. in Engl. Bot. Jahrb. 45 (1911) 386.

Isotria affinis, ever since its discovery by C. F. Austin near Closter, New Jersey, has remained a rare species and is very sparingly represented in herbaria. When met with, the plants are reported as being in very much restricted areas where diligent search is rewarded by the discovery of very few specimens. In June 1920, the range of the species was extended southward to Virginia by Prof. Earle Jerome Grimes, who discovered a colony one and one-half miles southwest of Williamsburg. Prof. Grimes describes the locality where his specimens were observed as a flat,

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dry hardwood on a gently undulating interstream area, the soil well drained, composed of a gray, fine sandy loam over a yellowish sandy-clay or clay. The woodland consisted of white oak, beech, tulip and chestnut trees, with a few scattering loblolly pines and an abundance of flowering dogwood. Here the undergrowth was sparse and the *Isotria* specimens were scattered over an area of about ten acres, occurring either singly or in open groups of from two to four plants. A composite soil sample of the habitat was tested and found practically neutral to Brom Thymol Blue, and soil shaken from the roots gave approximately the same reaction.

When we attempt to assemble data relative to *Isotria affinis*, we find ourselves in a well-nigh hopeless situation. In our largest herbaria there are but few sheets of this species; sometimes only a photograph rewards a search for specimens. When material is found, the plants are usually incomplete and inadequate for a thoroughgoing study, and examination of the flowers is precluded by the likelihood of damage being done when dissections are attempted. Now and again new stations are reported that it is hoped will relieve the situation, but investigation usually proves that some overzealous novice has confused *Isotria verticillata* with *I. affinis*. Those who have actually found *I. affinis* are among the favored few.

The following notes on the floral structure of *Isotria affinis* were taken from Virginian specimens supplied by Prof. Grimes. (PLATE 107.) Lip three-lobed as in *I. verticillata*, but the nerves of the lateral lobes irregularly thickened, resembling somewhat the streams of tallow that flow down the sides of a lighted candle. The elevated callus that extends from the base to about the middle of the disc is widely and shallowly grooved, and at the tip terminates in blunt, elongated, wart-like processes that stand

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erect on the middle nerves. The upper half of the middle lobe is free from calli. The most apparent difference between *I. affinis* and *I. verticillata* is found in the sepals. These are not elongated and resemble very closely the sepals of *Pogonia ophioglossoides*.

The plate of *Isotria affinis* (PLATE 107) shows two specimens the roots of which deserve close attention. One of the plants is apparently seven years old, with a root system that exhibits very little similarity to that of *I. verticillata*. The other specimen is a younger plant and appears to be blooming for the second time. The roots of this specimen were intact, each one being provided with a growing tip. Although in such limited material it would be indiscreet to attempt definitive characterizations, it is well worth while to suggest that the development of root-shoots is either rare or wanting in *Isotria affinis*. Prof. Grimes's account of the distribution of the plants he observed would lead one to believe that this species does not exhibit vegetative peculiarities that are comparable to those that characterize *I. verticillata*. An examination of the roots revealed the presence of mycorrhizal fungi in the cortical cells.

It is noteworthy that *Isotria affinis* frequently bears two flowers. It is not at all rare to find two capsules terminating the stems from the base of which a single flowered growth has sprung.

VERMONT

BURLINGTON, *Mrs. Henry Holt*, June 1901.

MASSACHUSETTS

MOUNT HOLYOKE RANGE, East Hadley, *H. L. Clark*, May 31, 1899.

CONNECTICUT

NEW HAVEN, *Edw. Duna*. LEDYARD, *B. J. Avery, Jr.*, June 3, 1909. Rather heavy, moist soil in woods. STRATFORD, *C. K. Averill*, October 6, 1891 (in fruit). In cool moist woods under beeches; *E. H. Eames & C. K. Averill*, June 3, 1892. In cool moist woods under beeches, all aerial parts glaucous

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in this species. Root system deep, distinct. WATERFORD, *Mrs. F. S. Button*, 1913. Small clearing in rich woods with *Cypripedium acaule*; Brown's Meadow, *Miss Florence Griswold*, June 1, 1913.

NEW YORK

LONG ISLAND, Hempstead, *Miss Harriet Mulford*, May 25, 1918.

NEW JERSEY

CLOSTER, *C. F. Austin*, 1858. This station exterminated by 1873. Reported from Norwood and Trenton.

PENNSYLVANIA

WESTTOWN, *Edith Cheney*, June 1, 1887. Reported from Monroe County, Water Gap, and from Berks and Philadelphia Counties.

VIRGINIA

WILLIAMSBURG, *E. Jerome Grimes 2637*, June 1, 1920. In high flat, dry open oak woods, in sandy soil; *Grimes 3555*, May 9, 1921. Flat white oak woods. Sandy soil and neutral.

CLEISTES *L. C. Rich.*

Cleistes divaricata (*L.*) *Ames comb. nov.* *Arethusa divaricata* *L.* Sp. Pl. 2 (1753) 951. *Pogonia divaricata* *R. Br.* in Ait. Hort. Kew ed. 2, 5 (1813) 203.

The last species for consideration is the *Pogonia divaricata* of the Manual. This is southern in its distribution, but reaches as far north as the pine barrens of New Jersey. It agrees vegetatively with *Pogonia* and *Isotria*, but seems to have more in common with the neotropical species that have been referred to *Cleistes*, and should, if my views are adopted, be included in that genus. Although it has been placed in *Pogonia* by all modern authors, it would seem that the characters emphasized in the key remove it clearly from that genus.

It is worthy of note that *Isotria* antedates *Cleistes*, and that should *Cleistes* not be taken up, the neotropical species that are not members of *Triphora* or *Psilochilus* would properly become members of the genus *Isotria*. (PLATE 108.)

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NEW JERSEY

QUAKER BRIDGE, *William H. Leggett*, July 7, 1864.

DELAWARE

ELLENDALE, *Bayard Long*, June 23, 1909.

NORTH CAROLINA

TABLE ROCK MOUNTAIN, *J. K. Small & A. A. Heller 285*, July 2, 1891.

BURKE, *M. A. Curtiss*. HICKORY, *A. A. Heller*, June 23, 1893. 1800 feet altitude. HOT SPRINGS, *J. R. Churchill*, June 9, 1899.

SOUTH CAROLINA

SANTEE CANAL, *H. W. Ravenel*, May. SUMMERVILLE, *Dr. Janet Perkins*, April 29–May 10, 1918; SAVANNAS, May 24, 1853. (EX HERB. A. C. HEXAMER & F. H. MAIER.) BLUFFTON, *W. H. Mellichamp*, 1886.

GEORGIA

THOMASVILLE, *Mrs. Augustus P. Taylor*, May 1902. Bogs and swamps; *Waite & Vasey*, June 1889. BULLOCK, *R. M. Harper 883*, June 11, 1901.

ALABAMA

MOBILE COUNTY, *W. S. Dukes*, May 1905.

FLORIDA

APALACHICOLA, May 1896. Distribution of duplicates of the Chapman Herbarium (no. 780 b). PALATKA, *William M. Canby*, April 1869. ARLINGTON RIVER, *G. Brown Goode*, Summer, 1872. JACKSONVILLE, *A. H. Curtiss 2796*, May. SOUTH JACKSONVILLE, *J. R. Churchill*, April 17, 1897.

SUMMARY

IF, now, we sum up the salient characters relied on for the conclusions arrived at in the foregoing pages, we find, with regard to the species of the northeastern United States, that the pollinia furnish characters of great importance and give three groups of species. *Pogonia* is first set aside by means of simple pollen grains. The remaining groups have the pollen cohering in tetrads. *Triphora* comes out because of the reticulated pollen grains and rigidly attached anther, and is sharply differentiated from its allies by means of its vegetative peculiarities and differ-

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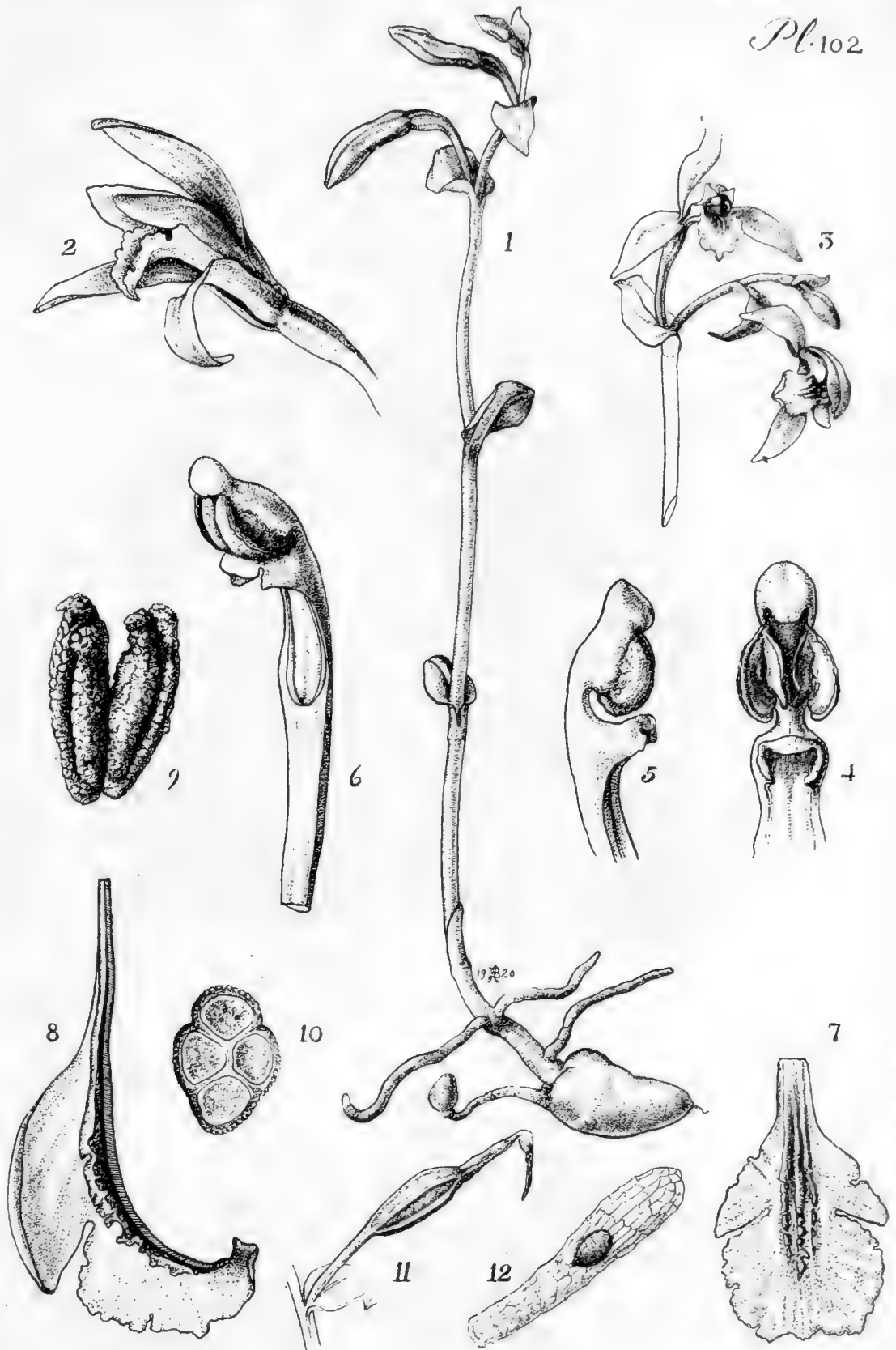
ent lip-base. *Isotria* and *Cleistes*, characterized in part by the unpitted extine of the pollen, remain. They are separated from each other by means of the foliage, *Isotria* having five or six leaves disposed in verticils, while in *Cleistes* the leaves are solitary or alternate. The verticils of leaves in *Isotria* are of extraordinary interest as they indicate a line of development, that now lacks a parallel in the Orchidaceae, the nearest approach to it being found in the Antarctic *Codonorchis*. It is when we consider the significance of verticillate leaves in the evolution of the orchids that this peculiarity in *Isotria* assumes deep significance in attempts at generic segregation.

PLATE 102

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PLATE 102: *Triphora trianthophora*

1, plant in bud, natural size, drawn from a specimen collected by Irving Holcomb, near Granby, Connecticut, in August 1920. 2, flower ($\times 2$). 3, flowers, natural size from plant shown in f. 1. 4, upper part of column ($\times 8\frac{1}{4}$), pollinia removed. 5, upper part of column, viewed from the side ($\times 8\frac{1}{4}$). 6, column, drawn to exhibit semiterete base, sunken stigma below the deflexed clinandrium and anther in normal position ($\times 6\frac{3}{4}$). 7, labellum, lateral lobes spread out. 8, labellum cut longitudinally in half, one keel removed. 9, pollinia ($\times 13$). 10, pollen tetrad highly magnified, median section, to show pitted extine. 11, capsule and persistent perianth, drawn natural size. 12, seed highly magnified.



TRIPHORA *trianthophora* (Sw) Rydb.

PLATE 103

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PLATE 103: *Triphora trianthophora*

1 and 2, fruiting specimens, drawn natural size, from specimens collected by Irving Holcomb, near Granby, Connecticut, in October 1921. 3, corm and stolons, drawn natural size. 4, young tubers ($\times 2$) showing original point of attachment to a stolon, at the basal end, and illustrating the development of a stolon and minute tuber (lower left), and the formation of a bud from which a stem is about to arise (upper centre). 5, a later stage of development than that shown in f. 4; the stolon has elongated and the tuber has become enlarged. 6, longitudinal section through the middle of the uppermost tuber shown in f. 5 (semi-diagramatic).

TRIPHORA
trianthophora
(Sw) Rydb.

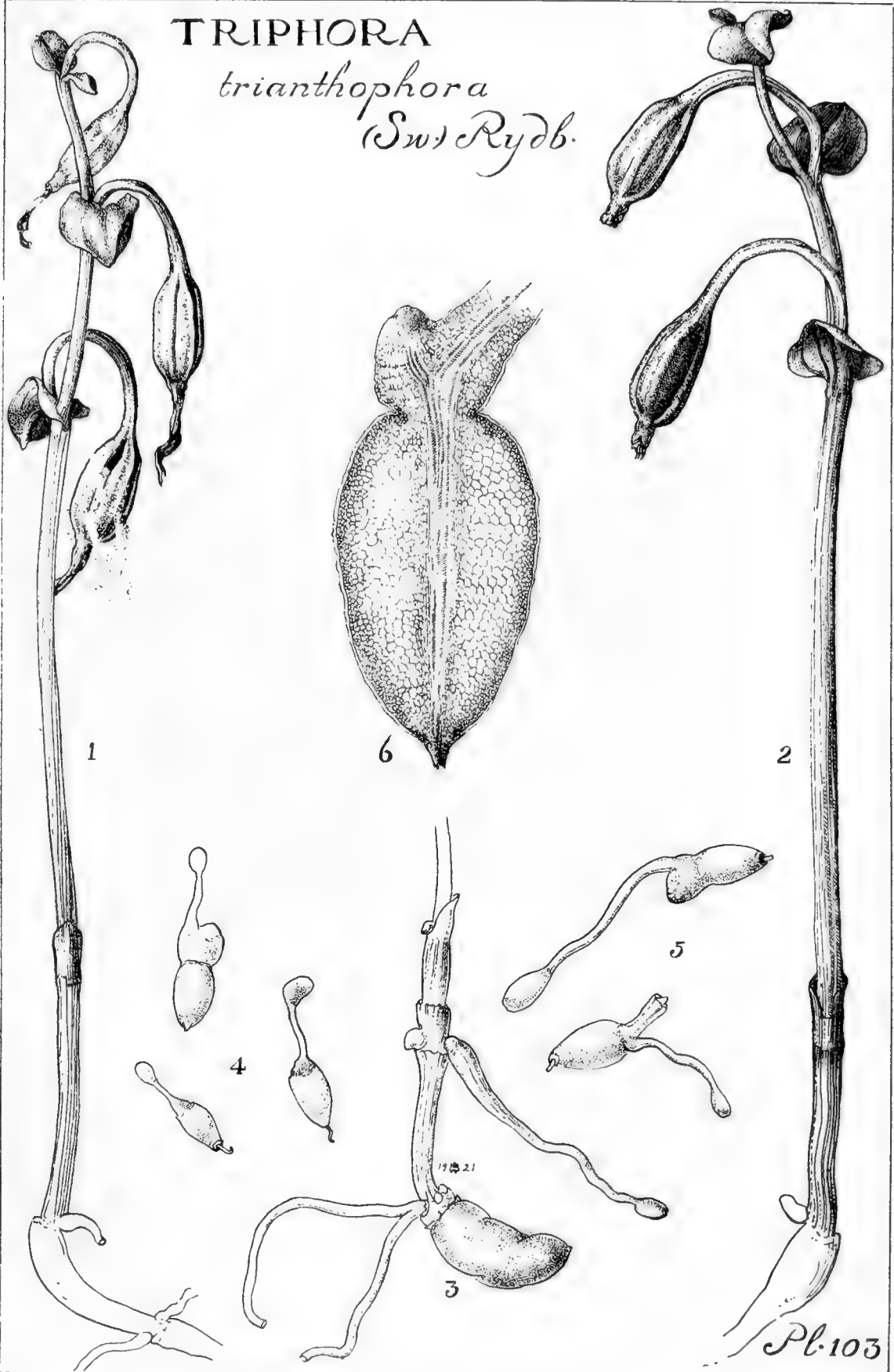


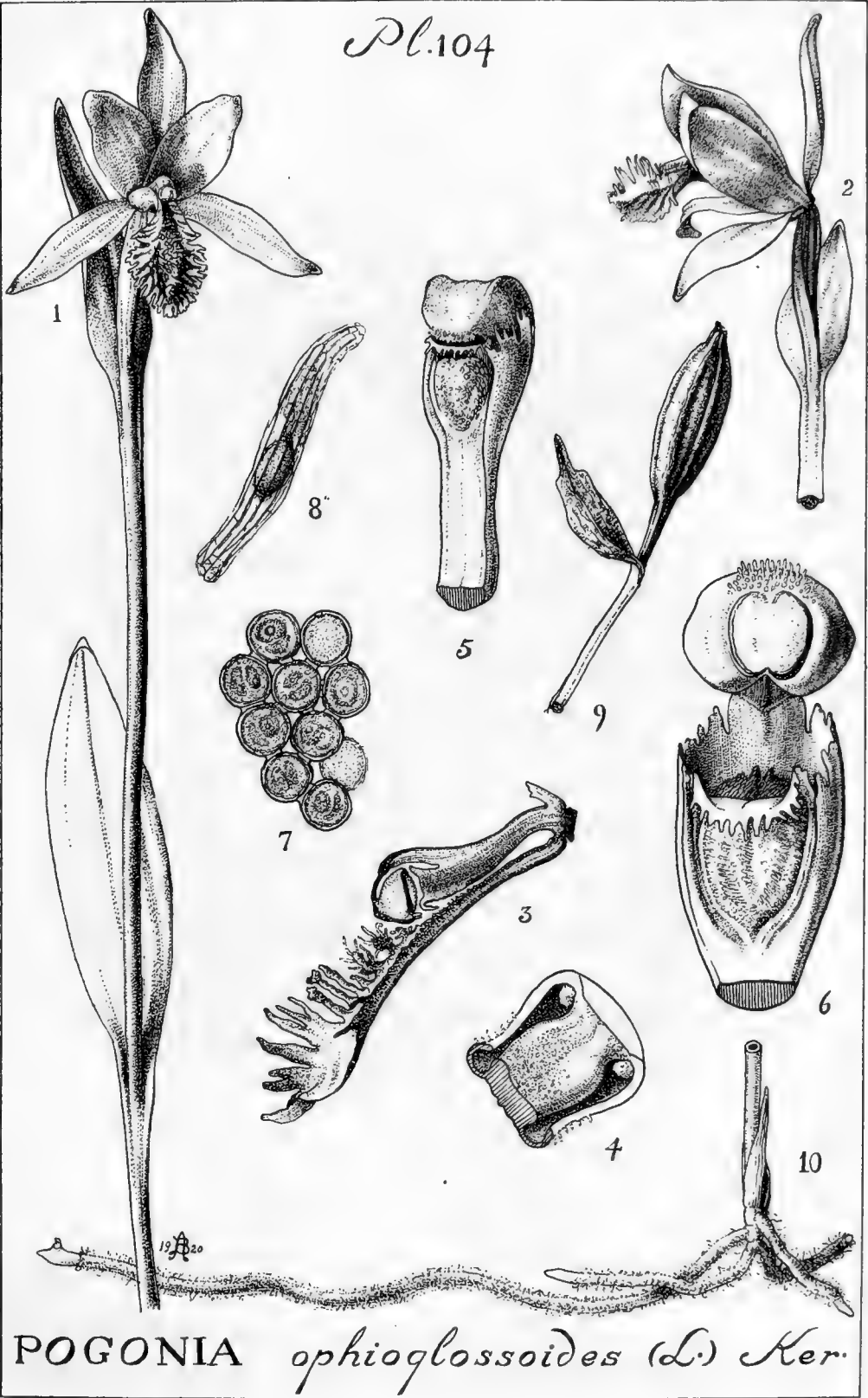
PLATE 104

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PLATE 104: *Pogonia ophioglossoides*

1, plant natural size, rooting base shown by f. 10, drawn from a specimen collected in North Easton, Massachusetts, in June 1921. 2, flower, natural size, from plant shown in f. 1, viewed from the side. 3, section taken from lip and column, made longitudinally through the centre, to show the structure of the median keel, and the position of the anther in relation to the clinandrium (the projection above at base of column represents the base of the upper sepal) ($\times 2\frac{1}{2}$). 4, base of lip, drawn to show glands, one on each side, at the base of the lip ($\times 5\frac{1}{4}$). 5, column with anther in normal position ($\times 3\frac{3}{4}$). 6, upper part of column, anther turned back ($\times 6\frac{3}{4}$). 7, ten pollen grains highly magnified. 8, seed highly magnified. 9, capsule, drawn natural size. 10, base of stem, showing vertical rhizome, roots and a root-shoot at the end of which may be seen a bud from which a new plant is about to develop (natural size).

Pl. 104



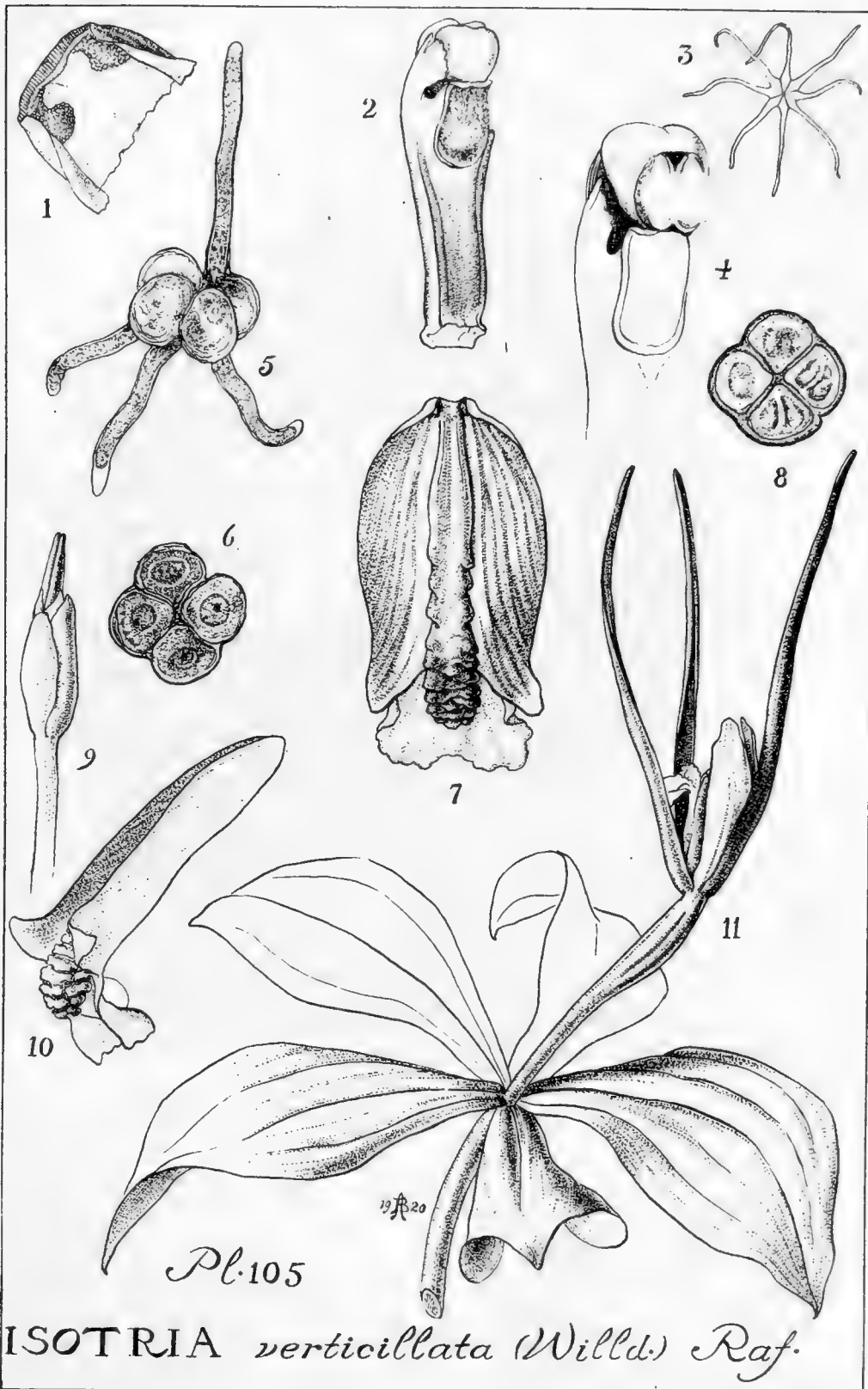
POGONIA *ophioglossoides* (L.) Ker.

PLATE 105

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PLATE 105: *Isotria verticillata*

1, base of lip, drawn to show the glands, one on each side ($\times 7\frac{1}{2}$). 2, column, showing papillose stigma and the anther in normal position ($\times 3$). 3, a stellate trichome highly magnified, usually abundant on the lip in fresh specimens, but easily deciduous. 4, upper part of column with the anther turned back and the mealy pollen exposed. 5, pollen tetrad highly magnified, found germinating *in situ*. 6, pollen tetrad before germination, highly magnified. 7, labellum spread flat, drawn to show the lobulate keel and lateral lobes ($\times 2\frac{1}{4}$). 8, pollen tetrad before germination, highly magnified. 9, flower bud invested by the verticil of leaves, drawn natural size. 10, labellum seen from the side ($\times 2\frac{1}{4}$). 11, flower and leaves, natural size, drawn from a specimen collected near North Easton, Massachusetts, in May 1920, upper sepal in position characteristic of floral maturity. (In younger stages of development the upper sepal is bent sharply backward.)



Pl. 105

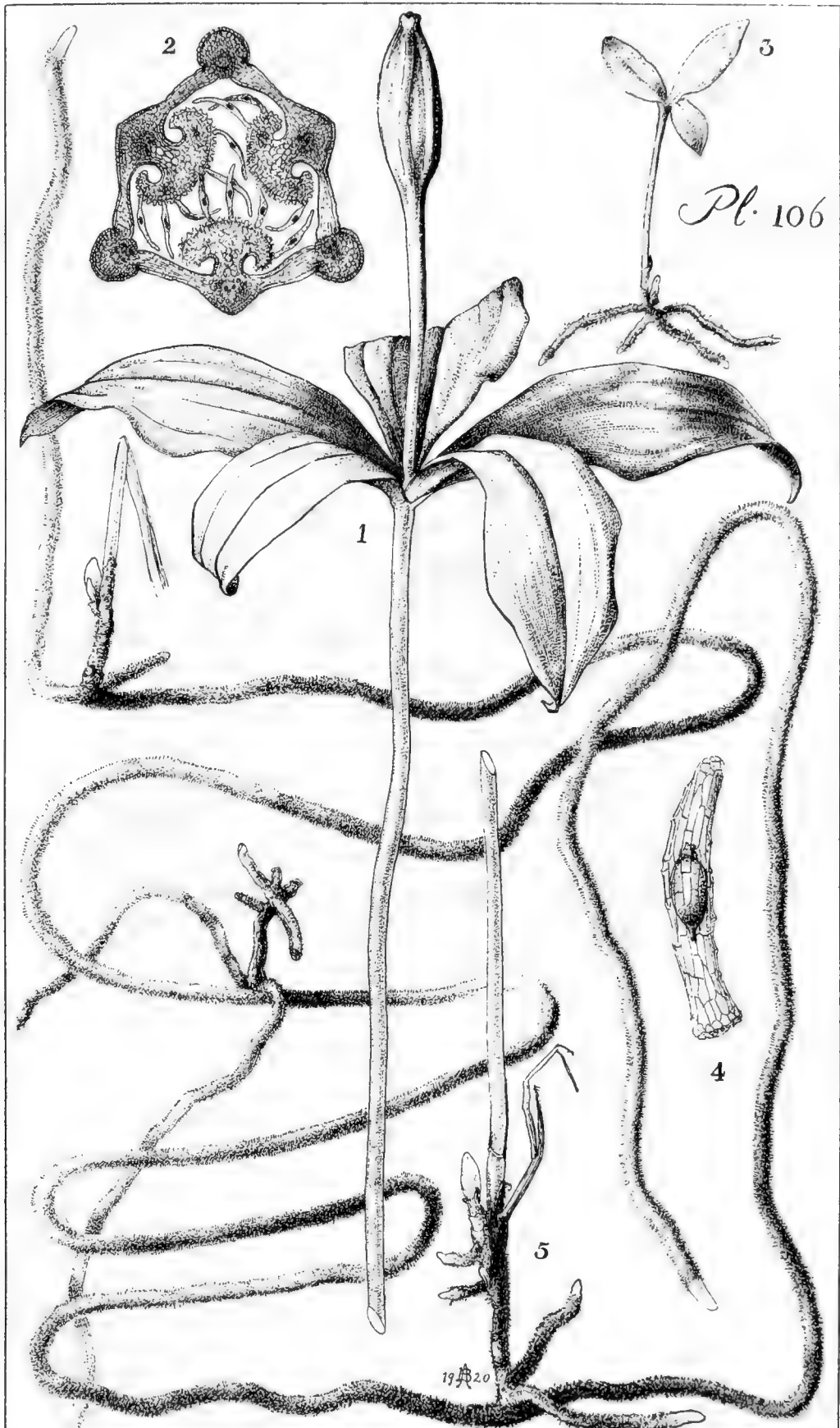
ISOTRIA *verticillata* (Willd.) Raf.

PLATE 106

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PLATE 106: *Isotria verticillata*

1 and 5, fruiting specimen, drawn natural size from a specimen collected near North Easton, Massachusetts, in 1920. 2, transverse section of capsule, magnified. 3, a seedling with complete root system, showing the stage of development characterized by three leaves, drawn natural size. 4, seed highly magnified. 5, lower part of stem, showing vertical rhizome with winter bud near the summit, several roots, and elongated root-shoot bearing the remains of a rooted rhizome and the winter bud and lower part of the stem of another plant, all drawn natural size.



Pl. 106

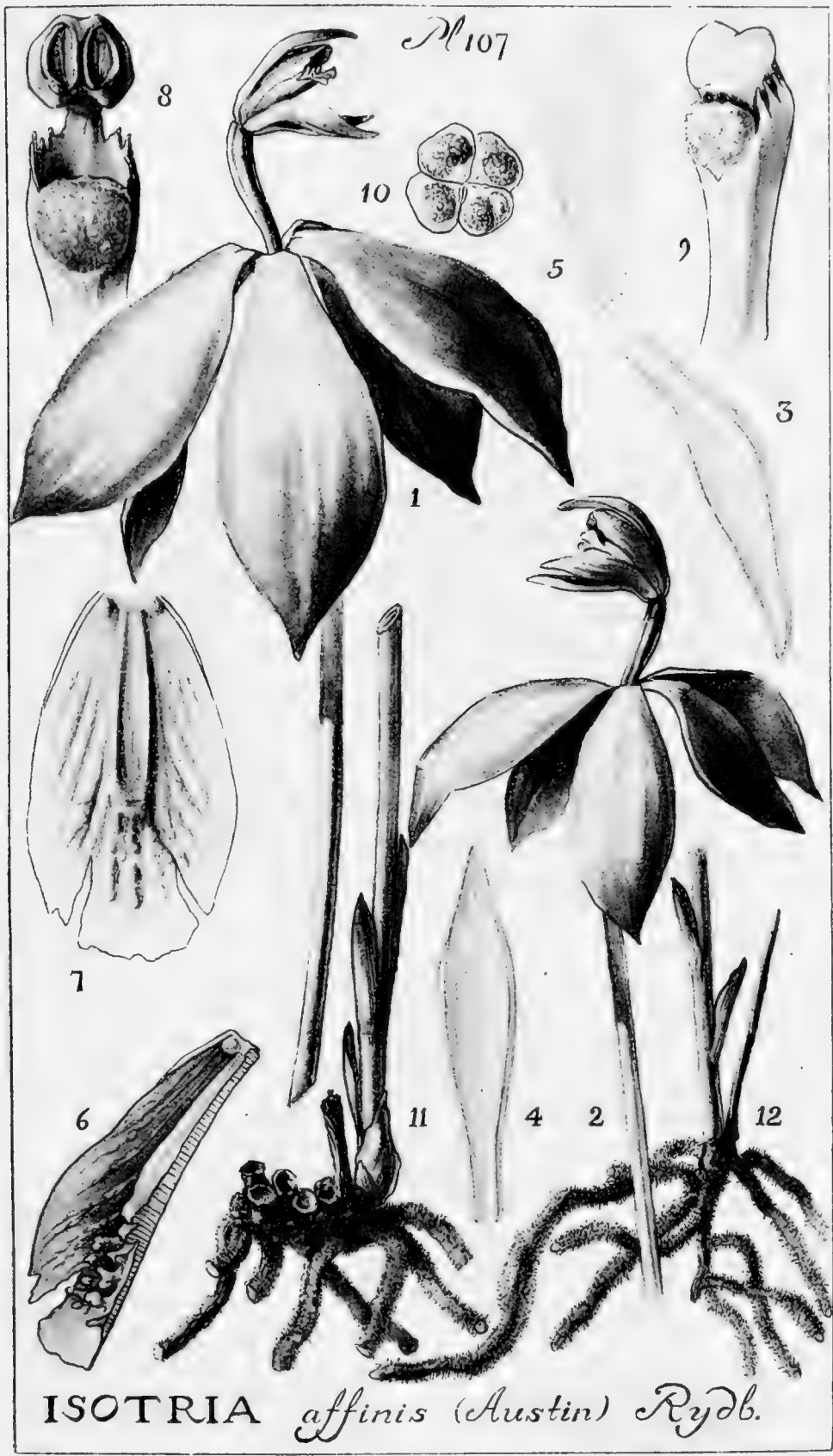
ISOTRIA verticillata (Willd) Raf.

PLATE 107

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PLATE 107: *Isotria affinis*

1, 2, 11 and 12, plant and root system, drawn natural size from material collected by Earle Jerome Grimes, near Williamsburg, Virginia, in May 1921. 3, lateral sepal ($\times 3$). 4, upper sepal ($\times 3$). 5, petal ($\times 3$). 6, lip, one half removed, drawn to show calli ($\times 4$). 7, lip spread out, drawn to show lateral lobes and calli ($\times 4$). 8, summit of column showing stigma, anther turned back, pollen removed. 9, column with anther in normal position. 10, pollen tetrad highly magnified.



ISOTRIA *affinis* (Austin) Rydb.

PLATE 108

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PLATE 108: *Cleistes divaricata*

1, 2 and 3, plant natural size, drawn from specimens collected by Mrs. Augustus P. Taylor, near Thomasville, Georgia. 4, petal, natural size. 5, lip spread out, drawn natural size. (In a series of specimens the margin of the triangular apical part of the lip, and the terminal part of the crest exhibit a wide range of variation.) 7, rhizome and roots, drawn natural size.

Pl. 108

CLEISTES
divaricata (L.)
Ames



NOTES ON MEXICAN SPECIES OF TRIPHORA

Triphora yucatanensis *Ames sp. nov.* Herba terrestris tenera plus minusve 10 cm. alta, caudice subterraneo simplice scapo continuo perpendiculari e tuberi carnosio, ovoideo enato. Tuber intra terram alte sepultum, potius parvum, plus minusve 1.5 cm. longum. Caulis erectus, in speciminibus nostris tri- ad quadrifoliatus, glaber, inferne squamis binis ternisve brevibus cinctus, internodiis 1.5 cm. longis. Folia 1–1.7 cm. longa, 5–15 mm. lata, inferiora late ovata, acuta, superiora lanceolata, acuta, membranacea, glabra, in sicco atroviridia, sessilia, amplexicaulia. Flores in apice scapi plerumque duo vel tres, alterni, raro solitarii, pedicellati, ut videtur erecti, vix nutantes, pallide rosei, 9 mm. longi, vix contemporanei. Bractee inflorescentiae foliaceae, plus minusve 5 mm. longae, ovato-lanceolatae, patentes. Ovarium lineari-fusiforme, rectum, obtuse trigonum. Sepala lateralia 8 mm. longa, trans medium 1.5 mm. lata, oblonga, subacuta, ad apicem minute cucullata, prope apicem valde incrassata, extus per medium usque ad apicem conspicue carinata, subpatentia. Sepalum dorsale 9 mm. longum, valde concavum, cymbiforme, ad apicem minute cucullatum, extus per medium usque ad apicem prominenter carinatum. Petala membranacea plus minusve 8.5 mm. longa, trans medium 1 mm. lata, oblonga, apice rotundato-obtusa, trinervia, erecta. Labellum trilobatum, 7 mm. longum, in basi gynostemii sine articulatione insertum, basi in unguem oblongum vix cuneatum leviter concavum angustatum, disco tricarinato e basi usque ad medium, carinis parallelis, carina intermedia multo reducta et abbreviata; lobi laterales 1 mm. lati, rotundati; lobus medius vix 3 mm. longus, plus minusve 2 mm. latus, oblongus, margine lacerato-dentato, ad apicem leviter re-

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tusus; discus muriculis sparsis ornatus. Columna omnino 6 mm. longa, clavata, sectioni propria. Anthera rigida, erecta, apiculata, 1.75 mm. longa. Massae polliniae ut in *T. trianthophora*.

The new species of *Triphora* described above was collected in Yucatan by G. F. Gaumer. The type preserved in the herbarium of the Field Museum of Natural History is composed of two plants, one in fruit, the other in flower. Originally this material was identified as *Pogonia mexicana* Wats. var. (a species now referred to *Triphora*), on the authority of Dr. Rudolf Schlechter of Berlin. From *T. mexicana* (Wats.) Schltr. the Yucatan species is widely separated by the oblong, denticulate middle lobe of the labellum and by the complanate-muriciform appendages that occur sparsely on the three middle nerves above the basal keels. The type of *T. mexicana* has a differently formed labellum, the middle lobe being cordate or subdeltoid rather than oblong and the claw more cuneate, while the ecarinate part of the disc-nerves lacks muriciform appendages. It is true that *T. mexicana* closely resembles *T. yucatanensis* and might readily be mistaken for it in the absence of flowers. (PLATE 109.)

YUCATAN, sine loco exactiore, *Gaumer 1008*. Floret Novembri.

Triphora mexicana (Wats.) Schltr. in Fedde Repert. 17 (1921) 139. *Pogonia mexicana* Wats. in Proc. Am. Acad. 26 (1891) 154.

Pogonia mexicana Wats., now referred to *Triphora* by Schlechter, was originally described from very poor material gathered by Pringle in the State of San Luis Potosi, Mexico. The type consists of four plants, none of which is satisfactory for critical examination. Indeed, it would seem that Pringle collected his specimens at a time when the flowers were passing their prime. The only clue to the floral characters is contained in a carefully

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preserved labellum that was mounted on a small square of stiff paper and protected by a coating of some varnish-like substance. It is presumable that this labellum was saved by Watson from among his dissections at the time the species was described. The type was collected in August 1890 in the Tamasopo Cañon, and in the following year from the same locality Pringle secured material which was in full flower in July.¹ Although the plants of the second collection are taller and more robust than the plants of the first collection, they seem to represent *Triphora mexicana* and to furnish evidence to the effect that the species when well developed is very similar in habit to the northern *Triphora trianthophora*.

The labellum of *Triphora mexicana* as exhibited by the type seems to have had three green keels that extend to about the middle, the central one exceeding the lateral ones in length. There appear to be no flattened papillae on the central nerves, but in other Mexican material that I have examined, presumably referable to *T. mexicana*, the middle nerves break up into a few complanate processes and vanish toward the lower part of the middle lobe in tiny complanate emergences and minute papillae that extend almost to the apex of the middle lobe. If such emergences occurred on the labellum of the type, it is plausible to suppose that they were obliterated by the fusing of the tissues under pressure and by the action of the preservative coating already referred to. The lip is 1 cm. long, the middle lobe 4 mm. wide across the broad base; the lateral lobes are 1 mm. wide. In moistened material of specimens that I have identified as *T. mexicana*, the measurements slightly exceed those given for the type, but if due allowance is made for shrinkage in dried

¹ It would seem that specimens of this second collection were distributed with labels that gave the name as *Pogonia mexicana* Wats. n. sp.

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material, the discrepancies noted are mechanical rather than botanical and should not be taken as seriously affecting the situation. (PLATE 109.)

MEXICO, State of San Luis Potosi, Tamasopo Cañon, *C. G. Pringle 3557*, August 5, 1890; *Pringle 3787*, July 17, 1891, from the same locality is also referred to the species.

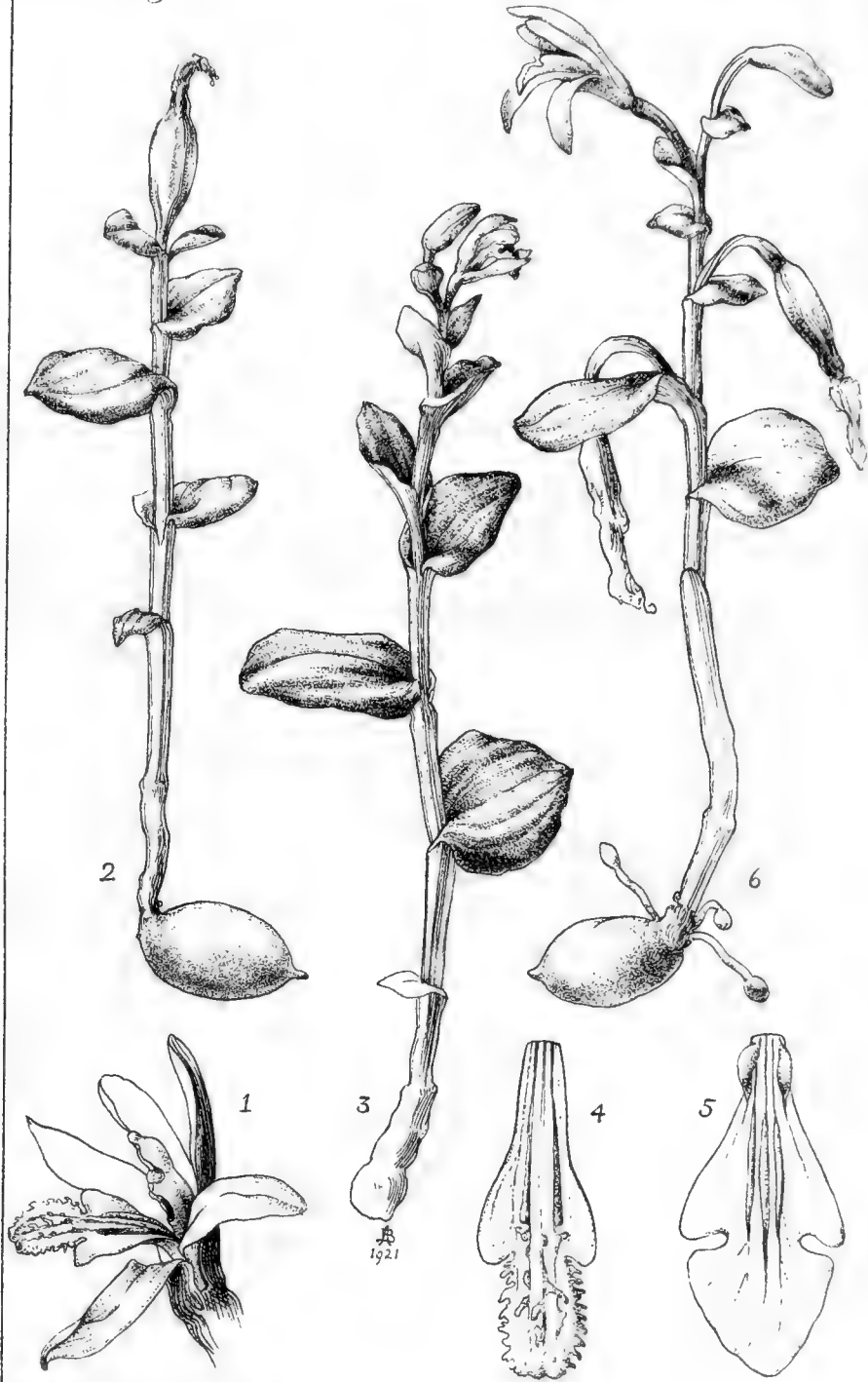
PLATE 109

ORCHIDACEÆ

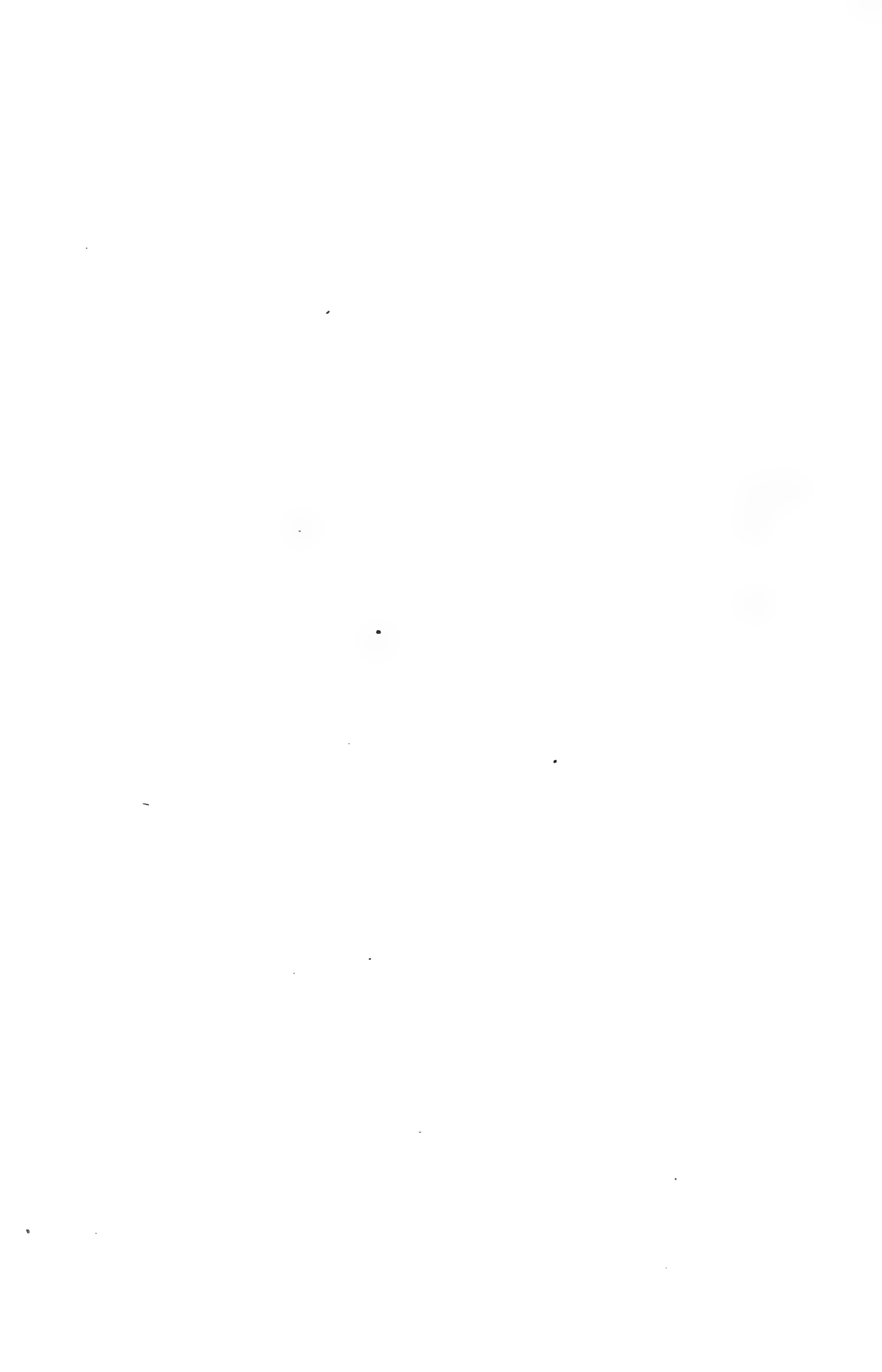
PLATE 109

Triphora yucatanensis. 1, flower enlarged. 2 and 3, plant natural size, drawn from the type preserved in the Herbarium of the Field Museum of Natural History, Chicago, Illinois. 4, labellum enlarged, drawn to show keels and appendages.

Triphora mexicana. 5, labellum enlarged, drawn from the type preserved in the Gray Herbarium, Harvard University. 6, plant natural size, drawn from the type.



TRIPHORA *yucatanensis* Ames



A TRIANDROUS FORM OF *PSILOCHILUS* *MACROPHYLLUS*

Psilochilus macrophyllus (*Lindl.*) *Ames comb. nov.* *Pogonia macrophylla Lindl.* in *Ann. & Mag. Nat. Hist. ser. 3, 1* (1858) 335. *Pogonia physurifolia Reichb. f.* in *Nederl. Kruidk. Arch. 4* (1858) 324.

Among the specimens of *Psilochilus macrophyllus* from Grenada, B. W. I. a single plant was found in which the gynostemium was triandrous in a very interesting way, the supplementary anthers being lateral, one on each side near the base of the stigma. These supplementary anthers probably represent normally suppressed members of the outer androecial whorl, which often occur as staminodia in species of *Orchis*, *Habenaria*, etc. When in natural position the anther cells face inward toward the stigma and conceal it. Each anther is supplied by a vascular strand that continues into it as a median nerve. The pollen masses taken from the supplementary anthers consist of tetrads that appear to be quite normal, the extine exhibiting the reticulations or pits found in the pollen of normal anther cells of the species. Aside from the abnormal condition of the gynostemium the flowers examined appeared to be perfectly normal.

As far as I have been able to ascertain, a triandrous condition in *Psilochilus macrophyllus* has not previously been recorded. (PLATE 110.)

GRENADA, B. W. I., Azima Mountain, *W. E. Broadway*, November 18, 1905. Woods, in damp flat ground. (Herb. Ames 7724.)

PLATE 110

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PLATE 110: *Psilochilus macrophyllus*

Plant natural size, drawn from a specimen preserved in the Herbarium of Oakes Ames, collected by W. E. Broadway, in Grenada, British West Indies. 1, flower ($\times 2$). 2, column drawn to show supplementary anthers ($\times 4$). 3, lip spread out ($\times 4$). 4, supplementary anthers. 5, pollen tetrad showing pitted extine.

Pl 110



PSILOCHILUS

macrophyllus (Lindl.) Ames

STUDIES OF OTOSTYLIS BRACHYSTALIX

AND THE SPECIES WITH WHICH IT HAS BEEN CONFUSED

Otostylis brachystalix (*Reichb. f.*) *Schltr.* in *Orchis* 12 (1918) 39, 40, t. 5. *Zygopetalum brachystalix* *Reichb. f.* in *Walp. Ann.* 6 (1861) 660. *Cyrtopodium cristatum* *Griseb.* *Fl. Brit. W. Ind.* (1864) 630, non *Lindl.* *Cyrtopodium Grisebachii* *Rolfe* ex *Patter* in *Orch. Rev.* 3 (1895) 276. *Cyrtopodium cristatum* *Cogn.* in *Urb. Symb. Antill.* 6 (1910) 579 in part as to *Broadway 2336*, exclude *Broadway 2343*. *Aganisia brachystalix* *Rolfe* in *Orch. Rev.* 22 (1914) 200. *Koellensteinia brachystalix* *Schltr.* in *Orchis* 9 (1915) 31, 32.

Otostylis brachystalix has had a remarkable history and has given rise to an extraordinary synonymy. It was originally collected in the Aripo Savannah of Trinidad and described by H. G. Reichenbach in 1861 as *Zygopetalum brachystalix*. In recent times it has been confused with *Cyrtopodium cristatum* *Lindl.*, a species originally collected by Schomburgk in British Guiana. In fact *Cogniaux* in *Symbolae Antillanae* among the specimens cited under *Cyrtopodium cristatum* included number 2336 of W. E. Broadway's collections, which is referable to *Otostylis brachystalix*.

In 1895, in a brief account of Trinidad orchids, *Patter* referred to a very beautiful white flowered plant with a lemon yellow crest on the lip under the name *Cyrtopodium Grisebachii* *Rolfe*. It would seem that this name was never properly published by *Rolfe* and depends wholly on *Patter's* citation. In 1914 *Rolfe* studied material of this species from Trinidad and detected its affinity with orchids of the *Zygopetaleae*. He suggested that the species represented *Zygopetalum brachystalix* *Reichb. f.* As the characters are not in conformity with *Zygopetalum* as now interpreted,

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Rolfe referred the species to *Aganisia* and made the combination *Aganisia brachystalix*. At this point in the history of the species Rudolf Schlechter of Berlin studied it and concluded that it belonged to *Koellensteinia*. He made the new combination *K. brachystalix*. This was in 1915. In 1918 Schlechter's treatment of *Aganisia* and allied genera appeared and *Koellensteinia brachystalix* was therein referred to a new genus under the name *Otostylis brachystalix*.

This, briefly, is the history of the Trinidad plant that has passed as a white flowered form of *Cyrtopodium cristatum* Lindl.

Stems very short, about 2 cm. long, somewhat obpyriform, concealed by long bracts and by the sheathing bases of the equitant rather stiff and leathery leaves. Leaves four or more, up to 7 dm. long, 1–4 cm. wide, ligulate-lanceolate, acuminate, acute, tapering gradually toward the base and passing by imperceptible gradation into elongated, winged petioles that sheath the short stems, prominently three-nerved beneath, many nerved, obliquely ascending, erect in the new growths. Scape wand-like, from the base of a new growth of closely equitant leaves and flowering before the growth is completed, provided below the raceme with several tubular bracts that are about 1 cm. long and at intervals of 1 dm. more or less. Raceme simple, strict, up to 2 dm. long, bearing fifteen or more showy white flowers. Bracts of the inflorescence shorter than the pedicels, 5 mm. long, strongly concave, lanceolate, acute. Pedicel with the ovary about 16 mm. long, ascending obliquely. Flowers about 2.5 cm. across when spread out. Lateral sepals elliptical, 1.3 cm. long, 8 mm. wide, rather fleshy, main nerves seven in number. Upper sepal similar. Petals 1.2 cm. long, 6 mm. wide near the middle, spathulate, obtuse, main nerves five. Labellum 9 mm. long, inserted under the tip of the foot of the column, strongly concave at the base, three-

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lobed, the lateral lobes reduced to auricles, middle lobe 7 mm. long, about equally broad, suborbicular, apiculate, margin entire. Between the lateral lobes and uniting them in such a manner as to form a deep pocket in front of the column, there is a complex carunculated crest which passes into three short prominent keels at the base of the middle lobe and follows the course of the three middle nerves, otherwise the disc of the labellum is naked. Column 5 mm. long to the base of the upper sepal, produced into a fleshy foot about 3 mm. long, broadly bialate at the summit, the wings 2.5 mm. long by 2 mm. wide; rostellum produced into an awl-shaped deflexed process. Anther two-celled, attached to the fleshy, triangular termination of the back of the column. Pollen masses two, in dried material readily disintegrating into tetrads; viscid disc elliptical. (PLATE 111.)

TRINIDAD, B. W. I., Aripo Savannah, *W. E. Broadway* 2336, April 16, 1908. Flowers white. Grows under the shade of trees on the outskirts of the Savannah. A very beautiful terrestrial. No pseudobulbs; *Britton, Broadway & Hazen* 295, March 5, 1920. Grassy plains.

My studies of *Otostylis brachystalix* led to a close examination of the plant that has passed unchallenged as *Cyrtopodium cristatum* Lindl. among Trinidad species. It is a true *Cyrtopodium* characterized by small flowers that are usually borne in simple racemes. When this species is compared closely with the type of *Cyrtopodium cristatum* collected in British Guiana by Schomburgk it becomes very apparent that the Trinidad species is quite distinct from it. As far as I have been able to ascertain it is a new species and for it I propose the name *Cyrtopodium Broadwayi*.

***Cyrtopodium Broadwayi* Ames sp. nov.** Pseudobulbi fusiformi-subcylindranei foliis coriaceis, linearibus, acutissimis. Scapus satis gracilis, plus minusve ramosus vel simplex, superne

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multiflorus, bracteis membranaceis, ovato-lanceolatis, setaceo-acuminatis. Flores purpureo-fusci et flavo-variegati. Pedicelli graciles. Sepala lateralia ovato-lanceolata, acuta, leviter undulata. Sepalum dorsale simile. Petala elliptico-ovata apice rotundata et minute apiculata. Labellum trilobatum, anguste longaque unguiculatum; lobi laterales erecti late falcati, ad apicem rotundati; lobus medius prope basim quadratus, superne dilatatus, late retusus; discus inter lobos laterales crista oblonga carnosae quadrilobata ornatus. Columna clavata, crassa, exalata.

Roots rather coarse, whitish in dried specimens, smooth. Pseudobulbs erect, 5–8 cm. long, ± 1.5 cm. in diameter below the middle, in dried specimens much wrinkled and with yellowish brown annulae at the five to eight points at which the leaves were borne, the fibrous remains of the leaves persistent. Leaves ± 1.5 dm. long, ± 5 mm. wide at flowering time, ± 4.5 dm. long, ± 1.5 cm. wide when mature, erect, coriaceous, many nerved, linear, acute, apiculate, soon surpassed by the elongated scape with which they arise from the base of a mature and defoliated pseudobulb, middle nerve prominent beneath. Scape ± 4 dm. tall, erect, with a few scattered bracts below the raceme, the bracts ample, the lowermost one sheathing and obliquely truncate, acute. Raceme ± 1.5 dm. (sometimes exceeding 3 dm.) in length, for the most part simple sometimes branching below, many flowered. Bracts of the raceme about 1.5 cm. long, membranaceous, ovate-lanceolate, acute, a little shorter than the pedicellate ovary. Pedicels slender with the ovary up to 2 cm. long. Flowers about 2 cm. across, sometimes 2.5 cm. across between the tips of the lateral sepals, brownish-purple with yellow spots and blotches. Sepals and petals spreading. Lateral sepals 9–12 mm. long, up to 6 mm. wide, ovate-lanceolate, acute, margins undulate. Petals 8–11 mm. long, ± 7 mm. wide, elliptic-ovate, very slightly clawed, apparently little

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if at all undulated. Labellum three-lobed, suggesting in its form the labellum of *C. punctatum*; lateral lobes ± 6 mm. long, about 3 mm. wide, erect, parallel with the column, rounded at the tip, conspicuously nerved; middle lobe about 5 mm. long, 5 mm. wide at the base, below the middle subquadrate, above the middle dilated, rounded on the distal margin, emarginate, conspicuously nerved; claw about 3.5 mm. long, nearly 2 mm. wide, oblong-cuneate, somewhat canaliculate and traversed longitudinally by raised nerves that terminate in the large lobed crest that is situated on the disc between the lateral lobes. Crest four-lobed. Column 7 mm. long, clavate, exalate, produced into a submembranaceous, mobile, oblong foot which is joined to the claw of the lip. Anther operculate, incumbent. Pollinia four, cohering in pairs.

In the structure of the flower this species shows close affinity with *Cyrtopodium punctatum* Lindl., but is clearly set apart by the smaller proportions of the perianth organs, more slender habit and by the simple, rarely branched, inflorescence. The lateral lobes of the labellum, as far as dried material allows one to judge, assume a different attitude from those of *C. cristatum*, and are not so nearly orbicular. Furthermore the crest is a differentiating character as a glance at the accompanying plate clearly shows. The flowers in dried specimens still retain indications of the reddish-brown maculations and yellow bars and blotches that characterize the species when the flowers are fresh. Unfortunately Lindley did not make any reference to the color of the flowers of *C. cristatum*, and from the specimens I have examined it is not possible to detect any traces of the color that might have prevailed in living material. In the preparation of the plate that illustrates *C. Broadwayi* an attempt has been made to restore the color areas, but due allowance should be made not only for normal variations but for those crudities in restoration that must

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always attend efforts to represent, as it must have been when fresh, a flower that has long been dried. (PLATE 112.)

TRINIDAD, B. W. I., Aripo Savannah, *W. E. Broadway* 2343, April 16, 1908. Flowers reddish brown and yellow.

Cyrtopodium cristatum Lindl. in Bot. Reg. (1841) sub t. 8; in Hook. Lond. Journ. Bot. 2 (1843) 672; Reichb. f. in Walp. Ann. 6 (1861) 667.

To complete the survey of the Trinidad species that have been referred to *C. cristatum* Lindl. it is now proposed to amplify the brief characterization which Lindley published in the Botanical Register for 1841. The remarks that follow are based on material in my herbarium that consists of a few flowers and a very clear tracing taken from Lindley's specimen of Schomburgk's 628 preserved at Kew. For this material and for the opportunity to clear away ambiguity I am indebted to Sir David Prain.

The type specimen of *Cyrtopodium cristatum* was collected by Schomburgk in what is now British Guiana and bears the number 628. Lindley in his list of Schomburgk's orchids, a list which appeared in Bentham's series of contributions toward a Flora of South America, gave the habitat of *C. cristatum* as rocks and trees.

In habit Lindley's type resembles *C. Broadwayi* very closely and might easily be mistaken for it until flowers of the two species are compared side by side; but it is very surprising that it should have been confused with *Otostylis brachystalix*, which has white flowers and short scale-like bracts subtending the pedicels, not to mention the very different lip with much reduced lateral lobes.

Sepals ± 14 mm. long, and about 8 mm. wide, conspicuously nine-nerved in dried specimens, elliptic-ovate, hardly acute, rather fleshy in texture, spreading, with undulate margins. Petals

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13.25 mm. long, 9 mm. wide above the middle, about 3 mm. wide near the base, obovate from a broad cuneate base, rounded at the apex, apparently not undulated on the margin, nine-nerved. Labellum about 1 cm. long, conspicuously three-lobed, with a comparatively short claw, articulated with the column foot, fleshy with coarse nerves. Claw 4 mm. long, 2.5 mm. wide near the middle, oblong, cuneate, five-nerved; lateral lobes 7 mm. long and wide, approximately 4 mm. wide where they join the main body of the lip, erect, partly concealing the column, round-falcate or orbicular, conspicuously nerved; middle lobe 5 mm. long, about 9 mm. wide, traversed longitudinally by about thirteen veins which are conspicuous in dried material, rounded at the apex, not emarginate nor thickened along the edge. Callus on the disc between the lateral lobes tuberculate, corrugated, extending onto the claw, 4 mm. long, 2 mm. wide at the truncated apex. Column fleshy, 6 mm. long to the point of insertion of the upper sepal, produced into a conspicuous foot. Pedicel and ovary 11 mm. long, slender. Flowers in dried material of a deep brown color. Habit as illustrated. (PLATE 113.)

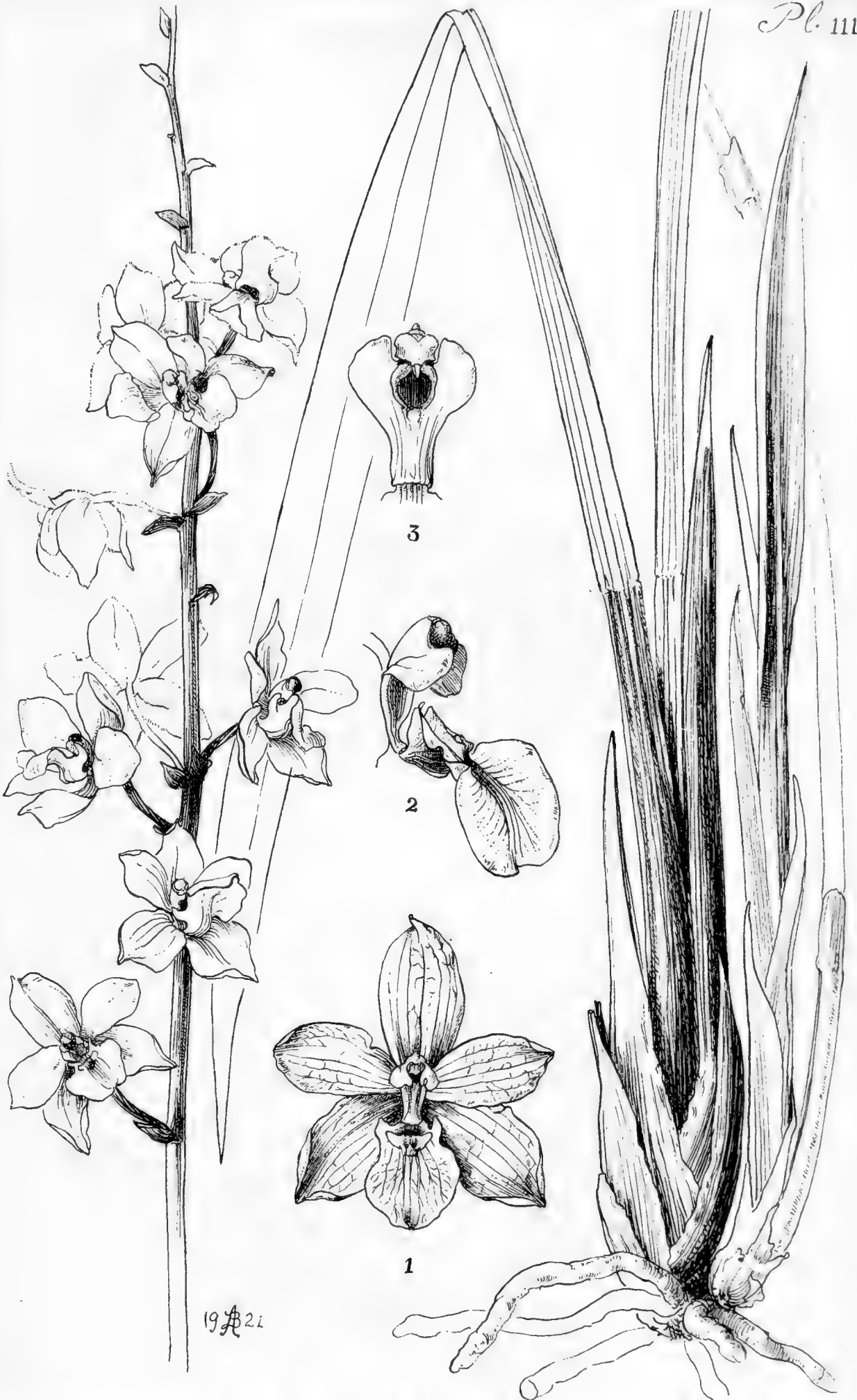
BRITISH GUIANA, *Schomburgk* 628. On rocks and trees.

PLATE 111

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PLATE 111: *Otostylis brachystalix*

Plant and inflorescence natural size, drawn from a specimen preserved in the Herbarium of Oakes Ames, collected by W. E. Broadway in Trinidad, British West Indies. 1, flower enlarged. 2, labellum and column, sepals and petals removed. 3, column enlarged.



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OTOSTYLIS brachystalix (Reichb.f) Schltr.

PLATE 112

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PLATE 112: *Cyrtopodium Broadwayi*

Plant and inflorescence, drawn from specimens preserved in the Herbarium of Oakes Ames, collected by W. E. Broadway, in Trinidad, British West Indies. 1, lip and column as seen from the side, enlarged. 2, flower enlarged, lateral lobes of the labellum spread out.



1



2



CYRTOPODIUM
Broadwayi
Ames

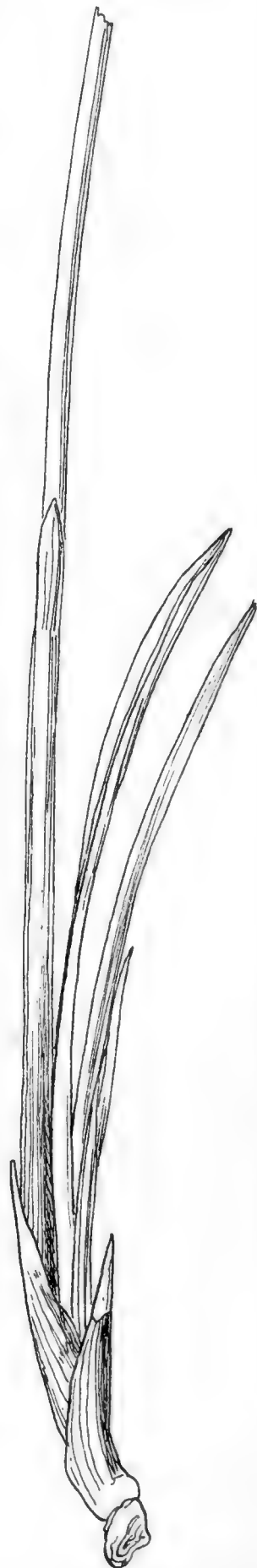
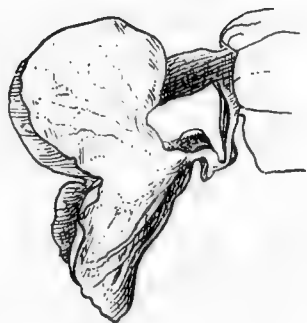
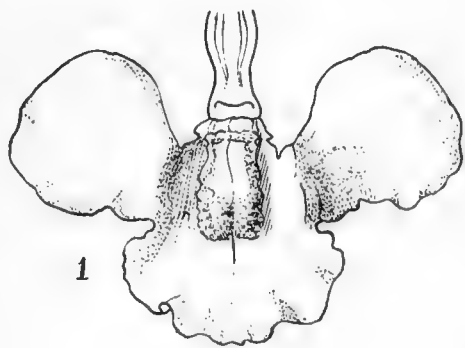
1918 B 21

PLATE 113

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PLATE 113: *Cyrtopodium cristatum*

Plant drawn approximately natural size from a tracing taken from the type preserved in the Lindley Herbarium at Kew, England, collected by R. H. Schomburgk, in British Guiana. 1, 2 and 3, drawn from a flower of Lindley's type preserved in the Herbarium of Oakes Ames. 1, labellum enlarged, lateral lobes spread out. 2, labellum and column enlarged, as seen from the side. 3, flower enlarged, lateral lobes of the labellum spread out.



CYRTOPODIUM
cristatum Lindl.





NOTES ON ERYTHRODES

WITH NOMENCLATORIAL CHANGES AND DESCRIPTIONS OF
THREE NEW SPECIES

THE genus *Erythrodes* founded by Blume and regarded as synonymous with *Physurus* L. C. Rich. has been reestablished as a living name by Fawcett and Rendle because *Physurus* as published by L. C. Richard is a *nomen nudum*.¹

Dr. Rudolf Schlechter in his studies of the group to which *Erythrodes* belongs concluded that the palaeotropical species are clearly distinguished from the neotropical by a bilobed or didymous sac on the labellum. He proposed that Blume's *Erythrodes* should be restricted to the palaeotropical species, the neotropical species being set apart as a distinct genus under *Physurus*.

Fawcett and Rendle in their discussion of the value of a bilobed sac for generic characterization put Schlechter's conclusions aside as in their judgment a bilobed sac is of trivial importance for the separation of the species of this group into distinct genera, and they directed attention to the occasional occurrence of a bilobed sac in the West Indian *Erythrodes plantaginea* Fawc. & Rendle.

Surely a bilobed sac by itself is a very superficial character for purposes of classification and should be disregarded in the definition of genera, unless correlated with other substantial differences. It is a character that is capable of extreme variation in species that exhibit it and may occur as a manifestation of abnormal development in a species which is normally without it. In other words, it is a character that may come and go and is plastic under those influences that govern the production of teratological formations in the orchid flower. Furthermore, the bilobed sac is

¹ *Flora of Jamaica* 1 (1910) 28.

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not restricted to the species of the eastern tropics, as *Erythrodes secunda* Ames, a native of Mexico, has a bilobed sac in the flowers I have examined, and proves that this character is not, as Schlechter would have us believe, geographically limited in the group under consideration. The slightest tendency toward a lobing of the sac demands an arbitrarily fixed limit to guide us as to the point where *Physurus* should end and *Erythrodes* should begin.

In my studies of numerous specimens of *Erythrodes* from the tropics of both hemispheres, I have endeavored to find characters correlated with a conspicuously bilobed sac that would make cleavage possible along geographical lines and point the way to an absolute separation of the palaeotropical from the neotropical species. The gynostemium, however, in which one would expect to find the more conservative structures of the flower, is very similar in all the species examined and exhibits only those variations, such as differences in the length of the anther or rostellar processes, that would naturally be expected and that occur in different species irrespective of their origin. Schlechter concluded that the gynostemium is more slender in the Old World species than in those of the New World, but I have been unable to demonstrate that this difference exists.

It is noteworthy that the carinae, complanate or papilliform calli that occur on the anterior wall of the sac in many species of *Erythrodes* have received very little attention; in fact they have been overlooked or disregarded by systematists who have characterized the genus. Bentham and Hooker failed to mention them in the *Genera Plantarum* and in his work on the orchids for Engler and Prantl's *Das Pflanzenfamilien* Pfitzer used the absence of warts from the interior of the sac as a key character to distinguish this genus from *Queteletia*. The neglect of these structures is altogether surprising because their position on the

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anterior wall of the sac and their form may be seen, in many cases, through the translucent lateral walls. In the separation of critical species I have found that these emergences or thickened tissues are really helpful, often decisive.

The sac of *Erythrodes* species is usually provided with three conspicuous nerves that pass down the posterior wall and ascend by way of the anterior wall to the elongated limb of the labellum. Alternating with these nerves are the carinae or papilliform calli just mentioned. They are usually four in number when they occur, but in some species two may be suppressed, or they may be broken up into cylindrical processes. Occasionally the outer ones, those situated on each side of the lateral nerves, are wanting; when present they are situated higher on the wall of the sac than the inner ones. The central pair, one on each side of the central nerve, may extend almost to the base of the sac as thickened lines, or they may be for the most part suppressed and appear simply as scale-like or papilliform calli, or, as in *Erythrodes mexicana* Ames, they may be verruciform. It is noteworthy that these raised thickenings are not situated on the nerves as is usually the case with such structures, but arise from the interneural tissues.

I have observed that in some species, as for example in *Erythrodes vaginata* (Hook.) Ames and *E. querceticola* (Lindl.) Ames, there are prominences alternating with the nerves of the sac, while in *E. secunda* Ames, there may be twelve cylindrical, slender processes, that resemble hairs found in some species of *Goodyera*. Four of these processes occur in a vertical line on either side of the central nerve and two on each side of the sac just below the point where the lateral nerves curve sharply upward in their course. In other words these twelve processes in *E. secunda*, six to the right and six to the left of the centre of the

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sac, correspond in their position to the carinae or thickened lines of other species. They are interneural.

It would seem that conclusive proof that the palaeotropical and neotropical species constitute a single genus would be established, if in connection with the similarity of the structures of the gynostemium and perianth, carinae or papilliform emergences could be found in representatives of the group taken from both hemispheres. *Erythrodes Wenzelii* Ames from the Philippines has a conspicuously bilobed sac, and is provided with carinae which in form and position resemble very closely those of *E. purpurea* Ames from Guatemala. The carinae alternate with the central nerves, the outer pair situated higher up on the sac than the inner pair. In *E. Weberi* Ames, a native of the Philippines, the anterior wall of the sac is also provided with carinae which are similar in appearance and position to those of *E. argyrosticta* (Schltr.) Ames from Guatemala. It seems inconceivable that the evidence offered by these carinae should be disregarded. In my estimation they indicate a kinship that geographical bounds cannot alter.

The following changes in nomenclature are supplementary to those made in Fascicle V of this work on pages twenty-eight and twenty-nine.

Erythrodes aratanhensis (Rodr.) Ames comb. nov. *Physurus aratanhensis* Rodr. Orch. Nov. 2 (1882) 290.

Erythrodes arietina (Reichb. f. & Warm.) Ames comb. nov. *Physurus arietinus* Reichb. f. & Warm. in Reichb. f. Otia Bot. Hamb. 2 (1881) 52.

Erythrodes argyrosticta (Schltr.) Ames comb. nov. *Physurus argyrostictus* Schltr. in Fedde Repert. 16 (1920) 440.

In the structure of the flowers this species bears a close resemblance to *E. purpurea* Ames. In habit, however, it is readily recognized by the shortness of the peduncle between the lower-

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most flowers of the raceme and the uppermost leaf. In Schlechter's type specimen the peduncle is about 3 cm. long between the raceme and the leafy portion of the stem and in my specimens exhibits an extreme range of 3–4 cm. In the type of *E. purpurea* the part of the peduncle that extends between the raceme and the leaves is 13.5 cm. long and in duplicates of the type number preserved in the United States National Herbarium it is 12–13.5 cm. long. Aside from habitual differences there are other reliable guides to aid one in distinguishing between these species, one of the most important being the calli that are found on the anterior wall of the sac alternating with the three main nerves. In *E. argyrosticta* these calli are four elongated ridges, hardly thickened at the free basal tip, the two outer ones about 1 mm. long, the inner ones equally long but so situated that they extend nearly to the base of the sac. In *E. purpurea* there are also four ridges on the anterior wall of the sac, but they are more or less thickened and papilliform at the basal tip and in the type do not form such distinct carinae or raised lines as in *E. argyrosticta*. In both species the sepals are provided externally with four or five-celled hairs, but in *E. purpurea* the hairs are more or less localized as tufts near the tip, only a few scattering ones occurring elsewhere.

Erythrodes bicolor (*Rodr.*) *Ames comb. nov.* *Physurus bicolor* *Rodr.* *Orch.* Nov. 2 (1882) 290.

Erythrodes bifalcis (*Lindl.*) *Ames comb. nov.* *Physurus bifalcis* *Lindl.* *Gen. & Sp. Orch.* (1840) 502. *Microchilus bifalcis* *D. Dietr.* *Syn. Pl.* 5 (1852) 166.

In Lindley's herbarium at Kew the flower of this species is shown by a rough sketch to have extraordinarily large falcate lobes at the end of the labellum. The spur is very long and slenderly cylindrical.

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Erythrodes brachyrhyncha (*Reichb. f.*) *Ames comb. nov.*
Physurus brachyrhynchus Reichb. f. Xen. Orch. 2 (1873) 184.

Erythrodes calophylla (*Reichb. f.*) *Ames comb. nov.* *Physurus calophyllus Reichb. f. Beitr. Orch. Centr. Am. (1866) 64.*

Erythrodes caucana (*Schltr.*) *Ames comb. nov.* *Physurus caucanus Schltr. in Fedde Repert. Beihefte 7 (1920) 70.*

Erythrodes chicharrasensis *Ames sp. nov.* Herba terrestris, erecta, 2–2.5 dm. alta, rhizomate decumbenti, cauliformi, radicans, mox in caulem erectum abeunte, radicibus villosis, caulium plerumque foliato, supra vaginis foliaceis obsessis, teretibus, superne dense glandulosis, infra partem foliatam vaginis tubularibus. Folia usque ad 8.5 cm. longa et 2.8 cm. lata, in sicco atroviridia, oblique lanceolata, prope apicem valde attenuata, chartacea in sicco, clare trinervia, patentia, plus minusve 2 cm. inter se distantia. Petioli plus minusve 2 cm. longi, vaginantes, laxè appressi. Racemus plus minusve 7 cm. longus, multiflorus, 2 cm. per medium. Bractee inflorescentiae plus minusve 9 mm. longae, quam pedicellus cum ovario multo longiores, triangulari-lineares, acutissimae, scariosae, clare trinerviae, glanduloso-pubescentes. Sepala lateralia 4.5 mm. longa, 1 mm. lata, oblongo-ligulata, obtusa, uninervia, prope apicem glanduloso-villosa. Sepalum dorsale simile. Petala 4 mm. longa, vix 1 mm. lata, oblongo-spathulata. Labellum usque ad lobum terminalem 4 mm. longum, marginibus incurvum; lobus terminalis 1 mm. longus et 3 mm. latus, oblongo-crescentiformis, obtuse mucronatus, minute papillosus; calcar 3.5 mm. longum, complanato-cylindraceum, plus minusve 1 mm. per medium, intus quadricallosum callis papilliformibus. Columna 3 mm. longa, rostello profunde bifido utrinque angulato, divisionibus setaceis, acutissimis. Anthera 2 mm. longa, anguste lanceolata. Ovarium glanduloso-pubescentis.

Rhizome elongated, creeping, rooting at the nodes, the roots

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produced opposite the lowermost leaves, one at each node; internodes approximately 2–3 cm. long. Leaves at first crowded, the sheaths of the petioles entirely concealing the upper part of the stem, apparently variegated with oblique cross veins of a deep green when fresh; where the stem is revealed it appears to have been suffused with purple when in life. Racemes slender, the period of anthesis of long duration as is shown in the type in which the lowermost flowers are expanded while the buds of the upper flowers are crowded in a pyramidal, dense cluster 2.5–3 cm. long. Rachis densely glandular pubescent. Peduncle about 3 cm. long between the uppermost foliaceous bract and the lowermost flower, densely glandular, brownish pubescent. Sepals with a few extraordinarily long glandular hairs scattered over the outer surface and with a tuft of hairs near the tip, the longest ones .5 mm. in length, margins smooth. Petals slightly dilated above the middle, smooth, lightly adherent to the upper sepal. Labellum fleshy, densely papillose on the upper third, the dilated bilobed or crescent-shaped terminal portion being papillose on both the upper and lower surfaces; spur cylindrical, about equally thick from the base to the more or less abruptly rounded tip, on the anterior wall within there are four linear calli,—in parallel pairs,—alternating with the three main nerves, two (the outer ones) situated just below the middle of the spur, two (the inner ones) with their free tips almost reaching the tip of the spur. Ovary 5 mm. long, fusiform-cylindrical, densely glandular hairy.

The terminal lobes of the lip suggest very strongly the Peruvian *Erythrodes bifalcis* (Lindl.) Ames which has a much more slender, spur-like sac. The type, according to notes in my herbarium, is very similar in habit to Spruce 4464 and 4870 preserved at Kew, specimens referable to *E. repens* (Poepp. & Endl.) Ames. In the form of the labellum, in the rostellum and elon-

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gated anther very similar to the Guatemalan *E. lunifera* (Schltr.) Ames, but differing from it in general habit and in the flowers being more sparsely pubescent.

MEXICO, Chiapas, Chicharras, *E. W. Nelson 3808*, February 12–15, 1896. 6000 feet altitude.

Erythrodes clavigera (*Reichb. f.*) *Ames comb. nov.* *Physurus claviger Reichb. f.* in *Bonpl.* 4 (1856) 211.

Erythrodes commelinoides (*Rodr.*) *Ames comb. nov.* *Physurus commelinoides Rodr.* *Orch. Nov.* 1 (1877) 193.

Erythrodes debilis (*Lindl.*) *Ames comb. nov.* *Physurus debilis Lindl.* *Gen. & Sp. Orch.* (1840) 503.

Erythrodes densiflora (*Lindl.*) *Ames comb. nov.* *Physurus densiflorus Lindl.* *Gen. & Sp. Orch.* (1840) 502.

Erythrodes dolichostachya (*Schltr.*) *Ames comb. nov.* *Physurus dolichostachys Schltr.* in *Fedde Repert. Beihefte* 7 (1920) 70.

Erythrodes erythrodoides (*Schltr.*) *Ames comb. nov.* *Physurus erythrodoides Schltr.* in *Fedde Repert. Beihefte* 7 (1920) 71.

Erythrodes foliosa (*Lindl.*) *Ames comb. nov.* *Physurus foliosus Lindl.* *Gen. & Sp. Orch.* (1840) 503.

Erythrodes hetaerioides (*Schltr.*) *Ames comb. nov.* *Physurus hetaerioides Schltr.* in *Fedde Repert. Beihefte* 7 (1920) 72.

Erythrodes hyphaematica (*Reichb. f.*) *Ames comb. nov.* *Physurus hyphaematicus Reichb. f.* *Xen. Orch.* 2 (1874) 184.

Erythrodes humilis (*Cogn.*) *Ames comb. nov.* *Physurus humilis Cogn.* in *Mart. Fl. Bras.* 3, pt. 4 (1895) 232.

Erythrodes juruenensis (*Hoehne*) *Ames comb. nov.* *Physurus juruenensis Hoehne* in *Comm. Linhas Teleg. Estrateg. Matto Gross. Anexo* 5, pt. 1 (1910) 30, t. 10.

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Erythrodes lacteola (*Rodr.*) *Ames comb. nov.* *Physurus lacteolus* *Rodr.* *Orch. Nov.* 2 (1882) 292.

Erythrodes Lehmannii (*Schltr.*) *Ames comb. nov.* *Physurus Lehmannii* *Schltr.* in *Beihefte Bot. Centralbl.* 36, Abt. 2 (1918) 379.

This species in the note accompanying the original description is compared with *E. secunda* Ames, a Mexican species that is well characterized among its allies by the general structure of the labellum, the apical part being reduced to a crenate margined semiorbicular lobe. In *E. Lehmannii* the tip of the labellum is also much less developed than is usual in the genus, the terminal lobe being obtusely angled on each side and mucronate in the middle. *E. secunda* would seem to differ from *E. Lehmannii* very markedly in having within the sac, near the base, twelve elongated processes.

Erythrodes Lindleyana (*Cogn.*) *Ames comb. nov.* *Physurus Lindleyanus* *Cogn.* in *Mart. Fl. Bras.* 3, pt. 4 (1895) 238, t. 55, f. II. *Physurus roseus* *Lindl.* in *Herb. Monac.*, non *Lindl. Gen. & Sp. Orch.*

Erythrodes loxoglottis (*Reichb. f.*) *Ames comb. nov.* *Physurus loxoglottis* *Reichb. f.* *Beitr. Orch. Centr. Am.* (1866) 64; *Xen. Orch.* 2 (1874) 182, t. 178, f. I.

I have been unable to place this species satisfactorily. It resembles *E. secunda* Ames in the foliage but is distinct in the raceme and in the terminal lobe of the labellum. *E. stictophylla* (*Schltr.*) Ames is a very closely related species.

Erythrodes lunifera (*Schltr.*) *Ames comb. nov.* *Physurus luniferus* *Schltr.* in *Fedde Repert.* 15 (1918) 199.

In the lunate terminal lobe of the labellum and in the foliage not unlike *E. chicharrasensis* Ames, but with the lip-lobes nar-

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rower and more acute, and without angles on the sides of the rostellar process.

Erythrodes maculata (*Hook.*) *Ames comb. nov.* *Physurus maculatus* *Hook.* in *Bot. Mag.* (1862) t. 5305.

In floral structure similar to *E. vaginata* (*Hook.*) *Ames*, but different in habit.

Erythrodes major (*Presl*) *Ames comb. nov.* *Microchilus major* *Presl* *Rel. Haenk.* 1 (1827) 94. *Physurus major* *Schltr.* in *Fedde Repert. Beihefte* 9 (1921) 132. *Physurus Preslei* *Lindl. Gen. & Sp. Orch.* (1840) 501.

This is closely allied with *E. procera* (*Schltr.*) *Ames* and a study of more material may prove that they are conspecific.

Erythrodes Mayoriana (*Kränzl.*) *Ames comb. nov.* *Physurus Mayorianus* *Kränzl.* in *Mem. Sci. Nat. Neuchat.* 5 (1914) 355 (*Fuhrm. & May. Voy. Explor. Sci. Colomb.* (1914) 355).

Erythrodes metallescens (*Rodr.*) *Ames comb. nov.* *Physurus metallescens* *Rodr. Orch. Nov.* 2 (1882) 291.

Erythrodes mexicana *Ames sp. nov.* Herba terrestris, erecta, 3 dm. alta, rhizomate decumbenti, cauliformi, radicanti, mox in caulem erectum abeunte, radicibus elongatis, villosis; cauli prope basim quinquefoliato, supra vaginis paucis dissitis obsesso, tereti, glanduloso-puberulo, infra partem foliatam vaginis truncatis scariosis. Folia plus minusve 5 cm. longa, usque ad 31 mm. lata, ovato-lanceolata, acuminata, acutissima, in sicco viridia. Petioli vaginantes, 2 cm. longi. Scapus cum racemo 2.4 dm. longus, gracilis, bracteis vaginantibus tribus, 1.4–2 cm. longis, scariosis, glabris, plus minusve 4 cm. inter se distantibus. Racemus 6 cm. longus, plus minusve decemflorus. Bractee inflorescentiae 8–10 mm. longae, scariosae, sparse pubescentes, marginibus ciliolatis, triangulari-lanceolatae, acuminatae, acutissimae, quam pedicellus cum ovario vix longiores. Flores in genere inter majores, illis

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E. Killipii fere aequimagni. Sepala lateralia 6.25 mm. longa, 2 mm. lata trans medium, oblonga, obtusa, conspicue uninervia, extus glanduloso-pubescentia. Sepalum dorsale simile, 5.5 mm. longum, 2 mm. latum. Petala 6 mm. longa, 2 mm. lata, oblongo-spathulata, obtusa. Labellum 7 mm. longum, marginibus incurvum, apice dilatatum, deflexum, reniforme vel obtuse crescentiforme, 1 mm. longum, 3 mm. latum, obscure mucronatum, minute papillosum. Calcar 3 mm. longum, obtusissimum, intus squamis quatuor verruciformibus, breviter carinatis ornatum. Columna 3 mm. longa, rostello profunde bipartito, anthera cordata, acuminata, acuta. Ovarium glanduloso-pubescentia.

A rather robust plant among the Mexican and Central American species of the genus, with flowers that suggest in size the flowers of *E. Killipii* Ames and *E. vesicifera* (Reichb. f.) Ames. Rhizome stout with a single root at each node, internodes 2.5 cm. long. Just below the leafy portion of the stem there are three or four scarious whitish or yellowish tubular sheaths, about 12 mm. long. Leaves more or less crowded near the ground; leafy part of the stem 5 cm. long, concealed by the sheathing, loosely appressed bases of the spreading leaves. Leaves five, ovate-lanceolate, acuminate, acute, about nine-nerved, from studies of dried material apparently variegated or mottled when fresh. Peduncle with whitish glandular pubescence, with three bracts below the raceme, the bracts whitish, obliquely truncate, acute, with three prominent nerves. Raceme loose flowered, not unlike the raceme of *E. plantaginea* (Lindl.) Fawc. & Rendle, but with slightly larger flowers. The apical lobe of the labellum is sharply deflexed and minutely papillose. Within the sac, on the anterior wall, alternating with the three main nerves are four calli, the two outer ones just below the middle of the sac, the two inner ones near the base of the sac.

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In the nearly related *Erythroides procera* (Schltr.) Ames the calli on the anterior wall of the sac are small, the lowermost pair being very much reduced and consequently inconspicuous; in *E. plantaginea* the calli are represented by much elongated thickenings, the inner pair extending nearly the whole length of the sac and appearing rather as thickened nerves than as calli. In *E. vesicifera* the thickenings of the sac are carinate and much longer in relation to their height than the nearly quadrate, complanate calli of *E. mexicana* which are conspicuously protuberant. *Erythroides Killipii* from Panama is a closely related species, but very easily distinguished by means of the thickened, elongated carinae which extend from above the middle and reach nearly to the base of the sac.

MEXICO, Chiapas, Pinabate, *E. W. Nelson 3777*, February 8, 1896. 6500–8000 feet altitude.

Erythroides minor (*Presl*) *Ames comb. nov.* *Microchilus minor Presl Rel. Haenk. 1* (1827) 94. *Physurus minor Lindl. Gen. & Sp. Orch.* (1840) 503.

Erythroides mystacina (*Reichb. f.*) *Ames comb. nov.* *Physurus mystacinus Reichb. f. Xen. Orch. 2* (1874) 183.

Erythroides nigrescens (*Schltr.*) *Ames comb. nov.* *Physurus nigrescens Schltr. in Beihefte Bot. Centralbl. 36, Abt. 2* (1918) 380.

In general habit not unlike *E. Killipii* Ames, but with a different terminal lobe on the lip. The plants when dried take on a blackish color. This characteristic has not been noted in *E. Killipii* as represented by Killip's specimens and by *Maxon 5570* from the Upper Caldera River, Panama.

Erythroides ovata (*Lindl.*) *Ames comb. nov.* *Physurus ovatus Lindl. Gen. & Sp. Orch.* (1840) 502.

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In general habit not unlike *E. purpurea*. The extraordinarily long peduncle in Lindley's specimen of *Matthews 1877* from Peru is a distinguishing character of this species. The sac of the labellum as figured by Lindley on the type sheet is bulbous.

Erythrodes paleacea (*Schltr.*) *Ames comb. nov.* *Physurus paleaceus Schltr.* in *Fedde Repert. Beihefte 7* (1920) 72.

Erythrodes pauciflora (*Poepp. & Endl.*) *Ames comb. nov.* *Pelexia pauciflora Poepp. & Endl.* *Nov. Gen. ac Sp. 2* (1838) 17, t. 124 (excl. f. a–e). *Physurus pauciflorus Lindl.* *Gen. & Sp. Orch.* (1840) 504.

Erythrodes Petersiana (*Cogn.*) *Ames comb. nov.* *Physurus Petersianus Cogn.* in *Mart. Fl. Bras. 3*, pt. 4 (1895) 227, t. 52, f. I. *Physurus roseus Reichb. f.* in *Linnaea 41* (1877) 125, non Lindl.

Erythrodes Pittieri (*Schltr.*) *Ames comb. nov.* *Physurus Pittieri Schltr.* in *Fedde Repert. Beihefte 6* (1919) 31.

Erythrodes procera (*Schltr.*) *Ames* in *Proc. Biol. Soc. Wash.* 34 (1921) 150. *Physurus procerus Schltr.* in *Fedde Repert. Beihefte 7* (1920) 73.

This species is closely allied to *E. major* and to *E. Killipii*. From the latter species it differs markedly in the calli on the anterior wall of the sac, the lowermost ones, being very much reduced.

Erythrodes rariflora (*Lindl.*) *Ames comb. nov.* *Physurus rariflorus Lindl.* *Orch. Linden.* (1846) 28.

Erythrodes repens (*Poepp. & Endl.*) *Ames comb. nov.* *Pelexia repens Poepp. & Endl.* *Nov. Gen. ac Sp. 2* (1838) 17, t. 124 f. a–e. *Physurus repens Lindl.* *Gen. & Sp. Orch.* (1840) 502. *Microchilus repens D. Dietr.* *Syn. Pl. 5* (1852) 166.

Erythrodes rosea (*Lindl.*) *Ames comb. nov.* *Physurus roseus Lindl.* *Gen. & Sp. Orch.* (1840) 501.

Erythrodes stenocentron (*Schltr.*) *Ames comb. nov.* *Phy-*

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surus stenocentron *Schltr.* in Fedde Repert. Beihefte 9 (1921) 60.

Erythrodes stictophylla (*Schltr.*) *Ames comb. nov.* *Physurus stictophyllus* *Schltr.* in Fedde Repert. 10 (1911) 249.

In the representatives of this species found in herbaria a surprising range of variation in size is to be observed, some of the more robust specimens resembling very closely *E. Tuerckheimii* (*Schltr.*) *Ames*. The smaller flowers and the erect flattened papillae at the base of the sac are differentiating characters. I have been unable to detect in the flowers of *E. Tuerckheimii* any trace of calli at the base of the sac and the lateral ones are wanting or obscure. Apparently a close ally of *E. loxoglottis* (*Reichb. f.*) *Ames*, which is similar in habit to some of the smaller specimens observed.

Erythrodes tridax (*Reichb. f.*) *Ames comb. nov.* *Physurus tridax* *Reichb. f.* Beitr. Orch. Centr. Am. (1866) 64; Xen. Orch. 2 (1874) 182, t. 178, f. II.

Erythrodes trinitatis *Ames sp. nov.* Aff. *E. querceticolae* et *E. vaginatae*. Herba terrestris, erecta, plus minusve 9 cm. alta, glabra, rhizomate decumbenti, cauliformi. Folia approximata, variegata, lamina 1–2 cm. longa, usque ad 11 mm. lata, ovato-lanceolata, acuminata, acuta. Petiolus plus minusve 1 cm. longus, infra medium laxe vaginans, supra medium contractus. Racemus plus minusve 2 cm. longus, densiflorus, glaber. Bractee inflorescentiae usque ad 6 mm. longae, scariosae, ovato-lanceolatae, uninerviae, acuminatae, acutae. Flores plus minusve 4 mm. longi, albidi, mediocres. Sepala lateralia 4 mm. longa, 1.75 mm. lata, elliptico-oblonga, apice leviter cucullata, subobtusa, glabra. Sepalum dorsale 4 mm. longum, extus leviter carinatum, prope apicem minute papillosum. Petala 3.5 mm. longa, 1 mm. lata supra medium, inaequaliter spathulata, obtusa, uninervia. Label- lum 3.5 mm. longum, saccatum, lobo terminali trilobulato, 2 mm.

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longo, trans basim 2 mm. lato, lobulo intermedio triangulari; discus lobi terminalis carina transversa ornatus. Calcar 2 mm. longum, subglobulum, intus glabrum. Gynostemium 1.75 mm. longum. Ovarium cum pedicello usque ad 4 mm. longum, longitudinaliter alatum.

Erythrodes trinitatis is closely related to the Central American *E. vaginata* and to *E. quercetica*. From both it differs in the form of the terminal lobe of the labellum and in the more compact habit. The stems are leafy almost to the raceme.

TRINIDAD, B. W. I., St. Anne's, *W. E. Broadway s. n.*, 1888. A lovely variegated terrestrial orchid. (TYPE in Herb. N. Y. Bot. Gard.)

Erythrodes Tuerckheimii* (*Schltr.*) *Ames comb. nov. *Physurus Tuerckheimii Schltr.* in Fedde Repert. 2 (1906) 132. *Physurus polygonatus Ames* in Donn.—Sm. Enum. Pl. Guatem. 7 (1905) 50, *nomen*; Orch. 2 (1908) 259; Orch. 3 (1908) 35, t. 35. *Erythrodes polygonata Ames* Orch. 5 (1915) 28.

The type material of *E. Tuerckheimii* and *E. polygonata* is represented by the same number of Tuerckheim's Guatemalan collection.

***Erythrodes vaginata* (*Hook.*) *Ames* Orch. 5 (1915) 29.** *Physurus vaginatus Hook.* Ic. Pl. (1842) t. 449.

Physurus humidicola Schltr. in Fedde Repert. 15 (1918) 198 is a very near relative of *E. vaginata* and in general habit resembles one of the larger specimens of Skinner's Guatemalan collection on which Hooker based his description of *Physurus vaginatus*.

Physurus trilobulatus Schltr. in Fedde Repert. 15 (1918) 199 is surely a near ally of *E. vaginata*. In habit it resembles closely one of the smaller specimens of Skinner's Guatemalan collection of *Physurus vaginatus*, and in the structure of the labellum closely resembles that species.

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Erythrodes valida (*Rolfe*) *Ames comb. nov.* *Physurus validus* Rolfe in *Kew Bull.* (1912) 134.

Erythrodes vesicifera (*Reichb. f.*) *Ames comb. nov.* *Physurus vesicifer* *Reichb. f.* *Beitr. Orch. Centr. Am.* (1866) 63.

Erythrodes xystophylla (*Reichb. f.*) *Ames comb. nov.* *Physurus xystophyllus* *Reichb. f.* *Xen. Orch.* 2 (1874) 183.

Erythrodes zeuxinoides (*Schltr.*) *Ames comb. nov.* *Physurus zeuxinoides* *Schltr.* in *Fedde Repert. Beihefte* 7 (1920) 74.

NOMENCLATORIAL CHANGES IN DENDROCHILUM

PSEUDACORIDIUM *Ames gen. nov.*

Sepala libera similia, glabra, patentia, subaequalia, saccum labelli amplexentia, oblique ascendentia. Petala sepalis similia, patentia. Labellum saccatum, bilobatum, ad basim columnae sessile, utrinque callosum, lobis erectis columnae parallelis, cuculum formantibus. Saccus scrotiformis, intus per medium leviter carinatus. Columna gracilis, oblique erecta, semiteres, exalata, apicem versus sensim paulo dilatata, clinandrio prominenti marginibus integro, canaliculato. Anthera intra clinandrium opercularis, incumbens, bilocularis. Pollinia quatuor, cerea, pyriformia, per paria in loculis segregata. Ovarium pedicellatum, clavatum. Herba epiphytica, erecta, radicibus flexuosis, carnosulis. Pseudobulbi parvi, monophylli, vaginis nonnullis scariosis obtecti. Folium coriaceum, breviter petiolatum. Scapus lateralis racemo terminali, erectus quam folium longior; floribus distichis in racemo denso dispositis. Bracteae inflorescentiae glumaceae, rigidae, ovarium excedentes. Species singula adhuc nota silvarum Mindoro indigena.

Pseudacoridium Woodianum *Ames comb. nov.* *Dendrochilum Woodianum* *Ames* *Orch.* 2 (1908) 80 cum ic.

The bilobed labellum, its lobes erect and forming a hood over the column, the deep scrotiform sac with a keel inside, and the lateral scape arising from the base of a pseudobulb are characters that set this genus apart from *Acoridium*; from *Dendrochilum* the exalate column, prominent clinandrium and saccate bilobed labellum separate it clearly.

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ACORIDIUM *Nees & Meyen.*

From the abundance of material that has been examined in collections from the Philippine Islands it is clear that the section *Acoridium* of *Dendrochilum* should be elevated to generic rank. The exalate column, prominent rostellum and saccate or concave labellum which is rigidly attached to the column are differentiating characters that indicate the line of cleavage. The following nomenclatorial changes are proposed.

Acoridium affine *Ames comb. nov.* *Dendrochilum affine* *Ames* Orch. 2 (1908) 95.

Acoridium anfractoides *Ames comb. nov.* *Dendrochilum anfractoides* *Ames* Orch. 3 (1908) 13, t. 28.

Acoridium auriculare *Ames comb. nov.* *Dendrochilum auriculare* *Ames* in Philipp. Journ. Sci. C. Bot. 4 (1909) 595.

Acoridium binuangense *Ames comb. nov.* *Dendrochilum binuangense* *Ames* Orch. 6 (1920) 281.

Acoridium cinnabarinum (*Pfitz.*) *Ames comb. nov.* *Dendrochilum cinnabarinum* *Pfitz.* in Engl. Pflanzenreich IV. 50. II. B. 7 (1907) 104.

Acoridium confusum *Ames comb. nov.* *Dendrochilum confusum* *Ames* in Philipp. Journ. Sci. C. Bot. 6 (1911) 41.

Acoridium Curranii *Ames comb. nov.* *Dendrochilum Curranii* *Ames* Orch. 3 (1908) 15, t. 29.

Acoridium Elmeri *Ames comb. nov.* *Dendrochilum Elmeri* *Ames* in Elmer Leaflet Philipp. Bot. 5 (1912) 1558.

Acoridium exile *Ames comb. nov.* *Dendrochilum exile* *Ames* Orch. 2 (1908) 84.

Acoridium Foxworthyi *Ames comb. nov.* *Dendrochilum Foxworthyi* *Ames* Orch. 3 (1908) 8, t. 26.

Acoridium hastatum *Ames comb. nov.* *Dendrochilum hastatum* *Ames* Orch. 2 (1908) 99 cum ic.

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Acoridium Hutchinsonii *Ames comb. nov.* **Dendrochilum Hutchinsonii** *Ames* Orch. 2 (1908) 96 cum ic.

Acoridium irigense *Ames comb. nov.* **Dendrochilum irigense** *Ames* Orch. 5 (1915) 58.

Acoridium Loheri *Ames comb. nov.* **Dendrochilum Loheri** *Ames* Orch. 3 (1908) 12, t. 27, f. I.

Acoridium longibulbum *Ames comb. nov.* **Dendrochilum longibulbum** *Ames* in Philipp. Journ. Sci. C. Bot. 7 (1912) 26.

Acoridium lucbanense *Ames comb. nov.* **Dendrochilum lucbanense** *Ames* in Elmer Leaf. Philipp. Bot. 5 (1912) 1559.

Acoridium luzonense *Ames comb. nov.* **Dendrochilum luzonense** *Ames* Orch. 2 (1908) 121 cum ic.

Acoridium maleolens (*Kränzl.*) *Ames comb. nov.* **Dendrochilum maleolens** *Kränzl.* in Orchis 2 (1908) 63.

Acoridium McGregorii *Ames comb. nov.* **Dendrochilum McGregorii** *Ames* in Philipp. Journ. Sci. C. Bot. 6 (1911) 42.

Acoridium microchilum (*Schltr.*) *Ames comb. nov.* **Platyclinis microchila** *Schltr.* in Bull. Herb. Boiss. ser. 2, 6 (1906) 302. **Dendrochilum microchilum** *Ames* Orch. 2 (1908) 87.

Acoridium mindorense *Ames comb. nov.* **Dendrochilum mindorense** *Ames* Orch. 2 (1908) 91 cum ic.

Acoridium pulogense *Ames comb. nov.* **Dendrochilum pulogense** *Ames* in Philipp. Journ. Sci. C. Bot. 4 (1909) 594.

Acoridium pumilum (*Reichb. f.*) *Ames comb. nov.* **Dendrochilum pumilum** *Reichb. f.* in Bonpl. 3 (1855) 222.

Acoridium purpureum *Ames comb. nov.* **Dendrochilum purpureum** *Ames* Orch. 6 (1920) 286.

Acoridium quadrilobum *Ames comb. nov.* **Dendrochilum quadrilobum** *Ames* Orch. 5 (1915) 61.

Acoridium reniforme *Ames comb. nov.* **Dendrochilum reniforme** *Ames* Orch. 5 (1915) 63.

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Acoridium simulacrum *Ames comb. nov.* **Dendrochilum simulacrum** *Ames* Orch. 2 (1908) 92 cum ic.

Acoridium Vanoverberghii *Ames comb. nov.* **Dendrochilum Vanoverberghii** *Ames* in Philipp. Journ. Sci. C. Bot. 7 (1912) 27.

Acoridium Wenzelii *Ames comb. nov.* **Dendrochilum Wenzelii** *Ames* Orch. 5 (1915) 65.

NEW OR NOTEWORTHY ORCHIDS
FROM
DIFFERENT PARTS OF THE WORLD

IN the following pages new species from the Philippines, Borneo, Samoa, Central America, South America, Trinidad and Cuba are described. I have been unable to refer these species to any that have been reported heretofore. Notes that throw light on the history and distribution of orchids or that increase our knowledge of the orchid family have been included. To facilitate reference, the genera have been arranged in alphabetical sequence.

Species from Bukidnon Subprovince, Mindanao, collected on Mount Lipa and Mount Candon by Ramos and Edaña indicate that as explorations in this region are carried on intensively many additions to the orchid flora of the Philippines may be expected. Among the species from the mountains named are several which lack close allies in those parts of the Philippines that are now botanically well known.

BULBOPHYLLUM *Thou.*

Bulbophyllum cubicum *Ames sp. nov.* Radices fibratae. Pseudobulbi caespitosi, 11 mm. alti, in sicco rugosi, anguste pyriformes, in sicco plus minusve 4 mm. in crassitudine infra medium, monophylli. Folium ligulatum, 3-6 cm. longum, circa 6 mm. latum trans medium, usque ad basim subtiliter attenuatum, apice acuto, minute apiculatum, textura coriaceum, in sicco nervosum. Scapi plus minusve 3 cm. longi, pergraciles, numerosi, folio multo breviores, infra florem nudi, in sicco circa .25 mm. in crassitudine, uniflori. Bractea pedicellum subtendens scariosa, infundibuliformis, 1 mm. longa. Flos 7 mm. longus, sepalis vix

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patentibus. Pedicellus cum ovario 8 mm. longus, pergracilis. Sepala lateralia circa 7 mm. longa, 2 mm. lata, oblongo-triangularia, sensim acuta, trinervia, in sicco pellucida. Sepalum dorsale simile, 6 mm. longum, basi concaviusculum. Petala 3.5 mm. longa, 1 mm. lata, oblonga, uninervia, margine praecipue prope apicem ciliata. Labellum mobile, 4 mm. longum, in circuitu elliptico-lanceolatum, vix 2 mm. latum trans medium, apice subacuto, basi valde cubico-incrassata, truncata, in basi bilobulatum, lobis circa 1 mm. latis, obtusis, leviter recurvis, elevatis, post lobos callo papilliformi; unguis brevis, angustatus. Columna vix 1.5 mm. alta, in pedem 1.5 mm. longum producta, utrinque ad apicem in stelidium sigmoideum, antheram superans, vix 1 mm. longum producta. Anthera apice incrassata.

The labellum is thickened at the base so as to form a cube in front of the membranaceous elliptic-lanceolate lamina. At the summit of this cubically thickened base there is a crescent-shaped appendage—its rounded tip curved backward—that gives a two-lobed appearance to the basal part of the labellum. In addition to the crescent-shaped appendage there is a small papilliform or umbonulate protuberance, posteriorly situated, which points toward the column.

Near allies of *B. cubicum* are *B. graciliscapum* Ames & Rolfe which has broader leaves and a very different labellum; *B. sapphirinum* Ames which has shorter scapes, more falcate lateral sepals and a very different labellum and *B. angulatum* J. J. Sm. which has ovate not oblong petals, shorter scapes and a very different labellum.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mahilucot River, *M. Ramos & G. Edaño Bur. Sci.* 38633, June–July 1920. On tree in forest. “Flowers blue and brown.” 4200 feet altitude.

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Bulbophyllum erratum *Ames sp. nov.* Rhizoma longe repens, flexuosum, vagans, circa 1 mm. in crassitudine, prope pseudobulbos radicans, glabrum. Radices fibratae, abbreviatae, usque ad 2.7 cm. longae, .5 mm. per medium. Pseudobulbi 1.4–3.5 cm. inter se distantes, 5–7 mm. longi, plus minusve 4 mm. in crassitudine, obpyriformes, usque ad apicem attenuati, in sicco valde sulcati, flavescentes, nitidi, oblique erecti, monophylli. Folia 1.5–2.5 cm. longa, usque ad 6 mm. lata, oblonga vel oblongo-lanceolata, obtusa, vix apiculata, in petiolum brevem, rigidum, 1 mm. longum, sulcatum contracta, erecta, lamina coriacea, in sicco nervulosa. Scapi 6–9 mm. longi, e basi pseudobulbi vel a rhizomate in medio inter pseudobulbos orti, basi bractea 2 mm. longa, tubulata vaginati, uniflori vel biflori. Flos 6 mm. longus, bractea infundibuliformi, oblique truncata, 2 mm. longa subtentus. Pedunculus cum ovario plus minusve 2 mm. longus, pergracilis. Sepala lateralia usque ad 6 mm. longa, prope basim 2 mm. lata, triangula, acuta, apice subcarinata, trinervia, textura membranacea, mentum 1.25 mm. longum formantia. Sepalum dorsale 6 mm. longum, 1.5 mm. latum, oblongo-lanceolatum, apice subcaudatum, acutum, trinervium, concavum. Petala quam sepala multo minora, vix 2 mm. longa, .6 mm. lata, oblonga vel oblongo-spathulata, apice rotundata, uninervia, glabra. Labellum 2 mm. longum, 1.5 mm. latum inter loborum lateralium apices extenditos, cum pede columnae articulatum, mobile; lobi laterales semiorbiculares, membranacei, in sicco pellucidi; lobus medius vix 1 mm. longus, 1 mm. latus, valde incrassatus, apice late rotundatus, margine leviter revolutus, in sicco superficie corrugatus; discus inter lobos laterales linea vel carina incrassata ornatus. Columna carnosae, ebrachiata.

In habit very similar to *B. alagense* Ames, from which it is distinguished by its apiculate leaves, less caudate sepals and

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broader labellum. Closely allied to *B. longerepens* Schltr. of the Celebes, from which it is separable by the longer scapes, by a distinctly three-lobed labellum and by slightly larger flowers.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mahilucot River, *M. Ramos & G. Edaña Bur. Sci. 38685*, July 14, 1920. Along streams in forest. Flowers yellowish. 4100 feet altitude.

***Bulbophyllum nigroscapum* Ames sp. nov.** Herba epiphytica. Rhizoma repens. Pseudobulbi subobsoleti, monophylli. Foliolum erectum, ligulatum, coriaceum, petiolatum, utrinque attenuatum, costa media supra sulcata, subtus carinata. Scapus subarcuatus, in sicco niger, plus minusve quindecimflorus, infra racemum bracteatus, bracteis vaginantibus. Bracteae inflorescentiae anguste lanceolatae. Sepala lateralia triangulari-lanceolata, ad basim mentum formantia. Sepalum dorsale simile. Petala sepalis multo breviora, oblonga, obtusa. Labellum simplex, ecallosum. Columna brevis, ad apicem bicuspidata vel bidentata.

Rhizome creeping, whitish when dry, copiously rooted, the roots coarse and fibrous. Pseudobulbs inconspicuous, reduced to raised discs on the rhizome, 1 mm. high, about 2 cm. apart, monophyllous, yellowish. Leaves 8–13.5 cm. long including the petiole, about 1.5 cm. wide at the middle, coriaceous, oblong, ligulate, hardly bidentate at the rounded tip, sulcate above along the mid-nerve. Petiole short, about 1.5 cm. long, sulcate, rigid. Scape ± 8 cm. long, with its loose raceme of cream colored flowers shorter than the leaves, blackish when dry, sheathed below the raceme by several tubular scarious bracts ± 1 cm. long, the uppermost one obliquely infundibuliform, whitish when dry. Raceme about 5 cm. long, flowers about 3 mm. apart, subtended by linear-lanceolate, acuminate bracts ± 5 mm. in length, whitish when dry, which exceed the pedicellate ovaries. Flowers about fifteen, yellowish in dried material, cream colored when fresh.

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Lateral sepals approximately 6 mm. long, 2 mm. wide near the middle, triangular-lanceolate, acute, somewhat thickened near the tip, decurrent on the curved foot of the column at base, forming an obtuse mentum 2 mm. long. Dorsal sepal 6 mm. long, oblong, ligulate, acute, conspicuously one-nerved along the middle, similar to the lateral sepals. Petals 2–2.5 mm. long, about 1 mm. wide below the middle, much smaller than the sepals, oblong, obtuse, conspicuously one-nerved. Labellum about 4 mm. long and 2 mm. wide, simple, linguiform, elliptical-oblong when spread out, obtuse, conspicuously three-nerved, deflexed above the middle, basal half with the sides erect, ecallose. Gynostemium very short, from the tip to base of column-foot scarcely 1 mm. long, terminating on each side in a triangular tooth; foot 1.5 mm. long. Anther with a cucullate tip. Pollinia two.

Bulbophyllum nigroscapum is a member of that puzzling group of the genus for which Dr. Rudolf Schlechter proposed the section Aphanobulbon. It is closely related to *B. anguipes* Schltr., a native of the Celebes, and to *B. dasypetalum* Rolfe of the Philippine Islands. The section Aphanobulbon is characterized by the racemose inflorescence and by extraordinarily reduced pseudobulbs which are represented by disc-like thickenings on a more or less elongated rhizome. *B. nigroscapum*, as its name implies, possesses in dried specimens a blackish scape which forms a striking contrast with the scarious floral bracts. Whether or not this characteristic is to be noticed in fresh material is not reported by the collector. (PLATE 114.)

SAMOA, Tutuila Island, "Vao sosolo i le la'ou." On trees at about 1800 feet altitude. Flowers cream color. Collected by *M. C. Collarino*, July 19, 1920. (No. 383 of W. A. Setchell's distribution of plants collected on Tutuila Island under the auspices of the Department of Biology of the Carnegie Institution of Washington, D. C.)

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CAMPYLOCENTRUM *Benth.*

Campylocentrum panamense *Ames sp. nov.* Herba epiphytica, plus minusve 3 dm. longa, foliosa. Caules dependentes, plus minusve 3 mm. in crassitudine, rigidi ut videtur, vaginis foliorum obtecti. Folia valde coriacea, plus minusve 8 cm. longa, usque ad 22 mm. lata, apice inaequaliter bilobata vel oblique et profunde retusa, lobis terminalibus 4–8 mm. longis, nervo medio subtus leviter carinato. Vaginae foliorum plus minusve 2 cm. longae, in sicco valde nervosae, coriaceae, rigidae. Pedunculi cum racemo plus minusve 5 cm. longi, validi, multiflori, laterales, racemo 4 cm. longo. Flores parvi, breviter pedicellati. Sepala lateralia 5.5 mm. longa, vix 1 mm. lata, oblongo-spathulata, carnosae, obtusa, trinervia, basi dilatata. Sepalum dorsale simile. Petala plus minusve 4 mm. longa, 1 mm. lata prope apicem, spathulata, prope medium contracta. Labellum 5.25 mm. longum, 1.5 mm. latum prope basim, triangulari-lanceolatum, utrinque lobulo prope basim obsessum, acuminatum, acutum, nervosum, in saccum 4 mm. longum productum. Saccus 1.5 mm. in diametro, scrotiformis, leviter curvatus, valde obtusus. Gynostemium generis. Capsula 10–11 mm. longa.

The type consists of a single plant in which the racemes are well advanced toward the production of mature capsules. From *C. micranthum* (Lindl.) Rolfe it differs in having longer leaves, longer racemes and more or less spathulate perianth segments. It differs from *C. Schiedii* Benth. in the form of the leaves and perianth segments.

PANAMA, near Gatun, *Sutton Hayes 988*, January 10, 1860. On trees. (TYPE in Herb. N. Y. Bot. Gard.)

COELOGYNE *Lindl.*

Coelogyne longirachis *Ames sp. nov.* Radices glabrae, plus minusve 2 mm. in crassitudine, carnosae ut videtur, in sicco pal-

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lidae. Rhizoma validum, plus minusve 8 mm. crassum. Pseudobulbi in serie, approximati, usque ad 14 cm. alti, anguste ampullacei, plus minusve 12 mm. in crassitudine infra medium, usque ad apicem attenuati, diphylli, in rhizomate crasso repenti plus minusve 1 cm. inter se distantes; juniores vaginis coriaceis acutis fulti. Folia cum petiolo usque ad 24 cm. longa, plus minusve 4.5 cm. lata, elliptico-lanceolata, sensim acuta, utrinque attenuata, subtus prominenter quinquenervia, in petiolum 3 cm. longum contracta. Scapus initio foliis juvenilibus synanthus, folium demum superans, basi nuda, multiflorus, compressus, conspicue bialatus, antheseos finem versus plus minusve 80 cm. longus, gracilis, arcuatus, rachide fractiflexa. Bractee inflorescentiae ovaria pedicellata superantes, cum floribus deciduae, supra flores arcissime imbricatae, plus minusve 8 mm. longae. Rachis usque ad 56 cm. longa, demum antheseos finem versus valde arcuata. Flores subrubri, succedanei. Pedicellus cum ovario 1.7 cm. longus, in fructu 4.5 cm. longus. Sepala lateralia usque ad 7 mm. longa, 6 mm. lata, anguste elliptica, abrupte acuta, subcarnosa, in sicco subfusca. Sepalum dorsale simile. Petala 11 mm. longa, 1 mm. lata prope basim, usque ad apicem sensim attenuata, leviter curvata, linearia, acuta. Labellum vix 12 mm. longum, subcarnosum, conspicue trilobatum; lobi laterales subquadrati, apice rotundati, circa 3.5 mm. longi ex apice loborum lateralium usque ad basim lobi medii, 3.5 mm. lati prope apicem, margine inaequaliter triangulari-dentata; lobus medius 6.5 mm. longus, 3 mm. latus, basi leviter rotundata, apice triangulari-acuto; discus callo alte sulcato, apice tridentato ornatus. Columna 8 mm. longa, carnosa, apicem versus alata, ala paucidentata.

Among Philippine species closely allied to *C. bilamellata* Lindl. from which it is distinguished by the broader lateral lobes of the labellum which are blunt at the tip and irregularly

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toothed, and by the tridentate callus which extends from the base of the column onto the lower third of the middle lobe. The scapes attain an extraordinary length as the flowering season advances and would seem to droop in such a manner that the tip of the raceme must hang far below the point where the plants are attached. As many as sixty flowers are produced in succession, approximately one centimeter apart on the rachis.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mahilucot River, *M. Ramos & G. Edaña Bur. Sci. 38671*, July 15, 1920. Along streams in forest. 4000 feet altitude.

Coelogyne Ramosii *Ames sp. nov.* Aff. *C. sulphureae* (Bl.) Reichb. f. Herba epiphytica. Radices carnosae. Pseudobulbi plus minusve 4 cm. alti, anguste obpyriformes vel late semifusiformes, in sicco longitudinaliter rugosi; juniores vaginis ovatis, obtusis, 2–8 cm. longis, siccis papyraceis fulti. Folium usque ad 3 dm. longum, plus minusve 4 cm. latum, in petiolum lamina multo brevior angustatum, coriaceum, late oblongum, usque ad basim attenuatum, apice abrupte rotundato, vix acutum, nervo medio solo subtus prominenter praeditum. Petiolus plus minusve 4 cm. longus, rigidus. Scapus proteranthus sive folii apice protruso synanthus, erectus, 1.5 dm. longus, sex ad octoflorus, folium non aequans. Bractee naviculares, vix 2 cm. longae, pallidae, subscariosae, deciduae, ovarium longe pedicellatum superantes. Pedicellus cum ovario usque ad 1.7 cm. longus. Flores in racemo laxo dispositi, 13–14 mm. longi, subvirides, textura valde membranacea. Sepala subaequalia, 12.5 mm. longa, 3 mm. lata, acuta, basi manifeste saccata, extus valde carinata. Petala plus minusve 11 mm. longa, 1 mm. lata. Labellum 13 mm. longum, prope apicem 9 mm. latum, basi lata gynostemio insertum; lobi laterales parvi, triangulares, 1 mm. longi, acuti, prope medium labelli; lobus medius ex isthmo distincto valde dilatatus, trans-

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verse reniformis, 8.5 mm. longus, emarginatus. Carinae duae. Gynostemium e basi angustiore valde alato-dilatatum, conchiforme, ala apice subtrilobata, margine erosa.

Coelogyne Ramosii is a near relative of *C. sulphurea* (Bl.) Reichb. f. from which it differs in the smaller side lobes of the labellum and in the texture of the flowers.

Unfortunately my materials for comparative studies have been limited so that I have been unable to judge of the variation which is characteristic of *Coelogyne sulphurea*. My studies of Javan specimens distributed by J. J. Smith, and of Bornean specimens, indicate that the lobes of the labellum should have some weight in determinations; furthermore the Philippine material which I have proposed as a new species differs from both the Javan and Bornean representatives of *C. sulphurea* in having extremely membranous floral segments which in dried material become so agglutinated that the usual methods of preparation make examination extremely difficult.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos & G. Edaña Bur. Sci.* 38944, June 27, 1920. Flowers green with red interior. 5000 feet altitude.

CRANICHIS Sw.

Cranichis monophylla Lindl. Orch. Linden. (1846) 27; in Ann. & Mag. Nat. Hist. ser. 3, 1 (1858) 334 as to name, excl. plant. *Sauroglossum monophyllum* Griseb. Cat. Pl. Cub. (1866) 269 as to synonymy, excl. plants. *Spiranthes monophylla* Cogn. in Urb. Symb. Antill. 6 (1909) 339 as to synonymy, excl. plants. *Cyclopogon monophyllus* Schltr. in Beihefte Bot. Centralbl. 37, Abt. 2 (1920) 391 as to synonymy, excl. Cuba.

Schlechter in his monograph of the *Spiranthinae* unaccountably referred to *Cyclopogon* the *Cranichis monophylla* of Linden, a Venezuelan plant collected by Linden in the Province

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of Merida. In his geographical note he refers the species to Cuba.

In Lindley's herbarium at Kew there are three specimens mounted on the sheet of *Cranichis monophylla*, one, the type, from Venezuela, the others from Cuba, where they were collected by Charles Wright in 1856–57. The Cuban specimens are comparable to *Cranichis diphylla* Sw. from the Blue Mountains of Jamaica. These Cuban plants are apparently conspecific with *C. tenuiflora* Griseb. Wright's specimens belong to the series collected in eastern Cuba, and in pencil the number 621 has been inscribed on the label that accompanies them. There is absolutely no doubt as to the type, because Lindley glued the labels to the sheet in such a manner that the stem of the Venezuelan plant is covered by Linden's label.

Cogniaux in Urban's *Symbolae Antillanae* in the synonymy given under *Spiranthes monophylla* (Lindl.) Cogn. cites the original description of Lindley's *Cranichis monophylla* and in his geographical notes gives Wright's 621 and 1480 as the specimens that represent the Cuban species. Now, it is perfectly clear from the specimens in the Lindley Herbarium and in the Gray Herbarium, that Wright's 621 collected in eastern Cuba in 1856–57 is a species of *Cranichis*. Wright's 1480, on the other hand, on the evidence of two specimens preserved in the Gray Herbarium is a species of *Spiranthes*, but as the plants bearing this number were collected in 1859 they may be disregarded for the present. (See *Spiranthes* under *S. Wrightii*.)

The type of *Cranichis monophylla* Lindl., as has been stated already, was a Venezuelan plant. Why it should have been reduced to synonymy because specimens from Cuba were later referred to it by Lindley is difficult to understand. It is true that Grisebach in his *Catalogus Plantarum Cubensium*, pub-

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lished in 1866, referred Wright's 1480 and 621 to *Sauroglossum monophyllum* Griseb., citing Lindley's *Cranichis monophylla*, based on Wright's Cuban specimens, as a synonym, but such a procedure had nothing to justify it, as *C. monophylla* was a species in good standing prior to the time when Lindley published his paper on Wright's Cuban collection of orchids, and as Wright's 621 which Lindley confused with *C. monophylla* is a true *Cranichis*.

It would seem that the transference of *Cranichis monophylla* Lindl. to *Cyclopogon*, made by Schlechter, resulted from a dependence on the synonymy cited by Cogniaux, and that attempts to identify Lindley's Venezuelan species were based on a study of Wright's 1480 rather than on Linden's material from Venezuela.

***Cranichis tenuiflora* Griseb. Cat. Pl. Cub. (1866) 268.**

Wright's specimens of 621 that I have examined are diphyllous, one leaf being much larger than the other, somewhat ovate-cordate in outline, with a petiole about 3 cm. long. The smaller leaf is lanceolate, acuminate, acute and gives to the plant a very distinctive appearance. When compared with Swartz's type of *Cranichis diphylla* it becomes very apparent that the Cuban plants are clearly related to it. Wright's 621 is the same as his 3292 which is the type number of *Cranichis tenuiflora* Griseb.

CUBA, Orientale, *Wright 621*, 1856-57. Pinal, Monte Verde, February 1860-64; *Wright 3292*, Pinal, Monte Verde, February 1860-64.

DENDROBIUM Sw.

***Dendrobium* (§ *Pedilonum*) *appendiculoides* Ames sp. nov.**
Herba epiphytica, gracilis. Radices fibratae, carnosae. Caules aggregati, fasciculati, plus minusve 2.5 dm. alti, 2 mm. in crassitudine, multiarticulati, demum flavescentes. Folia disticha, usque ad 3.5 cm. longa, 5-6 mm. lata trans basim, apice inaequaliter bilo-

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bata, demum retusa, in sicco subcoriacea, nervosa, plus minusve 1 cm. inter se distantia, vaginis inserta; internodia leviter nodosa, demum fibrillis vaginalium dejectarum vestita. Racemi e caulibus aphyllis breves, pauciflori, plus minusve 1.5 cm. longi. Flores membranacei, tenues, albidi, roseotincti. Bracteae inflorescentiae minutae, triangulares, acutae, 1.75 mm. longae. Pedicellus cum ovario usque ad 18 mm. longus, gracilis, glaber. Sepala lateralia 5 mm. longa, triangulari-oblonga, subacuta, mentum trilobatum, valde elongatum, 16 mm. longum, 1 mm. in crassitudine, cum labello formantia. Sepalum dorsale elliptico-ovatum, obtusum, 5.25 mm. longum, trans medium 2 mm. latum. Petala 5 mm. longa, 2 mm. lata trans medium, elliptico-oblonga, obtusa, trinervia, membranacea, in sicco pellucida. Labellum simplex, lamina vel pars libera labelli oblanceolata e basi lata, ecallosa, 7 mm. longa, 3 mm. lata. Columna brevis, apice utrinque lobulata, lobulo rotundato.

Dendrobium appendiculoides is related to *D. Hasseltii* Lindl., but is a more slender and compact species with much smaller flowers. In habit the slender leafy stems resemble *Appendicula lucbanensis* Ames.

The mentum is very slender and about equally thick from base to tip, and is closed in front up to the point where the lamina of the lip begins to dilate.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos & G. Edaña Bur. Sci. 38940*, June 27, 1920. Flowers pink and white. On tree in forest. 5000 feet altitude.

***Dendrobium* (§ *Desmotrichum*) *candoonense* Ames sp. nov.**
Aff. D. convexo Lindl. Rhizoma longe repens. Caules penduli, ramosissimi, in nodis infimis radicanes, fibrillis foliorum veteriorum obsiti, articuli ultimi in pseudobulbos clavatos, 2–3 cm. longos, plus minusve 3 mm. crassos incrassati, monophylli. Pseu-

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dobulbi usque ad basim attenuati, in sicco longitudinaliter sulcati, flavescentes, plus minusve 3 cm. inter se distantes, caulibus subparallelis. Folia 4–8 cm. longa, 4–7 mm. lata, ligulata, oblongo-lineararia, coriacea, apice inaequaliter bilobata, lobulis obtusis in petiolum brevem contracta. Racemi ex axilla folii unici orientes, basi squamis scariosis obsiti, perbreves. Flores succedanei, semper singuli, fugacissimi, vix aperti. Pedicellus cum ovario circa 3 mm. longus. Sepala lateralia 6 mm. longa, mentum apertum, obtusum, 3 mm. longum formantia, oblique triangula, obtusa, 4 mm. lata trans medium. Sepalum dorsale 4–5 mm. longum, circa 2.5 mm. latum, e basi lata ellipticum, subacutum. Petala membranacea, circa 5 mm. longa, lineararia, subacuta, trinervia. Labellum 1 cm. longum, a basi lineari cuneatum, trilobatum, lobo medio bifurcato, inter apices loborum lateralium 4 mm. latum, prope apicem 5 mm. latum; lobi laterales minuti, valde obtusi, vix 1.5 mm. longi; lobus medius quadratus, deinde profunde bilobulatus vel bifurcatus, e basi usque ad apicem lobulorum 4.5 mm. longus, infra lobulos vix 3 mm. latus; lobuli 2 mm. longi, 2 mm. lati, subelliptici, obtusi; lamellae in disco tres, quarum mediana brevissima; lamellae laterales in isthmo lobi medii valde curvatae, manifeste elevatulae. Gynostemium breve.

Dendrobium candoonense, among Philippine species, is most closely allied to *D. pseudoconvexum* Ames from which it is separated by its oblong linear leaves, three carinae on the disc instead of two, and by the smaller lateral lobes of the labellum which are not porrect as in *D. pseudoconvexum*.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos & G. Edaña Bur. Sci.* 38716, June 27, 1920. On tree trunk on forested slopes. Flower with red stripes. 5000 feet altitude.

Dendrobium crumenatum Sw. in Schrad. Journ. Bot. 2 (1799) 237.

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In the Philippine Islands the yellow stems of this plant are used for purposes of ornamental weaving. In the economic plant collection of the Bussey Institution of Harvard University there is a riding whip the handle of which is covered with interwoven strands taken from the stems of *Dendrobium crumenatum* and from a species of fern, probably from *Lygodium circinnatum* (Burm.) Sw.

Dendrobium Schuetzii Rolfe in Orch. Rev. 19 (1911) 224; in Bot. Mag. (1913) t. 8495.

A specimen of this species from the Province of Surigao in northwestern Mindanao, where it was collected in company with *D. Dearei* Reichb. f., is in my herbarium. Although *D. Schuetzii* was originally published without exact localization, the geographical origin being given as the Philippine Islands, it is now known to be a native of Mindanao. *Dendrobium Sanderæ* Rolfe, a near relative of *D. Schuetzii*, is a native of Luzon, where it has been found in the Province of Benguet and in Bontoc Subprovince. *Dendrobium Dearei* is represented in my herbarium by specimens from Mindoro, and from Dinagat Island, a small island just north of Mindanao.

Dendrobium (§ *Aporum*) *sinuosum* Ames sp. nov. Radices fibratae, albidae. Caulis plus minusve 30 cm. altus, e basi tereti paulum complanatus, medium usque conspicue foliatus, internodiis 4 cm. longis. Folia cum vaginis usque ad 5 cm. longa, 5 mm. lata, bene longiora quam altiora, lineari-lanceolata a latere visa, acuta, disticha, oblique ascendencia, supra medium caulis subito in foliolos complanato-subulatos decrescentia, foliolis plus minusve 4 cm. inter se distantibus, cum vaginis plus minusve 2.5 cm. longis, pars caulis aphylla sinuosa. Flores prope apicem caulis succedanei ut videtur, albidi et purpurei. Glomeruli florum certe pauciflori; bracteae griseae, quam ovarium longius pedicellatum

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bene breviores. Pedicellus cum ovario plus minusve 8 mm. longus, gracilis. Sepala lateralia triangula, 8 mm. longa, mentum apertum 5.5 mm. longum formantia, acuminata, apice breviter subulata. Sepalum dorsale 8 mm. longum, 2 mm. latum infra medium, anguste lanceolatum, acuminatum, acutum, apice breviter subulatum. Petala membranacea, 6 mm. longa, plus minusve 1 mm. lata supra medium, lanceolato-acuminata, e basi oblonga. Labellum vix trilobatum, prope medium in unguem 4.5 mm. longum contractum; lamina libera 6 mm. longa, 6 mm. lata trans basim, rotundato-triangula, subacuta, membranacea, margine irregulariter denticulato et crenulato; lineae tres breviter elevatulae per discum, in medio disci crista auctae. Gynostemium perbreve, 1 mm. altum in pedem 5 mm. longum productum. Anthera subconica, postice retusa, basi utrinque in auriculam producta, antice obtusa, apice bilobata, curvata.

Among Philippine species most closely related to *Dendrobium ventricosum* Kränzl. which has a very different labellum and larger more erect leaves. In habit it bears some resemblance to the Celebesian *D. chrysotainium* Schltr. which is a more robust species and is very different in the structure of the labellum.

The lower third of the stem is occupied by from six to thirteen obliquely spreading distichous leaves of about equal length. Above the lower third of the stem the leaves become suddenly reduced to form linear limbs about five in number that are approximately 13 mm. long to the tip from the point of contact with the stem and scarcely 2 mm. wide. The stem that bears these reduced leaves is complanate and more or less sinuous, and near its summit gives rise to clusters of bracts from among which the flowers are produced in succession. In height the plants examined range from eighteen to thirty-five centimeters. The anther is produced posteriorly, at the base, into a distinct auricle

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on each side, and at the shallowly bilobed tip is somewhat bent backward.

PHILIPPINES, Leyte, Tacloban, *C. A. Wenzel 0996*, May 5, 1916. Flower with white sepals and petals and a white, purple and yellow labellum. At sea level.

DENDROCHILUM *Bl.*

Dendrochilum (§ *Platyclinis*) *prodigiosum* *Ames sp. nov.*
Herba epiphytica. Radices fibratae, ramosae, glabrae. Pseudobulbi caespitosi, plus minusve 1 cm. longi, subfusiformes, in sicco flavidi, rugosi, monophylli. Folium cum petiolo 2.5–4.5 cm. longum, usque ad 11.5 mm. latum, anguste ellipticum, obtusum, bene marginatum, valde coriaceum. Petiolus 3–7 mm. longus, rigidus. Pedunculus terminalis, cum racemo 5.5–6 cm. longus, gracilis, usque ad racemum nudus, infra inflorescentiam bractea glumacea vestitus. Racemus densiflorus, 3 cm. longus, 1 cm. per medium. Pedicellus cum ovario plus minusve 2.5 mm. longus. Bracteae inflorescentiae glumaceae, nervosae, quadrato-ovatae, margine erosae, 5 mm. longae, ovarium excedentes. Sepala lateralia 6 mm. longa, 3 mm. lata trans basim, lanceolata, acuta, cum apiculo sub apicem, carnosae, trinervia, mentum brevem formantia. Sepalum dorsale 5 mm. longum, valde concavum, ovato-lanceolatum, trinervium. Petala ligulata, vix 5 mm. longa, 1 mm. lata, subacuta, trinervia. Labellum carnosum, 6 mm. longum, subsaccatum, basi gynostemii insertum, utrinque prope basim lobulo minuto instructum; hypochilium 4 mm. longum, bicarinatum, oblongum, marginibus erectis, apice dilatatum; lobus terminalis 2 mm. longus, 3 mm. latus transverse ellipticus. Discus lobi terminalis tricarinatus. Columna plus minusve 2 mm. longa. Brachia erecta, recurva, acuta, e parte superiore gynostemii orientia, anguste linearia.

Dendrochilum prodigiosum is without close allies in the Phil-

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ippine Islands. The structure of the labellum sets it clearly apart from all other members of the genus. The lip is subsaccate at the base and produced into a long semitubular hypochil which is terminated by a transversely elliptical plate or epichil. On either side of the hypochil, near the margin, a thickened keel extends from the base of the lip and terminates in a distinct callus. The terminal plate is tricarinate, the middle carina being longer than its companions and reaching nearly to the tip of the lip. Where the hypochil joins the column there is a tiny triangular lobe on each side.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Lipa, *M. Ramos & G. Edaña Bur. Sci. 38521*, July 13, 1920. On tree in mossy forest. Flowers brownish red. 6500 feet altitude.

EPIDENDRUM L.

Epidendrum strobiliferum Reichb. f. in *Nederl. Kruidk. Arch.* 4 (1858) 333.

This species has recently been collected in Guatemala. I do not find any record of this plant, heretofore published, that brings it within the Central American flora.

GUATEMALA, Department of Alta Verapaz, Chamá, *Harry Johnson 861*, October 15, 1920. On tree trunks, usually in sun. Flowers white. 900 meters altitude.

Epidendrum sulcatum Ames sp. nov. Aff. *E. gracillimo* Lehm. & Kränzl., speciei quam habitu et structura haec species conspicue simulat. Radices albidæ, ramosæ, glabrae, carnosæ. Caules ramosi, 8.5–12.5 cm. longi, plus minusve 4 mm. in crassitudine, quinquefoliati, foliis distichis, infra folia vaginis persistentibus, plus minusve 2.5 cm. longis, arcte appressis, complanatis, pars caulis aphylla usque ad 7.5 cm. longa. Folia coriacea, plus minusve 4.5 cm. longa, plus minusve 7 mm. lata, oblongo-linearum, acuta, nervo medio subtus carinato. Pedunculus elongatus, plus minusve 22 cm. longus, satis gracilis, basi bractea spatha-

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cea instructus, infra racemum bractea vaginanti, plus minusve 2 cm. longa, acuminata, acuta ornatus. Racemus usque ad 14 cm. longus, multiflorus, laxis, arcuatus, gracilis. Bractee inflorescentiae elongatae, plus minusve 1 cm. longae, anguste lanceolatae, valde acuminatae, acutissimae, ovarium aequantes vel excedentes. Pedicellus cum ovario 1 cm. longus, gracilis, oblique ascendens ut videtur. Sepala lateralia plus minusve 1.3 cm. longa, 3 mm. lata, conspicue quinquenervia, nervis prominentibus, extus nervo medio carinato, spathulato-lanceolata, acuminata, apice conduplicata. Sepalum dorsale 1.4 cm. longum, 2 mm. latum, lineari-oblongum, acutum, prominenter trinervium. Petala usque ad 12 mm. longa, 1 mm. lata supra medium, lineari-spathulata, acutissima, prope basim valde angustata, vix .5 mm. lata, nervo medio prominenti. Labellum 12-13 mm. longum, usque ad 7 mm. latum trans medium, valde trilobatum, circuitu hastatum, columnae appressum et cum eo in tubum connatum; lobi laterales semiorbiculares, margine denticulati, 4 mm. longi, vix 3 mm. lati; lobus intermedius primo oblongus deinde triangulus, acutus, 4 mm. longus, 3 mm. latus trans basim, margine minute denticulatus vel integer; discus prope apicem columnae conspicue bicarinalis, inter callos breviter carinatus, carina carnosae. Columna carnosae, 7 mm. longa, usque ad apicem ungui labelli adnata, in sicco alte bisulcata.

Closely allied with *Epidendrum gracillimum* Lehm. & Kränzl. which is much smaller in all its parts, with the lateral lobes of the labellum more conspicuously and coarsely dentate. The specific name alludes to the deep longitudinal grooves on the back of the column which are separated by a rounded rib.

COLOMBIA, State of Cauca, headwaters of Rio Lopez, Rio Palo basin, Tierra Adentro, *H. Pittier 1060*, January 1906. Epiphyte, flowers greenish yellow. 2500-3000 meters altitude. (TYPE in U. S. Nat. Herb. No. 531282.)

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ERIA *Lindl.*

Eria (§ *Eriuræ*) **candoonensis** *Ames sp. nov.* Herba epiphytica, plus minusve 3 dm. alta. Radices fibratae, ramosae. Caules erecti, plus minusve 8 mm. in crassitudine, rigidi, usque ad apicem foliosi, vaginis foliorum tecti. Folia disticha, 8–11 cm. longa, 10–12 mm. lata, coriacea, articulata, oblonga, apice valde inaequilobata, lobis obtusis. Vaginae foliorum 2 cm. longae, persistentes. Racemi terminales, in speciminibus nostris duo, plus minusve 1.5 dm. longi. Pedunculus infra racemum 4 cm. longus, dense lanuginosus, 2 mm. crassus. Racemus multiflorus, plus minusve 1 dm. longus. Bracteae inflorescentiae dependentes, plus minusve 7 mm. longae, lanceolatae, acuminatae, pubescentes, in sicco verruculosae. Flores plus minusve 4 mm. inter se distantes. Pedicellus cum ovario 1–1.4 cm. longus, dense lanuginosus. Sepala lateralia 5.25 mm. longa, 3.25 mm. lata prope basim, carnosa, ovato-lanceolata, obtuse acuta, quinquenervia, extus dense pubescentia. Sepalum dorsale 5.75 mm. longum, 2 mm. latum trans medium, anguste elliptico-lanceolatum, obtusum, extus pubescens. Petala 5 mm. longa, 1.25 mm. lata, prope apicem spatulata, obtusa, trinervia. Labellum unguiculatum, plus minusve 6 mm. longum, trilobatum, in circuitu semiorbiculatum, 6 mm. latum; unguis 1 mm. longus; lobi laterales labelli 2 mm. longi, 1.5 mm. lati trans basim, semiovati, obtusi, lobum intermedium aequantes; lobus intermedius 2 mm. longus, 5.5 mm. latus, leviter retuso-apiculatus, transverse ellipticus. Calli sex, tres prope basim labelli, in disco utrinque callus complanatus, breviter carinatus prope sinum, in medio lobi terminalis tuberculum permagnum, erectum, complanato-conicum. Columna brevis.

A very distinct species well characterized by its distichous, rigid leaves. The calli of the labellum in the less mature flowers are covered with a farinaceous substance that is formed by the

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breaking down of trichome-like structures at an early period in the development of the flowers. In mature flowers this farinaceous substance soon passes away. The central callus of the basal trio is curved backward and is much taller than its companions; the lateral calli are membranaceous, triangular, obtuse, purplish in color and posteriorly shortly carinate. The large fleshy callus on the middle lobe is flattened laterally, is 2 mm. tall and is blunt at the apex.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos & G. Edaña Bur. Sci. 38941*, June 27, 1920. Flowers whitish yellow, labellum purplish. 5000 feet altitude.

Eria hirsutipetala *Ames sp. nov.* Rhizoma validum, tomento rufo vestitum, radicans, circa 1 cm. per medium. Caules erecti, usque ad 16 cm. alti, plus minusve 6 mm. in crassitudine, in sicco longitudinaliter sulcati, pilosi, prope medium vagina inflata, 3.5 cm. longa, laxe appressa vestiti. Folia prope apicem caulis conferta, plerumque tria, usque ad 17 cm. longa, 1.5–2.4 cm. lata, utrinque attenuata, coriacea, anguste elliptica, apice inaequaliter bilobata, lobulis obtusis, in petiolum brevem contracta, nervo medio subtus prominenti. Racemi quam folia breviores, plus minusve 2 cm. longi, pauciflori, rubro-villosi, floribus plerumque glomeratis. Bracteae inflorescentiae circa 8 mm. longae, dense rufo-villosae, concavae, rotundatae, margine erosae, quam pedicellus cum ovario vix breviores. Flores circa 1 cm. longi, tomento rufo vestiti. Sepala lateralia circa 8 mm. longa, carnosa, triangulari-lanceolata, subacuta, intus pubescentia, extus villosa, mentum 4 mm. longum, obtusum formantia. Sepalum dorsale 9–10 mm. longum, oblongo-ellipticum, valde concavum, obtusum, extus dense villosum, intus pubescens. Petala valde carnosa, circa 8 mm. longa, 2 mm. lata, oblonga, extus pubescentia, intus hirsuta, apice attenuata et incrassata, obtusa vel subacuta. Labellum 8 mm. longum, usque ad 4.5 mm. latum prope

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basim, breviter unguiculatum, circuitu ovato-lanceolatum, obtusum, valde carnosum, extus pubescens. Columna 4 mm. longa, pubescens, in pedem 4 mm. longum producta.

This is a very remarkable species which differs conspicuously from its Philippine allies in the short stems with from two to four leaves near the summit, in the manner of species of section *Hymeneria*, in the stout rhizomes which at the base of young shoots are covered by closely appressed tubular bracts with a dense reddish tomentum, and in the fleshy petals, thickened at the tip, which are densely pubescent on both sides.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Tangcunan and vicinity, *M. Ramos & G. Edaña Bur. Sci. 39124*, July 2, 1920. On tree in mossy forest. Flowers yellow and coffee color. 5500 feet altitude.

Eria (§ *Hymeneria*) ***macera*** *Ames sp. nov.* Herba epiphytica. Rhizoma repens. Radices fibratae, ramosae, pubescentes. Caules aggregati, graciles, plus minusve 2 dm. longi, in sicco plus minusve 2.5 mm. in crassitudine, pauciarticulati ut videtur, vaginis tubulatis vestiti, plerumque trifoliati. Folia plus minusve 12 cm. longa, usque ad 1 cm. lata, lineari-oblonga, in sicco chartacea, utrinque attenuata, acuta, oblique erecta. Racemi subapicales, laxiflori, floribus 8 mm. inter se distantibus, cum pedunculo usque ad 5 cm. longi, plus minusve quadriflori, glabri. Bracteae inflorescentiae usque ad 5 mm. longae, in sicco chartaceae, ovatae, acutae, margine erosae. Pedicellus cum ovario 6–13 mm. longus, gracilis, glaber. Sepala lateralia plus minusve 11 mm. longa, usque ad 2.5 mm. lata trans basim, triangulari-oblonga, usque ad apicem attenuata, acuta, mentum obtusum 2 mm. longum formantia. Sepalum dorsale simile, plus minusve 1 cm. longum, 3 mm. latum. Petala 9 mm. longa, 2–2.75 mm. lata, ligulata, acuta, trinervia, apice incrassata. Labellum 4 mm. longum, 3 mm. latum infra medium, 2 mm. latum trans lobum

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medium, circuitu ovatum, vix unguiculatum, obtusum, trilobatum; lobi laterales e medio labelli orientes, minuti, obtusi; lobus medius ellipticus, 2 mm. longus, margine ciliolata, per medium disci carina carnosae usque ad basim lobi medii extendit, utrinque prope marginem labelli carinis duabus prostratis. Columna 2 mm. longa in pedem 1 mm. longum producta. Pollinia octo.

The elongated stems with as many as six tubular sheaths which loosely invest them at the period of anthesis; the slender peduncles and few-flowered loose racemes which arise from among the sheaths just below the obliquely erect, oblong-linear leaves, give to this species a very distinct aspect among its nearest allies in the Philippines. From *Eria retroflexa* Lindl. it differs in the few-flowered racemes, three-lobed lip with distinct carinae and in the linear-oblong leaves.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Lipa, *M. Ramos* & *G. Edaña Bur. Sci. 38512*, July 12, 1920. On trees on mossy forest slope. Flowers yellowish white. 6400 feet altitude.

Eria (§ *Hymeneria*) **microchila** *Ames sp. nov.* Planta habitu *E. philippinensis*. Caules ramosi, vagi, oblique ascendentes, cataphyllis laxe imbricantibus, obtusis, in sicco fulvis tecti. Caules foligeri usque ad 1.5 dm. longi, super vix 1 cm. in crassitudine, rugosi, infra medium attenuati, plus minusve 5 mm. crassi. Vaginae caulis in sicco inflatae, plus minusve 2 cm. longae, in sicco chartaceae, prope basim caulis imbricatae, apice foliatae. Folia plus minusve 1.5 dm. longa, 10–18 mm. lata, utrinque attenuata, acutissima, in sicco chartacea, oblique erecta, quinque ad septem. Racemi nonnulli ex axillis superioribus, plus minusve 1.5 dm. longi, pubescentes, tomento brunneo vestiti. Bractee racemi reflexae, plus minusve 6 mm. longae, lanceolatae, acutae, glabrae. Pedicellus cum ovario arcuatus, usque ad 9 mm. longus, dense pubescens, tomento brunneo tectus. Flores

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extus sparsim brunneo-pubescentes. Sepala lateralia triangula, 9 mm. longa, mentum 3 mm. longum formantia, margine infra medium ciliata. Sepalum dorsale ligulatum, 1 cm. longum, plus minusve 1.5 mm. latum, margine ciliata. Petala oblonga, utrinque leviter attenuata, 9 mm. longa, 2.25 mm. lata, obtusa, trinervia. Labellum breviter unguiculatum, 3 mm. longum, 2 mm. latum trans basim laminae, cordato-lanceolatum, apice obtusum, utrinque prope basim callo breviter carinato instructum; unguis vix .5 mm. longus. Columna 1.5 mm. longa in pedem 2.5 mm. longum producta.

Eria microchila is closely allied to *E. philippinensis* Ames, but is distinct from it in the smaller flowers. From *E. Hutchinsoniana* Leavitt it is in part separated by the different foliage and bicallose lip.

In young flowers of *E. microchila* the lip is distinctly bicallose near the base, close to the margin, and supplementary calli may be detected near the middle nerve in front of the claw. It would seem that these calli are evanescent, as in older flowers they are wanting.

PHILIPPINES, LUZON, Bontoc Subprovince, Mount Cauca, *M. Ramos & G. Edaña Bur. Sci.* 37997, March 7, 1920. On tree trunk in mossy forest. 5600 feet altitude.

Eria (§ *Aeridostachyae*) **propinqua** *Ames sp. nov.* Aff. *E. aeridostachyae* et *E. Whitfordio*. Radices fibratae, ramosae, glabrae. Pseudobulbi cauliformes, 3–4 cm. longi, plus minusve 1.5 cm. in crassitudine, diphylli, vaginis magnis laxisque omnino tecti. Folia plus minusve 2.5 dm. longa, usque ad 3.9 cm. lata, valde coriacea, ligulata, utrinque angustata, quam racemus longiora, nervo medio prominenti. Pedunculus cum racemo 1.5 dm. longus, pubescens. Rachis inflorescentiae dense pubescens, tomento flavido perbrevis. Racemus dense multiflorus, cylindraceus, arcuatus, 1.8–1.9 cm. trans medium. Bractee inflorescen-

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tiae flores subtendentes, squamiformes, late ovatae, cucullatae, 1 mm. longae. Pedicellus cum ovario 3.5 mm. longus ad basim menti; mentum 2 mm. longum. Flores extus dense flavido-pubescentes. Sepala lateralia vix 3 mm. longa, 4 mm. in diametro maximo, falcata, subacuta. Sepalum dorsale 3.5 mm. longum, valde concavum vel cochleatum, ovato-oblongum, trinervium. Petala ligulata, curvata, 3 mm. longa, 1 mm. lata, obtusa, trinervia. Labellum simplex, 4 mm. longum, 2 mm. latum, aliquid incrassatum, oblongo-ovatum, acutum, margine crenulata, tri- vel quinquenervium, ecallosum, vix unguiculatum. Columna in pedem crassum producta.

Smaller in all floral parts than *E. Whitfordii* Leavitt to which it is closely allied. In dried specimens the flowers appear to have been yellowish with purplish petals. In herbarium specimens easily separated from its near allies by the yellowish rather than rusty pubescence of the peduncle and flowers. From *E. Mearnsii* Leavitt clearly distinguished by the proportions of the labellum.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos* & *G. Edaña Bur. Sci.* 38939, June 27, 1920. On tree in forest. 5000 feet altitude.

Eria (§ *Hymeneria*) **vagans** *Ames sp. nov.* Planta habitu *E. philippinensis* Ames. Caules ramosi, vagi, lignosi, plerumque abbreviati, demissi ut videtur, caulibus foligeris plus minusve 4 cm. inter se, usque ad 1 dm. longis, cataphyllis laxe tectis. Folia plerumque anguste lanceolata, approximata, plus minusve 7 cm. longa, usque ad 14 mm. lata, utrinque attenuata, subcoriacea, apice inaequaliter bilobata. Racemi ex axillis superioribus, foliis longiores, plus minusve 8 cm. longi, laxiflori, rachide pubescenti, pilis rufis. Bractee inflorescentiae plus minusve 4 mm. longae, ovato-ellipticae, acutae, subglabrae vel sparsim pubescentes, trinerviae. Pedicellus cum ovario 6–9 mm. longus, leviter

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arcuatus, tomento denso rufo. Flores 10 mm. longi, prope basim sepalorum pubescentes, plus minusve 8 mm. inter se distantes. Sepala lateralia usque ad 10 mm. longa, mentum 3 mm. longum formantia, triangularia, subacuta. Sepalum dorsale 7 mm. longum, 3 mm. latum, ligulatum, ad basim vix attenuatum, obtusum. Petala 9 mm. longa, vix 3 mm. lata, anguste lanceolata, obtusa, trinervia, in sicco pellucida. Sepala petalaeque membranacea. Labellum 5 mm. longum, trans basim plus minusve 4 mm. latum, late ovatum, obtusum, margine irregulariter denticulata, utrinque supra basim callo carinato ornatum; unguis perbrevis. Columna circa 3 mm. longa in pedem 3 mm. longum producta. Anthera transverse elliptica.

Eria vagans belongs to the same category with *E. philippinensis* Ames and *E. dagamensis* Ames, but differs from them in its smaller flowers and much shorter racemes. In general aspect it is a more compact species than either *E. philippinensis* or *E. dagamensis*, the flowering stems being much shorter than in *E. dagamensis* to which it is most closely allied.

From the specimens examined *E. vagans* is of decidedly straggling habit, the flowering stems arising as shortened growths from an elongated, primary, leafless stem.

PHILIPPINES, LUZON, Bontoc Subprovince, Bauco, *Vanoverbergh* 3896, January 12, 1914. Epiphyte on trees. Plant 5 dm. high. 1700 meters altitude; *Vanoverbergh* 2223, January 1913. Here the following specimens should be referred, Luzon, Province of Benguet, Baguio, *Elmer* 8801, March 1907.

HABENARIA *Willd.*

Habenaria bicornis *Lindl.* Gen. & Sp. Orch. (1835) 309.

Originally described from Cuban material. This species has not been reported from Central America heretofore.

PANAMA, Canal Zone, Las Sabanas, *H. Pittier* 6792, September 10, 1914.

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LIPARIS *L. C. Rich.*

Liparis (§ *Distichae*) *magnicallosa* *Ames sp. nov.* Aff. *L. propinqua* *Ames.* Herba epiphytica. Radices fibratae, glabrae, albidae, prope pseudobulbos orientes. Rhizoma repens, valde elongatum, plus minusve 2 mm. in crassitudine, vaginis scariosis, tubulatis vestitum. Pseudobulbi plus minusve 1 cm. alti, pyriformes, usque ad 7 mm. in crassitudine trans basim, 2–4 cm. inter se distantes, monophylli, in sicco valde rugosi, erecti. Folium plus minusve 12 cm. longum, usque ad 9 mm. latum, in sicco subchartaceum, utrinque attenuatum, acutum, lineari-oblongum, erectum, prominenter quinquenervium, nervulis interjectis. Scapus erectus, plus minusve 12 cm. longus, bialatus, infra racemum nudus, complanatus, circa 1 mm. per medium, folio brevior. Racemus usque ad 4 cm. longus, multiflorus, floribus flavidis, perpaucis eodem tempore apertis. Bractee inflorescentiae distichae, usque ad 6 mm. longae, circa 2 mm. latae a latere visae, demum deciduae. Pedicellus cum ovario usque ad 15 mm. longus, valde gracilis, bractea subtendenti multo longior. Sepala lateralia dependentia, 5 mm. longa, vix 2 mm. lata, oblongo-elliptica, acuta, apiculata, extus nervo medio prominenti, in apiculum producta. Sepalum dorsale dependens, 5 mm. longum, circa 1 mm. latum, anguste elliptico-lanceolatum, apiculatum, extus nervo medio prominenti. Petala dependentia, 4 mm. longa, .5 mm. lata prope apicem, linearia, acuta, usque ad basim attenuata, membranacea. Labellum 4 mm. longum, usque ad 2 mm. latum trans medium, dependens, oblongo-ovatum, leviter obconeatum, obtuse et breviter apiculatum, haud retusum, infra apicem 1.25 mm. latum, 2.25 mm. latum trans basim, ad basim callo permagno ornatum, eo usque ad rostellum columnae pertinenti, plus minusve 1 mm. alto, erecto, transverse 1 mm. lato, curvato, utrinque callo minore, complanato, carinato instructum. Co-

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lumna 2 mm. alta, valde arcuata, utrinque prope apicem breviter alata. Anthera antice truncata.

In habit similar to *L. cyclostele* Schltr. and *L. gibbosa* Finet. From *L. propinqua* Ames it differs conspicuously in the form of the labellum and petals. *Liparis Amesiana* Schltr. is very similar in habit, but is clearly set apart by the cuneate labellum which is much broader at the tip than at the middle.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Candoon, *M. Ramos & G. Edaño Bur. Sci.* 38739, June 27, 1920. On trees on forested slopes of the mountain. 5000 feet altitude.

Liparis (§ *Distichae*) **prava** *Ames sp. nov.* Herba epiphytica usque ad 16.5 cm. alta, gracilis. Radices fibratae, prope pseudobulbos orientes. Rhizoma repens, lignosum, plus minusve 2 mm. in crassitudine, vaginis scariosis, tubulatis tectum. Pseudobulbi plus minusve 5 mm. longi, usque ad 2.5 cm. inter se distantes, pyriformes, erecti, in sicco rugosi, monophylli, juniores vaginis inclusi. Folium usque ad 11 cm. longum, 3–6 mm. latum, lineare, apiculatum, apiculo brevi, nervo medio subtus prominenti. Scapus usque ad 8 cm. longus, bialatus, infra racemum nudus, 1 mm. per medium, folio brevior. Racemus plus minusve 1 cm. longus, multiflorus. Flores bicolores, perpauci eodem tempore aperti. Bractee inflorescentiae distichae, usque ad 8 mm. longae, vix 2 mm. altae, persistentes. Pedunculus cum ovario 8–11 mm. longus, gracilis, quam bractee inflorescentiae longior. Sepala lateralia dependentia, 6–7 mm. longa, vix 3 mm. lata trans medium, ovato-lanceolata, extus nervo medio prominenti, in apiculum productum. Sepalum dorsale 5–6 mm. longum, 2 mm. latum infra medium, lanceolatum, extus nervo medio prominenti in apiculum productum. Petala erecta, usque ad 5 mm. longa, 1 mm. lata, ligulato-oblonga, basi angustata, apice rotundata, margine revoluta. Labellum 5.5 mm. longum, usque ad 3.5 mm. latum

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trans basim, 2 mm. latum trans medium, vix 3 mm. latum trans apicem, supra basim gibbosum, abrupte deflexum, circuitu late panduratum, apice retuso-apiculato, prope basim callo lobato ornatum. Columna carnosae, 2.5 mm. alta, prope medium dilatata; alae terminales in dentes triangulares, porrectos reductae. Anthera antice obtusa.

This species differs very much from *L. gibbosa* Finet in the structure of the column, the wings being reduced to triangular teeth which are somewhat deflexed at the acute apex, and directed forward. Among Philippine species *L. propinqua* Ames is most similar to *L. prava* in the structure of the flower, but the wings of the column in that species are blunt, and the labellum when spread out is not conspicuously constricted at the middle. In habit the plants of *L. prava* resemble those of *L. Amesiana* Schltr., but the floral differences are great

PHILIPPINES, Leyte, Jaro, Conpagal, *C. A. Wenzel 0718*, November 24, 1914. Sepals and petals flesh color, labellum flesh color and orange. Epiphyte. 800 meters altitude.

Liparis (§ Distichae) **propinqua** *Ames sp. nov.* Radices fibratae, albae, graciles. Rhizoma lignosum. Pseudobulbi approximati, lageniformes, monophylli, 2–2.5 cm. longi, vaginis foliaceis scariosis subtenti. Folium 7–16 cm. longum, usque ad 1 cm. latum, lineari-oblongum, acutum, quam scapus longius, rigidum, subcoriaceum, basim scapi plus minusve vaginans. Scapus bialatus, cum racemo usque ad 12 cm. longus, gracilis. Rachis brevis, 1–2 cm. longa. Bracteae inflorescentiae distichae, approximatae, conduplicatae, plus minusve 4 mm. longae, acutae. Flores succedanei, parvi, aurantiaci. Pedicellus cum ovario usque ad 1 cm. longus, gracilis, glaber, leviter bialatus. Sepala lateralia 4 mm. longa, plus minusve 2 mm. lata, oblongo-elliptica, acuta, apice incrassata, extus carinata, trinervia, dependentia.

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Sepalum dorsale elliptico-lanceolatum, 4 mm. longum, plus minusve 1.5 mm. latum, apice leviter incrassatum, extus leviter carinatum. Petala 4 mm. longa, 1 mm. lata prope apicem, spathulata, valde obtusa vel obscure apiculata, apiculis obtusis. Labelium sessile, 3 mm. longum, plus minusve 2 mm. latum prope basim, in circuitu late ovatum, mucronatum, glabrum; callus pulvinatus, transversus, antice bilobus, ad basim columnae cohaerens. Columna suberecta, lamina vel ala longitudinalis utrinque columnae latera percurrens. Anthera ovata, antice subrostrata, obtusa. Pollinia rotundato-triangularia.

A close ally of *Liparis gibbosa* (Bl.) Finet, from which it is in part distinguished by the smooth labellum, by the pseudobulbs being less remote from one another, and by subtle differences in the structure and consistency of the flowers which are quite apparent when the two species are compared side by side. In the Javan *L. gibbosa* the labellum in specimens that I have studied is minutely, although conspicuously, papillose. In both species the labellum is similar in outline and in having the characteristic constriction at the sides which gives a pandurate aspect to the lamina when in natural position. It would seem that the Philippine specimens referred to *L. disticha* belong here.

PHILIPPINES, Bancalan Island, *C. M. Weber 011*, October 14, 1916. Epiphyte. Flower orange. At sea level.

MALAXIS *Soland. ex Sw.*

Malaxis bracteosa *Ames sp. nov.* Aff. *M. Junghuhnio* (J. J. Sm.) Ames. Herba epiphytica, cum racemo usque ad 30 cm. alta. Radices fibratae, elongatae. Pseudobulbi vel caules abbreviati, usque ad 3–4 cm. alti, basi tumida, plus minusve 1 cm. per medium, vaginis scariosis tecti, paucifoliati. Folia lanceolata, plus minusve 10 cm. longa, usque ad 4 cm. lata infra medium, conferta,

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acuminatissima, acuta, in petiolum latum, vaginantem transeuntia, valde chartacea, in sicco pellucida. Scapus elongatus, usque ad 26 cm. altus, gracilis, fere usque ad basim bracteatus, multiflorus, floribus parvis, flavidis. Bracteae inflorescentiae lineares, 3–8 mm. longae, vix 1 mm. latae, patentés, margine scabridiuscula. Racemus plus minusve 20 cm. longus, cylindræus, circa 1.5 cm. per medium. Pedicellus cum ovario circa 5 mm. longus, gracilis, quam bractea subtendens paulo brevior. Sepala lateralia circa 2 mm. longa, plus minusve 1 mm. lata, oblongo-elliptica, manifeste uninervia, deflexa. Sepalum dorsale simile, 2 mm. longum, erectum. Petala 2 mm. longa, linearia, obtusa, patentia. Labellum trilobatum, e basi columnae ad apicem lobi medii 2 mm. longum, inter apices loborum lateralium 2 mm. latum; lobi laterales antice rotundati, post columnam in auriculas 2 mm. longas, triangulas producti, auriculis obtusis. Columna 1 mm. longa, auriculis obtusis, erectis.

Malaxis bracteosa is a near ally of *M. Junghuhnii* (J. J. Sm.) Ames which it resembles very closely in the shape of the labellum.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mahilucot River, *M. Ramos & G. Edaño Bur. Sci. 38658*, July 15, 1920. Along streams in forest on tree. 4200 feet altitude.

NOTYLIA *Lindl.*

Notylia panamensis *Ames sp. nov.* Herba epiphytica, rhizomate valde abbreviato, radicibus fibratis, elongatis, flexuosis, glabris. Pseudobulbi plus minusve 2 cm. longi, complanati, compressi, monophylli, vaginis foliatis duabus obtecti. Folia plus minusve 1.5 dm. longa, 31–36 mm. lata, coriacea, nervo medio conspicuo, oblonga, utrinque vix attenuata, apice inaequaliter et obtuse bilobulata, basi in petiolum plus minusve 1 cm. longum conduplicatum contracta. Pedunculus infra racemum plus mi-

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nusve 7 cm. longus, bracteis nervosis, setaceis obsessus. Racemus densiflorus, 12.5 cm. longus, in sicco usque ad 22 mm. per medium. Bractee inflorescentiae in sicco scariosae, triangulari-lineares, valde acuminatae, setaceo-acutae, trinerviae, plus minusve 4.5 mm. longae. Pedicellus cum ovario 5–6 mm. longus, gracilis. Flores albidi. Sepala lateralia 8 mm. longa, usque ad apicem in laminam lineari-lanceolatam connata, in sicco conspicue binervia. Sepalum dorsale 7 mm. longum, 5 mm. latum, valde concavum, ellipticum, obtusum. Petala elliptico-lanceolata, acuta, 7 mm. longa, usque ad 2.5 mm. lata, basi leviter cuneata. Labellum sagittatum, basi carinato-callosum, cum ungue 6 mm. longum, 3 mm. latum trans basim; unguis 1 mm. longus. Columna tertiuscula, glabra, 3 mm. longa, rostello in gibbum incrassato. Pollinia generis.

The large flowers in a crowded drooping raceme give to this species a very distinct aspect from that of the other Central American species.

PANAMA, Marraganti and vicinity, *R. S. Williams 977*, April 3–9, 1908. 10–200 feet altitude. (TYPE in Herb. N. Y. Bot. Gard.)

OBERONIA *Lindl.*

Oberonia linearifolia *Ames sp. nov.* Aff. *O. neglectae* Schltr. Herba parvula, radicibus fibratis, albidis, flexuosis. Caules abbreviati, plus minusve 1 cm. longi, vaginis foliorum omnino obtecti, complanati. Folia quinque ad decem, anguste ensiformia, linearia a latere visa, patentia, acuta, disticha, prope basim vaginantia, 2.5–6 cm. longa, 1.3 mm. lata, quam racemus multo breviora, oblique erecta. Racemus floribus in genere inter minimos, 5–7 cm. longus, gracilis, 2 mm. per medium, densiflorus. Bractee infra racemum scariosae, lineari-setaceae, arcte appressae. Bractee inflorescentiae triangulares, acuminatae, valde acutae. Se-

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pala lateralia vix 1 mm. longa, subacuta, ovata, usque ad medium connata, membranacea, pellucida. Sepalum dorsale simile. Petala anguste elliptica vel oblonga, obtusa vel subacuta, obscure denticulata, .5 mm. longa. Labellum trilobatum, apice bilobulatum, mucrone obtuso interjecto, lobulis angustatis, setaceis, e basi labelli usque ad lobulum terminalem 1 mm. longum, inter apices loborum lateralium 1 mm. latum; lobi laterales basilares, triangulares vel subquadrati, margine plerumque inaequali. Columna minuta.

Closely allied to *Oberonia neglecta* Schltr. from which it differs in the apical lobe of the labellum, in the proportionately shorter lateral lobes and in the slightly larger flowers. In habit *O. linearifolia* is very similar to *O. neglecta* Schltr. from Borneo and to *O. potamophila* Schltr. from Sumatra.

The terminal portion of the labellum resembles very closely the labellum of *O. Mannii* Hook. f. as illustrated in *Icones Plantarum* t. 2003, f. 2. When one bears in mind the great range of variation that is characteristic of the very delicate lip-lobes in the microscopically small flowers of the alliance to which *O. linearifolia* and *O. neglecta* belong, it may well be asked if they do not represent the same species. I originally identified my material as conspecific with *O. neglecta*. Material was submitted to Dr. Schlechter for comparison with his type specimen. On his assurance that my material did not agree with *O. neglecta* and relying on a sketch and analysis of the flower of the type, it was decided to propose a new species. (PLATE 114.)

BORNEO, Sarawak, *Native Collector 921*. (Collected through the Sarawak Museum for the Bureau of Science, Manila, Philippine Islands.)

Oberonia lipensis *Ames sp. nov.* Planta epiphytica, minima, vix caulescens, cum racemo usque ad 8.5 cm. alta. Radices fibratae, glabrae. Caules abbreviati, vaginis foliorum tecti, valde com-

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planati. Folia disticha, anguste ensiformia, 16.5–42 mm. longa, usque ad 4 mm. lata a latere visa, acuta, infra medium haud attenuata, coriacea, oblique ascendente, scapo multo breviora. Scapus cum racemo usque ad 7 cm. longus, gracilis, multiflorus, sublaxiflorus, racemo 4.5 mm. per medium, rachide glabra. Bractee inflorescentiae 2 mm. longae, ovato-lanceolatae, acuminatae, acutae, margine erosa. Flores flavidi, parvi. Pedicellus cum ovario 1.5 mm. longus. Sepala lateralia 1 mm. lata, valde concava, late ovata, acuta, reflexa, in sicco pellucida. Sepalum dorsale simile. Petala 1 mm. longa, anguste lanceolata, obtusissima, margine erosa. Labellum 1.5 mm. longum, valde concavum vel leviter saccatum, basi cordata in lobulos producta, lobulis suberectis obtusis; pars terminalis labelli bilobata, lobis quadratis, mucrone obtuso, lato interjecto. Columna minuta.

Oberonia lipensis is allied to *O. benguetensis* Ames which has a very different labellum, the terminal lobes being very short. It is also allied to *O. minima* Ames, which is a much smaller species with acute lobes at the tip of the labellum. In habit not unlike *O. linearifolia* Ames and *O. neglecta* Schltr., but with a very different labellum.

The base of the labellum is distinctly cordate, the rounded basal lobes or rather auricles directed backward. In front of the column the lamina of the lip is deeply concave or subsaccate, at the middle it is constricted and terminates in two divergent quadrangular lobes which are truncate at the tip.

PHILIPPINES, Mindanao, Bukidnon Subprovince, Mount Lipa, *M. Ramos* & *G. Edaña Bur. Sci.* 38535, July 13, 1920. On tree in mossy forest. 6600 feet altitude.

Oberonia minutissima *Ames sp. nov.* Herba epiphytica, 6–10 cm. alta, gracilis, acaulescens. Radices fibratae. Folia basi imbricata, linearia a latere visa, usque ad 10 cm. longa, plus mi-

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nusve 5 mm. lata, oblique erecta, anguste ensiformia, equitantia, folia exteriora quam folia interiora multo breviora, 2–4.5 cm. longa. Pedunculus quam folia brevior, 6–8 cm. longus, 2–4 mm. per medium, flexuosus vel arcuatus, longitudinaliter plurialatus. Bracteae infra inflorescentiam lineares, acuminatissimae, congestae, numerosae. Bracteae inflorescentiae plus minusve 2 mm. longae, integrae, lineares, apice longe acuminatae, acutissimae, flores excedentes. Flores verticillati, verticillis plus minusve 2 mm. inter se distantibus. Pedicellus cum ovario 1 mm. longus, subgracilis, glaber. Sepala lateralia .75 mm. longa, .25 mm. lata trans basim, late triangulari-ovata, acuta, pellucida, reflexa. Sepalum dorsale simile. Petala .5 mm. longa, vix .25 mm. lata, elliptica, apice rotundata, margine crenato-dentata. Labellum .5 mm. longum, .25 mm. latum trans lobos laterales, conspicue trilobatum; lobi laterales alte et inaequaliter quadri- vel quinque-dentati, patentés, .25 mm. longi; lobus medius .25 mm. longus, e basi oblonga leviter dilatatus, in lobulos duos, divaricatos productus. Columna minuta, apice valde dilatata, pellucida.

Although much more slender in all its parts and with much smaller flowers, this species is closely allied to *O. cylindrica* Lindl.

PHILIPPINES, Mindanao, Province of Surigao, Placer, *C. A. Wenzel* 1030, July 16, 1916. Epiphyte in forest. Flowers light green. 150 meters altitude.

PLEUROTHALLIS *R. Br.*

Pleurothallis consimilis *Ames sp. nov.* Herba epiphytica. Rhizoma repens, in sicco curvatum et angulatum, vaginis in fibras solutis vestitum, radicibus flexuosis, glabris, maxima parte sub caulibus secundariis. Caules secundarii 1–1.5 cm. inter se distantes, plus minusve 2 cm. alti, valde compressi, prominenter canaliculati, uniarticulati, folio breviores, dimidio basali va-

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gina in fibras soluta vestiti. Folia elliptica vel oblongo-elliptica, 2.5–3.5 cm. longa, 8–13 mm. lata, coriacea, apice minute bidentato et apiculato, basi cuneata, in sicco multinervosa, nervo medio subtus carinato. Pedicelli uniflori, singuli vel bini, basi vaginis in fibras solutis vestiti, in parte superiore vagina tubulari donati. Flos a sepali dorsalis apice ad labelli apicem 1.3 cm. longus, membranaceus. Sepala lateralia oblique semiovalia, 5 mm. longa, 2.5 mm. lata trans medium, obtusa, trinervia. Sepalum dorsale lineari-oblongum, 8 mm. longum, 1.45 mm. latum sub apice, acutum, trinervium. Petala tenuiora, anguste rhomboideo-lanceolata, 3.8 mm. longa, .8 mm. lata, acuta vel obtusa, uninervia, marginibus superioribus serrulatis. Labellum trilobatum, hastatum, unguiculatum; unguis basi callo convexo omnino obtectus; lamina 3.8 mm. longa, 2.5 mm. lata trans lobos laterales, basi callo magno, convexo; lobi laterales basales, minuti, patentés, ovato-triangulares; lobus medius deltoideus 2.9 mm. longus, 1.8 mm. latus, apice late obtusus, margine ciliata, dimidio basali callis duobus remotis. Gynostemium gracile, 3.2 mm. longum, apex alis tribus dentatis praeditus.

Near allies of this species are *Pleurothallis fimbriata* Lindl., which has smaller flowers and secondary stems that are much longer than the leaf, and *P. papillosa* Lindl. in which the labelum and petals are entire. *P. josephensis* Rodr. is similar in habit, but is more robust in all its parts.

TRINIDAD, B. W. I., Valencia, *N. L. Britton, E. G. Britton & T. E. Hazen*
1026, March 1920. On forest trees.

***Pleurothallis Hitchcockii* Ames sp. nov.** Herba epiphytica. Rhizoma abbreviatum, radicibus numerosis, albidis, filiformibus. Caules caespitosi, approximati, prope basim uniarticulati et nigromaculati et vaginis duabus tubularibus arcute cincti. Folium ellipticum, apice obtusum, basi cuneato-rotundatum, coriaceum,

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nervo medio subtus carinato. Petiolus strictus, canaliculatus. Pedicelli nonnulli, aggregati, uniflori, bractea scariosa nervosa in fibras soluta inclusi. Sepala lateralia tertia parte inferiore connata, anguste lanceolata, sensim longe acuminata, apicibus conduplicatis, basi concava. Sepalum dorsale lanceolatum, longe acuminatum, basi valde concavum. Petala multo minora, lanceolato-lineararia, prope basim lobo brevi porrecto. Labellum subhastatum, apice obtusum, basi utrinque lobulo anguste falcato, obtuso, valde incurvo et disco incumbenti praeditum; discus inter lobos basales callo parvo ornatus. Columna minuta, basi valdissime alata, ala subito angustata, apice triloba, lobo medio denticulato.

Plant epiphytic, up to 16.6 cm. high, the rhizome abbreviated and conspicuously supplied with whitish, flexuose fibrous roots. Secondary stems about 10 cm. high, monophyllous, erect, slender, terete, with a nigro-annulate articulation near the base and with two closely appressed scarious tubular bracts. Leaf about 6.35 cm. long by 2.4 cm. wide, elliptical, coriaceous, obtuse at the tip, cuneate at base, middle nerve prominent beneath. Petiole about 12 mm. long, rigid, canaliculate. Pedicels much reduced, aggregated, one-flowered, partly concealed by the sheathing bract that soon breaks down into numerous fibres at the base of the petiole of the leaf. Flower about 18 mm. long, brownish and membranaceous in dried specimens. Lateral sepals about 17 mm. long, connate for about one third of their length, strongly concave at base, each about 2 mm. wide at point of separation, narrowly lanceolate, acuminate, acute, thickened at the apex and somewhat conduplicate. Dorsal sepal 1.8 cm. long, 4 mm. wide near the base, lanceolate, long acuminate, strongly concave, subacute. Petals about 6 mm. long, .8 mm. wide below the middle, linear-lanceolate, provided — about 2 mm. above the base —

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with a minute lobe that is approximately .5 mm. wide and situated on the posterior margin. Labellum 7 mm. long, about 4 mm. wide at the broadest part (2.5 mm. above the base), subhastate in outline from a cuneate claw, three-nerved, near the base on each side provided with a falcate, obtuse lobe that is about 3 mm. long and shortly decurrent along the lateral nerve, slightly angled on the exterior margin and cucullate at the tip. Between the lateral lobes, on the disc, there is a small oblong callus which is truncate at both ends. Below the middle of the lip, on either side, there is apparent in dried specimens a thickening of the surface tissues of the disc. Column with broad wings, minutely three-lobed at the apex behind the anther, the middle lobe minutely denticulate. (PLATE 114.)

BRITISH GUIANA, Potaro, ten miles south of Potaro Landing, lat. 5° 10' N., long. 59° W., *A. S. Hitchcock 17394*, January 7-8, 1920. Distributed by the United States Department of Agriculture, Gray Herbarium of Harvard University and the New York Botanical Garden.

Pleurothallis Schaferi *Ames sp. nov.* Aff. *P. elegantulae* et *P. rhomboglossae* Lindl. Planta inconspicua, caespitosa, vix 1 cm. alta. Radices carnosae, glabrae. Caules secundarii abbreviati, inconspicui, plus minusve 2 mm. longi, monophylli. Folia cum petiolo 4-6 mm. longa, usque ad 3 mm. lata, coriacea, elliptico-oblonga, marginata, margine scabridiuscula, apice retuso-apiculata, in petiolum plus minusve 1.5 mm. longum sensim attenuata. Scapus gracilis, usque ad 8 mm. longus, glaber, infra racemum paucibracteatus, vulgo bibracteatus. Racemus pauciflorus, vulgo triflorus, vix 3 mm. longus. Bractee inflorescentiae subinfundibuliformes, 1 mm. longae, scariosae. Pedicellus cum ovario 1 mm. longus, leviter arcuatus, glaber. Flores minuti, in sicco albidi et semipellucidi, plus minusve 2 mm. longi. Sepala lateralia 1.75 mm. longa, plus minusve 1 mm. lata, anguste lan-

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ceolata, acuta, uninervia, extus leviter carinata, mentum .5–.75 mm. longum valde obtusum formantia. Sepalum dorsale 2 mm. longum, valde concavum, oblongo-ellipticum, obtusum, apice rotundatum. Petala spathulata, plus minusve 1 mm. longa, valde obtusa, apice rotundato, enervia ut videtur. Labellum 1.25 mm. longum, ecallosum, .5 mm. latum infra apicem, spathulatum, obtusum. Columna 1 mm. longa, gracilis, supra medium utrinque alata, ala subquadrata, obscure et irregulariter crenulata.

Pleurothallis Schaferi is similar in habit to *P. Grobyi* Lindl., but is a much smaller plant with a very different lip and column. In the aspect of the foliage it resembles very closely *P. lichenicola* Griseb., from which it is clearly distinguished by its smaller flowers and ecarinate lip.

CUBA, Oriente, Sierra Nipe, near Woodfred, *J. A. Schafer 3441*, January 5, 1910. Bases of trees in rich woods. 450–550 meters altitude.

***Pleurothallis Williamsii* Ames sp. nov.** Herba epiphytica ut videtur, usque ad apicem inflorescentiae plus minusve 1 dm. alta, radicibus numerosis, albidis. Caules secundarii caespitosi, monophylli, usque ad 7 cm. longi, bracteis infundibuliformibus ornati. Bracteae quinque ad duodecim, marginibus ciliolatis, in sicco diaphanae, apiculatae, nervis prominentibus, brunneis, plus minusve 5 mm. longae, plus minusve 5 mm. inter se distantes. Folium cum petiolo 15–19 mm. longum, usque ad 8 mm. latum trans medium, coriaceum, in sicco conspicue marginatum, apice minute bidentatum, basi cuneatum, nervo medio subtus carinato. Petiolus 2 mm. longus. Pedunculi terminales et laterales, graciles, plus minusve 5 cm. longi, infra racemum bracteis tubularibus paucis, vulgo quinqueflori. Bracteae flores subtendentes parvae, infundibuliformes, quam pedicellus cum ovario multo breviores. Sepala lateralia vix 4 mm. longa, usque ad 1 mm. lata infra medium, triangulari-lanceolata, acuta, conspicue uninervia. Se-

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palum dorsale ovato-lanceolatum, acuminatum, 4 mm. longum, 1–1.5 mm. latum, apice valde incrassatum, abbreviato-caudatum, conspicue trinervium, valde concavum ut videtur. Petala 2 mm. longa, 1 mm. lata supra medium, spathulata, valde obtusa vel rotundata, uninervia, in sicco pellucida. Labellum 2 mm. longum, 1 mm. latum, prope basim obscure rotundato-lobatum vel dilatatum, breviter unguiculatum, prope apicem leviter incrassatum, obtusum, disco bicarinato, carinis usque ad 1 mm. longis, nervo medio incrassato. Columna prope apicem valde bialata, alis quadratis.

Pleurothallis Williamsii is similar to *P. Broadwayi* Ames, but is larger both in floral and in vegetative parts, and with an oblong rather than an elliptical labellum. From *P. lepanthoides* Schltr. it differs in its smaller leaves, fewer flowered racemes, and smaller sepals.

PANAMA, Cana and vicinity, *R. S. Williams* 976, April 17–June 8, 1908. 2000–6500 feet altitude.

PLOCOGLOTTIS *Bl.*

Plocoglottis McGregorii Ames *sp. nov.* Rhizoma repens, lignosum, validum. Pseudobulbi vel caules monophylli, erecti, sensim in petiolum folii transeuntes, cum folio plus minusve 40 cm. alti, pauciarticulati, statu juvenili vaginis vestiti. Bractee vel vaginae mox in fibras persistentes solutae. Petiolus gracilis, plus minusve 1 dm. longus, in sicco 2 mm. in crassitudine, purpureo-tinctus. Folium plus minusve 3 dm. longum, utrinque attenuatum, plus minusve 3.5 cm. latum, anguste elliptico-lanceolatum, acuminatum, acutum, prominenter trinervium, in sicco viridi-flavum et albo-punctatum. Scapus lateralis, plus minusve 40 cm. altus, purpureo-tinctus, setulosus vel pubescens, infra racemum paucibracteatus; bractee infimae vaginantes, elon-

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gatae, acuminatae. Racemus 8–10 cm. longus, plus minusve 3.5 cm. trans medium. Bracteae inflorescentiae plus minusve 9 mm. longae, triangulari-lanceolatae, acuminatae, acutae, pubescentes. Flores flavi, purpureo-punctati. Pedicellus cum ovario plus minusve 1.7 cm. longus, setoso-pubescentis. Sepala lateralia 1.6 cm. longa, 6 mm. lata trans medium, inaequaliter lanceolata, acuta, extus pubescentia. Sepalum dorsale 1.5 cm. longum, prope basim 6 mm. latum, oblongum, acuminatum, acutum, extus pubescens. Petala 1.4 cm. longa, 2 mm. lata, lineari-oblonga, carnosae, subacuta, glabra. Labellum 9 mm. longum, 8 mm. latum trans apicem, quadrato-cuneatum, apiculatum, apiculo 1.5 mm. longo, triangulo, prope basim utrinque callosum, callis breviter carinatis. Columna crassa, 6 mm. longa, dense pubescens.

Plocoglottis McGregorii is most nearly related to *P. Copelandii* Ames among the Philippine species, but is easily distinguished by its larger flowers and differently proportioned leaves. From *P. bicallosum* Ames it differs markedly in the proportions of the leaf.

PHILIPPINES, Panay, Antique Province, Culasi, *R. C. McGregor Bur. Sci.* 32189, June 20, 1918. Flowers yellow speckled with wine red. Mossy forest, hills east of Culasi. 1000 meters altitude.

PONTHIEVA *R. Br.*

Ponthieva parvilabris (*Lindl.*) *Reichb. f.* *Xen. Orch.* 3 (1878) 18; *Benth. ex Griseb. in Goetting. Abhandl.* 24 (1879) 337. *Cranichis parvilabris* *Lindl. Orch. Linden.* (1846) 27.

Schlechter in his enumeration of Colombian orchids¹ referred *Cranichis parvilabris* Lindl. to the genus *Cranichis*, although it would seem that Lindley based his description on a specimen that is referable to *Ponthieva*. On the same sheet with the type of *Cranichis parvilabris* there is a stouter plant of similar aspect,

¹ In *Fedde Repertorium, Beihefte* 7 (1920) 215.

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but as it was collected in 1857, it was identified after the Linden plant was described. Beneath the type specimen Lindley made a sketch of the flower which leaves no room for doubt as to the generic position of his species. It exhibits the characteristic labellum of *Ponthieva* and agrees with the very brief description published in *Orchidaceae Lindenianae*. The generic position of this species was noted by Bentham in his paper published in the *Journal of the Linnean Society* 18 (1881) 342. Under *Cranichis* he wrote "*Cranichis*, Swartz, has nearly twenty species, to the exclusion of *C. parvilabris* Lindl., which according to our specimens, is a species of *Ponthieva*." Grisebach apparently took up this suggestion made by Bentham, but for quite another plant, ignorant of the fact that Reichenbach f. had made the combination *Ponthieva parvilabris* to cover the species described under *Cranichis* by Lindley. The nomenclatorial history of the species, as I understand it, is given above.

ROBIQUETIA *Gaudich.*

Robiquetia Merrillii *Ames comb. nov.* *Malleola Merrillii* *Ames* *Orch.* 5 (1915) 236.

Robiquetia Ramosii *Ames sp. nov.* Herba epiphytica, plus minusve 4 dm. alta, robusta, floribus in paniculam laxam dispositis. Caules validi, complanati, vaginis foliorum tecti. Vaginae foliorum plus minusve 5 cm. longae, in sicco nervosae, persistentes, rigidae. Folia ligulata, disticha, plus minusve 3 cm. inter se distantia, oblique ascendencia, plus minusve 2 dm. longa, usque ad 3.8 cm. lata, apice inaequaliter bilobata, lobis obtusis. Pedunculus cum racemo paniculato usque ad 2.8 dm. longus, prope basim paucibracteatus, bracteis vaginantibus. Bractee inflorescentiae squamiformes, 2 mm. longae, acutae, rigidae. Rami paniculae plus minusve 1 dm. longi, laxiflori. Pedicellus cum ova-

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rio plus minusve 12 mm. longus, gracilis. Flores albidi et purpurei, in racemis pyramidatis dispositi. Rachis incrassata. Sepala lateralia 4 mm. longa, 3 mm. lata prope apicem, obovata, carnosae, basi cuneata, vix patentia. Sepalum dorsale 4.5 mm. longum, plus minusve 2 mm. latum, valde concavum, valde acutum, apiculatum. Petala 3.5 mm. longa, supra medium 2.75 mm. lata, late obovata, obtuse apiculata, basi breviter cuneata, textura carnosae. Labellum trilobatum, longe calcaratum; lobi laterales erecti, subquadrati, truncati, 1 mm. longi, vix 1.25 mm. lati, carnosi, quam columna multo breviores; lobus medius vix 1 mm. longus, valde carnosus, tumidus, minute pubescens, infra apicem protuberans; calcar usque ad 9 mm. longum, obtusum, leviter curvatum, plus minusve 1.5 mm. per medium. Columna erecta, 3 mm. longa, carnosae, utrinque prope basim ala rectangula. Rostellum exsertum, alte bifidum, divisionibus flaccidis, valde acutis. Anthera operculata, antice longe rostrata, rostro 1.5 mm. longo, acuto; caudicula pergracilis, vix 3 mm. longa, superne dilatata, in disco lineari inserta.

Robiquetia Ramosii is closely allied to *R. Vanoverberghii* Ames from which it is to be distinguished by the longer spur, prominent lateral lobes of the labellum and by the elongated rostellum. In *R. Vanoverberghii* the lateral lobes of the labellum are suppressed, and the rostellum is short, and simply forked. From *R. Merrillii* Ames it is separated in part by the spur being curved forward at the tip, not backward, and by the divisions of the rostellum being flexible rather than rigid. *Robiquetia compressa* (Lindl.) Schltr. differs from *R. Ramosii* in its broad obovate petals with a longer cuneate base and in the simple, not paniculate, inflorescence.

PHILIPPINES, Catanduanes, *M. Ramos Bur. Sci.* 30396, December 2, 1917.
On trees along the Santo Domingo River. 30 meters altitude. (TYPE);

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Panay, Antique Province, *R. C. McGregor Bur. Sci.* 32592, July 18, 1918. In mossy forest. Sepals and petals spotted with red. Labellum lobes yellow, spur white. About 900 feet altitude.

SARCOCHILUS *R. Br.*

Sarcochilus tripercus *Ames sp. nov.* Herba epiphytica. Radices elongatae, glabrae, albae. Caules abbreviati, plus minusve 1 cm. longi, vaginis foliorum obtekti. Folia disticha, articulata, 4–11 cm. longa, usque ad 9 mm. lata, lingulata, coriacea, apice inaequaliter bilobata, subacuta, oblique erecta. Scapus plus minusve 7 cm. longus, setosus, gracilis, quam folia brevior. Rachis leviter incrassata, plus minusve 5 mm. longa. Bracteae inflorescentiae rigidae, obtusae, squamiformes, 1 mm. longae, quam pedicellus cum ovario multo breviores. Pedicellus cum ovario 5 mm. longus, glaber. Flores succedanei, subflavi. Sepala lateralia 5 mm. longa, plus minusve 3 mm. lata trans medium, inaequaliter ovata, obtusa, apice incrassato minute appendiculata, quinque-nervia. Sepalum dorsale 6 mm. longum, 2 mm. latum, valde concavum. Petala plus minusve 5 mm. longa, 1.5 mm. lata prope apicem, oblongo-spathulata, apice rotundata. Labellum complicatum, unguiculatum, cum sacco 1 cm. longo, trilobatum; lobi laterales asciformes, ad medium valde constricti, apice 1 mm. lato; lobus medius trilobulatus, lobulis lateralibus lineari-oblongis, 2 mm. longis, .5 mm. latis, patentibus, membranaceis, lobulo medio triangulo, acuto, 1 mm. longo, concavo; unguis gracilis, .75 mm. longus. Saccus elongatus, cylindratus, 7 mm. longus, apice curvatus, obtusus, prope apertionem inflatus, ad medium attenuatus. Columna curvata, in pedem 2 mm. longum producta, infra apicem gracilis, rostello producto, triangulo, acuto, deflexo. Anthera ovata, antice subrostrata, acuta. Pollinia globosa, glandula lineari-triangula.

In habit not unlike *Sarcochilus mindanaensis* Ames, but with

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very dissimilar flowers. The labellum suggests *S. appendiculatus* J. J. Sm., but the elongated sac is a differentiating character. The labellum is a very interesting structure and might well be described as five-lobed; the basal lateral lobes being erect, more or less membranaceous and suddenly dilated above the middle; the apical lateral lobes being membranaceous and linear-oblong; the terminal or fifth lobe being more or less rigid and apparently thickened at the tip, when fresh.

PHILIPPINES, Leyte, Tacloban, *C. A. Wenzel 0968*, February 11, 1916. Epiphyte in forest. Flower yellow and white. At sea level.

SPIRANTHES, *L. C. Rich.*

Spiranthes bicaudata *Ames sp. nov.* Radices fasciculatae, fusiformes, carnosulae, plus minusve 4 cm. longae, 7 mm. crassae, foliis radicalibus ut videtur, paucis, laminis foliorum usque ad 7 cm. longis, 17–27 mm. latis, membranaceis, in sicco chartaceis, flavidis, ellipticis, utrinque leviter attenuatis, acutis, quinquennerviis, petiolis usque ad 3 cm. longis. Scapus erectus, gracilis, cum racemo usque ad 22 cm. longus, infra racemum bracteis setaceis octo, illis prope basim scapi vaginantibus. Racemus elongatus, multiflorus, plus minusve 11 cm. longus, plus minusve 1.5 cm. crassus per medium. Bractee inflorescentiae lineari-lanceolatae, plus minusve 7 mm. longae, scariosae, setaceae, quam pedicellus cum ovario longiores. Pedicellus cum ovario glanduloso-pubescens, usque ad 8 mm. longus. Flores albidii, minuti, 3–4 mm. longi. Sepala lateralia ligulata, 4 mm. longa, acuta, apice leviter incrassata, uninervia, glabra. Sepalum dorsale simile, 4 mm. longum, vix 1 mm. latum trans medium, uninervium, obtusum, prope apicem leviter carinatum vel incrassatum. Petala quam sepalum dorsale breviora, 2.5 mm. longa, leviter sigmoidea, uninervia. Labellum 3 mm. longum, 1 mm. latum trans medium,

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late unguiculatum, usque ad medium dilatatum nunc constrictum demum prope apicem leviter dilatatum, trinervium, ad basim utrinque in caudam elongatam, gracilem, plus minusve 1 mm. longam productum. Columna mediocris, stigma simplex, vix bilobatum. Rostellum haud productum, breviter emarginatum. Anthera late ovata, 1 mm. longa.

Allied with *S. Lucayana* Cogn. The small flowers and bicaudate labellum are differentiating characters.

This species is apparently a member of the group recently described under the genus *Mesadenus* by Dr. Rudolf Schlechter in his monograph of the *Spiranthinae*.¹ I have not taken up this name for the Trinidad species, because I am convinced that Schlechter's treatment of the *Spiranthinae* needs to be carefully tested from beginning to end before it is adopted as a basis for progress. Schlechter's monograph is very subtle in conception, and is based on characters which are too recondite for practical purposes. It is certainly perplexing and one may fairly question the advisability of accepting its innovations.

Dr. Schlechter has, it is true, revealed some clear lines of demarcation in a group that is large and heterogeneous, yet several of his new genera seem hardly isolable from *Spiranthes* and rest on characters that are difficult to define. Whether or not the lines of demarcation are sufficiently clear for generic separation, it is patent, as one uses Schlechter's system, that difficulties have been shifted rather than removed.

The conception of genera admittedly rests on personal judgments. The history of biological science indicates quite clearly that personal judgments in the erection of genera receive harsh treatment when they fail to elucidate relationships, when they give place to burdensome perplexity and when they emphasize

¹ *Beihefte Bot. Centralbl.* 37, Abt. 2 (1920).

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the magnitude of a difference rather than its constancy. Some thirty-two thousand personal judgments have characterized the history of the genus in systematic botany, and of these about eleven thousand have withstood conscientious scrutiny and the test of time. In other words, the generic synonymy that we encounter in systematic work among plants records a surprising disregard of genera that have been too loosely defined or too hastily proposed or that rest on decisions which ignore the practical application of taxonomy.

In genera comparable to *Spiranthes*—genera that have been retained in their broadest sense, although made up of very unlike elements—the limits imposed by an historical and traditional past seem almost sacrosanct. Of course, such groups should not be maintained forever as heterogeneous assemblages because they have been so maintained in the past. Such a procedure would effectually put an end to progress. But when dismemberment of such genera as *Spiranthes* results in difficulties of interpretation and gives rise to a situation in which a working botanist is shifted from one exasperating perplexity to another, his final state of mind being uncertainty as to the accuracy of his diagnosis, then dismemberment is inadvisable. If one of these large genera is to be dismembered, it is fair to expect that proposed changes will be published only after a reasonably long period of probation in the hands of their author.

It is not my intention to review Dr. Schlechter's monograph of the *Spiranthinae* in these pages, but having criticized it, a single example to substantiate my position may suffice.

Spiranthes novaezelandiae Hook. f., a species in facies similar to *S. sinensis* (Pers.) Ames, is characterized in part by the apparent suppression of the rostellum. It would, I think, be described as erostellate by the majority of botanists. The pollinia appear

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to rise above the stigma as a naked mass. In flowers that are examined at the time of anthesis it is possible to detect a very thin membrane which is continuous with the body of the gynostemium. To this membrane the pollinia are in part agglutinated. That this membrane is deeply bifid, as is the case in related species, is by no means clear. In fact the use of this membrane in generic classification would, I am sure, be regarded as reprehensible by cautious investigators. Unless one were pretty well acquainted with the more delicate characters of the flower in *Spiranthes*, it would be natural to suppose that development of the rostellum in *Spiranthes novaezelandiae* had been suppressed. However interpreted, the gynostemium does not bring the species within the proper genus if Schlechter's monograph of the *Spiranthinae* is depended on for identification. Indeed, the condition of the rostellum removes *S. novaezelandiae* from the group in which Schlechter placed it. Gattungsreihe I of Schlechter's system, in which *S. novaezelandiae* is included under *Spiranthes*, is defined as follows: "Gattungen, bei denen die Klebscheibe der Pollinien zwischen den Fortsätzen des verlängerten, zweispaltigen Rostellum festgehalten, resp. eingeklemmt ist." Under *Spiranthes*, the first genus in the group, the column is described as follows: "Columna brevis, pede brevi, apice incurvulo; rostello alte bifido, cruribus erectis, subulatis." And yet in Schlechter's notes under *Spiranthes novaezelandiae* he tells us that the column in the flowers he has examined had not developed a rostellum.

By the preceding remarks it is not my purpose to demonstrate that Schlechter's system is open to general condemnation. I have found it a very helpful effort toward clarity in a highly technical group. One would regard it more favorably, however, if the new genera proposed and some of the genera reinstated had been kept as sections or as tentative groups, on which to build up a more

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profound knowledge than we now possess of relationships in the complex made up of *Spiranthes*, *Cyclopogon* and similar concepts. The multiplication of genera attempted by Schlechter has tended to conceal the larger affinity indicated by the more comprehensive genus, and the difficulties of identification have been unduly intensified by reliance on characters which are hard to define. As modified by Dr. Schlechter the *Spiranthinae* has lost much even if it has gained a little.

In a survey of Schlechter's proposals I find myself leaning strongly toward the point of view expressed by Dr. B. L. Robinson in his paper on "The Generic Concept in the Classification of the Flowering Plants," a point of view clearly expressed as follows: "Different minds may work in unlike manner when confronted by the difficulties of identifying plants. Personally, I should very much prefer to have the difficulty at one point rather than at two; that is to say, I should rather have generic lines drawn so widely that genera would be pretty definite and readily recognized, in the manner, let us say, of *Cyperus*, *Astragalus*, or *Euphorbia* in the broader and long traditional sense. The recognition of such genera requires little or no mental effort on the part of a botanist of any training. The attention is left free for the specific identification, and this may be undertaken with a happy confidence that all the species likely to come into question will be found in the same group and under the same generic name. These species may be inconveniently numerous, but at least one is not disturbed by any lurking doubt whether, after all, he has got the right genus." (Proc. Am. Assoc. Adv. Sci. 55 (1906) 424.)

TRINIDAD, B. W. I., heights of Aripo, *N. L. Britton & W. G. Freeman 2327*, March 16, 1921. Flowers white, minute.

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Spiranthes Wrightii *Ames nom. nov.* Sauroglossum monophyllum *Griseb.* Cat. Pl. Cub. (1866) 269 as to Wright 1480, excl. synonymy and Wright 621. *Spiranthes monophylla Cogn.* in Urb. Symb. Antill. 6 (1909) 339 as to description, not as to synonymy, excl. Wright 621.

Spiranthes Wrightii differs from its nearest allies in Cuba in being monophyllous. Apparently there is a wide range of variation in the height of the plants and in the number of flowers borne by the racemes. The sheet in the Gray Herbarium bears two specimens that represent what may be taken as extremes, the tallest plant being 40 cm. high with nine flowers, the smaller one being 15 cm. high with only two flowers.

From the discussion under *Cranichis* it is evident that the plant referred by Cogniaux to *S. monophylla* under the number 1480 of Wright's Cuban plants is without a valid name. As a new name is necessary, *S. Wrightii* is proposed.

CUBA, Pinal, Monte Verde, *Wright 1480*, February 19, 1859. In dense woods. Whole plant tinged with dull red. Petals and sepals one-nerved. Lip five-nerved, nerves reddish green.

STELIS *Sw.*

Stelis parvibracteata *Ames sp. nov.* Aff. *S. obscuratae* Reichb. f. Radices fibratae, patentés. Caules oblique ascendentes, plus minusve 3 cm. longi, uniarticulati, vaginis duabus alte et arcte amplectentibus obtecti, monophylli. Folium cum petiolo 5–11 cm. longum, usque ad 1.5 cm. latum, ligulatum, coriaceum, anguste oblanceolatum, obtusum, marginatum, in petiolum 2 cm. longum sensim productum. Pedunculus singulus, folio multo longior, cum racemo 10–18 cm. longus, infra racemum paucibracteatus. Racemus plus minusve 10 cm. longus, laxe multiflorus. Bracteae inflorescentiae minutae, vix 1 mm. longae, late ovatae, valde acutae, quam pedicellus cum ovario multo breviores.

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Pedicellus cum ovario plus minusve 2 mm. longus. Flores 5 mm. trans medium, purpurei. Sepala lateralia 2 mm. longa, vix 3 mm. lata, late ovata, vix obtusa, trinervia. Sepalum dorsale 2.5 mm. longum, 3 mm. latum, late rotundato-ovatum, trinervium. Petala cuneata, 1 mm. longa, plus minusve 1 mm. lata prope apicem, trinervia, apice valde incrassata, glabra vel exiliter papillosa. Labellum 1 mm. longum, plus minusve 1 mm. latum, elliptico-reniforme, apiculatum, apiculo triangulo, acuto, erecto; discus callo permagno ornatus. Columna brevis, apicem versus conspicue dilatata.

In habit similar to *S. coiloglossa* Schltr., but different in having shorter stems and a reniform-apiculate, not ovate obtuse lip.

PANAMA, Cana and vicinity, *R. S. Williams* 972, April 27, 1908. On trees, flowers purplish. 6000 feet altitude.

Stelis pleurothalloides *Ames sp. nov.* Herba epiphytica, usque ad apicem racemi plus minusve 22 cm. alta. Radices carnosofibratae, albidae, glabrae, in sicco nitidae, plus minusve 6 cm. longae, usque ad 1 mm. in crassitudine. Caules plus minusve 8 cm. longi, vaginis elongatis, laxe appressis omnino obtecti, monophylli. Folium valde coriaceum, oblongo-ellipticum, 6–6.5 cm. longum, in sicco usque ad 1.5 cm. latum, apice breviter apiculatum, nervo medio subtus prominenti, conspicue marginatum, in petiolum brevem contractum. Pedunculus singulus, cum racemo plus minusve 16 cm. longus, basi vagina 1.8 cm. longa inclusus. Racemus usque ad 12 cm. longus, multiflorus, 1 cm. in diametro. Flores plus minusve 4 mm. inter se distantes, textura carnosae, in sicco 4 mm. longi, straminei. Bractee inflorescentiae plus minusve 3 mm. longae, scariosae, oblique infundibuliformes, rachidem amplectentes, quam pedicellus cum ovario breviores, acutae. Pedicellus cum ovario plus minusve 5 mm. longus, valde

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arcuatus. Sepala lateralia 4.75 mm. longa, infra medium 2 mm. lata, prope basim cohaerentia, fere libera, anguste triangula vel triangulari-lanceolata, obtusa, extus leviter carinata, trinervia. Sepalum dorsale 5 mm. longum, 2.25 mm. latum prope basim, ovato-lanceolatum, obtusum, trinervium. Petala 1.5 mm. longa, apice 1 mm. lata, valde incrassata, cuneata, truncata, extus leviter umbonata prope apicem, in sectione transversa triangulari, .5 mm. in crassitudine. Labellum 1 mm. longum, basi .75 mm. latum, supra medium dilatatum 1 mm. latum, orbiculari-apiculatum, a basi breviter oblonga usque ad medium labelli callo bilobato, antice excavato extendit. Columna brevis, apicem versus dilatata, petala aequans, apice bilobulata.

In habit this species suggests *S. micrantha* Sw. The callus on the labellum resembles that of *S. patula* Schltr. The aspect of the flowers recalls some species of *Pleurothallis*.

COLOMBIA, State of Cauca, Páramo de Buena Vista, Huila group, Central Cordillera, *H. Pittier 1156*, January 1906. Upper zone of forest. 3000–3600 meters altitude. (TYPE in U. S. Nat. Herb. No. 531353.)

***Stelis Williamsii* Ames sp. nov.** Aff. *S. confusae* Schltr. Radices fibratae, copiosae, patentés. Caules caespitiosi, abbreviati, vix 1.5 cm. longi, monophylli, oblique ascendentes, in sicco longitudinaliter sulcati. Folia coriacea, in petiolum abbreviatum sensim decrescentia, cum petiolo 4–10 cm. longa, usque ad 11 mm. lata, ligulata, marginata, apice retuso-apiculata, subtus nervo medio leviter carinato. Scapus singulus, folio longior, usque ad 2 dm. longus, infra racemum paucibracteatus. Bractee acutae, plus minusve 6 mm. longae, vaginantes. Racemus multiflorus, usque ad 9 cm. longus. Rachis gracilis, in sicco fragilis, floribus 3–5 mm. inter se distantibus. Bractee inflorescentiae triangulari-ovatae, plus minusve 3 mm. longae, acutae, extus longitudinaliter carinatae. Pedicellus cum ovario 2 mm. longus.

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Flores purpurei. Sepala lateralia 3.5 mm. longa, 3.5 mm. lata, usque ad medium cohaerentia, late ovata, glabra, subacuta, trinervia. Sepalum dorsale simile, trinervium. Petala 1 mm. longa, plus minusve 1 mm. lata, cuneata, truncata, prope apicem minute verruculosa vel papillosa, margine apicali scabridula. Labellum plus minusve 1 mm. longum, prope basim 1 mm. latum, trulliforme, obtusum, apice rotundatum, ecallosum. Columna minuta, utrinque in lobum spathulatum vel subrotundatum producta.

Stelis Williamsii is a near ally of *S. confusa* Schltr., a Mexican species which is dissimilar in the column-lobes, in the structure of the labellum and in the differently shaped petals. The racemes suggest *S. ciliaris* Lindl., but the sepals are eciliate.

PANAMA, Cana and vicinity, *R. S. Williams* 970, April 27, 1908. On trees, flowers purplish. 2000–6500 feet altitude.

THRIXSPERMUM *Lour.*

Thrixspermum subulatum (*Bl.*) *Reichb. f.* Xen. Orch. 2 (1867) 122; *J. J. Sm.* in *Fl. Buitenz.* 6 (1905) 578, f. 434. *Dendrocolla subulata* *Bl.* *Bijdr.* (1825) 291. *Aerides subulatum* *Lindl.* *Gen. & Sp. Orch.* (1833) 241. *Sarcochilus subulatus* *Reichb. f.* in *Walp. Ann.* 6 (1861) 500.

This species has not been recorded from the Philippines heretofore, although it is known to be a native of Java, Sumatra and Ambon.

PHILIPPINES, Luzon, Bontoc Subprovince, Mount Masapilid, *M. Ramos* & *G. Edaña* *Bur. Sci.* 37905, March 17, 1920. Epiphyte. Flowers yellow. 3000 feet altitude.

Thrixspermum Weberi *Ames* *sp. nov.* Caules radicanter, plus minusve 15 dm. longi, usque ad 5 mm. in crassitudine, vaginis foliorum tecti. Radices ramosae, fibratae. Vaginae foliorum usque ad 12 mm. longae, valde complanatae, coriaceae, rigidae,

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apice oblique truncatae, in sicco rugosae. Folia plus minusve 4.5 cm. longa, circa 11 mm. lata, 6 mm. inter se distantia, valde coriacea, ligulata, apice inaequaliter bilobata, in petiolum brevem contracta, disticha, oblique ascendente, in sicco rugosa. Pedunculi elongati, usque ad 20 cm. longi, rigidi, vix 1 mm. per medium, paucibracteati, bracteis tubulatis, circa 3 mm. longis. Racemus plus minusve 2 cm. longus. Bracteae inflorescentiae usque ad 6 mm. longae, lineari-triangularae, acutissimae, rigidae, quaquaversae, quam pedicellus cum ovario breviores. Flores succedanei, flavescentes, perpauci aperti eodem tempore, membranacei. Pedicellus cum ovario vix 1 cm. longus, gracilis, glaber. Sepala lateralia plus minusve 7 mm. longa, supra basim 4.5 mm. lata, inaequaliter triangula vel late falcata, acuminata, acuta, apice conduplicata. Sepalum dorsale 7 mm. longum, lanceolatum, valde contractum, acutum. Petala 6 mm. longa, circa 1 mm. lata, oblongo-lanceolata, acuta, valde membranacea. Labellum e basi columnae usque ad apicem lobi terminalis circa 5 mm. longum, trilobatum, membranaceum, in saccum 3 mm. longum productum, unguiculatum, ungue 2 mm. longo; lobi laterales antice 2 mm. longi, late falcati, apice curvati, triangulari-acuti, membranacei, quam lobus medius multo longiores; lobus medius abbreviatus, vix 1 mm. longus, triangulus, porrectus, leviter concavus; discus prope basim lobi medii callosus, callo bilobato, transverse complanato, prope apertionem sacci callo triangulo, carnosus instructus. Gynostemium ad apicem antherae 2.5 mm. longum, carnosum. Capsula cylindrata, usque ad 6 cm. longa.

Among Philippine species *T. Weberi* is closely related to *T. agusanense* Ames and *T. Wenzelii* Ames from which it differs in the characters of the inflorescence. When spread out the lateral lobes of the labellum project far beyond the middle lobe and converge. The lateral sepals are characterized by an excessive

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protuberance of the basal angle. This gives a bilobed appearance to each sepal.

PHILIPPINES, Mindanao, Province of Agusan, Cabadbaran, *C. M. Weber* 187, August 8, 1911. Epiphyte on tree trunks. Fruit green-purple. At sea level.

TRICHOGLOTTIS *Bl.*

Trichoglottis brachiata *Ames sp. nov.* Aff. *T. philippinensi* Lindl. Caules plus minusve 30 cm. alti, rigidi, usque ad apicem foliati, vaginis foliorum obtecti, usque ad 8 mm. in crassitudine, internodiis 1.4 cm. longis. Folia plus minusve 4.5 cm. longa, 2.9 cm. lata, oblongo-elliptica, disticha, retusa, apiculata, apiculo rigido, acuto. Flores laterales, e nodis orientes, singuli. Pedicellus cum ovario usque ad 3.5 cm. longus. Sepala lateralia patentia, 21 mm. longa, 11 mm. lata, ovato-lanceolata, acuta, coriacea. Sepalum dorsale simile. Petala 2 cm. longa, 6 mm. lata, anguste lanceolata, utrinque attenuata, subacuta, valde coriacea, patentia. Labellum 19 mm. longum, quinquelobatum, usque ad medium columnae affixum, ecalcaratum, basi saccatum vel valde concavum; lobi basiales erecti, trianguli, carnosii, circa 3 mm. alti, intus minute pubescentes; lobi laterales 8 mm. longi, usque ad 1.5 mm. lati, acinaciformes, apice inaequaliter dentati, utrinque minute pubescentes; lobus terminalis a latere complanatus, 9 mm. longus, 5 mm. altus, carnosus, cuneato-quadratus, angulo superiore valde elongato, utrinque pubescens, supra pilosus; discus carina valde carnosus ornatus, prope basim appendicula quadrata, truncata, carnosus instructus. Columna brevis, 7 mm. longa, minute pubescens.

Trichoglottis brachiata is closely allied to *T. philippinensis* Lindl. from which it is most readily distinguished by the elongated, linear, curved lateral lobes of the labellum which arise near the base of the terminal lobe, and by the nearly smooth

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appendage on the disc in front of the concave base. In habit these species are very similar and in the absence of flowers might easily be confused. In Lindley's specimens of *T. philippinensis* collected by Cuming the terminal pair of lobes is abbreviated and triangular in outline.

PHILIPPINES, Biliran Island, *R. C. McGregor Bur. Sci.* 18931, June 13, 1914. In mangrove swamp. Sepals and two upper petals light cadmium on the back, inside victoria lake except narrow edge and a central line on each which are light cadmium. Odd petal white with a few lines of true purple near base, large patch of cadmium yellow in centre with some victoria lake above—Ridgeway's Color Standard.

Trichoglottis philippinensis *Lindl.* in *Ann. & Mag. Nat. Hist.* 15 (1845) 386. *Stauropsis philippinensis* *Reichb. f.* in *Hamb. Gartenzeit.* 16 (1860) 117.

In my previous lists of Philippine orchids the generic name *Stauropsis* was adopted for this species. *Stauropsis* is at present regarded as a monotypic genus, the only species *S. undulata* Benth., being a native of the Himalayan region.

PLATE 114

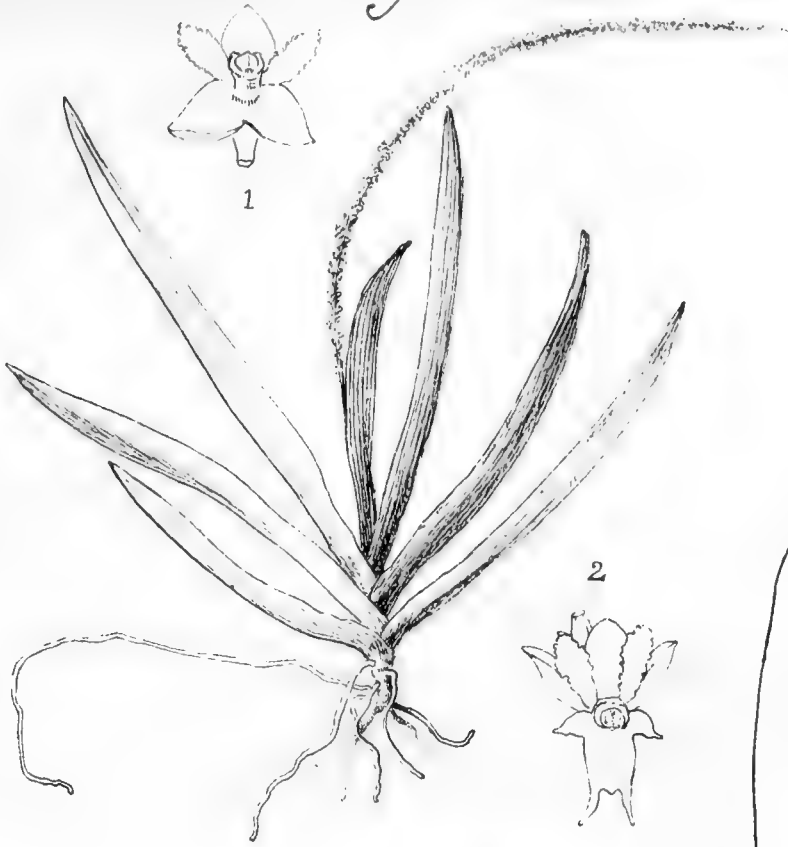
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PLATE 114

Oberonia linearifolia. Plant, natural size, drawn from the type. 1, flower enlarged, lip removed, showing denticulate petals, and the sepals. 2, flower enlarged, with lip somewhat spread out to show the lobes.

Bulbophyllum nigroscapum. Plant, natural size, drawn from the type. 3, flower enlarged, showing sepals, petals, lip and column. 4, lip enlarged.

OBERONIA *linearifolia* Ames



BULBOPHYLLUM
nigroscapum Ames



ADDITIONS TO THE ORCHID FLORA OF THE MOUNTAIN PROVINCE, LUZON

IN late September and early October of 1921, M. Ramos and G. Edaña continued explorations in northern Luzon for the Bureau of Science. Among the orchids obtained, those species that appear to be new are described below. One new species from the expedition of March 1920 is also included.

ACORIDIUM *Nees & Meyen.*

Acoridium linearifolium *Ames sp. nov.* Aff. *A. graminifolio* Ames. Radices valde incrassatae, plus minusve 3 mm. in crassitudine, in sicco longitudinaliter plurisulcatae. Pseudobulbi caespitosi, dense aggregati, usque ad 3.3 cm. longi, attenuati; juniores vaginis arcte appressis, tubulatis, in sicco rubidis, plus minusve 2.5 cm. longis vestiti; vetustiores nudi, longitudinaliter sulcati, erecti, in sicco 2 mm. in crassitudine, monophylli. Folia linearia, graminea, plus minusve 30 cm. longa, circa 3 mm. lata, subtus prominenter trinervia, basi valde attenuata, sensim in petiolum semiteretem contracta. Pedunculus folium excedens, cum racemo plus minusve 25 cm. longus, pergracilis, pro parte folio adnatus, usque ad basim racemi nudus. Racemus usque ad 8 cm. longus, distichiflorus, 1 cm. in diametro, floribus 3 mm. inter se distantibus. Bracteae inflorescentiae 3 mm. longae, glumaceae, late triangulari-ovatae, acutae. Pedicellus cum ovario 1.5 mm. longus. Sepala lateralia usque ad 6 mm. longa, 1.75–2 mm. lata prope basim, triangulari-lanceolata, acuminata, acuta, trinervia, apice trigono-incrassata. Sepalum dorsale usque ad 5 mm. longum, plus minusve 1 mm. latum, oblongo-lanceolatum, acuminatum, acutum, trinervium. Petala usque ad 4.75 mm. longa, plus minusve 1.5 mm. lata trans medium, oblongo-lanceolata,

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acuminata, acuta, trinervia. Labellum vix 2 mm. longum, 3 mm. latum trans basim loborum lateralium, trilobatum, carnosum, ad basim columnae sessile, inarticulatum; lobi laterales 2 mm. longi, prope apicem circa 1 mm. lati, lateraliter emarginati, basi dilatati et rotundati, apice valde rotundato-obtusi, ecallosi; lobus medius vix 1 mm. longus, prope apicem 1.25 mm. latus, subquadratus, retuso-apiculatus, prope basim leviter constrictus; basis labelli leviter saccata, tricallosa, callis lateralibus crescentiformibus, callo mediano in depressione disci papilliformi. Columna brevis, incrassata, ebrachiata, 1 mm. longa, rostello prominenti.

A near ally of *A. graminifolium* Ames from which it is distinguished by the very different habit, looser inflorescence and by the middle lobe of the labellum equaling or slightly exceeding the lateral lobes. In dried specimens the flowers are yellowish white with a reddish brown mid-lobe on the labellum. In dried specimens of *A. graminifolium* the flowers are uniformly reddish brown.

Acoridium perplexum Ames is also a closely related species, but is different from *A. linearifolium* in having the lateral lobes of the labellum conspicuously longer than the middle lobe.

BENGUET SUBPROVINCE, Mount Boadan, *M. Ramos & G. Edaña* 56, September 26, 1921. Epiphyte on tree in mossy forest. Flowers white. 6860 feet altitude.

Acoridium perplexum Ames *sp. nov.* Radices incrassatae, plus minusve 2 mm. in crassitudine, in sicco longitudinaliter plurisulcatae, albidae. Pseudobulbi aggregati, caespitosi, usque ad 6.5 cm. longi, in sicco anguste cylindracei; juniores vaginis longe tubulatis, usque ad 6.5 cm. longis, in sicco rubidis, arcte appressis vestiti; vetustiores nudi, in sicco plurisulcati. Folia usque ad 40 cm. longa, usque ad 3 mm. lata, linearia, acuta, sub-

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tus nervo medio prominenti, basi valde attenuata in petiolum semiteretem sensim decrescentia. Pedunculus cum racemo folio paulum longior, plus minusve 34 cm. longus, pergracilis, pro parte folio adnatus, usque ad racemum nudus. Racemus plus minusve 6 cm. longus, 6 mm. in diametro, distichiflorus, arcuatus, floribus 2 mm. inter se distantibus. Bractee inflorescentiae 3 mm. longae, glumaceae, nervosae nervis eminentibus, acutae, late ovatae. Pedicellus cum ovario 1 mm. longus. Sepala lateralia usque ad 5.5 mm. longa, prope basim 2 mm. lata, triangulari-lanceolata, trinervia, apice incrassato-duplicata, breviter carinata. Sepalum dorsale usque ad 5.5 mm. longum, 1.25 mm. latum, oblongum, acuminatum, acutum, trinervium. Petala usque ad 4.5 mm. longa, 1.25 mm. lata trans medium, lanceolata, acuminata, acuta, trinervia. Labellum a basi usque ad apicem lobi medii 2 mm. longum, 2 mm. latum trans basim, trilobatum lobis lateralibus quam lobus medius longioribus; lobi laterales 2 mm. longi, prope medium leviter constricti, basi rotundati, apice obtusi; lobus medius usque ad 1 mm. longus, 1 mm. latus prope apicem, quadrato-trulliformis, valde apiculatus, concavus; discus tricallosus prope basim labelli, callis papilliformibus. Columna incrassata, vix 1 mm. longa, ebrachiata.

Allied with *A. graminifolium* Ames and *A. linearifolium* Ames. From *A. graminifolium* it is separated by differences in the inflorescence, by the longer leaves and by the color of the flowers, both in dried and living specimens. According to the collectors' notes the flowers are red when fresh, and in dried specimens they are of a brownish red color. The flowers of *A. graminifolium* are yellowish when alive and in dried material are deep brown. *A. linearifolium* and *A. perplexum* are so closely allied that it is difficult to separate them by casual comparison based on dried material. The most conspicuous difference is the

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relative length of the labellum lobes, the lateral lobes equaling the terminal one in *A. linearifolium* and exceeding it in *A. perplexum*. Another difference is found in the more or less concave mid-lobe of the lip of *A. perplexum*, which has an elongated apiculate tip.

LEPANTO SUBPROVINCE, Mount Sinapsapan, *M. Ramos & G. Edaña 55*, October 13, 1921. On tree in mossy forest. Flowers red. 6000 feet altitude.

Acoridium pulcherrimum *Ames sp. nov.* Herba epiphytica. Rhizoma elongatum. Radices fibratae, plus minusve 4 cm. longae, circa 1 mm. in crassitudine, ramosae. Pseudobulbi usque ad 4 cm. longi, in sicco 5 mm. crassi, flavescentes vel virescentes, longitudinaliter sulcati, fusiformes, aggregati, contigui; juniores vaginis scariosis obtecti, monophylli. Folium cum petiolo usque ad 11 cm. longum, usque ad 1.5 cm. latum, in sicco subcoriaceum, ligulatum, utrinque attenuatum, apice subacutum, mucronulatum, bene marginatum, nervo mediano prominenti, nervulis in sicco vix eminentibus. Scapus hysternanthus, lateralis ut videtur, vaginis scariosis arcte appressis obtectus, cum racemo plus minusve 10 cm. longus, infra racemum bracteis imbricantibus vestitus. Racemus usque ad 7 cm. longus, distichiflorus, plus minusve 7 mm. latus trans basim, in sicco bene flavescens, quam folii brevior. Bractee inflorescentiae plus minusve 3 mm. longae, circa 3 mm. latae, glumaceae, late ovatae, conspicue nervosae, margine apicali denticulatae. Pedicellus cum ovario vix 1 mm. longus, oblique ascendens, quam bractea multo brevior. Sepala lateralia 4 mm. longa, 1.5 mm. lata trans medium, oblongo-elliptica, uninervia, membranacea, apice obtusa, rotundata. Sepalum dorsale vix 4 mm. longum, 1 mm. latum, oblongum, membranaceum, apice subacutum vel obtusum. Petala membranacea, 3 mm. longa, supra medium plus minusve 1 mm. lata, spathulata, margine fimbriata, apice obtusa vel acuta. La-

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bellum usque ad apicem lobi medii 1.5 mm. longum, trilobatum, ad basim columnae sessile; lobi laterales lineares, falcati, 1.25 mm. longi, .25 mm. lati, acuti, curvati, a basi usque ad apicem sensim attenuati; lobus medius valde concavus, vix 1 mm. longus, 1 mm. latus trans basim, semiellipticus, apice obtusus; discus ad basim lobi utriusque lateralis callo complanato, bilobato instructus et in depressione labelli callo vel papilla ornatus. Columna vix 1 mm. longa, ebrachiata, rostello triangulo prominenti. Clinandrium integrum. Anthera antice obtusa. Pollinia quatuor.

There are not any very near allies of this species. In dried specimens the flowers and the veins of the leaves are orange-yellow. The leaves are prominently three-veined, the lateral veins being close to the margin. In general appearance it suggests *Acoridium microchilum* (Schltr.) Ames, but is larger in all of its parts and is clearly distinguished by the lateral origin of the flower shoots. The labellum recalls that of *A. philippinense* Ames, but is readily separated from it by the elongated lateral lobes of the labellum which exceed the middle lobe in length.

BENGUET SUBPROVINCE, Mount Natoo, *M. Ramos & G. Edaña 45*, September 30, 1921. In mossy forest, on trees. Flowers yellow. 5800 feet altitude.

Acoridium unicolorne *Ames sp. nov.* Herba epiphytica, usque ad apicem inflorescentiae plus minusve 10 cm. alta. Rhizoma repens. Pseudobulbi usque ad 1 cm. longi, prope basim plus minusve 5 mm. in crassitudine, obpyriformes, in sicco valde rugosi, monophylli; juniores vaginis arcte appressis vestiti; vetustiores nudi, flavescentes, plus minusve curvati. Folia in sicco coriacea, ligulata, utrinque attenuata, breviter mucronulata, margine inconspicue scabridiuscula, prominenter trinervia; juniora 1.5–2 cm. longa, basi bracteis vaginantibus obtecta; vetustiora usque ad 6 cm. longa, 9 mm. lata, pedicello bracteis vaginantibus, brunneis

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obtecto. Petiolus plus minusve 1 cm. longus, superne sulcatus. Pedunculus terminalis, cum racemo plus minusve 7 cm. longus, arcuatus, quam folium longior, usque ad racemum nudus, infra racemum bracteis duabus imbricantibus. Racemus circa 2 cm. longus, usque ad 8 mm. in diametro, distichiflorus, plus minusve decemflorus, floribus aurantiacis, circa 2 mm. inter se distantibus. Bractee inflorescentiae distichae, usque ad 3 mm. longae, glumaceae, quam pedicellus multo longiores, late ovatae, acutae, vaginantes. Pedicellus cum ovario 2 mm. longus. Sepala lateralia 2.5 mm. longa, prope basim 1.5 mm. lata, ovato-lanceolata, obtusa vel subacuta, textura subcarnosa, in sicco brunnea, conspicue uninervia per medium, quam labellum longiora. Sepalum dorsale oblongo-ellipticum, 3 mm. longum, 1 mm. latum prope medium, apice subobtusum vel acutum. Petala 2 mm. longa, 1 mm. lata prope medium, bene lanceolata, acuta vel obtusa, margine inconspicue serrulata, textura subcarnosa. Labellum 2 mm. longum, vix 1 mm. latum prope apicem, oblanceolatum, basi inconspicue bilobatum, ad basim columnae sessile, inarticulatum, apice acutum, textura valde carnosum, infra medium disci callo uncinato ornatum. Columna ebrachiata, incrassata, 1.5 mm. longa.

There are no near allies of this species. It belongs to the section of the genus *Acoridium* which is characterized by a more or less simple labellum, that is rigidly attached to the column-foot. The callus situated just below the middle of the labellum is conspicuously uncinata, the bent tip pointing in the direction of the column. If it were not for the rigidly attached labellum this species might be referred, on floral characters alone, to the section *Aphanostelidium* of *Dendrochilum*.

BENGUET SUBPROVINCE, Mount Simakoko, *M. Ramos & G. Edaña* 54, October 6, 1921. On tree in mossy forest. Flowers reddish yellow. 6500 feet altitude.

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BULBOPHYLLUM *Thou.*

Bulbophyllum (§ *Monanthaparva*) **alboroseum** *Ames sp. nov.* Rhizoma repens. Radices fibratae, albidæ, glabrae. Pseudobulbi 5 mm. longi, decumbentes, in sicco valde pluriarticulati, rugosi, nitidi, monophylli. Folia usque ad 7 mm. longa, 3–4 mm. lata, coriacea, oblongo-elliptica, nervo medio in mucronem extenso, in sicco super pustulosa. Scapus usque ad 2 cm. longus, pergracilis, erectus, minute scabridiusculus, usque ad basim pedicelli nudus. Bractea pedicellum subtendens infundibuliformis, oblique truncata, acuminata, apice aristata, circa 2 mm. longa. Pedicellus cum ovario 5–7 mm. longus, scabridiusculus. Flos singulus, usque ad 8 mm. longus, sepalis petalisque conniventibus. Sepala lateralia usque ad 9 mm. longa, 2.5–3 mm. lata, ligulata, apice triangulari-angustata, acuta, quinquenervia, pellucida, membranacea, mentum obtusum 1.75 mm. longum formantia. Sepalum dorsale 7.5–9.5 mm. longum, circa 2 mm. latum, ligulatum, utrinque leviter angustatum, apice acutum, quinquenervium. Petala usque ad 3 mm. longa, supra medium circa 1 mm. lata, bene spathulata, apice rotundata, uninervia. Labellum cum ungue 3 mm. longum, plus minusve 1 mm. latum prope medium, linguiforme, margine partis apicalis valde revoluta vel deflexa, apice rotundatum, basi cuneatum; unguis brevis, trinervius. Columna 1 mm. longa in pedem longum producta, utrinque apice triangulari-cuspidata. Ovarium dense muricatum.

Vegetatively this species resembles *B. mindorense* Ames and *B. McGregorii* Ames. From *B. mindorense* it differs in having larger flowers. From *B. McGregorii* it is separable by the larger sepals which are five-nerved.

BENGUET SUBPROVINCE, Mount Luson, *M. Ramos & G. Edaña 105*, October 7, 1921. On dead branches of trees. Flowers pink and white. 6000 feet altitude.

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Bulbophyllum (§ Racemosae) **invisum** *Ames sp. nov.* Rhizoma repens, plus minusve 4 mm. in crassitudine. Radices copiosae, late patentēs, ramosae, fibratae, plus minusve 6 cm. longae, usque ad 1 mm. crassae. Pseudobulbi multo reducti, circa 8 mm. longi, plus minusve 7 mm. in crassitudine prope rhizoma, erecti vel decumbentes, superne angustati, in sicco rugosi, monophylli, circa 1 cm. inter se distantes. Folia cum petiolo 5–8 cm. longa, 1–1.3 cm. lata trans medium, anguste elliptico-oblonga, apice subacuta, basi sensim in petiolum 5–15 mm. longum angustata, valde coriacea, in sicco sparsim pustulosa. Petiolus rigidus, semiteres, in sicco circa 1 mm. crassus. Pedunculus cum racemo usque ad 16.5 cm. longus, demum arcuatus, gracilis, infra racemum vaginis tribus complanatis, laxe appressis, circa 15 mm. longis instructus, in sicco sparsim muricatus. Racemus usque ad 9 cm. longus, laxiflorus, floribus albidis, 8.5 mm. inter se distantibus. Bractee inflorescentiae 3–5 mm. longae, patentēs, lanceolatae, acuminatae, acutissimae, pedicellum cum ovario multo superantes. Pedicellus cum ovario circa 3 mm. longus, oblique insertus, in sicco niger. Sepala lateralia 6 mm. longa, usque ad 3 mm. lata prope medium, triangularia, acuta, trinervia cum nervo brevi addito, textura subcarnosa, mentum 2 mm. longum, rotundatum formantia. Sepalum dorsale 6 mm. longum, 2 mm. latum trans medium, ligulato-oblongum, apice subacutum, trinervium. Petala vix 4 mm. longa, circa 1 mm. lata prope medium, carnosa, spathulata, obtusa, apice rotundata, margine minute papillosa, trinervia. Labellum 5 mm. longum, 2.5 mm. latum trans medium, circuitu elliptico-lanceolatum, apice triangulari-acutum, ad basim angustatam margine erecta, breviter unguiculatum, trinervium; unguis plus minusve .5 mm. longus, .5–.75 mm. latus, trinervius; discus prope basim labelli valde incrassatus, ecallosus. Columna brevis, 1 mm. longa, apice

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utrinque triangulari-cuspidata. Anthera .75 mm. longa, antice obtusa.

The habit of *B. invisum* suggests *B. lepantense* Ames, but the leaves are larger and the flowers twice larger than in that species. In the structure of the flowers the three-nerved petals of *B. invisum* and the very different labellum are differentiating characters when comparisons with *B. lepantense* are made. *B. Escribatorii* Ames, which is also a closely related species, is different in having one-nerved petals and a labellum which is not narrowed at the base.

BENGUET SUBPROVINCE, Mount Pulogloco, *M. Ramos & G. Edaña* 58, September 30, 1921. On tree in mossy forest. Flowers white. 6700 feet altitude.

Bulbophyllum (§ *Racemosae*) **papillipetalum** *Ames sp. nov.*
Herba epiphytica. Rhizoma longe repens, plus minusve 4 mm. in crassitudine, radiciferum. Radices fibratae, plus minusve 3 cm. longae, patentes. Pseudobulbi subnulli, 3 mm. alti, 3 mm. in crassitudine, monophylli; juniores vaginis tubulatis obtecti; vetustiores nudi, defoliati, persistentes. Folia valde coriacea, crassa; juniora circa 4 cm. longa, 1.8 cm. lata, in sicco atroviridia, petiolo abbreviato vaginis tubulatis occulto; vetustiora cum petiolo usque ad 9 cm. longa, 3 cm. lata, petiolo 2–4 cm. longo; limbi oblongo-elliptici, subacuti, basi rotundati, abrupte in petiolum contracti, subtus nervulis eminentibus. Pedunculus cum racemo usque ad 17 cm. longus, infra racemum vaginis infundibuliformibus instructus. Vaginae 1–1.5 cm. longae, in speciminibus nostris tres. Racemus usque ad 10 cm. longus, plus minusve decemflorus, floribus flavescentibus, plus minusve 5 mm. inter se distantibus. Bracteae inflorescentiae plus minusve 6 mm. longae, ovato-lanceolatae, acuminatae, acutae, ovarium excedentes. Sepala lateralia 9 mm. longa, plus minusve 5 mm. lata

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prope basim, triangulari-lanceolata, subacuta, trinervia, textura subcarnosa, mentum 2.5 mm. longum formantia. Sepalum dorsale 9 mm. longum, usque ad 3.25 mm. latum, oblongo-ellipticum, acutum, trinervium. Petala vix 4 mm. longa, circa 1 mm. lata prope apicem, oblongo-spathulata, carnosa, valde obtusa, apice rotundata, intus dense papillosa, margine papilloso-ciliata. Labellum 5 mm. longum, linguiforme, abrupte acutum, circuitu ovato-oblongum, margine bene ciliata, prope basim bituberculatum, utrinque carinatum. Columna utrinque triangulari-cuspidata.

Allied with *B. dasypetalum* Rolfe and *B. Clemensiae* Ames, but in habit resembles more closely *B. Vanoverberghii* Ames from which it is clearly distinguished by its larger flowers in shorter, fewer flowered racemes.

BENGUET SUBPROVINCE, Mount Boadan, *M. Ramos & G. Edaña* 79, September 27, 1921. In mossy forest. Flowers whitish yellow. 6800 feet altitude.

CALANTHE *R. Br.*

Calanthe angustifolia (*Bl.*) *Lindl.* Gen. & Sp. Orch. (1833) 251; *Fol. Orch. Calanthe* (1854) 5. *Amblyglottis angustifolia* *Bl.* *Bijdr.* (1825) 369. *Calanthe phajoides* *Reichb. f.* *Xen. Orch.* 1 (1856) 207, t. 79, f. II; in *Bonpl.* 5 (1857) 37. *Alismorchis angustifolia* *Ktze.* *Rev. Gen. Pl.* 2 (1891) 650. *Alismorchis phajoides* *Ktze.* *Rev. Gen. Pl.* 2 (1891) 650.

This species was collected for the first time in the Philippines by Elmer D. Merrill in November 1906 on Mount Halcon, Mindoro, at an altitude of 2300 feet. The specimens collected in the Mountain Province by Ramos and Edaña are the first that I have seen from Luzon.

BENGUET SUBPROVINCE, Mount Simakoko, *M. Ramos & G. Edaña* 82, October 5, 1921. On the ground in mossy forest. Flowers white with pink interior. 5600 feet altitude.

CERATOSTYLIS *Bl.*

Ceratostylis dataensis *Ames sp. nov.* Rhizoma longe repens, vaginis chartaceis bene reticulato-nervosis, rufis tectum. Radices fibratae, pilosae, patentes. Pseudobulbi plus minusve 2 cm. inter se distantes, 1 cm. longi, in sicco circa 3.5 mm. in crassitudine, plerumque cylindranei; juniores vaginis rufis, imbricantibus, reticulato-nervosis, chartaceis occulti, monophylli. Folia junciformia, usque ad 12 cm. longa, in sicco semiteretia, sulcata, vix 2 mm. in diametro, ut videtur subacuta; juniora vaginis laxè appressis pro parte obtecta. Flores parvi, inter bracteas scariosas capitulum parvulum ad axillam folii sessile formantes; capitulum plus minusve 1 cm. in diametro, dense bracteatum. Bracteae capituli imbricatae, scariosae, plus minusve 5 mm. longae, late ovatae vel suborbiculares, concavae. Bractea pedicellum subtendens 5 mm. longa, valde concava, orbicularis, ovarium pedicellatum excedens. Pedicellus perbrevis, cum ovario 3 mm. longus, albido-villosus. Flores albidii, usque ad 5 mm. longi, in sicco atrobrunnei vel purpurascens. Sepala petalaeque vix patentia. Sepala lateralia 4.5 mm. longa, usque ad 2.5 mm. lata, ovato-oblonga, obtusa, vix subacuta, quinquenervia, carnosae, mentum brevem vix 1 mm. longum, obtusum formantia. Sepalum dorsale 5 mm. longum, 2 mm. latum, oblongo-ellipticum, apice rotundatum, quinquenervium. Petala 5 mm. longa, 1.5 mm. lata prope medium, oblongo-ligulata, subacuta, trinervia, utrinque leviter angustata. Labellum simplex, circa 3 mm. longum, plus minusve 1 mm. latum, pedi columnae affixum, ungue 1 mm. longo; lamina 2 mm. longa, oblonga, apice triangula, acuta, superne pubescens, subtus plus minusve scabridiuscula, supra medium valde incrassata et papillosa. Columna circa 2 mm. alta, apice dilatata, in lobos clinandrii erectos producta.

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In habit suggestive of *C. ramosa* Ames & Rolfe, but distinct in having elongated semiterete leaves.

BENGUET SUBPROVINCE, Mount Data, *M. Ramos & G. Edaña* 76, September 22, 1921. Epiphyte in mossy forest. Flowers white. 7630 feet altitude.

ERIA Lindl.

Eria carnicolor *Ames sp. nov.* Rhizoma elongatum, ad nodos radicans, in sicco 4.5 mm. in crassitudine, vaginis abbreviatis, inter se distantibus tectum. Caules pseudobulbosi, plerumque abbreviati, 4–6 cm. longi, ad extremum rhizomatis rarius 1 dm. longi, in sicco plus minusve 7 mm. in crassitudine, oblique erecti, prope apicem plerumque trifoliati. Folia usque ad 1 dm. longa, 2–3.5 cm. lata, parenchymate opaco, anguste elliptica, apice rotundata, obtusa, breviter petiolata, conferta, 2.5 mm. inter se distantia, patentia, subtus nervis plus minusve decem eminentibus. Petiolus 2–3 mm. longus, caulem amplectens. Racemi plus minusve 1 dm. longi, nutantes, ex axillis superioribus orientes, satis graciles, flexuosi. Rachis rubido-pubescens. Bracteae inflorescentiae 6 mm. longae, 3 mm. latae, lanceolatae, acutae, patentees vel deflexae, glabrae. Pedicellus cum ovario usque ad 9 mm. longus, dense rubido-pubescens, plerumque curvatus. Flores illis *E. philippinensis* aequimagni, plus minusve 7 mm. inter se distantes. Sepala lateralia circa 1 cm. longa, usque ad 5 mm. lata, mentum 3.5 mm. longum formantia, triangularia, sensim acuminata, subacuta, in sicco roseo-tincta, pellucida, extus praecipue prope basim pubescentia. Sepalum dorsale vix 1 cm. longum, 3.5 mm. latum, lanceolatum, obtusum, extus sparsim pubescens. Petala 8.5 mm. longa, prope medium 3 mm. lata, lanceolata, subacuta. Labellum cum ungue 7 mm. longum, vix 4 mm. latum, simplex, oblongum, apice rotundatum, basi cordatum, ecallosum, in sicco aureo-roseum, carnosum, pellucidum; unguis brevis, vix .5 mm. longus, usque ad 1 mm. latus, trinervius. Columna cum pede semicircu-

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lum formans, omnino 6 mm. longa, subgracilis, apicem versus dilatata, utrinque rotundato-alata, pedem 3 mm. longum formans.

Closely allied with *E. philippinensis* Ames from which it differs in the broader leaves and differently formed ecallose labellum.

BONTOC SUBPROVINCE, Mount Masapilid, *M. Ramos & G. Edaña Bur. Sci.* 37937, March 16, 1920. On tree in mossy forest. Flowers "meat" colored. 4800 feet altitude.

HABENARIA *Willd.*

Habenaria boadanensis *Ames sp. nov.* Herba terrestris, usque ad 36 cm. alta, gracilis, foliis in medio caulis congestis. Radices ignotae. Folia usque ad 7 cm. longa, plus minusve 2.3 cm. lata, lanceolata, acuminata, acuta, margine crenato-undulata, supra atroviridia, subtus pallidiora, nervis vix eminentibus. Bracteae caulinae infra folia vaginantes, tubulatae, oblique truncatae, acutae; bracteae caulinae supra folia caulem amplectentes, anguste lanceolatae, acuminatae, acutae, plus minusve 2 cm. longae. Racemus sublaxiflorus, usque ad 13.5 cm. longus, vix 2.5 cm. in diametro, floribus viridibus, plus minusve 6 mm. inter se distantibus. Bracteae inflorescentiae 6–16 mm. longae, lanceolatae, acuminatae, acutissimae. Pedicellus cum ovario 8–15 mm. longus, utrinque attenuatus, oblique ascendens, glaber. Sepala lateralia usque ad 7.5 mm. longa, 4 mm. lata trans medium, ovato-lanceolata, membranacea, trinervia, dependentia, nervo medio in mucronem producto. Sepalum dorsale valde concavum, cucullatum, 6 mm. longum, late ovato-ellipticum, obtusum, trinervium. Petala simplicia, vix 6 mm. longa, prope basim 2 mm. lata, anguste triangula, acuta, binervia, erecta, quam sepalum dorsale vix breviora. Labellum usque ad apicem lobi medii plus minusve 7 mm. longum, valde carnosum, parenchymate opaco, trilobatum, partitionibus linearibus; lobi laterales 5 mm. longi, circa .5 mm. lati, prope basim labelli inserti, recurvi, usque ad apicem

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attenuati; lobus medius 7 mm. longus, prope lobos laterales labelli 2 mm. latus, supra medium vix .75 mm. latus, porrectus vel dependens; calcar 11 mm. longum, cylindraceum, apice obtusum, prope basim labelli leviter attenuatum, dependens, quam ovarium brevius. Columna usque ad apicem antherae 2 mm. alta, canalibus rectis, processibus stigmaticis deflexis, acutis.

The nearest ally of this species is *H. Delessertiana* Kränzl., which is characterized by larger flowers and longer leaves. In my specimens of *H. Delessertiana* from Calauan, Luzon, the spur is 2 cm. long and the leaves are 6.5–12 cm. long. The racemes of *H. boadanensis* are much more slender than those of *H. Delessertiana*.

BENGUET SUBPROVINCE, Mount Boadan, *M. Ramos & G. Edaña* 78, September 25, 1921. Open slopes. Flowers green. 6000 feet altitude.

Habenaria reticulata *Ames sp. nov.* Herba pergracilis, cum racemo 30–38 cm. alta. Radices ignotae. Caules usque ad racemum plus minusve 25 cm. longi, prope basim circa 2 mm. in crassitudine, paucifoliati. Folia tria, conferta, plus minusve 10 cm. supra basim caulis, plus minusve 1.5 cm. inter se distantia, ovato-lanceolata, rarius orbicularia, acuminata, acuta, 2.5–6 cm. longa, usque ad 2.5 cm. lata, bene reticulato-nervosa, basi rotundata, supra atroviridia, subtus multo pallidiora, nervis vix eminentibus, margine crenulato-undulata. Petiolus vaginans, inflatus, usque ad basim limbi dilatatus. Bractee caulinae infra folia vaginantes, apice dilatatae, foliaceae; bractee caulinae supra folia vaginantes, apice acuminatae, acutae, plus minusve quatuor, 1–1.5 cm. longae, approximatae vel 2–3 cm. inter se distantes. Racemus pergracilis, 7–17 cm. longus, circa 1.3 cm. in diametro, sub-laxiflorus, floribus plus minusve 5 mm. inter se distantibus. Bractee inflorescentiae usque ad 9 mm. longae, lanceolatae, acutae, quam pedicellus cum ovario breviores. Pedicellus cum ovario

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usque ad 9 mm. longus, utrinque attenuatus, clavatus, glaber, leviter arcuatus, oblique ascendens. Flores inter mediocres generis, virides. Sepala lateralia 2–2.5 mm. longa, 1 mm. lata, dependentia, oblongo-elliptica, obtusa, infra apicem mucronulata nervo medio subtus prominenti, scabridiusculo. Sepalum dorsale 2.5 mm. longum, valde concavum, ellipticum, apice rotundatum. Petala 2 mm. longa, prope medium 2 mm. lata, inaequaliter cuneata vel obtuse triangularia, antice prominentia, angulum obtusum formantia. Labellum conspicue trilobatum, usque ad apicem lobi medii plus minusve 2 mm. longum, carnosum, inter apices loborum lateralium 3.5 mm. latum; lobi laterales 1.5 mm. longi, vix .75 mm. lati prope basim, semicrescentiformes, carnosi, obtusi, divaricati; lobus medius 1 mm. longus, 1 mm. latus, carnosus, obtuse triangulus, porrectus; calcar leviter sigmoideum, usque ad 6 mm. longum, usque ad medium gracile, cylindraceum, deinde sensim dilatatum, parte apicali scrotiformi. Columna vix 1 mm. longa, incrassata; processus stigmatici paulum elongati, clavati, pro parte labello adnati.

Clearly distinguished from *H. goodyeroides* D. Don and *H. Copelandii* Ames, its nearest allies in the Philippines, by the elongated spur which nearly equals the pedicellate ovary in length.

BENGUET SUBPROVINCE, Mount Pulogloco, *M. Ramos & G. Edaña 108*, September 29, 1921. Open pine slopes. Flowers green. 6000 feet altitude.

TWO NEW SPECIES OF MALAXIS FROM HAITI

Malaxis domingensis Ames sp. nov. Aff. *M. spicatae*. Radices fibratae, elongatae. Caulis brevis, basi tumidus, bifoliatus, foliis alternis, approximatis. Folia chartacea, inaequalia, elliptico-ovata vel elliptico-lanceolata, acuta vel subobtusa. Pedunculus elongatus, usque ad racemum nudus. Racemus elongatus. Pedicelli graciles. Flores mediocres. Sepala lateralia elliptica, obtusa, trinervia. Sepalum dorsale simile, ovato-ellipticum, obtusum. Petala linearia, obtusa. Labellum subhastatum, lobis auriculatis obtusis, apice in lobum brevem abrupte contractum, margine conspicue ciliolato. Columna minuta.

Plant terrestrial, 24.5 cm. tall, slender, in habit resembling *Malaxis spicata* Sw. Roots fibrous, elongated. Stems bifoliate, tumid at the base, 4.5 cm. to the base of the lamina of the uppermost leaf, sheathed with two ample greenish bracts. Leaves alternate, dissimilar; the lowermost one elliptic-ovate, 4.5 cm. long, 3.1 cm. wide, contracted into a broad sulcate petiole that sheathes the stem; the uppermost leaf ovate-lanceolate, 4 cm. long, 2.2 cm. wide near the middle, at base clasping the stem. Peduncle elongated, slender, including the inflorescence 19 cm. long, naked up to the raceme. Raceme about 3 cm. long (elongating as anthesis progresses), many flowered; bracts minute, hardly 2 mm. long, triangular, much shorter than the pedicels, greenish. Pedicels slender, together with the ovary 1.3 cm. long. Flowers small, greenish, opening in succession. Lateral sepals 3 mm. long, about 1 mm. wide, distinctly three-nerved in dried material, ovate-elliptic, obtuse, strongly convex, obliquely deflexed. Dorsal sepal similar. Petals 2 mm. long, linear. Labellum 3 mm. long from the tip of the terminal lobe to the tip of the basal auricles, about 2 mm. wide across the middle, broadly

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sagittate in outline, terminating abruptly in a lobe-like bluntly triangular tip, margin of the apical half of the lip distinctly ciliate, basal portion shallowly concave, margin of the triangular depression strongly thickened; basal auricles about 1 mm. long, obtusely triangular. Column minute with cylindrical, blunt lobules—one on each side. Anther as in *M. Leonardii*.

Allied to *M. spicata* Sw. from which it differs in the ciliate margin of the labellum and in the longer pedicel of the flower. There is not any thickened ridge running through the middle of the concave base, as in *M. Leonardii*, from which species *M. domingensis* is in part distinguished by the sagittate ciliate labellum with large basal auricles. ***Malaxis carpintera*** *Ames comb. nov.* (*Microstylis carpintera* Schltr. in Beihefte Bot. Centralbl. 36, Abt. 2 (1918) 381) differs from *M. domingensis* in its larger nearly opposite leaves and in the distinctly tridentate apex of the labellum. *Malaxis rotundata* (Ridl.) Ktze. is also a closely related species, but is separable from *M. domingensis* by the form of the lip.

DOMINICAN REPUBLIC, vicinity of Laguna, Samaná Peninsula, *W. L. Abbott* 371, December 21, 1920. 100–500 meters altitude. (TYPE in U. S. Nat. Herb. No. 1078077.)

Malaxis Leonardii *Ames sp. nov.* Aff. *M. Adolpho*. Radices fibratae. Caulis prope basim tumidus, bifoliatus, foliis confertis. Folia inaequalia, elliptico-ovata. Pedunculus valde elongatus. Inflorescentia subumbellata. Flores numerosi, congesti, longe pedicellati. Sepala lanceolata, obtusa, sepalo dorsali angustato. Petala linearia. Labellum integrum, breviter acuminatum, infra medium concaviusculum. Columna minuta.

In habit similar to *M. domingensis*, from which it differs in having a smooth labellum. Roots elongated, fibrous, up to 8 cm. or more long. Stems tumid at base with two or three sheathing obtuse greenish bracts, 4–6 cm. long up to the base of the lamina

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of the lowermost leaf and about 5 mm. in diameter above the swollen base, in dried specimens plurisulcate. Leaves two, alternate, approximate, one much larger than the other, 3–7.5 cm. long, 1.4–4 cm. wide, elliptic-ovate, membranaceous, acute, contracted into a broad, abbreviated, sulcate petiole. Peduncle elongated, winged, 17–28 cm. long, longitudinally sulcate, in dried specimens ± 2 mm. in diameter, ebracteate up to the inflorescence. Raceme many flowered, contracted, 8–12 mm. long, appearing umbellate. Bracts minute, crowded, about 1 mm. long, triangular, acute, much shorter than the slender pedicels of the small, greenish purple flowers. Pedicels with the ovary ± 6 mm. long, spreading. Lateral sepals 3 mm. long, about 1 mm. wide, narrowly elliptical, obtuse, convex, obliquely deflexed. Dorsal sepal similar, 3 mm. long, obtuse, erect, convex. Petals 2 mm. long, linear, obtuse, coiled. Labellum 2.5 mm. long, about 1 mm. wide, entire, in outline elliptic-ovate, obtuse, below the middle concave and traversed longitudinally by a thickened keel, apical half fleshy with slightly deflexed margins; at the base the longitudinal keel divides into crescentiform calli. Column minute with an obtuse lobe on each side near the summit. Anther much broader than long, the cells distinct and semiovate.

Closely related to *Malaxis Adolphii* (*Schltr.*) *Ames comb. nov.* (*Microstylis Adolphii* Schltr. in *Beihefte Bot. Centralbl.* 36, *Abt.* 2 (1918) 380), from which it differs in having longer peduncles, much larger leaves and smaller flowers with a different labellum. *Malaxis fastigiata* (*Reichb. f.*) *Ktze.* is vegetatively a close ally of *M. Leonardii*, but is separable in having an elongated lanceolate labellum.

HARTI, vicinity of Furcy, *E. C. Leonard 4730*, May 26–June 15, 1920. Flowers greenish purple. Wet rocks in thicket, very scarce. 1300 meters altitude. (TYPE in U. S. Nat. Herb. No. 1077246.)

A NEW ONCIDIUM FROM HAITI

Oncidium (§ *Equitantia*) **haitiense** *Leonard & Ames sp. nov.*
Radices elongatae, albidae, glabrae, patentes. Pseudobulbi nulli. Folia plus minusve sex in numero, basi complicata equitantia, 3.5–12 cm. longa, usque ad 9 mm. alta, disticha, conferta, triquetra, valde complanata, coriacea, rigida, oblongo-lanceolata et valde arcuata a latere visa, acuta, margine distincte serrulata, in sicco multinervia. Pedunculus elongatus, erectus, cum rachide inflorescentiae 40–60 cm. longus, plus minusve 1.5 mm. in crassitudine, simplex vel paulum ramosus, laxe pauci- vel pluriflorus, bracteis tubulatis, 6 mm. longis, plus minusve 2.5 cm. inter se distantibus vestitus. Bractee inflorescentiae usque ad 4 mm. longae, quam pedicellus gracilis multo breviores, acutae. Pedicelli cum ovario usque ad 2.5 cm. longi, saepe curvati. Flores amabiles, flavescens, sepalis petalisque maculis atrofuscis ornatis. Sepala lateralia 4 mm. longa, fere usque ad apicem connata, laminam late spathulatam, plus minusve 2.5 mm. latam supra medium formantia, apice sepali utriusque breviter carinata et apiculata. Sepalum dorsale vix 5 mm. longum, spathulatum, acutum, basi angustatum, trinervium, valde concavum vel cucullatum. Petala quam sepala multo majora, 6 mm. longa, plus minusve 4 mm. lata, obovato-spathulata, margine inaequaliter sinuosa, apice leviter emarginata apiculo interjecto, textura subtilia, per medium longitudinaliter trinervia. Labellum trilobatum, plus minusve 1.5 cm. longum, trans lobum medium usque ad 1.9 cm. latum, isthmo subobsoleto; lobi laterales comparate parvi, 4.5 mm. longi, prope basim vix 3 mm. lati, obtuse triangulares vel semilanceolati, textura subtiles; lobus medius profunde retuso-bifidus, transverse reniformis, vix unguiculatus, margine inaequaliter undulata, superficie minute papillosa;

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crista labelli carnosae, minute puberula vel glandulosa, valde producta, obtuse sex-tuberculata, tribus majoribus antipositis. Columna 3 mm. alta, basi valde incrassata, antice in appendicem complanatam, sulcatam, quadratam producta, dimidio superiore conspicue alata, ala 2 mm. longa, dolabriformi. Anthera et polinia sectionis.

Closely allied with *O. intermedium* Bertero from which it differs conspicuously in the structure of the crest, in the much reduced isthmus and in the very dissimilar lateral lobes of the labellum. In specimens examined the crest is distinctly six-tuberculate, with three of the tubercles much flattened laterally and situated in a transversely parallel series in front of the three more fleshy basal tubercles which are also parallel to one another and decurrent posteriorly to form a thickened keel which passes to the base of the column. In habit not unlike *O. intermedium* Bertero as represented by the specimen collected by H. von Tuerckheim in Santo Domingo (3334).

HAITI, vicinity of Etáng, *E. C. Leonard* 3600, April 1920. Flowers light yellow; epiphyte; on arid low hills, occasional. (TYPE in U. S. Nat. Herb. No. 1075944. Duplicate type in Herb. Ames No. 21849.)

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Dendrochilum confusum Ames.

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