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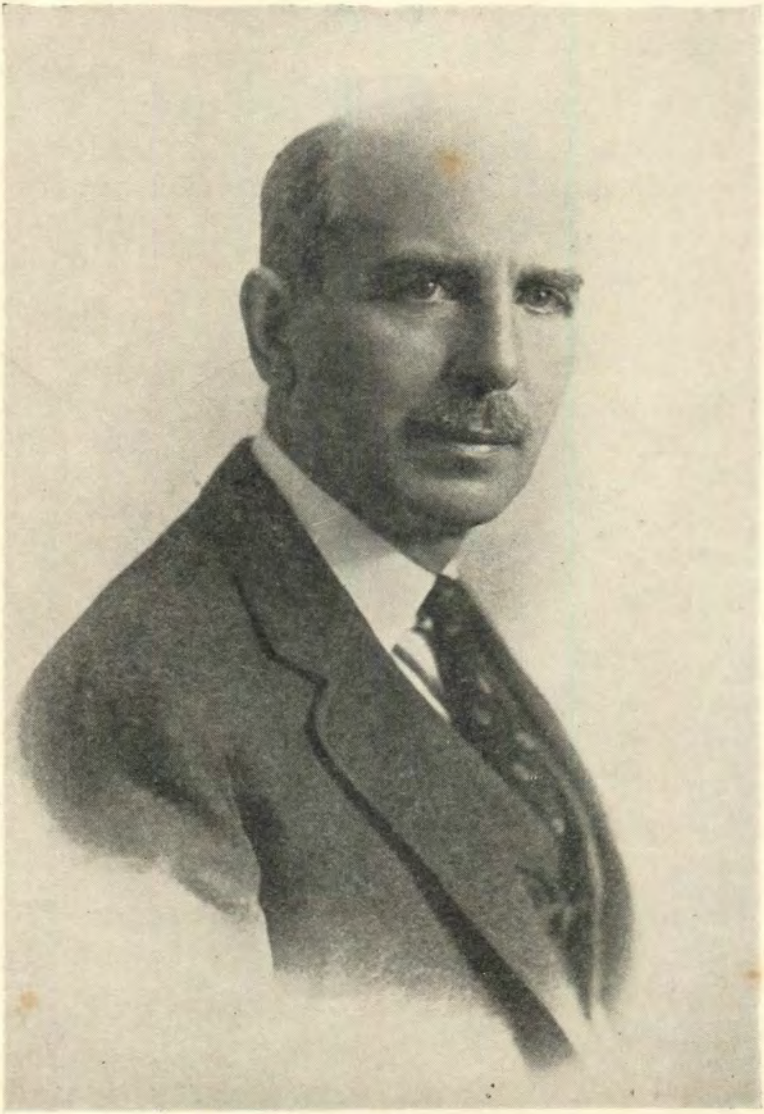
THE ORCHIDACEAE OF MEXICO

LOUIS O. WILLIAMS



KARL ERIK MAGNUS ÖSTLUND
1875 - 1938

Mr. Ostlund was assisted in his work on the Mexican orchids by Mr. Otto Nagel and it is due to his patience that the specimens were so skillfully prepared. Mr. Nagel has collected over most of Mexico and perhaps has seen growing more Mexican orchids than any other man.

The elaboration of "The Orchidaceae of Mexico" has been a labor of love and one which extended over a number of years. The work was begun in 1938 and was ready for the press late in 1941 when the first galleys were set up. I was called away and the work was discontinued. I returned to Harvard University in late 1945 but remained only a short time before coming to Honduras to live.

The necessary revision of the manuscript was done in the spring of 1950. This revisionary work was carried out where the original work was done, at the Ames Herbarium, Botanical Museum, Harvard University. The director of the Botanical Museum, Dr. Paul C. Mangelsdorf not only provided facilities to do this final work but gave permission to take the manuscript to Honduras.

In revisions such as this, one depends on the work of his colleagues as well as on their advice and assistance. Without the unstinted aid of my colleagues this work could not have been completed; what merit it may have is largely due to their help, yet errors that it most certainly contains are mine.

The late Mr. Oakes Ames helped with counsel and the experience gained in a half century of the study of the Orchidaceae. He helped, as well, in many other ways during the years I was associated with him.

Charles Schweinfurth has assisted whenever requested and to him I owe a great deal.

Donovan S. Correll, now of the Bureau of Plant Industry at Beltsville, Maryland; Victor S. Summerhayes, of the Royal Botanic Gardens at Kew, England; Paul H. Allen of the United Fruit Company in Costa Rica; Gordon W. Dillon, now Secretary and editor, the American Orchid Society; have all given freely of their time.

Thanks are due to the curators or directors of several herbaria where I visited to study the Mexican collections: the late Dr. William R. Maxon, United States National Herbarium; the late Dr. Jesse More Greenman, formerly Curator of the Herbarium of the Missouri Botanical Garden; Dr. Paul

C. Standley, Curator Emeritus of the Herbarium of the Chicago Natural History Museum and now my colleague in Honduras; Dr. Paul C. Mangelsdorf, director of the Botanical Museum of Harvard University.

FOREWORD

"THE ORCHIDACEAE OF MEXICO" does not pretend to be more than it is,—a list of the species of Mexican orchids with their synonyms; a description of each of the genera of orchids known to occur in Mexico and a key to those species now known in Mexico is given. It his hoped that a generic description will assist in determining these; a key to the species should assist in the determination of the Mexican kinds. A statement of the range of each species is given, in general terms outside of Mexico but I have tried to list each of the Mexican states from which a specimen has been seen. A few words of discussion are added in many instances.

Specific descriptions would have added much to the value of the work. Time to elaborate the descriptions has not been available.

The orchid collection of the Ames Orchid Herbarium at Harvard University, Cambridge, Massachusetts, which includes the very valuable Ostlund Herbarium, has been the basic collection studied. The collections in the United States National Herbarium; in the Herbarium of the Missouri Botanical Garden and the Herbarium of the Chicago Natural History Museum were studied also.

THE ORCHIDACEAE OF MEXICO

The orchids of Mexico have attracted collectors from abroad for more than a hundred years past, and in more recent years plant lovers residing within the country. Comercial collectors no longer range the hills and ravines in order to find those plants which will bring a small fortune somewhere overseas. Fashions in orchids, like those in hats, change and the hybridist's art has brought to the world an unlimited variety of showy kinds which are now fashionable. It is just as well, for some orchids were in danger of extinction, and some

perhaps still are because of the local "flower peddlers" who pull the plants from the trees to secure a spike of flowers which will bring a few centavos in the market, or perhaps a bit more from some tourist.

It is quite probable that the Mexican Orchidaceae are as well known and as thoroughly collected as any other large family of plants growing in that country. This situation has existed for many years.

The first general account of the Mexican flora was that of Hemsley in Godman and Salvin, Biologia Centrali-Americana, the orchids portion published about 1884. The account of the Orchidaceae in this work is little more than a list of the species known to occur or described from the country. The list is not critically done. There are given for Mexico a few more than 500 species of orchids.

The second list enumerating Mexican orchids was Schlechter's Kritische Aufzählung der bisher aus Zentral-Amerika bekanntgeworden Orchidaceen, published in 1918. Schlechter was a specialist and perhaps knew the tropical American orchids better than anyone else. His list is more critical than that of Hemsley although it leaves much to be desired. In it there are a total of 628 species accredited to Mexico.

The increase in the number of species of orchids from Hemsley's list to that of Schlechter is less than one hundred twenty-five.

Knowledge of Mexican orchids has increased greatly since Schlechter's list of 1918 and a great many collections have been made. Schlechter, Ames, Ames and Schweinfurth, Rolfe and the present author between them have published a large number of papers dealing wholly or in part with Mexican orchids.

In the present work there are given a few more than six hundred species of orchids for Mexico. Some twenty species less than the number given by Schlechter in his list, which was published about thirty-three years ago.

The apparent anomaly of fewer species of orchids known in Mexico after a lapse of some thirty-three years of rather intensive and continued work is easily explaind by a glance at any of the larger genera in Schlechter's list of 1918 and of this one. In the present list, as an example, there are accepted nineteen species of Habenaria, of which two were not

represented from Mexico in Schlechter's list. In Schlechter's list there are thirty-five species of *Habenaria* (*Habenaria* and *Platanthera* together) reported from Mexico which is almost twice as many as are accepted today.

The largest single collection of orchids ever to be made in Mexico was that brought together by Erik Ostlund and his associates; perhaps there were as many as four thousand numbers represented in the collection. Not only was it the largest orchid collection ever made in Mexico but it was also the finest. Ostlund and his associate Otto Nagel prepared as nearly perfect specimens as I have ever seen. It was my pleasure to study this collection in its entirety.

DISTRIBUTION OF MEXICAN ORCHIDS

The north of Mexico is essentially without orchids, a few terrestrials and still fewer epiphytes make up the flora.

The great central plateau of Mexico has relatively few species although there are more than there are in the north. The plateau is too high and too cold, and in most places too dry to support a large orchid flora.

The slopes of the southern part of the great central plateau, where the plateau falls away to more moderate elevations, is where the greatest number of Mexican orchids are to be found. This is probably true as much to individuals as to kinds.

Distribution maps for all of the larger genera of the orchids show the same pattern for most of them. This pattern is a sort of mammoth letter Y. The base of the Y comes into Mexico, out of Central America, following the Sierra Madre. There usually is a small side branch of the base of the Y, like a barb on a fish hook, extending from the Sierra Madre (around the volcanos of Tacaná and Tacamulco) up toward Comitán and San Cristóbal in the mountains. The stem of the Y continues in a west northwesterly direction up into the state of Oaxaca. Somewhere east southeast of the city of Oaxaca the "stream of orchids" divides and the Y gets its prongs. One main prong extends north-north-westward from Oaxaca touching the states of Vera Cruz, Puebla, Tlaxcala, Hidalgo and just into San Luis Potosí. The other main branch of the Y continues almost westward up the Sierra Madre del Sur through

the states of Guerrero, Michoacán and Jalisco. Another subsidiary branch of the northward-flowing stream of orchids separates from the easternmost prong of the Y in south central Vera Cruz and goes almost westward through the states of Puebla, Morelos and México, to the north of the valley of the Río Mezcala (or Río de las Balsas), to join the other prong of the Y in Michoacán.

This pattern of greatest concentration of species must follow the 1000 meter contour, as a center, fairly closely.

The Isthmus of Tehuantepec is low and has relatively few orchids. It also serves as a barrier between the Central American and the truly Mexican flora.

The mountainous and beautiful state of Chiapas is as yet relatively little known. The flora here seems to be essentially Central American.

The Yucatán peninsula has but a small orchid flora. It is composed mostly of lowlands, a part of which is very dry and a part wet. The floral relationship is with Central America.

ORCHIDACEAE

Epiphytic, terrestrial, rarely semi-aquatic or saprophytic, perennial herbs. Vegetative growth of two main types: (1) Termed MONOPODIALES, in which the main axis or stem grows steadily upward year after year, the annual growths at length being indistinguishable and a monopodium being formed; the inflorescences borne on lateral shoots. (2) Termed SYMPODIALES, in which a new growth develops laterally from the base of the previous year's growth, which is completed and matures in a few months. In the SYMPODIALES if the annual growth is terminated by an inflorescence the plant is termed *acranthous* (terminal flowering); if the inflorescence originates on lateral branches (usually at the base of or laterally on a pseudobulb) and the annual growth is terminated only by leaves the plant is termed *pleuranthous* (lateral flowering). Stems (secondary) of many orchids developed into thickened or swollen structures (pseudobulbs) which act as storage organs for food and moisture. Flowers hermaphroditic and gynandrous, occasionally monogamous or polygamous, the male and female ones being very different; zygomorphic; superior. Perianth of two tripartite whorls, alternating, often variously united; in the

same whorl the even pair similar, the odd one usually different in form. Sepals 3, similar, or the dorsal differing from the laterals, free or variously united. Petals 3, two similar and termed petals, the other one usually strikingly different and termed lip or labellum. Stamens in two tripartite whorls, only one (MONANDRAE) or two (DIANDRAE) fertile, the others, along with the styles and sterile stigmas, forming the column by consolidation; in the MONANDRAE the odd stamen of the outer whorl fertile; in the DIANDRAE the paired stamens of the inner whorl fertile. Pollen (except in the CYPRIPEDILOIDEAE) usually consolidated into pollinia. Stigmas 3, usually only one or two fertile (if two, often confluent and appearing as one). The column, the central structure in the flowers, which is made up of the consolidated styles and filaments along with the suppressed anthers and stigmas, is diagnostic of the family. Fertile anthers and stigmas usually borne toward the apex of the column. Ovary 1-celled or rarely 3-celled. Seeds numerous, minute, lacking endosperm.

A cosmopolitan family of about 600 genera and 15,000-20,000 species. Most abundant in tropical regions of the world.

The Orchidaceae is an extremely complex family, the morphology of which is often not too well understood. The genera, in some groups, are technical and perhaps not too well differentiated; in other groups they are fairly well differentiated. With the exception of a few terrestrial genera and even fewer of the epiphytic ones, the respective genera are limited to either the eastern or to the western hemisphere. A few genera contain a very large number of species (Dendrobium, eastern hemisphere, probably more than 1,000; Epidendrum western hemisphere, possibly nearly 1,000). The species of orchids, as a whole, are distinctive, and extreme variation within species is not too common. Terrestrial species, especially those of temperate climates, are inclined to be more variable than are epiphytic ones. Species are inclined to be restricted in distribution although terrestrials and epiphytes growing at low elevations often range widely.

The greatest concentrations of orchids occur within twenty degrees of the equator. While some are found at low elevations, the great majority of them grow on mountains within the tropics. Malaysia and tropical America are richest in species and genera, with Africa a poor third. New Guinea probab-

ly contains more species than any comparable land area, although it is still not well known botanically. Colombia is perhaps the richest in species of any comparable area in the western hemisphere.

KEY TO THE GENERA OF MEXICAN ORCHIDS

Stamens 2, a third transformed into a large staminode; pollen granular, not united into masses or bodies.

Subfamily DIANDRAE
(Tribe 1 *Cypripedieae*)

Stamen 1, the laterals abortive or forming small staminodes; pollen consolidated into masses or solid bodies (pollinia).

Subfamily MONANDRAE

Caudicle and gland arising from the base of the pollinia; anthers erect or more or less resupinate, very closely adnate to the broad-based column, never deciduous after flowering; pollinia always granular.

(Basitonae)
(Tribe 2 *Ophrydoideae*)

Caudicle and gland arising from the apex of the pollinia; anthers erect or incumbent, the filament short and slender, generally narrowly joined to the column, usually deciduous but if persisting soon withering.

(Acrotonae)

Pollinia granular, soft; anther commonly persistent; inflorescence (normally) always terminal.

(Tribe 3 *Polychondreae*)

Pollinia waxy or cartilaginous; anther commonly soon deciduous; inflorescence terminal or lateral.

(Tribe 4 *Kerosphaereae*)

I. Subfamily Diandrae, tribe Cypripedieae, subtribe Cypripedileae. One genus in Mexico.

1. *Cypripedium*

II. Subfamily Monandrae, Division Basitonae, tribe Ophrydoideae. One genus in Mexico.

2. *Habenaria*

III. Subfamily Monandrae, Division Acrotonae, tribe Polychondreae. Eight subtribes and fourteen genera in Mexico, as follow:

A. Anther more or less prone, incumbent.

B. Stems pseudobulbous, at least at the base, very short (Subtribe *Bletilleae*)

8. *Crybe*

BB. Stems cane-like, not conspicuously pseudobulbous, usually long.

C. Leaves not articulated, persistent.

D. Lip divided into hypochile and epichile, the hypochile

concave cucullate or calcarate; leaves plicate-veined (Subtribe *Cephalanthereae*)

3. *Epipactis*

DD. Lip not divided into hypochile and epichile; leaves soft or fleshy.

(Subtribe *Vanilleae*)

E. Terrestrial herbs with fleshy roots and comparatively small flowers (less than 2 cm. long)

4. *Pogonia*

EE. Scandent herbs, usually epiphytic, without fleshy roots and with comparatively large flowers (more than 2 cm. long)

5. *Vanilla*

CC. Leaves articulated, caducous (Subtribe *Sobralieae*)

F. Base of the lip strongly gibbous or subsaccate, ornamented with two prominent calli; flowers relatively small.

6. *Elleanthus*

FF. Base of the lip not strongly gibbous or subsaccate, without prominent calli; flowers relatively large.

7. *Sobralia*

AA. Anther more or less erect; rostellum erect or suberect.

G. Leaves not plicate-nerved, usually soft.

H. Roots fasciculated.

I. Lip uppermost, adaxial, flowers resupinate (Subtribe *Cranichideae*)

J. Petals and lip sometimes inserted on the column.

11. *Ponthieva*

JJ. Petals and lip inserted on the receptacle.

K. Sepals connate at the base and forming a tube.

9. *Prescottia*

KK. Sepals free at the base, not forming a tube.

10. *Cranichis*

II. Lip lowermost, abaxial, flowers not resupinate (subtribe *Spirantheae*)

12. *Spiranthes*

HH. Roots not fasciculated, arising from the nodes on the lower part of the stem or rhizome (subtribe *Physureae*)

L. Lip produced into a sac or spur at the base.

14. *Erythrodes*

LL. Lip plain or gibbous, not produced into a sac or spur at the base.

13. *Goodyera*

GG. Leaves plicate-nerved, chartaceous or subcoriaceous (subtribe *Tropideiae*).

M. Lip narrow at the base; sepals and petals narrow, more or less coherent into a tube; column long.

16. *Corymborchis*

MM. Lip broad at the base, concave, saccate or short spurred; lateral sepals forming a short mentum at the base; column short.

15. *Tropidia*

IV. Subfamily Monandrae, Division Acrotonae, Tribe Kerosphaereae. Twenty-five subtribes and sixty-seven genera in Mexico as follow:

a. Series a, *Acranthae*. Inflorescence normally terminal or by abortion of the terminal inflorescence axillary in the uppermost leaves (see also *Lockhartia* in the Pleuranthae).

b. Viscid disc, when present, arising from the apex of the pollinia, commonly irregular, rudimentary or none.

c. Ovary articulated to the pedicel; the pedicel persistent; stems slender rigid, sometimes reduced, usually unifoliate (Subtribe *Pleurothallideae*).

d. Sepals all distinctly connate.

e. Sepals forming a narrow or campanulate tube at the base.

f. Inflorescence a raceme.

18. *Physosiphon*

ff. Inflorescence a single flower or rarely two flowers.

19. *Masdevallia*

ee. Sepals more or less rotate, not forming a narrow tube.

17 *Stelis*

dd. Sepals not distinctly connate, at least the dorsal sepal free or nearly so.

g. Blade of the petal transverse, i.e. strongly bilobed.

20. *Lepanthes*

gg. Blade of the petal not transverse nor strongly bilobed.

21. *Pleurothallis*

cc. Ovary not articulated to the pedicel, pedicel caducous with the flowers; stems slender or fleshy, 1-several-leaved.

h. Pollinia without appendages; i.e. no viscid disc nor caudicles (Subtribe *Liparideae*).

i. Column very short; anther sessile in the clinandrium, erect.

22. *Malaxis*

ii. Column elongated; anther terminal, incumbent.

23. *Liparis*

hh. Pollinia appendaged, i.e. with at least rudimentary viscid disc or a caudicle with a viscid apex.

j. Column footless; lip more or less connate to the base of the column (Subtribe *Laelieae*).

k. Pollinia 4, 2 in each cell of the anther.

l. Lip geniculate at its junction with the column.

m. Lip gibbous or saccate at the base.

24. *Hexisea*

mm. Lip not saccate nor gibbous at the base.

25. *Alamania*

ll. Lip not geniculate at its junction with the column, or if geniculate free from the column.

n. Lip gibbous or saccate at the base; with an apparent mentum.

26. *Nageliella*

nn. Lip not gibbous nor saccate at the base.

o. Flowers large and showy; stems always pseudobulbous.

28. *Cattleya* *

oo. Flowers usually not large and showy; stems either pseudobulbous or ebulbous.

27. *Epidendrum*

kk. Polinia 8, 4 in each cell of the anther.

p. Pollinia 4 pairs, each pair joined by parallel caudicles; anther operculate.

q. Pollinia of two sizes, unequal.

s. Lip very different from the sepals.

30. *Brassavola*

ss. Lip similar to the sepals.

32. *Homalopetalum*

qq. Pollinia of one size, equal.

29. *Laelia*

pp. Pollinia a fascicule of eight, not paired; anther not operculate.

31. *Meiracyllium*

jj. Column produced into a distinct foot; lip hardly connate to the column or at most connate to the base of the column-foot (Subtribe *Ponereae*).

A. Pollinia 4 or 6.

r. Leaves distichous and scattered along an elongated stem; pollinia 4.

z. Inflorescence a fascicle.

t. Inflorescence terminal on the stem; leaves more or less fleshy.

34. *Jacquiniella*

tt. Inflorescence lateral on the stem in the axils of leaves, leaves not fleshy.

33. *Ponera*

zz. Inflorescence a terminal raceme.

u. Lip S-shaped at the base; inflorescence terminal only.

35. *Isochilus*

uu. Lip not S-shaped at the base; inflorescence terminal and sometimes also lateral.

33. *Ponera*

rr. Leaves not distichous on an elongated stem, terminal from pseudobulbs or short indurated stems; pollinia 4 or 6.

36. *Scaphyglottis*

* Cattleya and Epidendrum are technically indistinguishable and are nothing more than genera of convenience.

AA. Pollinia 8.

v. Leaf one from the apex of an indurated stem; bracts subtending the inflorescence spathe-like.

37. *Arpophyllum*

vv. Leaves two or more from the apex of a thickened pseudobuib; bracts subtending the inflorescence not spathe-like.

w. Column-foot subequal to the column in length; mentum conspicuous.

39. *Bothriochilus*

ww. Column-foot much shorter than the column, very conspicuous; mentum almost none.

38. *Coelia*

bb. Viscid disc distinct, regular with the margins well defined, arising from the apex of the rostellum.

x. Column with a foot, plants with pseudobulbs; pollinia four or four joined into two pairs (Subtribe *Palystachyeae*).

y. Lip with a spur.

41. *Galeandra*

yy. Lip without a spur.

40. *Polystachya*

xx. Column footless; plants without pseudobulbs; pollinia 2. (Subtribe *Epidantheae**).

42. *Epidanthus*

aa. Series b, Pleuranthae. Inflorescence lateral, arising near the base of the pseudobulb or in the axils of the lower leaves or sheaths. This series contains two subseries.

A. Subseries a, Sympodiales. Plants forming a sympodium, i.e. the stems approximate or superimposed and the apical growth manifestly terminal.

B. Pollinia without stipe, viscid disc commonly rudimentary or the apex of the caudicle glutinous, or none.

C. Rhizome shortened or coralloid, bulbose, annulated internodes short; pseudobulbs usually none; leaves plicate or lacking (in the saprophytic genera); plants terrestrial.

D. Plants saprophytic, without leaves; rhizome coralloid; stems elongated (Subtribe *Corallorrhizeae*).

E. Pollinia 4; flowers comparatively small.

44. *Corallorrhiza*

EE. Pollinia 8; flowers comparatively large.

43. *Hexalectris*

DD. Plants sot saprophytic, with green leaves; roots not coralloid; stems shortened or pseudobulbous (Subtribe *Phajeae*).

F. Lip with a spur.

45. *Calanthe*

* Subtribus **Epidantheae** L. O. Williams, subt. nov. — Inflorescentia terminalis. Pollinia duo stipite et glandula ornata. Columna apoda. Labellum columnae connatum. Genus unicum **Epidanthus** L. Wms.

FF. Lip without a spur.

46. *Bletia*

CC. Rhizome more or less elongated; stems pseudobulbous, 1-many-leaved; leaves plain or plicate; plants epiphytic.

G. Pseudobulbs homoblastic (i.e. of several nodes, only the terminal one of which bears leaves), fusiform, many-leaved; leaves plicate, thin; flowers relatively large (Subtribe *Chysieae*).

47. *Chysis*

GG. Pseudobulbs heteroblastic (i.e. of a single node with one or two terminal leaves), usually small; leaves coriaceous or fleshy, not plicate; flowers relatively small (Subtribe *Bulbophylleae*).

48. *Bulbophyllum*

BB. Pollinia with a prominent stipe, sometimes short; viscid disc distinct.

H. Pollinia of a waxy texture, easily mashed (Subtribe *Cyrtopodieae*).

I. Lip spurred or with a saccate base.

49. *Eulophia*

II. Lip not spurred or saccate at the base.

J. Lip prominently 3-lobed.

50. *Cyrtopodium*

JJ. Lip simple or at most crenulate.

51. *Govenia*

HH. Pollinia of a cartilaginous texture, i.e. not easily mashed.

K. Leaves convolutive in vernation.

L. Pseudobulbs large, fusiform, homoblastic, many-leaved (Subtribe *Cataseteae*).

M. Flowers perfect, monomorphic; column twisted.

52. *Mormodes*

MM. Flowers dimorphic or trimorphic (rarely perfect); column not twisted.

N. Column thick, straight, in male flowers usually with two antennae.

53. *Catasetum*

NN. Column slender, curved or arcuate, without antennae.

54. *Cycnoches*

LL. Pseudobulbs short, heteroblastic, 1-few-leaved.

O. Lip continuous with the base of the column or solidly attached to the short column-foot, not articulated, more or less prominently divided into an epichile and hypochile (Subtribe *Gongoreae*).

P. Petals very much narrower and smaller than the sepals, usually inserted on the base of the column.

58. *Gonogora*

PP. Petals similar to the sepals or a little smaller.

Q. Lateral sepals strongly reflexed in anthesis.

57. *Stanhopea*

QQ. Lateral sepals not reflexed in anthesis.
R. Lip with a long claw and with the lateral lobes expanded near the middle.
55. *Acineta*
RR. Lip without a long claw and with the lateral lobes expanded near the base.
56. *Lacaena*
OO. Lip articulated to the apex of the column-foot.
S. Inflorescence basal, i.e. arising at the base of the pseudobulb; lip usually provided with a low longitudinal callus (Subtribe *Lycasteae*).
T. Inflorescence consisting of a single flower.
60. *Lycaste*
TT. Inflorescence a few-several-flowered raceme.
59. *Xylobium*
SS. Inflorescence suprabasal, i.e. in the axils of the lower sheaths; lip usually provided with a transverse callus or a transverse crest (Subtribe *Zygopetaleae*).
61. *Zygopetalum*
KK. Leaves duplicative in vernation.
U. Column produced into a foot and forming a mentum with the lateral sepals; rostellum hardly produced, emarginate.
V. Callus of the lip transverse, often flabellate; inflorescence suprabasal, i.e. in the axils of sheaths or sheath-like leaves; pseudobulbs reduced or rudimentary (Subtribe *Huntleyeae*).
62. *Chondrorrhyncha*
VV. Callus of the lip longitudinal, often depressed or rarely none; inflorescence borne from the base of a pseudobulb; pseudobulbs usually well developed or forming elongated stems (Subtribe *Maxillarieae*).
W. Sepals forming a short tube at the base; lip not half as long as the sepals.
65. *Trigonidium*
WW. Sepals not forming a tube at the base; lip usually at least half as long as the sepals.
X. Viscid disc lunate or horseshoe-shaped; column almost footless; peduncle as long as or longer than the leaves.
64. *Mormolyca*
XX. Viscid disc scale-shaped; column with a distinct foot; peduncle usually much shorter than the leaves.
63. *Maxillaria*
UU. Column footless; rostellum commonly produced, sometimes subulate and acute.
Y. Anther incumbent; rostellum porrect or deflexed, never ascending.

Z. The base of the lip spurred or saccate or the lateral sepals connate and saccate or spurred at the base.
a. Base of the lip forming a spur or deeply saccate.
b. Lateral sepals free; inflorescence usually 1-flowered (Subtribe *Trichocentreae*).
66. *Trichocentrum*
bb. Lateral sepals connate to their apices; inflorescence a raceme (Subtribe *Oncidieae*, pars).
75. *Papperitzia*
aa. Base of the lip not forming a spur nor deeply saccate but sometimes caudate; lateral sepals connate and spurred or saccate at the base; inflorescence racemose or paniculate (Subtribe *Comparettieae*).
c. Lip with two filiform caudicles at the base.
68. *Comparettia*
cc. Lip without caudicles at the base.
67. *Ionopsis*
ZZ. The base of the lip neither spurred nor saccate; lateral sepals free or connate, if connate then neither spurred nor saccate at the base (Subtribe *Oncidieae*, except *Papperitzia*).
d. Pollinia 2.
e. Leaves articulated, i.e. deciduous; plants with pseudobulbs; inflorescence from the base of the pseudobulbs.
f. Sepals and petals long caudate; column not winged at the apex.
71. *Brassia*
ff. Sepals and petals not long caudate or if so then the column winged or auriculate; column winged or wingless at the apex.
g. Anther produced in front into a membranaceous appendage longer than the locule.
h. Lip prominently 3-lobed.
73. *Erycina*
hh. Lip entire or inconspicuously lobed.
74. *Leochilus*
gg. Anther not produced in front into a membranaceous appendage longer than the locule.
i. Lip long unguiculate.
76. *Sigmatostalix*
ii. Lip not long unguiculate.
j. Lip erect and parallel or contiguous to the column at the base; calli on the lip usually two, parallel and not joined; column usually not winged.
70. *Odontoglossum*

jj. Lip spreading (usually approaching a right angle) from the column; calli on the lip various but if two and parallel then usually joined; column usually winged at the apex.

72. *Oncidium*

ee. Leaves not articulated, i.e. marcescent; plants with densely equitant-leaved, elongated stems, epseudobulbous (Subtribe *Lockhartieae*).

77. *Lockhartia*

dd. Pollinia 4 (Subtribe *Ornithocephaleae*).

k. Lip with a retrorse calius near the base.

79. *Hintonella*

kk. Lip without a retrorse callus near the base.

78. *Ornithocephalus*

YY. Anther erect on the back of the column or erect on the apex of the column under the clinandrium; rostellum erect (see Erycina and Papperitzia which sometimes appear to have erect anthers) (Subtribe *Notylieae*).

l. Lip 4-lobed, the lobes filiform.

81. *Cryptarrhena*

ll. Lip not 4-lobed.

80. *Notylia*

AA. Subseries b, Monopodiales. Plants forming a monopodium i.e. the stems with infinite apical growth.

m. Column with an infrastigmatic ligule; stems with equitant leaves (Subtribe *Dichaeeae*).

82. *Dichaea*

mm. Column without an infrastigmatic ligule; stems without equitant leaves, sometimes leafless (Subtribe *Sarcantheae*).

83. *Campylocentrum*

1. CYPRIPEDIUM Linnaeus, Sp. Pl. ed. 1, 2: 951. 1753.

Terrestrial herbs with plicate cauline leaves. Sepals subequal, free (in our) or the lateral pair connate. Petals free, usually smaller than the sepals. Lip sessile, strongly inflated, calceiform. Column short, terete. Perfect anthers 2, lateral. Pollen granular.

1. CYPRIPEDIUM IRAPEANUM Llave & Lexarza Nov. Veg. Descr. fasc. 2: 10. 1824; Lindley Gen. & Sp. Orch. Pl. 528. 1840; Bot. Reg. 32: t. 58. 1846; Matschat in Orch. Rev. 41: 170. 1933.

Cypripedium molle Lindley in Bentham Pl. Hartw. 72. 1840; Gen. & Sp. Orch. Pl. 526. 1840.

Range: Mexico (Durango, Guerrero, Nayarit, Jalisco, Mexico, Michoacán, Morelos, Sinaloa and Vera Cruz) and Guatemala.

Even though it must be very showy, *Cypripedium irapeanum* is not a common plant in collections. Matschat reports that it is rather common where it grows. It is the only species of the genus known to be a native of Mexico.

Two probable synonyms which we have not been able to authenticate are: *Cypripedium Lexarzae* Scheidw. and *C. splendidum* Scheidw. in Otto & Dietr. Allg. Gartenz. 8: 265-266. 1839.

2. HABENARIA Willdenow Sp. Pl. 4: 44. 1806; Kränzlin, Orch. Gen. & Sp. vols. 1 & 2: 1897-1903; Ames, Orch. 4: 1910.

Terrestrial or semiaquatic herbs with cauline or basal leaves or rarely with the leaves reduced to bracts. Leaves thin to fleshy, usually prominente. Inflorescence few-many-flowered, spicate or racemose; flowers various; bracts often large and conspicuous. Sepals subequal, free or connate at the bases, the dorsal erect, usually concave, the laterals usually spreading. Petals similar to the sepals but usually smaller, often more or less deeply bifid (rarely trifid or polyfid). Lip simple or 3 or more lobed, often adnate to the column, spreading or pendulous, calcarate at the base. Column short, footless, stigmas two or the stigma 2-lobed, with the lobes often elongated into short or comparatively long processes; anther erect, persistent; pollinia (or pollen) granular, with short, or sometimes long caudicles. (*Bonatea* Willdenow Sp. Pl. 4: 43. 1805; *Gymnadenia* R. Brown in Aiton Hort. Kew ed. 2, 5: 191. 1813; *Platanthera* L. C. Richard in Mem. Mus. Par. 4: 48. 1818; *Limnorchis* Rydberg Mem. N. Y. Bot. Gard. 1: 104. 1900; *Habenella* Small Fl. S. E. United States 51. 1903.)

A polymorphic genus of world wide distribution.

a. Petals entire or merely toothed at the base; lip entire, toothed at the base or 3-lobed.

3. HABENARIA LIMOSA (Lindl.) Hemsley in Godman & Salvin, Biol. Cent.-Am. 3: 305. 1884; Kränzlin, Orch. Gen. & Sp. 1: 646. 1899; 1: 943. 1901; Ames, Orch. 4: 109. 1910.

Platanthera limosa Lindley in Ann. Nat. Hist. 4: 381. 1840.

Platanthera volcanica Lindley in Ann. Nat. Hist. 4: 381. 1840.

Platanthera neottioides Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

Habenaria volcanica S. Watson in Proc. Am. Acad. 18: 159. 1883; Ames, Orch. 4: 107. 1910.

Range: Arizona and New Mexico (U.S.A.), Mexico, (Chihuahua, Sonora, Coahuila, Baja California, Nuevo Leon, Tlaxcala, Distrito Federal, Colima, Mexico, Michoacan, Guerrero, Oaxaca and Chiapas) and Guatemala.

A rather variable species which should possibly include *H. brevifolia* Greene.

4. HABENARIA ALATA Hooker Exot. Fl. 3: t. 169. 1826; Ames, Orch. 4: 273. 1910; Ames in Bot. Mus. Leafl. Harv. Univ. 3: 20, fig. 1934.

Habenaria stricta Richard & Galeotti in Ann. Sci. Nat. ser. 3. 3: 29. 1845; Ames, Orch. 4: 257. t. 78, fig. II. 1910.

Range: West Indies and Mexico (Vera Cruz, San Luis Potosí, Guerrero, Morelos, Colima and Nayarit) to South America.

A helpful discussion of the species, by Ames, is to be found in Bot. Mus. Leafl. Harv. Univ. 3: 20. 1934.

5. HABENARIA BREVILABIATA Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845; Ames, Orch. 4: 266. 1910.

Range: Mexico (Michoacan and Oaxaca).

Habenaria brevilabiata, which remains a rare plant, is said by Ames to be allied to *H. alata* Hook.

6. HABENARIA EUSTACHYA Reichenbach filius in Ber. Deut. Sch. Bot. Gesell. 3: 274. 1885; Kränzlin Orch. Gen. & Sp. 1: 391. 1898; Cogniaux in Urban Symb. Antill. 6: 257. 1901.

Habenaria troyana Fawcett & Rendle in Journ. Bot. 47:

264. 1909; Ames, Orch. 4: 260. 1910; Schlechter in Beih. Bot. Centralbl. 36, Abt. 2: 426. 1918.

Range: West Indies, Mexico (Vera Cruz and Tabasco), Guatemala and Honduras.

Habenaria eustachya seems to be rare in Mexico. Schlechter has reported *H. troyana* from Mexico but the basis for this report is not given. *Habenaria troyana* seems to be the same as *H. eustachya.*

7. HABENARIA TRIPTERA Reichenbach filius in Linnaea 22: 814. 1849; in Walp. Ann. 3: 588. 1852; in Bonplandia 2: 10. 1854; Kränzlin, Orch. Gen. & Sp. 1: 445. 1898; Ames, Orch. 4: 263. 1910.

Range: known only from the Mexican plants which are not well localized and which were reported as from Caracas, Venezuela by Reichenbach.

Habenaria triptera does not seem to have appeared in any Mexican collection since the time of its discovery; our conception of the species is based on a photograph of the type mentioned and on an analytical drawing prepared by Reichenbach.

8. HABENARIA STRICTISSIMA Reichenbach filius in Linnaea 18: 407. 1844; Kränzlin, Orch. Gen. & Sp. 1: 392. 1898; Ames, Orch. 4: 272. 1910.

Habenaria pyramidalis Lindley in Ann. Nat. Hist. 15: 386. 1845; Kränzlin, Orch. Gen. & Sp. 1: 393. 1898.

Habenaria Amesiana Schlechter in Beihefte Bot. Centralbl. 36, Abt. 2: 371. 1918.

Habenaria amblyantha Kränzlin in Saertr. af Vidensk. Medd. fra Dansk Naturh. Foren. 7: 179. 1920.

Range: Mexico (Mexico, Distrito Federal, Sinaloa, Vera Cruz, Morelos, Puebla, Michoacan and Guerrero), Guatemala and Nicaragua.

8a. HABENARIA STRICTISSIMA var. ODONTOPETALA (Reichb. f.) L. O. Williams in Bot. Mus. Leafl. Harv. Univ. 7: 184. 1939.

Habenaria odontopetala Reichenbach filius in Linnaea 18: 407. 1844; Kränzlin, Orch. Gen. & Sp. 1: 392. 1898; Ames in Proc. Biol. Soc. Wash. 16: 117. 1903; Ames,

Orch. Fl. Florida 12: t. 2, 1904; Ames, Orch. 4: 266. 1910.

Habenaria Garberi Porter in Bot. Gaz. 5: 135. 1880. *Platanthera Garberi* Chapman Fl. S. United States, ed. 3, 486. 1897.

Habenella Garberi Small Fl. S. E. United States 316. 1903.

Range: Florida (U.S.A.), West Indies, Mexico (Vera Cruz and Michoacan), Guatemala, Honduras, Costa Rica.

Habenaria strictissima var. *odontopetala* is distinguished from the species in having oblong petals which usually have one to three teeth at the blunt apex and by the protuberant anterior basal angles. The species has petals which are usually orbicular, lacking apical teeth and usually lacking the protuberant anterior basal angles.

9. HABENARIA VIRENS Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845; Ames, Orch. 4: 29, t. 78. 1910.

Range: Mexico (Vera Cruz, Nayarit and Oaxaca).

Habenaria virens is a very rare species of whih the following specimens are the only ones in the Ames Herbarium. *Nagel 5091* has petals similar to Richard's drawings (cf. Ames Orch. 4: t. 78. 1910) but *Nagel & Juan Gonzalez 6029* exhibits a short lanceolate tooth on the anterior margins of the petals.

10. HABENARIA UMBRATILIS Ames & Williams in Bot. Mus. Leafl. Harv. Univ. 10: 59. 1941.

Range: known only from the type station in San Luis Potosí, Mexico.

Habenaria umbratilis has much the aspect of *H. novemfida* Lindley to which, however, it is not too closely allied.

11. HABENARIA QUINQUESETA (Michx.) Swartz, Adnot. Bot. 46. 1829.

Orchis quinqueseta Michaux, Fl. Bor. Am. 2: 155. 1803. *Habenaria macroceratitis* Willdenow Sp. Pl. 4: 44. 1805; Reichenbach filius in Bonplandia 4: 210. 1856; Grisebach, Fl. Brit. West Ind. 643. 1864; Cogniaux in Martius Fl. Bras. 3, pt. 4: 35. 1893; Cogn. in Urban Symb. Antill. 6: 299. 1909; Kränzlin, Orch. Gen. & Sp. 1: 192. 1897, excl. syn. *H. Pringlei;* Ames, Orch. 4: 222. 1910.

Habenaria lucaecapensis Fernald in Zoe 4: 379. 1893-1894; Ames, Orch. 4: 224. 1910.

Habenaria oreophila Greenman in Proc. Am. Acad. 39: 76. 1903.

Range: Florida (U.S.A.), Mexico (Chihuahua, Baja California, Jalisco, Morelos, Michoacán, Guerrero, Oaxaca and Chiapas), El Salvador, Nicaragua, British Honduras, the West Indies to northern South America.

The four specific names cited above, all of which were maintaned by Ames in his monograph of the American Habenarias, seem to be hardly more than components of a variable species. To these may be added, as a synonym, the Guatemalan *H. macroceratitis* var. *brevicalcarata* Ames. All of these concepts depend for distinction upon the relative lengths of the spur or on the rather variable leaves. The length of the spur varies from 4 to 18 cm.

12. HABENARIA BRACTESCENS Lindley, Gen. & Sp. Orch. Pl. 308. 1835; Cogniaux in Martius Fl. Bras. 3, pt. 4: 29. 1893; Kränzlin, Orch. Gen. & Sp. 1: 193. 1897.

Habenaria Pringlei Robinson in Proc. Am. Acad. 27: 184. 1892; Kränzlin, Orch. Gen. & Sp. 1: 188. and as syn. of H. macroceratitis on p. 192. 1897; 887. 1901; Ames, in Bot. Mus. Leafl. Harv. Univ. 3: 31, t. 1934.

Range: Mexico (Vera Cruz, San Luis Potosí, and Tabasco), Guatemala, Honduras and to Argentina in South America.

Habenaria bractescens is a much described species of South America of which the plant named *H. Pringlei* seems of be the only North American representative.

The South American representatives of the species which, taken as a whole, are polymorphic, have been divided by several authors into no less than a dozen proposed species. These proposals are based, for the most part, on the comparative lengths of the anterior and posterior lobes of the petals and on the comparative lengths of the middle and lateral lobes of the lip and on other inconsequential variations commonly found in the lip and petals. The segregation of *H. bractescens* in South America has somewhat of an analog in the segregation of the primarily North American *H. entomantha* which, however, still

presents some unnamed variations comparable to some forms of *H. bractescens* which have been named.

13. HABENARIA PAUCIFLORA (Lindl.) Reichenbach filius in Bonplandia 2: 10. 1854; Cogniaux in Martius Fl. Bras. 3, pt. 4: 37. 1893; Kränzlin, Orch. Gen. & Sp. 1: 254. 1897.

Bonatia pauciflora Lindley Gen. & Sp. Orch. Pl. 329. 1835.

Habenaria setifera Lindley in Ann. Nat. Hist. 4: 381. 1840; Cogniaux in Martius Fl. Bras. 3, pt. 4: 62. 1893; Kränzlin, Orch. Gen. & Sp. 1: 285. 1898; Cogniaux in Urban Symb. Antill. 6: 303. 1909; Ames, Orch. 4: 209, t. 69. 1910; Ames in Bot. Mus. Leafl. Harv. Univ. 3: 35, fig. on p. 23. 1934.

Habenaria spathacea Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845; Reichenbach filius in Bonplandia 2: 10. 1854; Kränzlin, Orch. Gen. & Sp. 1: 247. 1897.

Range: Mexico (Durango, San Luis Potosí, Jalisco, Nayarit, Vera Cruz and Mexico), Guatemala, Honduras, British Honduras, Panama and South America.

Ames in his monograph of American Habenarias stated, under *H. setifera*, that "*Habenaria setifera*, *H. spathacea* and *H. pauciflora* are very closely allied species, if not conspecific" (p. 209) and again "It is highly probable that *H. pauciflora* should include both *H. setifera* and *H. spathacea*, but my material has been insufficient for a definitive conclusion regarding *H. pauciflora*. *H. pauciflora* seems to be confined to tropical South America."

On the evidence now available there seems to be no doubt but that Ames' earlied suspicions were correct.

In addition to the North American species here given as synonyms of *H. pauciflora* there would seems to be a number of South American species, mainly Brazilian, which also should be referred here.

14. HABENARIA CRASSICORNIS Lindley, Gen. & Sp. Orch. Pl. 311. 1835; Kränzlin, Orch. Gen. & Sp. 1: 314. 1898; Ames, Orch. 4: 233, t. 72. 1910; Ames in Bot. Mus. Leafl. Harv. Univ. 3: 25., fig. on p. 23. 1934.

Habenaria adenantha Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 28. 1845.

Range: Mexico (Baja California, Mexico, Puebla, Jalisco, Morelos, Michoacan, Guerrero, Oaxaca and "Chiapas, etc."), Guatemala and Honduras.

Habenaria crassicornis is very closely allied to *H. entomantha* (Llav. & Lex.) Lindley; and is distinguished from that species mainly by reason of the glandular puberulence of the various parts of the flower and often of the inflorescence. This character, however, is inconsequential because in some specimens glandular pubescence is lacking.

15. HABENARIA CLYPEATA Lindley, Gen. & Sp. Orch. Pl. 311. 1835; Kränzlin, Orch. Gen. & Sp. 1: 313, in part. 1898; Ames, Orch. 4: 240. 1910; Ames in Bot. Mus. Leafl. Harv. Univ. 3: 21, fig. on p. 23. 1934.

Habenaria lactiflora Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 28. 1845; Ames, Orch. 4: 237, t. 73. 1910.

Habenaria Schaffneri S. Watson in Proc. Am. Acad. 23: 283. 1888; Kränzlin, Orch. Gen. & Sp. 1: 318. 1898; Ames, Orch. 4: 236. 1910.

Range: Mexico (Chihuahua, Durango, Sonora, Jalisco, Vera Cruz, Mexico, Distrito Federal, Michoacan, Colima, Guerrero, Oaxaca and Chiapas), Guatemala, Honduras, Costa Rica and Panama.

Habenaria clypeata is closely allied to *H. entomantha* (Llav. and Lex.) Lindley from which it is distinguished, in part, by the white flowers.

16. HABENARIA ENTOMANTHA (Llav. & Lex.) Lindley, Gen. & Sp. Orch. Pl. 311. 1835; Kränzlin, Orch. Gen. & Sp. 1: 286, in part. 1898; Ames, Orch. 4: 242, t. 74, fig. I. 1910.

Orchis entomantha Llave & Lexarza Nov. Veg. Descr. (Opusc.) 2: 8. 1825.

Habenaria flexuosa Lindley, Gen. & Sp. Orch. Pl. 311. 1835; Ames, Orch. 4: 248. 1910.

Habenaria acutiflora Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845.

Habenaria guadalajarana S. Watson in Proc. Am. Acad. 22: 456. 1887; Ames, Orch. 4: 252, t. 76. 1910.

Habenaria filifera S. Watson in Proc. Am. Acad. 26: 154. 1891.

Habenaria felipensis Ames, Orch. 4: 251, t. 77. 1910.

Range: Mexico (Chihuahua, Durango, Sinaloa, Jalisco, Hidalgo, Puebla, Vera Cruz, Mexico, Distrito Federal, Morelos, Michoacan, Guerrero, Oaxaca and Chiapas) Guatemala, British Honduras and Honduras; reported from Venezuela.

Habenaria entomantha, as we have delimited it, is a rather variable species, the component parts of which can not be separated by satisfactory or consistent characters. Four species which were maintained by Ames in his monograph of the American Habenarias are placed here. More complete material seems to show that the differences which he relied upon for specific segregation are of negligible value.

16a. HABENARIA ENTOMANTHA var. SUBAURICULATA (Rob. & Greenm.) Ames & Williams in Bot. Mus. Leafl. Harv. Univ. 10: 60. 1941.

Habenaria subauriculata Robinson & Greenman in Proc. Am. Acad. 32: 34. 1896; Ames, Orch. 4: 254, t. 77, in part. 1910.

Range: Mexico (Puebla and Oaxaca).

Habenaria entomantha var. *subauriculata* is distinguished from the species chiefly by having entire or subauriculate petals, which may prove finally not to be even of varietal significance.

17. HABENARIA NOVEMFIDA Lindley in Bentham Pl. Hartw. 94. 1842; Kränzlin, Orch. Gen. & Sp. 1: 253. 1897; Ames in Bot. Mus. Leafl. Harv. Univ. 3: 27, fig. on p. 23. 1934.

Habenaria diffusa Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 28. 1845; Kränzlin, Orch. Gen. & Sp. 1: 315. 1898; Ames, Orch. 4: 247, t. 75. fig. II. 1910.

Range: Mexico (Baja California, Chihuahua, San Luis Potosí, Vera Cruz, Nayarit, Colima, Michoacan, Jalisco, Puebla, Mexico, Distrito Federal, Morelos, Guerrero and Oaxaca), Guatemala, El Salvador, Honduras and Costa Rica.

The flowers of *Habenaria novemfida* resemble those of *H. entomantha,* however, *H. novemfida* is easily recognizable by means of the much taller stems which bear large leaves.

18. HABENARIA JALISCANA S. Watson in Proc. Am. Acad. 22: 455. 1887; Ames, Orch. 4: 245, t. 74. 1910.

Habenaria alata Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845, not Hooker.

Range: Mexico (Chihuahua, San Luis Potosí, Vera Cruz, Mexico, Michoacan, Guerrero, Jalisco, Nayarit and Oaxaca).

Habenaria jaliscana is allied to *H. clypeata* and its allies. The large flowers distinguish it from the other species of the alliance.

19. HABENARIA DISTANS Grisebach, Cat. Pl. Cuba 270. 1866; Kränzlin, Orch. Gen. & Sp. 1: 194. 1897; Small, Fl. S. E. United States 315. 1903; Cogniaux in Urban Symb. Antill. 6: 300. 1909; Ames, Orch. 5: 202. 1910.

Habenaria Turckheimii Schlechter in Fedde Repert. 2: 129; 1906; Ames, Orch. 4: 206, t. 69. 1910.

Habenaria jamaicensis Fawcett & Rendle in Journ. Bot. 47: 126. 1909; Ames, Orch. 4: 204, t. 67. 1910.

Habenaria distans var. *jamaicensis* Cogniaux in Urban Symb. Antill. 6: 300. 1909.

Range: Florida (U.S.A.), Mexico (Vera Cruz, Oaxaca, Puebla, Sinaloa, Colima, Guerrero, Michoacan and Chiapas), Guatemala, Costa Rica and the West Indies.

OBSCURE OR EXCLUDED SPECIES

HABENARIA GHIESBREGHTIANA (Rich. & Gal.) Hemsley in Godman and Salvin Biol. Cent.-Am. 9: 305. 1884; Ames, Orch. 4: 101. 1910.

Platanthera Ghiesbreghtiana Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

The available records seems to indicate that the species is near *Habenaria limosa*. Ames was of the opinion, l.c., that it might be the same as *H. brevifolia* Greene, but that the leaves were quite different.

HABENARIA NUBIGENA (Rich. & Gal.) Ames, Orch. 4: 101, t. 62, fig. III. 1910.

Platanthera nubigena Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845.

Possibly a synonym of *Habenaria limosa*. While an analysis of the flowers shows the characters of *H. limosa* a photo-

graph of the type indicates a plant of some 12 cm. in total length.

HABENARIA ORIZABENSIS Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 29. 1845; Ames, Orch. 4: 256, t. 75, fig. I. 1910.

An analysis of the flower, a copy of Richard's drawings, and a photograph of the type are in the Ames Herbarium. The analysis shows the lip to be entire but a note in A. A. Eaton's handwriting, which accompanies the analysis, describes the lip as follows:

"Lip 9 mm. long, lateral divisions nearly filiform, equal?"

This observation would certainly cast doubt on the accuracy of Richard's drawing. From the incomplete evidence available I am inclined to believe that *H. orizabensis* may be the same as *H. novemfida* Lindley.

GYMNADENIA PROPINQUA Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

Unknown to me. Ames in his monograph (Orch. 4: 1910) has referred the plant to *Habenaria limosa* with a question.

HABENARIA RICHARDII Ames, Orch. 4: 99, t. 62, fig. I. 1910.

Platanthera longifolia Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30, not *Habenaria longifolia* Lindley, 1845.

Habenaria Richardii is quite as obscure now as when Ames monographed the group. From photographs of the type and from Richard's analytical drawings it seems possible that the species may be a mixture. The sketch of the flower has the appearance of *H. limosa* but the plant is very different from that species.

3. EPIPACTIS [Zinn] Swartz in Vet.-Akad. Handl. Stockh. 21: 232. 1800.

Terrestrial herbs with plicate cauline leaves. Sepals subequal, free, spreading. Petals similar to the sepals or a little smaller. Lip 3-lobed, sessile, concave, lateral lobes erect. Column short. Anther with the loculi contiguous. Pollen granular.

1. EPIPACTIS GIGANTEA Douglas ex Hooker, Fl. Bor.-Am. 2: 202, t. 202. 1839.

Range: British Columbia (Canada), the western United States and Mexico (Baja California and Hidalgo).

4. POGONIA Juss., Gen. 65. 1789.

Triphora Nuttall, Gen. N. Am. Pl. 2: 192. 1818; Ames, Orch. 7: 9, 39. 1922.

Small terrestrial herbs. Sepals unequal, free. Petals similar to the sepals. Lip unguiculate, 3-lobed, usually with carinate lamellae. Column short and straight, apex entire or simply lobed. Pollen granular, extine pitted or reticulate. (Our species).

Mid-lobe of the lip lacking muriciform appendages; cordate or subdeltoid.
1. *P. mexicana*

Mid-lobe of the lip with muriciform appendages.
Mid-lobe of the lip oblong; leaves well developed.
3. *P. yucatanensis*

Mid-lobe of the lip more or less orbicular or rhombic; leaves reduced to bracts.
2. *P. cubensis*

1. POGONIA MEXICANA S. Watson in Proc. Am. Acad. 26: 154. 1891.

Triphora mexicana Schlechter in Fedde Repert. 17: 139. 1921; Ames, Orch. 7: 40, t. 109, f. 5-6. 1922.

Range: Mexico (San Luis Potosí, Vera Cruz, Puebla, Chiapas and Oaxaca), Guatemala, Honduras and Panama.

Pogonia mexicana is a rare species closely allied to *P. trianthophora* (Sw.) Britt., Sterns & Poggenb.

2. POGONIA CUBENSIS Reichenbach filius in Nederl. Kruidk. Arch. 4: 322, as *rubensis* by error. 1858.

Triphora cubensis Ames, Sched. Orch. 7: 35. 1924.

Range: Florida (U.S.A.), Mexico (Yucatan), Gautemala, Panama and the West Indies.

Triphora cubensis is new to the flora of Mexico.

3. POGONIA **yucatanensis** (*Ames*) *L. Wms., comb. nov.*
Triphora yucatanensis Ames, Orch. 7: 39, t. 109, f. 1-4. 1922.

Range: known only from the type locality in Yucatan. *Pogonia yucatanensis* is allied to *P. mexicana*.

5. VANILLA Swartz in Nov. Act. Soc. Sci. Upsal. 6: 66. 1799; Rolfe in Journ. Linn. Soc. 32: 439-478. 1896.

Epiphytic, scandent, leafy herbs (ours) with branched stems. Sepals unequal, free, spreading. Petals similar to the sepals. Lip adnate to the base of the column and often enclosing the base, simple or 3-lobed. Column elongated, footless. Anther 1, incumbent. Pollen powdery or granular.

Lip with verrucose lines or papillae; fruit aromatic.
1. *V. fragrans*

Lip without verrucose lines or papillae; fruit aromatic in No. 2.
Disc of the lip appendaged; leaves up to 30 cm. long and 8 cm. broad, lanceolate.
2. *V. pompona*

Disc of the lip unappendaged; leaves up to 20 cm. long and 10 cm. broad, oval to ovate.
Flowers subtended by large bracts.
3. *V. inodora*

Flowers subtended by leaves.
4. *V. Pfaviana*

1. VANILLA PLANIFOLIA Andrews, Bot. Repos. 8: t. 538. 1808; Rolfe in Journ. Linn. Soc. 32: 463. 1896; Cogniaux in Urban, Symb. Antill. 6: 322. 1909.

Myrobroma fragrans Salisbury Parad. Lond. t. 82. 1807.
Vanilla mexicana Miller Gard. Dict. ed. 8: Vanilla N° 1, in part, 1768, fide Rolfe.

Vanilla fragrans Ames, Sched. Orch. 7: 36. 1924.

Range: Mexico (Vera Cruz, Oaxaca, Yucatan and Quintana Roo), Guatemala, British Honduras, Honduras, El Salvador, Costa Rica, Panama and possibly also West Indies. Cultivated throughout the tropics of both hemispheres.

Vanilla planifolia is the common vanilla of commerce and is grown in many parts of the tropics of the world. An account of the "Vanillas of Commerce" (by R. A. Rolfe?) is to be found in the Kew Bulletin 169-178, 1895. This account is essentially the same as the one to be found in Rolfe's monograph of Vanilla (Journ. Linn. Soc. 32: 439-478. 1896).

2. VANILLA POMPONA Schiede in Linnaea 4: 574. 1829; Rolfe in Journ. Linn. Soc. 32: 465. 1906; Cogniaux in Urban, Symb. Antill. 6: 323. 1909; Ames, Sched, Orch. 9: 6. 1925.

Vanilla pompona Lindley Gen. & Sp. Orch. Pl. 437. 1840.

Range: Mexico (Vera Cruz, Michoacan and Oaxaca), Honduras, Nicaragua, Panama, Colombia, British Guiana, Dutch Guiana, Venezuela, Ecuador, Bolivia and the West Indies; possibly as a cultivated plant in some of these countries and elsewhere.

Vanilla pompona is cultivated for commercial purposes but is not as widely used as *V. planifolia*. Nagel in Mexico, reports than the fruits are "very fragrant".

Vanilla pompona Lindley is doubtless a synonym and homonym of the earlier name of Schiede.

3. VANILLA INODORA Schiede in Linnaea 4: 574. 1829; Rolfe in Journ. Linn. Soc. 32: 449. 1896.

Vanilla mexicana Miller Gard. Dict. ed. 8: 1768. Vanilla N° 1, in part fide Rolfe.

Vanilla inodora Lindley Gen. & Sp. Orch. Pl. 437. 1840.

Range: Mexico (Vera Cruz), British Guiana, Dutch Guiana and the West Indies.

Vanilla inodora seems to be of no commercial value as the fruits lack aroma. The history of the species is given by Rolfe in the place cited above.

4. VANILLA PFAVIANA Reichenbach filius in Gard. Chron, n.s. 20: 230. 1883; Rolfe in Journ. Linn. Soc. 32: 452. 1896; Ames in Bot. Mus. Leafl. Harv. Univ. 4: 26, fig. 1936.

Range: Mexico (Vera Cruz and Guerrero), British Honduras and Costa Rica.

Vanilla Pfaviana originally was credited to Mexico by Reichenbach but Ames, l.c., thinks that the type was doubtless from Costa Rica. Fruits on specimens available seem to have no aroma nor does Nagel mention any.

6. ELLEANTHUS Presl, Rel. Haenk. 1: 97. 1827; Bentham & Hooker, Gen. Pl. 3: 522. 1883; Pfitzer in Engler & Prantl, Nat. Pflanzenf. II. 6: 149. 1889; Cogniaux in Martius,

Fl. Bras. 3, pars 5: 323. 1901; Cogniaux in Urban, Symb. Antill. 6: 560. 1910.

Epiphytic or terrestrial herbs with strongly nerved cauline leaves. Sepals subequal, free. Petals similar to the sepals but usually narrower. Lip adnate to the base of the column, often enclosing the column, base concave with two distinct calluses, usually somewhat constricted. Column erect, footless. Pollinia 8, subceraceous. Anther bilocular.

Elleanthus, with two known species in Mexico, is highly developed in the Andes of Colombia and Peru.

Inflorescence cylindric; leaves lanceolate or broader.
1. *E. capitatus*

Inflorescence distichous; leaves linear.
2. *E. linifolius*

1. ELLEANTHUS CAPITATUS (P. & E.) Reichenbach filius in Walp. Ann. 6: 475. 1862; Cogniaux in Urban, Symb. Antill. 6: 562. 1910.

Evelyna capitata Poeppig & Endlicher, Nov. Gen. ac Sp. Pl. 1: 32. 1835.

Bletia capitata R. Brown in Aiton Hort. Kew. ed. 2, 5: 206. 1813.

Range: Mexico (Vera Cruz, Oaxaca and Chiapas), Guatemala, Honduras, Nicaragua, Costa Rica, Panama and the West Indies. South to Peru and southern Brazil in South America.

2. ELLEANTHUS LINIFOLIUS Presl in Rel. Haenk. 1: 97. 1827; Cogniaux in Mart., Fl. Bras. 3, pars 5: 334. t. 73. fig. I. 1901; Cogniaux in Urban, Symb. Antill. 6: 564. 1910.

Range: Mexico (Chiapas), British Honduras, Honduras, Guatemala, Costa Rica, Panama and the West Indies. In South America to Peru.

7. SOBRALIA Ruiz & Pavón, Fl. Peruv. et Chil. Prodr. 120, t. 26. 1794; Syst. Veg. 231. 1798; Bentham & Hooker, Gen. Pl. 3: 590. 1883.

Reedy terrestrial or epiphytic herbs with strongly nerved cauline leaves. Sepals subequal, connate at the base. Petals

similar to but slightly broader than the sepals. Lip entire or two lobed, adnate to the base of the column, base of the lip enclosing the column. Column elongated, footless. Pollinia 8, 4 in each cell of the bilocular anther.

Lip mostly less than 5 cm. long.
1. *S. decora*

Lip mostly about 10 cm. long.
2. *S. macrantha*

1. SOBRALIA DECORA Bateman, Orch. Mex. & Guat. t. 26. 1843; Reichenbach filius, Xenia Orch. 1: 77, t. 30, fig. II, 2-9. 1854; Bateman in Godman & Salvin, Biol. Cent.-Am. 3: 295. 1884.

Sobralia Galeottiania A. Richard in Ann. Sci. Nat. ser. 3: 30. 1845; Hemsley in Godman & Salvin, Biol. Cent.-Am. 3: 295. 1884.

Sobralia sessilis Lindley, according to Hooker in Bot. Mag. 77: t. 4570. 1851.

Sobralia decurva Bateman ex Hooker filius in Bot. Mag. 120: t. 7376, in synon. 1894.

Range: Mexico (Nayarit, Guerrero and Oaxaca), British Honduras, Guatemala, Honduras, Nicaragua and Costa Rica.

2. SOBRALIA MACRANTHA Lindley, Sert. Orch. sub. t. 29. 1836; Lindley, Gen. & Sp. Orch. Pl. 431. 1840; Lindley, Fol. Orch. Sobralia 8. 1854; Hooker in Bot. Mag. 75: t. 4446. 1849.

Sobralia macrantha (A) *purpurea* Lindley, Fol. Orch. Sobralia 8. 1854.

Sobralia macrantha (B) *alba* Lindley, Fol. Orch. Sobralia 8. 1854.

Range: Mexico (Vera Cruz, Puebla, Oaxaca and Chiapas), British Honduras, Guatemala, El Salvador, Honduras and Costa Rica.

Sobralia macrantha is rather rare in the botanical collections we have studied althought it must be a very striking plant and according to Schultes is very common in the higher parts of northeastern Oaxaca. We have seen sides of canyons covered with it in Guatemala.

8. CRYBE Lindley, Nat. Syst. Bot. ed. 2: 446. 1836; Bot. Reg. 9: t. 1872. 1836; Schlechter in Orchis 9: 93. 1915.

Terrestrial herbs with large underground bulbs from which the leafy stems and inflorescences are borne separately. Sepals unequal, free. Petals similar to the sepals or a little broader. Lip adnate to the base of the column, very broad, exceeding the sepals and petals in length, apex retuse. Column long and erect. Pollinia 4 (or 8?), in pairs, mealy.

1. CRYBE ROSEA Lindley, Nat. Syst. Bot. ed. 2: 446. 1836; Lindley in Bot. Reg. 9: t. 1872. 1836; Schlechter in Orchis 9: 93, t. 7, figs. 8-15. 1915.

Bletia purpurata Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 23. 1845.

Arethusa rosea Bentham ex Hemsley in Godman & Salvin, Biol. Cent.-Am. 3: 304. 1884.

Arethusa grandiflora S. Watson in Proc. Am. Acad. 26: 154. 1891.

Range: Mexico (Baja California, Sinaloa, Jalisco, Mexico, Morelos, Guerrero, Michoacan, Vera Cruz, Oaxaca and Chiapas), Guatemala and Honduras.

9. PRESCOTTIA Lindley in Hooker, Exot. Fl. 2: t. 115. 1824.

Terrestrial herbs with basal or semi-basal leaves. Sepals membranaceous, at the base connate into a tube. Petals narrow, adnate to the base of the column. Lip uppermost, entire, auriculate at the base, claw adnate to the connate sepals, lip often enclosing the column. Column short; stigmata 2. Pollinia granular or powdery. (*Galeoglossum* Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845).

Leaves cauline; base of the lip not clearly auriculate.
3. *P. orchioides*

Leaves basal; base of the lip clearly auriculate.
Leaves lanceolate to broadly ovate.
Petiole slender, about as long as the blade.
2. *P. stachyodes*

Petiole very much shorter than the blade.
4. *P. oligantha*

Leaves oblanceolate, narrowed gradually into the petiole.
1. *P. tubulosa*

1. PRESCOTTIA TUBULOSA (Lindl.) L. Wms. in Bot. Mus. Leafl. Harv. Univ. 7: 137. 1939.

Cranichis tubulosa Lindley, Gen. & Sp. Orch. Pl. 451. 1840.

Prescottia pachyrhiza Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845.

Prescottia Lindeniana Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845.

Galeoglossum prescottioides Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845.

Prescottia Galeottii Reichenbach filius in Linnaea 19: 377. 1847.

Range: Mexico (Nuevo Leon, Hidalgo, Jalisco, Distrito Federal, Puebla, Morelos, Michoacan, Guerrero and Oaxaca) and Guatemala.

Prescottia tubulosa is a rather variable species, especially in size. The record of *P. Lindeniana* which is available seems to indicate that it is a synonym of *P. tubulosa* but the record is not satisfactory.

2. PRESCOTTIA STACHYODES (Sw.) Lindley in Bot. Reg. 22: sub. t. 1916. 1836.

Cranichis stachyodes Swartz, Fl. Ind. Occ. 3: 1427. 1799.

Range: Mexico (San Luis Potosí, Vera Cruz and Chiapas) to Brazil.

3. PRESCOTTIA ORCHIOIDES Lindley in Ann. Nat. Hist. 15. 386. 1845.

Range: known only from the type specimen.

I have seen no material which could be refered to *Prescottia orchioides* other than a record of the type. The species is somewhat unusual in the genus in its cauline leaves and in the lip being only subauriculate at the base.

4. PRESCOTTIA OLIGANTHA (Sw.) Lindley, Gen. & Sp. Orch. Pl. 454. 1840; C. Schweinfurth in Bot. Mus. Leafl. Harv. Univ. 7: 20. 1938.

Cranichis oligantha Swartz, Prod. Veg. Ind. Occ. 120. 1788.

Range: Florida (U.S.A.), Mexico (Vera Cruz), Guatemala, Costa Rica, Panama, the West Indies, Colombia and Venezuela.

10. CRANICHIS Swartz, Nov. Gen. & Sp. Prodr. 120. 1788; Bentham & Hooker, Gen. Pl. 3: 593. 1883; Cogniaux in Martius Fl. Bras. 3, pt. 4: 247. 1895; Cogniaux in Urban, Symb. Antill. 6: 353. 1909.

Small terrestrial herbs with basal leaves or rarely with reduced cauline leaves. Sepals free, subequal or the lateral pair often somewhat broader. Petals free or obscurely adnate to the base of the column, smaller than the sepals. Lip adnate to the middle or the base of the column or in *C. mexicana* with a long C-shaped claw, uppermost (non-resupinate), from concave to saccate. Anther one, two celled. Pollen granular. (*Ocampoa* Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845). A small genus of the western hemisphere.

Apex of the lip lacerated.
8. *C. thysanochila*

Apex of the lip not lacerated.
Apex of the lip 3-lobed; lip deeply saccate.
10. *C. gracilis*

Apex of the lip not 3-lobed; lip not deeply saccate.
Lip ciliate.
12. *C. ciliilabia*

Lip not ciliate.
Claw of the lip attached near the middle of the column.
7. *C. Schaffneri*

Claw of the lip attached at the base of the column.
Claw of the lip C-shaped.
10. *C. mexicana*

Claw of the lip straight.
Inflorescence subumbellate; lip acute, not verrucose; sepals about 2 mm. or more long.
6. *C. subumbellata*

Inflorescence not subumbellate; lip not acute, usually verrucose in lines; sepals more than 2 mm. long.
Petals not ciliate.
Lip prominently constricted toward the apex.
4. *C. apiculata*

Lip not constricted toward the apex.
Scape with the free portion of the bracts ovate below, becoming narrower above.
5. *C. muscosa*

Scape with free portion of bracts very narrow.
Sepals mostly about 4 mm. long; leaves ovate, acute, petiole usually shorter than the blade.
2. *C. sylvatica*

Sepals mostly about 2.5 mm. long; leaves broadly lanceolate, acuminate, petiole usually about as long as the blade.

1. *C. diphylla*

Petals ciliate.

Lip obovate.

4. *C. ciliata*

Lip elliptic-ovate to broadly ovate.

2. *C. hieroglyphica*

1. CRANICHIS DIPHYLLA Swartz, Nov. Gen. & Sp. Prodr. 120. 1788; Cogniaux in Urban, Symb. Antill. 6: 357. 1909.

Range: West Indies, Mexico (Chiapas) and Central America.

2. CRANICHIS HIEROGLYPHICA Ames & Correll in Bot. Mus. Leafl. Harv. Univ. 10: 61, t. 2. 1942.

Range: Mexico (Chiapas), Guatemala and Honduras. Closely allied to *C. diphylla* Sw.

3. CRANICHIS SYLVATICA Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

Cranichis pseudociliata Schlechter in Fedde Repert. 12: 202. 1913.

Macradenia mexicana Kränzlin in Saertryk af Vidensk. Medd. fra Dansk Naturh. Foren. 71: 175. 1920.

Range: Mexico (San Luis Potosí, Vera Cruz and Oaxaca), Guatemala and Honduras.

4. CRANICHIS CILIATA (H.B.K.) Kunth Syn. Pl. Aeq. 1: 324. 1822.

Ophrys ciliata Humboldt, Bonpland & Kunth, Nov. Gen. & Sp. Pl. 1: 334, t. 74. 1815; Lindley, Gen. & Sp. Orch. Pl. 451. 1840.

Range: Mexico (Chiapas), Guatemala, Honduras, Costa Rica and Venezuela.

5. CRANICHIS APICULATA Lindley in Bentham, Pl. Hartw. 92. 1842.

Cranichis cylindrica Ames in J. D. Smith, Enum. Pl. Guatemala 7: 49. 1905, nomen.

Range: Mexico (Chiapas) and Guatemala.

Cranichis apiculata is new to Mexico but it is not surprising to find it in Chiapas in as much as it occurs in adjacent Guatemala.

6. CRANICHIS MUSCOSA Swartz, Prodr. Veg. Ind. Occ. 120. 1788; Ames, Contr. Knowl. Orch. Fl. So. Florida 14, t. III. 1904.

Range: Florida (U.S.A.), Mexico (Chiapas), Costa Rica, Panama, the West Indies and Venezuela.

New to Mexico.

7. CRANICHIS SUBUMBELLATA Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

Range: Mexico (Morelos, Mexico, Guerrero and Oaxaca).

8. CRANICHIS SCHAFFNERI Reichenbach filius in Bonplandia 3: 238. 1855.

Range: Mexico (San Luis Potosí, Puebla, Distrito Federal, Vera Cruz, Colima, Guerrero, Michoacan and Oaxaca) and Guatemala.

Cranichis Schaffneri is apparently the commonest and most widely distributed Cranichis in Mexico.

9. CRANICHIS THYSANOCHILA Robinson & Greenman in Proc. Am. Acad. 22: 35. 1895.

Range: Mexico (Oaxaca).

Cranichis thysanochila is closely allied to *C. Schaffneri* Reichb. f.

10. CRANICHIS GRACILIS L. O. Williams in Ceiba 1: 185. 1950.

Range: Mexico (Durango).

Cranichis gracilis is most closely allied to *C. saccata* Ames, a Costa Rica species.

11. CRANICHIS MEXICANA (Rich. & Gal.) Schlechter in Beihefte Bot. Centralbl. 36, Abt. 2: 430. 1918.

Ocampoa mexicana Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 31. 1845.

Range: Mexico (Morelos, (?), Guerrero, Michoacan and Oaxaca) and Guatemala.

Cranichis mexicana is distinguished from all other Mexican species of Cranichis by the unguiculate, C-shaped base of the lip.

12. CRANICHIS CILIILABA C. Schweinf. in Bot. Must. Leafl. Harv. Univ. 14: 49, t. 12. 1949.

Range: Mexico (Chiapas).

Unusual among the Mexican and Central American species in that the lip is ciliate.

OBSCURE OR EXCLUDED SPECIES

CRANICHIS GLANDULOSA Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845. = Ponthieva.

CRANICHIS SPECIOSA Llave & Lexarza Nov. Veg. Descr. pars 2: 6. 1825. Not recognised. Lindley suggested that this and the next are referable to Stenoptera. It is probable however, that they belong to Spiranthes.

CRANICHIS TUBULARIS Llave & Lexarza Nov. Veg. Descr. pars 2: 5. 1825. Not recognized. See note on preceding species.

CRANICHIS TUBULOSA Lindley Gen. & Sp. Orch. Pl. 451. 1840. = *Prescottia tubulosa* (Lindl.) L. O. Williams.

11. PONTHIEVA R. Brown in Aiton, Hort. Kew. ed. 2, 5: 199. 1813; Bentham & Hooker, Gen. Pl. 3: 539. 1883; Cogniaux in Urban, Symb. Antill. 6: 361. 1909.

Small glabrous or pilose terrestrial herbs with basal leaves. Sepals free, spreading, subequal. Petals attached above the middle of the column, spreading. Lip uppermost (non-resupinate), adnate to the column by its unguiculate base, abruptly dilated from the claw. Anther one, two-celled. Pollen granular.—A small genus limited to the warmer regions of the western hemisphere.

Leaves glabrous.

Lip with two small calluses at the base of the blade.

Lip with two lateral arms at the base.

3. *P. Turckheimii*

Lip without lateral arms at the base.

4. *P. Ephippium*

Lip without calluses at the base of the blade.
Lateral sepals less than 4 mm. long.
5. *P. parviflora*

Lateral sepals much more than 4 mm. long.
2. *P. racemosa*

Leaves pilose-pubescent.
1. *P. maculata*

1. PONTHIEVA MACULATA Lindley in Ann. Nat. Hist. 15: 385. 1845; Hooker filius in Bot. Mag. 108: t. 6637. 1882.

Range: Mexico (Mexico, Morelos and Chiapas), Costa Rica, Panama, Venezuela, Colombia and Ecuador.

Ponthieva maculata has been collected in Mexico only twice. In the large Ostlund collection there is but one specimen of the species.

2. PONTHIEVA RACEMOSA (Walt.) Mohr in Contr. U. S. Nat. Herb. 6: 460. 1901; Ames & Schweinfurth, Sched. Orch. 10: 14. 1930.

Arethusa racemosa Walter, Fl. Carol. 222. 1788.
Neottia glandulosa Sims, Bot. Mag. 21: t. 842. 1805.
Ponthieva glandulosa R. Brown in Aiton, Hort. Kew, ed. 2, 5: 200. 1813.
Ponthieva rostrata Lindley in Ann. & Mag. Nat. Hist. 15: 385. 1845.
Ponthieva oblongifolia Richard & Galeotti in Ann. Sci. Nat. ser. 3, 3: 30. 1845.

Range: Virginia to Florida and Louisiana (U.S.A.), Mexico (San Luis Potosí, Vera Cruz, Morelos, Sinaloa, Nayarit, Michoacan and Oaxaca), the West Indies and northern South America.

Ames & Schweinfurth (Sched. Orch. 10: 14. 1930) have given an account of *Ponthieva racemosa* which includes most of the recognised synonyms.

Ponthieva oblongifolia, which we have added as a synonym, doubtless belongs here according to the evidence of a photograph of the type and an analysis of the type number made by Reichenbach.

3. PONTHIEVA TURCKHEIMII Schlechter in Fedde Repert. 3: 47. 1906; Schlechter & Mansfeld in Fedde Repert. Beihefte 59: t. 8, fig. 31. 1931.

Range: Mexico (Chiapas), Guatemala and Costa Rica.

4. PONTHIEVA EPHIPPIUM Reichenbach filius in Linnaea 28: 382. 1856.

Range: Mexico (San Luis Potosí, Vera Cruz, Distrito Federal, Morelos, Guerrero, Puebla and Chiapas) and Panama.

Ponthieva Ephippium is closely allied to *P. racemosa* (Walt.) Mohr but has a somewhat different lip and is usually a smaller plant with smaller flowers. The specific name of *Ponthieva Ephippium* was capitalized by Reichenbach filius and although no explanation of it was given it is possible that it is derived from the generic name Ephippium Blume, an orchid genus which is probably synonymous with Bulbophyllum.

5. PONTHIEVA PARVIFLORA Ames & Schweinfurth in Bot. Mus. Leafl. Harv. Univ. 4: 39. 1936.

Range: Mexico (Yucatan).

Ponthieva parviflora is the smallest flowered and the slenderest species of Ponthieva known to occur in Mexico.

In the original description the petals are described as "adnate to the dorsal sepals". This condition is not now observable in the flowers of the type in the Ames Herbarium; adnation of the petals to the dorsal sepal seems not to have been observed in any other species of Ponthieva and it is improbable that it occurs in this species.

12. SPIRANTHES L. C. Richard in Mem. Mus. Par. 4: 50. 1818, *nomen conservandum.*

Small or rarely large terrestrial (rarely epiphytic) herbs with basal or cauline leaves or both or leafless. Roots often fleshy, fasciculated or tuberous. Leaves synanthous or hysteranthous, various. Sepals free; dorsal sepal usually erect and forming a galea with the petals; lateral sepals erect or spreading, affixed to the summit of the ovary, decurrent and forming a free or adnate mentum. Petals usually narrow and usually coherent to the dorsal sepal. Lip sessile or clawed, plain, concave or gibbous, simple or lobed, in some species bicaudate at the base, adherent to the column in almost all spe-

cies, ecallose or callose. Column terete; clinandrium often membranaceous and conspicuous, often continued into the rostellum; rostellum various, inconspicuous to conspicuous, truncate to lobed to aristate; anther dorsal, erect, sessile or stipitate; pollinia two, powdery or granular, usually attenuated at one end.—(*Gyrostachis* * Persoon Syn. Pl. 2: 511. 1807; *Stenorrhynchus* L. C. Richard in Mem. Mus. Par. 4: 50. 1818; *Pelexia* L. C. Richard in Mem. Mus. Par. 4: 59. 1818; *Sarcoglottis* Presl, Rel. Haenk. 1: 95, t. 15. 1827; *Cyclopogon* Presl, Rel. Haenk. 1: 93. 1827; *Galeottiella* Schlechter in Beihefte Bot. Centralbl. 37: Abt. 2: 360. 1920; *Beloglottis* Schlechter in Beihefte Bot. Centralbl. 37: Abt. 2: 364. 1920; *Mesadenus* Schlechter in Beihefte Bot. Centralbl. 37, Abt. 2: 367. 1920; *Brachystele* Schlechter in Beihefte Bot. Centralbl. 37: Abt. 2: 370. 1920; *Schiedeella* Schlechter in Beihefte Bot. Centralbl. 37, Abt. 2: 379. 1920; *Deiregyne* Schlechter in Beihefte Bot. Centralbl. 37. Abt. 2: 426. 1920; *Gamosepalum* Schlechter in Beihefte Bot. Centralbl. 37, Abt. 2: 429. 1920; *Funkiella* Schlechter in Beihefte Bot. Centralbl. 37, Abt. 2: 430. 1920).—More than 100 species, mostly in the western hemisphere.

Spiranthes, in the broad sense, has its main center of distribution in Mexico with a secondary center of distribution in northern Argentina and another but smaller center in the Caribbean. In the eastern hemisphere the species are relatively few and simple.

The genus is an extremely complex one and the number of segregates that have been made from it is large. It appears that several segregate genera are easily separated when the genus is first studied but a more careful study shows that the characters relied upon to make the segregation are not consistent or are recondite. The most comprehensive account of the group is Rudolf Schlechter's Versuch einer systematischen Neuordnung der Spiranthinae (Beihefte Bot. Centralbl. 37, Abt. 2: 1920.). In this paper the Spiranthinae is separated into twenty-four genera and of these perhaps twenty-three are to be referred to Spiranthes in the broad sense. (The twenty-fourth

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* Never proposed as a genus by Persoon but so treated by subsequent authors.